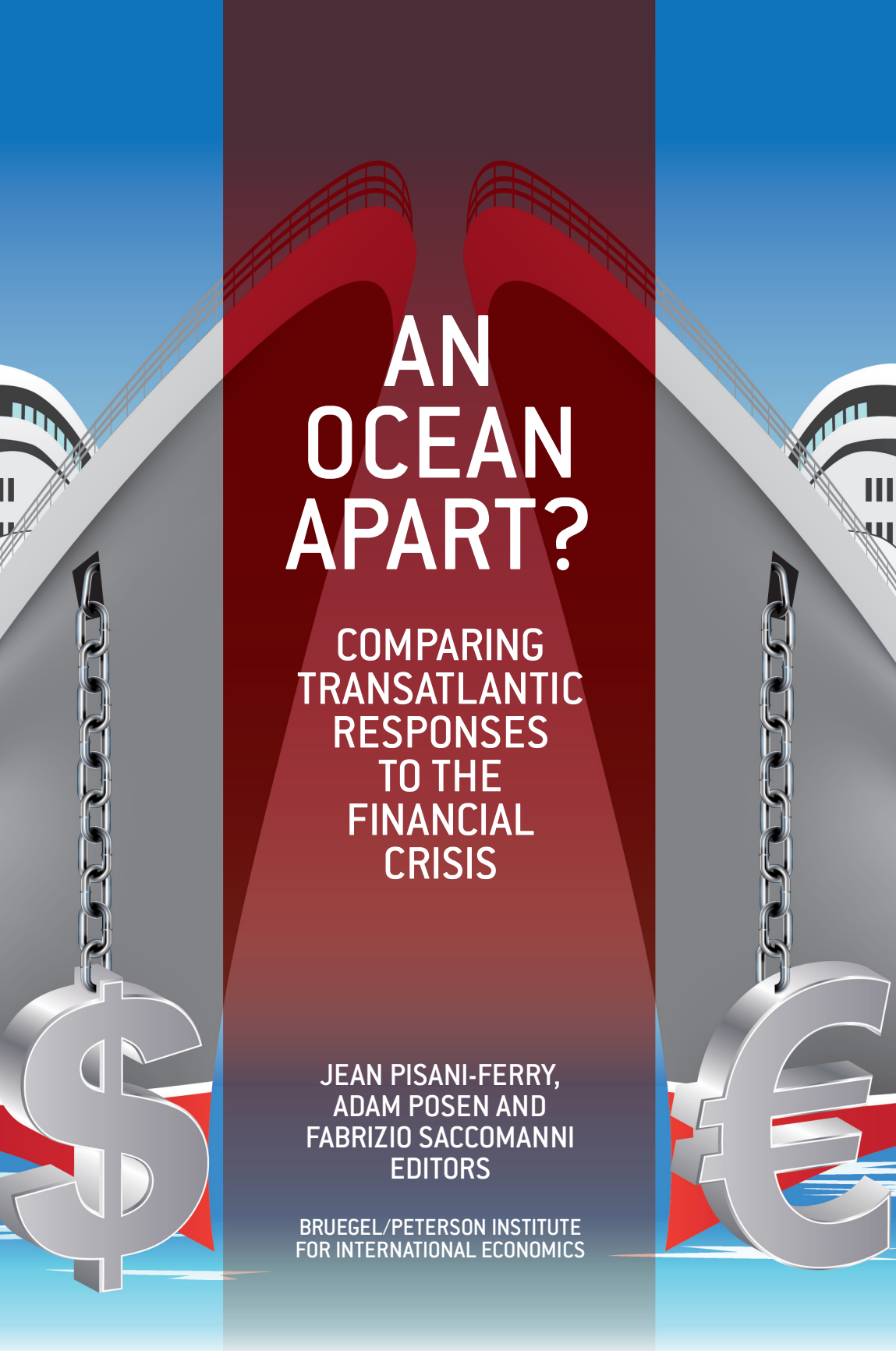


The background of the cover features a stylized illustration of two large, red, curved structures resembling ship hulls or bridges, set against a blue sky. On the left and right sides, there are large, 3D silver dollar (\$) and euro (€) symbols, each suspended by a chain. The central text is white and set against a dark red background.

# AN OCEAN APART?

COMPARING  
TRANSATLANTIC  
RESPONSES  
TO THE  
FINANCIAL  
CRISIS

JEAN PISANI-FERRY,  
ADAM POSEN AND  
FABRIZIO SACCOMANNI  
EDITORS

BRUEGEL/PETERSON INSTITUTE  
FOR INTERNATIONAL ECONOMICS

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# An ocean apart?

Comparing transatlantic responses  
to the financial crisis

Jean Pisani-Ferry, Adam Posen  
and Fabrizio Saccomanni, editors

## **AN OCEAN APART?**

### **COMPARING TRANSATLANTIC RESPONSES TO THE FINANCIAL CRISIS**

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## Foreword

Has the EU-US relationship become a sideshow or is it still central to the global economy? Conflicting signals have been sent out since the outbreak of the global crisis. The creation of the G20 and its designation as 'the premier forum for international cooperation' suggest that attention and priorities have moved away from the traditional G7 focus on the transatlantic economy. But most of the key policy debates of the last two years have retained a characteristically transatlantic flavour. This applies to the controversy about the pace of consolidation which resulted in an open US-German rift at the Toronto summit in June 2010; to the discussion on the new bank capital ratios which again was essentially a Euro-American affair; and to the broader conversation on the priorities of financial regulatory reform, for which the big action agendas have been the US Dodd-Frank Act and the European endorsement of a blueprint for coordinated supervision and a single European macroprudential body. True, other issues – the global rebalancing, or the creation of global financial safety nets – have had a distinctive G20 scope. But at least a fair share of the international debate has been transatlantic.

There are reasons for this state of affairs. To start with, what is known as the global crisis has been first and foremost a transatlantic crisis. As discussed in several contributions in this volume, the wake of the crisis financial integration through portfolio diversification essentially remained an EU-US phenomenon. Accordingly the subsequent financial turmoil primarily affected the European and American financial systems, and other economies indirectly only, through trade or capital outflows. It is therefore natural to see the same two regions take the lead in

setting the agenda for financial reform. Second, the problems they are facing in the aftermath of the shock – the travails of deleveraging, unemployment, the need for unconventional policy responses, the lowering of the growth potential, the rise of public debt, political pressures for protection – are largely common. Third, while they are not the main contributors to world growth, the EU and the US still constitute the bulk of the global economy, and what happens to them matters considerably for all.

The US and the EU however are not responding to the same shock in the same way and this is what makes the comparison interesting. It is telling that the sovereign debt crises developed in Europe in the first half of 2010 and triggered a move towards consolidation while the US fiscal situation is by most standards worse than the aggregate European situation. It is telling also that the priorities of financial reform have not been the same. Clearly neither the policy space nor the policy traditions are identical and this portends significant divergence across the Atlantic. How far this divergence will go and whether policymakers on the two continents will disagree or agree to disagree is one of the key questions for the future of the global economy in the years to come.

All this justifies a revival of the transatlantic economic conversation. The joint Banca d'Italia-Bruegel-Peterson Institute conference, held in Rome on 10-11 September 2009 with the support of the European Commission, aimed to contribute to the conversation through research and policy discussions. We hope that the papers collected in this volume will help foster a fact-based, analytically sound discussion.

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# Transatlantic cooperation in crisis management: an historical perspective

FABRIZIO SACCOMANNI<sup>1</sup>

## A relationship in search of a format

The opening lines of Robert Kagan's celebrated pamphlet on the relationship between America and Europe read as follows: 'It is time to stop pretending that Europeans and Americans share a common view of the world, or even that they occupy the same world'. He goes on to argue that 'on major strategic and international questions today, Americans are from Mars and Europeans are from Venus: they agree on little and understand one another less and less. And this state of affairs is not transitory – the product of one American election or one catastrophic event' (Kagan 2003, p3). Great *incipit*, but that was 2003; subsequent events, like the global financial and economic crisis of 2007-09 and the election of Barack Obama, seem to have brought Americans and Europeans back on the same planet, down to Earth.

In fact Americans and Europeans have always belonged on the same planet, though they have had differences of views, interests and approaches ever since Giovanni da Verrazzano in 1524 sailed through the Narrows into what is now called New York Bay. The main source of difficulties in the relationship has been, of course, the different political and institutional set-ups of the two partners: Americans have belonged to one nation since 1776, while Europeans belong to a diverse group of much older sovereign nations, some of which have embarked only recently on a

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1. Director General of the Banca d'Italia. I am grateful to Juan Carlos Martinez-Oliva for his valuable contribution to the preparation of this paper.



process leading to 'ever closer Union'. To find the appropriate partner for a transatlantic dialogue has never been easy, but the Americans have been historically the first at trying to establish a cooperative framework with willing European nations, sometimes to counter the hostility of other countries from the same Continent. France was the first European country to enjoy a 'special relationship' with the American States in their early years as British colonies, and later as an independent nation. French political thinkers such as Montesquieu exerted a strong influence on the ideas and actions of the 'founding brothers'<sup>2</sup> of the United States, and it is not by chance that major American political figures, like Benjamin Franklin and Thomas Jefferson, thought it important to serve as American ambassadors to Paris<sup>3</sup>.

The transatlantic relationship remained somewhat in the background during the nineteenth century, as the US consolidated itself as a nation: it was the period of 'isolationism' initiated by the Monroe Doctrine; of the Civil War; and of the expansion of the US presence in the western hemisphere, which culminated at the end of the century with the war against Spain, over US influence over Cuba and Latin America more generally. The US paid increased attention to Europe during the twentieth century, well before the US established a new special relationship with another European country, the United Kingdom, during the second world war. A few examples may suffice to support the argument. When, after the 1907 banking crisis, the US decided to establish a central bank, Congress conducted hearings with major European central banks in order to draw from their experience in the design of what became in 1913 the Federal Reserve System<sup>4</sup>. After the first world war, President Wilson launched the League of Nations project which was a basis for

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2. To use the felicitous definition of Ellis (2001).

3. Franklin was 'commissioner' and, subsequently Minister Plenipotentiary, to France from September 1776 to the end of 1784. During this period, he negotiated several treaties covering national defence, trade and the granting of financial assistance by France to the United States. Franklin also established excellent relationships with French scientists and philosophers, in particular with Voltaire (Franklin, 1990). Jefferson was Franklin's successor in Paris from 1785 to the end of 1789 and he greatly contributed to fostering the French-American alliance and friendship. He even collaborated with the Marquis de Lafayette – one of his closest friends – in drafting the Declaration of Rights submitted by Lafayette to the National Assembly in July 1789 in the early days of the French Revolution (Ellis, 1996).

4. In September 1909, Senator Nelson W Aldrich (Chairman of the United States National Monetary Commission) and Professor A P Andrews (Special Assistant to the Commission) met in Paris with French monetary authorities and with a number of financial experts, including Tito Canovai, Secretary General of the Bank of Italy, to gather information relevant for the purpose of 'endowing the United States with a financial system as solid as that of Great Britain or France' (as reported by the New York Times on 29 September 1909). Subsequently Senator Aldrich asked Canovai to write for the Monetary Commission a report on the history of banking and credit in Italy (see Canovai, 1911). The report was part of the background material to the 'Suggested Plan for Monetary Reform' prepared by Senator Aldrich in 1911.

political and economic cooperation between the US and Europe. Within that framework, there were a number of international initiatives, such as the monetary Genoa Conference in 1922, where the establishment of a 'gold-exchange standard' was first discussed; the establishment in 1930 of the Bank for International Settlements; and the London Economic Conference of 1933, which tried unsuccessfully to deal with the consequences of the Great Crash. Throughout this period, transatlantic cooperation among central banks was particularly intense, building on the close personal relationships between Federal Reserve President Benjamin Strong; the Governor of the Bank of England, Montagu Norman; the Governor of the Banque de France, Emile Moreau; and even the President of the Reichsbank, Hjalmar Schacht (Ahamed, 2009).

With the outbreak of the second world war the extraordinary season of international cooperation started, of which the Anglo-American alliance was the pivot. The US leadership is to be credited for providing a strong impulse toward multilateral cooperation and institution-building. In fact, the close collaboration between the US and the UK during wartime was the trigger for a broader framework for international economic cooperation, which benefited greatly from the strong intellectual leadership of John Maynard Keynes and Harry Dexter White. Anglo-American collaboration laid the foundations for the post-war world monetary order, paving the way for the Bretton Woods conference of 1944 where 730 delegates from 44 allied nations gathered<sup>5</sup>.

The Marshall Plan launched at the end of the war, provides further evidence of the US desire to extend the range of its post-war assistance beyond the UK, to include former enemies such as Germany and Italy. Europe was in dire straits, and there were no signs of recovery. In 1947, the real output of European countries was still much below the corresponding level of the pre-war period. The situation was made more severe by discriminatory practices and bilateral arrangements in international trade, a legacy of the protectionist policies adopted during the 1930s and during wartime. In turn, the scarcity of gold and dollars in European central banks' reserves made the return to trade liberalisation impossible. George Marshall understood that it was in the interest of the US to 'save Europe' (Behrman, 2007). The Marshall Plan led to the creation of the Organisation for European Economic

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5. The Bretton Woods Conference was the start of a new course in transatlantic relations, but since the UK and the US had strongly different views on the functioning of the international monetary system, the job of the two leading negotiators, Keynes and White, was far from easy. They had met in 1935 for consultations about a possible monetary agreement and went through periods of confrontation and open hostility before they were able to develop a mutual respect and to fraternise with every appearance of enjoyment (Horsefield, 1969, p.56).

Cooperation [OEEC], which was crucial for the subsequent achievements in the field of European integration. The removal of trade barriers between European countries, and the creation of the European Payments Union (EPU), a well-functioning multilateral clearing system based on the US dollar, contributed to the robust economic recovery during the 1950s, and eventually paved the way to the return to multilateral convertibility of European currencies in 1958.

The establishment of the European Economic Community (EEC) in 1957 was a turning point in the American-European relationship. Despite the early misgivings of the UK about the usefulness and viability of the project, the US took a firmly positive view of European political and economic integration. Washington believed, very much along the same lines of the proponents of the Common Market, such as Monnet, Schuman, Adenauer, Spaak and De Gasperi, that European integration would strengthen the prospects of world peace. Balance of payments disequilibria and exchange-rate issues were not among the core competences of the EEC at that time, and thus the monetary disturbances of the 1960s and 1970s did not affect the US-EEC relationship directly. The situation changed in the 1980s as the EEC became an important world player through its trade and competition policies. The US, while remaining a supporter of European integration, did not immediately realise that in these areas, the EEC would speak as a supranational authority with a single voice, wielding its full negotiating power within a law-based framework, rather than in the context of a more flexible political dialogue. When in late 1980s the European Community launched a plan to remove internal-trade barriers to achieve a Single Market by 1992, many foreign private companies feared that Europe would eventually erect external barriers to keep competitors out. Such an anxiety was widely shared by US officials who feared that a 'fortress Europe' was in the making, equipped with a large armory of import quotas, antidumping measures, reciprocity requirements and so forth. Competition issues have also been a source of friction between the US and the European Union (EU) in recent years. Well-known examples are the European Commission cases against Microsoft – for abusing its dominance in operating software – and against the merger of General Electric (GE) and Honeywell, on the basis that it would create a too-powerful entity and, consequently, alter competitive positions in the industry<sup>6</sup>.

The establishment of the Economic and Monetary Union (EMU) in 1998 created additional problems for transatlantic cooperation, both in terms of substance and procedure. The launch of the euro was seen by many American observers as

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6. The GE-Honeywell merger case, in particular, marks the first time that transatlantic regulatory authorities differed in their decision on a merger approval.

eventually posing a threat to the supremacy of the US dollar as the key reserve currency of the international monetary system<sup>7</sup>. At the same time, it emphasised, in the eyes of some Americans, the peculiarity of a situation in which a group of countries, which had adopted a single currency and created a common central bank, still pretended to be represented on the international stage by their national governments and central banks. The question of 'too many Europeans around the table' thus made its debut in transatlantic relations. It has become all the more relevant lately as emerging nations rightly demand an increase in their voting weight and voice in international institutions.

Finally, foreign and defence policy is the area where the Euro-American dialogue has had serious difficulties in finding an appropriate format. Here the relationships have been mostly bilateral, between the US and individual European countries, and conducted on a case-by-case basis, sometimes under the NATO umbrella, or the auspices of the United Nations, or in the context of informal 'coalitions of the willing'. I will not enter into these complex issues, except to note that since the end of the second world war there have been very few instances, to my knowledge, in which a major foreign-policy initiative on either side of the Atlantic has not been preceded by extensive consultations and negotiations in the various transatlantic cooperation forums. The fact that these consultations have not always been fruitful, and have sometimes ended in open disagreements, does not obscure the fact that transatlantic consensus was regarded as optimal by both sides of the Atlantic.

In 1981, Henry Kissinger expressed his frustration at the difficulty of having a bilateral dialogue with Europe on foreign policy issues by asking 'What is Europe's telephone number?'. The situation has significantly changed since then, at least as regards the availability of the telephone number of the High Representative of the Union for Foreign Affairs and Security Policy. Indeed, since the adoption of the Maastricht Treaty there has been a gradual strengthening of the EU's foreign-policy infrastructure at the level of the European Commission, which has been provided with significant financial resources to foster the EU's foreign policy objectives. It is a fact, however, that EU attention in recent years has been concentrated on its enlargement strategy and on strengthening its relations with the immediate neighbouring countries. The EU has done little to enhance its role as a global player on the major foreign policy issues.

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7. For example, Bergsten (1999) noted that: '[...] the creation of the euro could be the proximate trigger for the next phase of the dollar decline. It is now widely agreed that the euro will become a major global currency, perhaps eventually challenging the dollar for global financial supremacy. That historic development will entail a large portfolio diversification from dollars to euro [...].'

## Transatlantic cooperation in financial-crisis management

Transatlantic cooperation in managing balance-of-payments and foreign-exchange crises has been very close and continuous since Bretton Woods (James, 1996). It has, however, changed in nature: it had initially a strong institutional connotation as the US and major European countries worked together to strengthen the role of, and the instruments at the disposal of, the International Monetary Fund (IMF) to prevent and manage crisis situations. With the collapse of the Bretton Woods system, transatlantic cooperation became more pragmatic and conducted on an *ad-hoc* basis in the context of various 'groupings' outside the IMF's institutional framework.

The institutions created at Bretton Woods greatly contributed to the phase of strong growth and stability that Europe experienced in the 1950s. Their transatlantic character was underscored by the agreement – informal but still in force – that the IMF would be headed by a European, and the World Bank by an American. In the 1960s, the emergence of the problem of US external-payments imbalances prompted a strong cooperative effort that involved monetary authorities on both sides of the Atlantic (see James and Martinez Oliva, 2009). The gold rush of October 1960, when the free-market price of gold in London shot up to \$40 per ounce, as against an official price of \$35, suddenly revealed the Achilles' heel of the Bretton Woods system. It soon became apparent that the long-run stability of the exchange-rate regime could not be preserved if the US balance-of-payments deficit remained the main source of international liquidity<sup>8</sup>. President Kennedy understood the political implications of the challenge and he closely supervised the implementation of the US strategy of defending the dollar's stability.

International cooperation among monetary authorities involved the use of a number of measures designed to underpin the stability of exchange rates and of the gold price, and to strengthen the IMF's financial resources. To this end, in October 1962, ten major industrial countries (plus Switzerland) extended credit lines to the IMF for a total amount of \$6 billion, under the General Arrangements to Borrow. The agreement established *de facto* a new cooperative group, the G10, which came to play a major role in international monetary diplomacy. Within the G10, Euro-American leadership promoted policy-oriented analyses and proposals for reforming and strengthening the international monetary system. At a technical level, negotiations took place among the G10 Deputies, a body comprising top-

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8. This was the so called 'Triffin dilemma' identified at a very early stage by Triffin (1960).

ranking officials from member country finance ministries and central banks. Leading members of the G10 Deputies were Robert Roosa of the US, Otmar Emminger of Germany, Jacques de Larosière of France and Rinaldo Ossola of Italy. Ossola, who later became Director General of the Bank of Italy, was appointed chairman of the Deputies in 1967, keeping that position until 1976.

A pro-active approach to international monetary cooperation continued to be adopted under the Johnson administration. The US Government was indeed very active and resolute in pursuing international monetary reform, and in keeping the dialogue with Europe alive, in an open and straightforward attempt to reach a common agreement on a multilateral solution. Johnson's years can be seen as the natural evolution of the early intuition of the Kennedy administration, that the support of the European countries with strong balance-of-payments surpluses had become extremely important for the Bretton Woods regime to survive. In those years, the US favoured the idea of creating a new international-reserve asset within the IMF to relieve the pressure on the US balance-of-payments as the main source of international liquidity. As US Treasury Secretary Henry H Fowler put it: 'Providing reserves and exchanges for the whole world is too much for one country and one currency to bear'<sup>9</sup>. After proposals were elaborated by a G10 Study Group on the Creation of Reserve Assets, under the Chairmanship of Ossola, the IMF Governors approved in 1969 the introduction of a new reserve asset, the Special Drawing Right (SDR). The creation of the SDR, which came too late to prevent the collapse of the Bretton Woods system, represents the most courageous attempt to bring under multilateral control the process of creation of international liquidity, as originally envisaged by Keynes.

The collapse of the Bretton Woods system marked a turning point in the substance and the procedures of international monetary cooperation. The immediate impact of the August 1971 dollar crisis on the world's fixed exchange-rates regime was dealt with relatively quickly within the G10 in two crucial meetings held in Rome in November and in Washington<sup>10</sup> in December of that year. The negotiations to rebuild a new monetary system from the ashes of Bretton Woods took much longer. The task was entrusted, in July 1972, to a newly-created group, the Committee of Twenty (C20), chaired, at a technical level, by Sir Jeremy Morse of the UK and

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9. The quote is found in: [http://www.imf.org/external/np/exr/center/mm/eng/mm\\_sc\\_03.htm](http://www.imf.org/external/np/exr/center/mm/eng/mm_sc_03.htm)

10. A picture taken at the end of the Washington meeting that ratified the so-called Smithsonian Agreement on new exchange-rate parities shows a stern President Nixon, flanked by a proud Treasury Secretary John Connally, a smiling Rinaldo Ossola, Chairman of the G10 Deputies, and a relaxed Paul Volcker, then the US G10 Deputy, in a cloud of cigar smoke. The picture is reproduced on the cover of a conference book commemorating Rinaldo Ossola (Kenen, Papadia, Saccomanni, eds., 1994).

comprising all the IMF constituencies. Progress in the reform discussions was slow, and it soon became apparent that it would be difficult to reach agreement in such an enlarged forum on highly-technical issues with strong political connotations.

Already in April 1973, the US Treasury Secretary, George Schultz, began conducting informal talks in the White House library with his counterparts from the UK, Germany and France. This so-called Library Group eventually was enlarged to include Japan, and became a forum for discussing such topics as the persistent weakness of the dollar, the 1974 oil crisis and the failure to reach agreement on the monetary-reform negotiations. When two former members of the Library Group (Valéry Giscard d'Estaing of France and Helmut Schmidt of Germany) became head of government in their countries, the idea of a summit meeting restricted to a small group of 'like-minded' countries to settle pending economic and monetary issues took shape. France hosted it in Rambouillet on 15 November 1975, including Italy among the invitees. The meeting paved the way for the conclusion of the negotiations on the amendment of the IMF Articles of Agreement, in January 1976 in Jamaica. Canada joined later at the insistence of the US: the G7 was born. With the creation of the G7 an era of variable 'summitry' began, which continues to this day. In parallel, international monetary cooperation gradually lost its institutional character and became increasingly informal, pragmatic and *ad hoc*.

The last attempt to deal with the structural deficiencies of the international monetary system in an institutional context was the negotiation in 1978-80 of an agreement to endow the IMF with a Substitution Account (SA), to replace excess foreign-exchange reserves denominated in US dollars with newly created SDRs (Micossi and Saccomanni, 1981). The proposal, which had initially received strong support on both sides of the Atlantic, eventually failed to gain the necessary consensus among the broad IMF membership, particularly from emerging and oil-producing countries. The US financial industry also expressed strong reservations. This is regrettable because the SA could have been an instrument for diversifying reserve holdings without putting pressure on key exchange rates, offering a stable basket-based reserve asset at a reasonable cost.

After the shelving of the SA proposals, international cooperation was conducted mainly within the G7, again with a strong transatlantic influence. A few examples, without too many details, may suffice (for the details, see Saccomanni, 2008). The first is the G7 attempt in 1985-87 to stabilise the dollar through a strategy of policy coordination in the context of the Plaza and Louvre Accords. European pressure to stop an unwarranted appreciation of the US dollar eventually convinced the Reagan administration to conduct coordinated interventions in foreign-exchange markets,

supported by consistent monetary and fiscal policy measures. A second example is the reform of the international financial architecture launched by the G7 in the aftermath of the emerging countries debt crises of 1994-98. American and European leaderships combined at the 1999 G7 Summit in Cologne to produce a comprehensive set of measures to strengthen financial systems in emerging countries. The reform was supported by the creation of two cooperative bodies, the G20 and the Financial Stability Forum (FSF), on the basis of a proposal by the Bundesbank President, Hans Tietmeyer. These new groupings were not given much of a role initially, but became important in tackling the next (and current) global crisis.

Finally, one should not overlook two episodes of transatlantic cooperation that are emblematic of the nature of the Europe-US relationship. The first is the joint intervention by the Federal Reserve and the European Central Bank (ECB) to support the euro in the autumn of 2000. This was crucial to halt a vicious circle of destabilising expectations and speculation in the early months of the life of the new currency. Transatlantic cooperation was again successfully activated after the 9/11 terrorist attacks on the US. The attacks destroyed or disabled whole portions of New York's financial infrastructure, with potentially harmful domestic and international effects. Financial markets remained closed until Monday 17 September. The Federal Reserve instantly indicated that it stood ready to inject virtually unlimited amounts of liquidity to avoid payment failures and cascading defaults. On the international front, the Federal Reserve established or expanded 30-day swap lines with the ECB, the Bank of England, and the Bank of Canada, totalling \$90 billion, to enable them to provide dollars to their financial institutions.

### The future of transatlantic cooperation

The conclusion that can be drawn from my brief historical survey is that transatlantic cooperation has had a great past, particularly in dealing with crises. But does it have any future? The question is particularly relevant if one looks beyond the near term, which will be devoted to the implementation of the crisis-management strategy agreed on by the G20, again under strong American-European leadership. In the longer run, however, there is a risk that the US may reconsider the usefulness of the transatlantic partnership and pay more attention to cooperation with China, India, Brazil, and to emerging countries in south-east Asia or Latin America more generally. Some observers also have mentioned the possibility that in the future a G2, including the US and China, will become the only relevant international cooperation forum<sup>11</sup>. This scenario may appeal to the media,



but the reality of the global economic system is much more complicated.

The agenda in front of policy-makers today is daunting: promoting a sustainable economic recovery to revive growth of output, jobs and trade; strengthening the world's financial system and its regulatory framework; adjusting global payments imbalances. Unfortunately these agenda items cannot be addressed in sequence, or within a relatively long time span, because they are closely inter-related. Insufficient progress in achieving the first two objectives may trigger a disorderly adjustment of global payments imbalances, with negative repercussions for growth prospects and for monetary and financial stability. In turn, a widening of global imbalances could have a negative impact on the stability of the global financial system, thus depressing again economic activity. It is difficult to see how a strategy to cope with these global issues could be dealt with bilaterally between the US and China. For example, any Sino-American understanding on exchange-rate adjustments or reserve diversification is bound to have implications for the European economy and for the euro, and would require the involvement of the Eurosystem. Obviously, the US and China have many bilateral issues and interests to discuss, but their dialogue need not be at the expense of cooperation in broader multilateral forums. At the same time, past experience shows that it will require a long time before an adequate working relationship is established in multilateral institutions, once the discussions move from general exchanges of views to more technical and concrete cooperation in implementation of macroeconomic policies, banking supervision and macroprudential risk management.

More generally, a consequence of the crisis seems to be a return to institutional cooperation. After having tried all manner of informal, pragmatic, cooperative arrangements, in an endless string of 'G' formations, the international community seems to have gone full-circle to the long-neglected safe haven of the IMF. This is not surprising: informal groupings cannot deal with financial emergencies unless they have an institutional arm with adequate instruments and resources. The decision taken by the G20 in London in April 2009 to endow the IMF with additional resources amounting to \$1.1 trillion (including a very significant new allocation of SDR), under the leadership of the UK Chair of the G20, Gordon Brown, provided a much needed relief to seriously-strained financial markets. The enlargement and the formalisation of the role of the FSF (and its renaming as the Financial Stability Board), and the agreement about the division of labour between the IMF and the FSB, were also welcome signs of a return to more balanced and transparent

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11. See, for example, The Economist (2009).

international cooperation procedures. The US, EU countries and the major emerging economies (China, India, Brazil) are actively collaborating in negotiations to redefine the role and functions of these institutions, and to reform their internal governance, in order to give adequate weight and voice to all the main systemically-relevant countries.

In this context, it may be in the interest of the US to reconsider the role of the transatlantic partnership in the dialogue between global players. The more-open attitude shown by the Obama administration towards multilateral cooperation is a welcome development after many years in which the US enjoyed the illusory role of lone superpower. But taking account of allies' views will nonetheless have a price. As US vice-president Joe Biden recently put it: 'America will do more – that's the good news. The bad news is America will ask for more from our partners'<sup>12</sup>. It could be argued that the US and the EU could each contribute something valuable to a transatlantic partnership. The US has a strong culture of growth, with an emphasis on supporting investment, innovation, competition in free markets. The EU has an equally strong culture of stability, with an emphasis on sound macropolicies and effective market regulation, and attention keenly paid to social security. The current crisis may provide an opportunity for redefining the optimum mix of growth and stability on both sides of the Atlantic. The US may want to pay more attention to stability, especially monetary and financial; the EU may want to give more attention to growth by promoting innovation and competition. More broadly, in foreign policy, transatlantic partners should think about combining their resources, as Joseph Nye has recently suggested, linking American 'hard power' and Europe's 'soft power' to adopt mutually-reinforcing strategies in those areas of the world where the EU and US have shared interests. This may imply for the US an effort to extend its 'soft power' capabilities and for Europe to reinforce its 'hard power' resources (Nye, 2006).

From an economic and financial point of view, the transatlantic market will continue to be for the foreseeable future the main outlet for the exports of the rest of the world, and the main source of financing for global trade and investment. The ability to absorb the production of other areas of the global economy and to provide financial resources to the world is proportionate to the size of the transatlantic economy, an area with a population of more than 800 million and a gross product that exceeds €25 trillion, nearly 60 percent of world output. In 2008, EU and US imports from the rest of the world amounted to €1.6 and €1.2 trillion respectively, almost 35 percent of global trade. The EU and the US are also each other's main

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12. Speech of US vice-president Joe Biden at the 45th Munich Conference on Security Policy, 7 February 2009. See [http://voices.washingtonpost.com/44/2009/02/07/biden\\_addresses\\_munich\\_confere.html](http://voices.washingtonpost.com/44/2009/02/07/biden_addresses_munich_confere.html)

trading partners, with daily trade flows across the Atlantic amounting to around €1.2 billion. The outward flows of FDI of the two areas were more than 70 percent of all world FDI activity between 2000 and 2008. In the same period, 31 percent of EU investment flows were directed to the US, equivalent to more than 58 percent of total FDI to that country. The corresponding figure for US investment to the EU was 45 percent. Total stock-market capitalisation in the EU, the US, and Canada amounted to €13.6 trillion, or 60 percent of world stock-market capitalisation. The sum of bonds, equities, and bank assets in the transatlantic economy was €98 trillion (€57 trillion in the EU and €42 in the euro area), a share of almost 68 percent of the world total<sup>13</sup>. In the international monetary area, transatlantic currencies (US\$, Can\$, €, sterling) account for 77.6 percent of the daily turnover in the global foreign-exchange market (BIS, 2007). Moreover, the dollar and the euro are the only two currencies with global reserve status and account for 91 percent (63 percent dollars and 28 percent euro) of the total foreign-exchange holdings of monetary authorities.

Given its size and depth, the transatlantic market's role in the global economy is not in question. But it should be able to guarantee to the rest of the world freedom of access within the rules of an open multilateral trading system and reasonable protection against financial instability and exchange-rate volatility. The question of monetary and financial stability is of particular relevance for Asian countries. Since 2000, members of the Association of South East Asian Nations (ASEAN) have cooperated with Japan, China and Korea under the so called Chiang Mai Initiative (CMI) to promote regional financial cooperation with the objective of achieving currency and financial stability and stable economic growth. The CMI key financial instrument is a network of bilateral-swap arrangements between member central banks totalling \$120 billion<sup>14</sup>. The CMI obviously draws from the experience of regional cooperation in Europe through the European Monetary System. More recently, the governor of the People's Bank of China has advocated an increased role of the SDR in the international monetary system, with the aim of creating 'an international reserve currency that is disconnected from individual nations and is able to remain stable in the long run, thus removing the inherent deficiencies caused by using credit-based national currencies' (Zhou, 2009). Here again, the Chinese proposal draws from the work done by the US and Europe to establish an SDR-based substitution account in the IMF.

These examples clearly show that the current global crisis has put reform of the

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13. The figures quoted below are derived, unless otherwise indicated, from IMF databases.

14. Information on regional cooperation among ASEAN plus 3 countries is available on the ASEAN website ([www.aseansec.org](http://www.aseansec.org)).

international monetary and financial system back on the IMF's agenda. In this context, it is evident that the US and the Eurosystem will be directly involved in shaping any new arrangement that will have an impact on the role of the dollar and the euro. The transatlantic partnership could provide a unique contribution to the debate, based on the partners' shared experience in international monetary cooperation since Bretton Woods.

Is Europe ready to meet the requirements of a new transatlantic partnership? The answer, based on past experience, is uncertain. The EU has been too pre-occupied with its own internal affairs – political, economic, social and institutional – to be able to play a significant role on a global scale. Of course, the EU can do that in some areas: trade, competition, monetary policy. But what is missing is a comprehensive framework for a consistent foreign policy, including a deliberate external economic policy. The global crisis may change the EU's outlook. European leaders should make an effort to convince their citizens that the ultimate aim of the EU is not to become a superstate that would interfere with their private lives, but to provide a common shield to protect them from the problems posed by globalisation. In areas like energy security, climate change, epidemics and global financial turbulence, individual nation states, especially small ones, are powerless. The entry into force of the Lisbon Treaty can provide the opportunity for a reconsideration of the EU's long-term strategic objectives.

In antiquity, Ovid, a Roman poet, described an impossible love affair with the immortal words: '*nec tecum, nec sine te vivere possum*' (neither with you, nor without you, can I live). This need not be the fate of the transatlantic relationship. The US and Europe should be able to live together. There seem to be no fundamental reasons for them to drift apart, other than misunderstandings and misconceptions<sup>15</sup>. These should not be allowed to alter established relationships in the current situation of global economic strain and changing geopolitical configurations.

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# The international transmission of the financial crisis<sup>1</sup>

GIAN MARIA MILESI-FERRETTI

## Introduction

The financial crisis that started in the United States in the summer of 2007 gradually spread to the rest of the world economy, resulting in its most severe downturn since the Great Depression. The initial transmission of the crisis came through financial-sector linkages – in particular, the exposures of highly-leveraged financial institutions in Europe and the US to privately-issued asset-backed securities (ABS) backed by subprime mortgages. Financial-sector linkages were also crucial in subsequent phases of the crisis – for example, emerging markets were severely affected by the process of deleveraging of financial institutions in advanced economies, which was triggered by the need to reduce the size of their balance sheets. By the second half of 2008, the financial crisis had spread with particular virulence to the real economy, causing a dramatic decline in global demand, economic activity and international trade across the globe.

This chapter focuses on how international financial linkages, which multiplied dramatically over the past decade, help understand the cross-border transmission

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of the financial crisis and its implications for exchange rates. It starts by reviewing the evolution and structure of cross-border borrowing and lending in the period preceding the crisis. It focuses in particular on the size of cross-border exposures, their economic type and sectoral aspects, highlighting key differences between advanced economies and emerging markets. These aspects help clarify the subsequent *denouement* of the crisis. In particular, they help understand why certain countries were more affected than others and help identify the factors driving the sizable exchange-rate changes that took place over the past year. We conclude with a brief discussion of a few 'lessons' to be learnt from the crisis, relating to capital flows, exchange rates and international financial architecture more generally.

### Imbalances and cross-border holdings in the run-up to the crisis

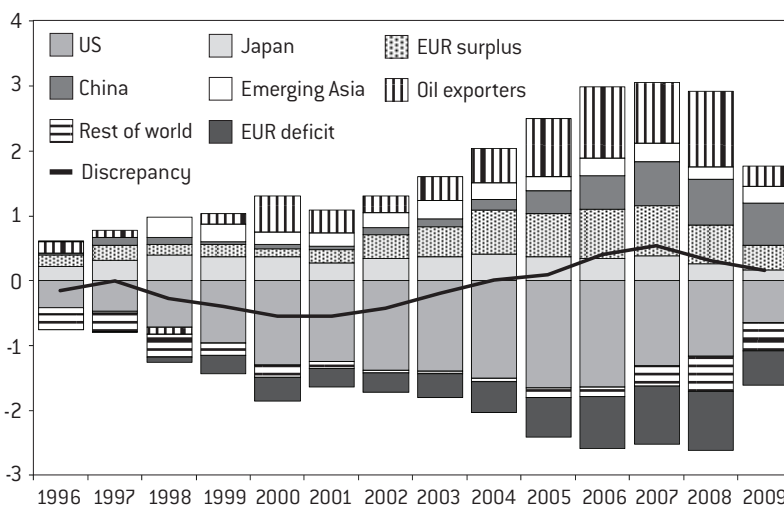
The period from the mid-1990s to 2007 was characterised by a rapid expansion in international trade, the emergence of global imbalances and a boom in cross-border capital flows, particularly among advanced economies. We discuss briefly some salient features of these phenomena.

#### A. Global imbalances

While there is a very extensive literature analysing causes and consequences of global imbalances, as well as possible adjustment scenarios, accounts of imbalances are often simplistic (US v China). As argued in Blanchard and Milesi-Ferretti (2009), imbalances went through several phases with different driving forces: while a large US deficit was a common element, its relative importance as well as its counterparts changed over time (Figure 1).

During the first phase (1996 to 2000), imbalances were characterised by a widening current account deficit in the US, driven by an investment boom and surpluses in emerging Asia and Japan, and by sharply-declining investment rates. Flows into the US primarily took the form of FDI and portfolio equity investment. From 2001-04, the US deficit continued to widen, driven this time by a sharp decline in domestic saving, with a five percent of GDP increase in fiscal imbalance playing a key role. Its surplus counterparts included not only Asian countries, but also oil exporters and a number of countries in central and northern Europe, including Germany. The financing of the US deficit was primarily in the form of foreign purchases of US bonds, with foreign official institutions playing an important role.

Figure 1: Global imbalances, 1996-2009 (in percent of world GDP)



Note: Current account balances (in percent of world GDP). Source: World Economic Outlook (January 2010 forecast). The composition of country groups is as follows:  
 EUR surplus: Austria, Belgium, Denmark, Finland, Germany, Luxembourg, Netherlands, Sweden, Switzerland. EUR deficit: Greece, Ireland, Italy, Portugal, Spain, United Kingdom, Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic, Turkey, Ukraine. Emerging Asia: Hong Kong S.A.R. of China, Indonesia, Korea, Malaysia, Philippines, Singapore, Taiwan province of China, Thailand. Oil exporters: Algeria, Angola, Azerbaijan, Bahrain, Republic of Congo, Ecuador, Equatorial Guinea, Gabon, Iran, Kazakhstan, Kuwait, Libya, Nigeria, Norway, Oman, Qatar, Russia, Saudi Arabia, Sudan, Syria, Trinidad and Tobago, United Arab Emirates, Venezuela, Yemen. Rest of the world: remaining countries.

Finally, during the 'boom and bust' phase of 2005-08 the composition of imbalances changed once again. The US deficit declined but remained large, with a correction in 'real' trade flows offset by much higher commodity prices. Foreign purchases of US Treasury, corporate and agency bonds accounted for the lion's share of its financing. A number of European countries (such as Ireland, Portugal, Spain, the United Kingdom and countries in central and eastern Europe) accounted for an increasing fraction of global current-account deficits, driven primarily by investment booms, including in construction. These larger deficits were accompanied by credit booms and appreciating real effective exchange rates. Among their counterparts, surpluses widened dramatically in China, in oil-exporting countries (driven by higher saving) and in Germany and other countries of central and northern Europe.

Global imbalances were viewed by the IMF as well as by several policymakers and observers as posing a risk to the world economy. The main source of risk was viewed to be a possible 'disruptive adjustment' in which a reduced willingness by other countries to accumulate claims on the US would result in a sharp depreciation of the US dollar, severe capital losses for countries that were net creditors of the



dollar and disruptions to economic activity worldwide, potentially amplified by a rise in protectionist sentiment.

The current financial crisis developed differently. As discussed in the next sections, it initially propagated through gross exposures to particular segments of the US bond market in which US net creditors (such as China, Japan and oil exporters) were not large players. Even though imbalances were not the trigger of the financial crisis, they clearly reflected the financial excesses that were the root cause of the crisis – and particularly so in the period 2005-08.

## B. Cross-border flows

The process of international financial integration – in particular, the substantial two-way capital flows among advanced economies – received comparatively less attention than global imbalances prior to the current financial crisis. Because these aspects are of key importance in understanding the cross-border transmission of the crisis, it is useful to briefly review their evolution over the past decade.

Figure 2 shows global capital flows by region in relation to the size of world GDP. The increase in these flows over the 1998-07 decade – from around five percent of world GDP in 1998 to more than 17 percent of world GDP in 2007 – is striking. The dominant importance of flows to and from the main advanced economies is evident and would be even more dramatic if euro-area countries were considered separately (the figure only includes flows into and out of the euro area, netting out intra-euro-area flows).

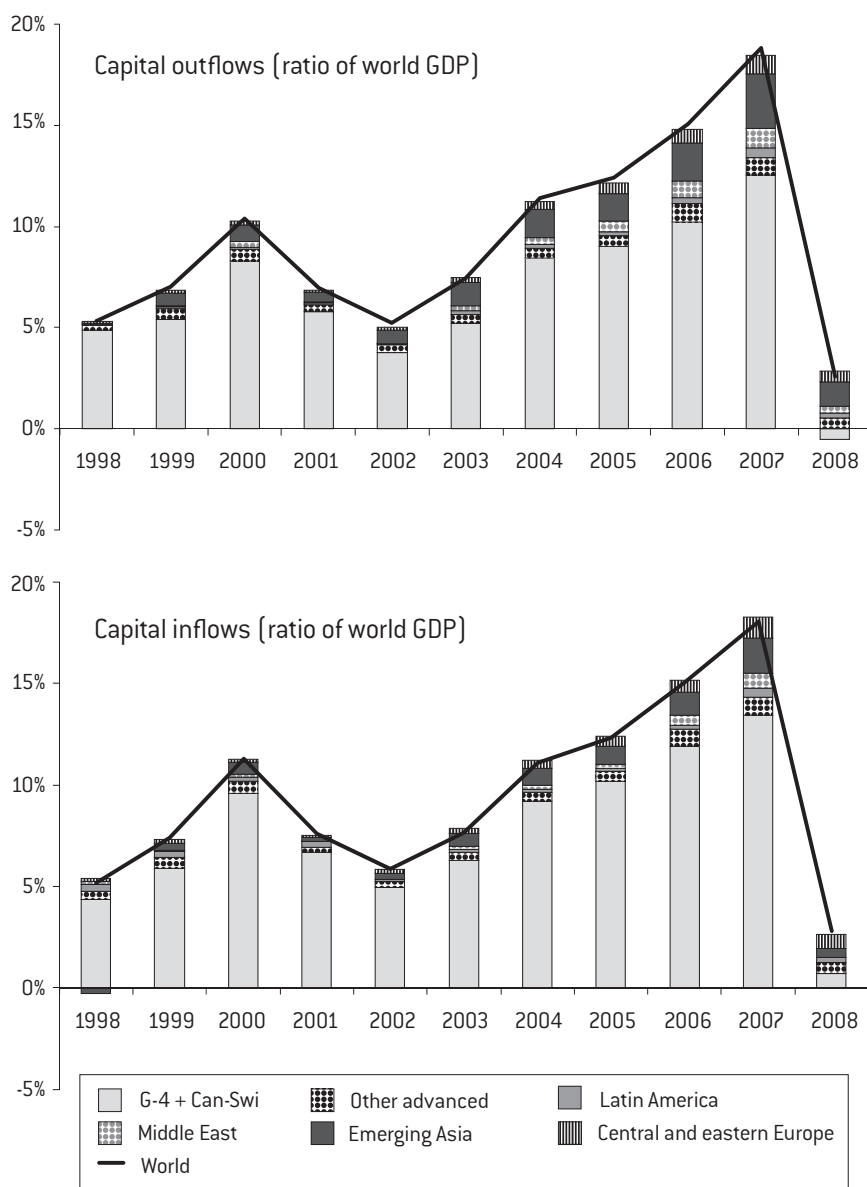
Figure 3 focuses on external assets and liabilities, and hence on stocks rather than flows<sup>2</sup>. It shows that, for advanced economies, cross-border holdings increased in all asset and liability categories. By the end of 2007, both external assets and external liabilities exceeded 220 percent of the GDP of advanced economies, twice the ratio of a decade earlier. In terms of portfolio composition, the very large increase in equity instruments is driven both by flows and by the increase in stock-price valuations during this period. The increase in debt holdings represents almost entirely a boom in cross-border debt flows.

Banks played a very important role in this respect (Table 1). Total cross-border claims and liabilities of BIS-reporting banks almost tripled in US-dollar terms between the end of 2001 and the end of 2007. In both absolute terms and in relation to the each region's GDP, bank positions within Europe were dominant, while

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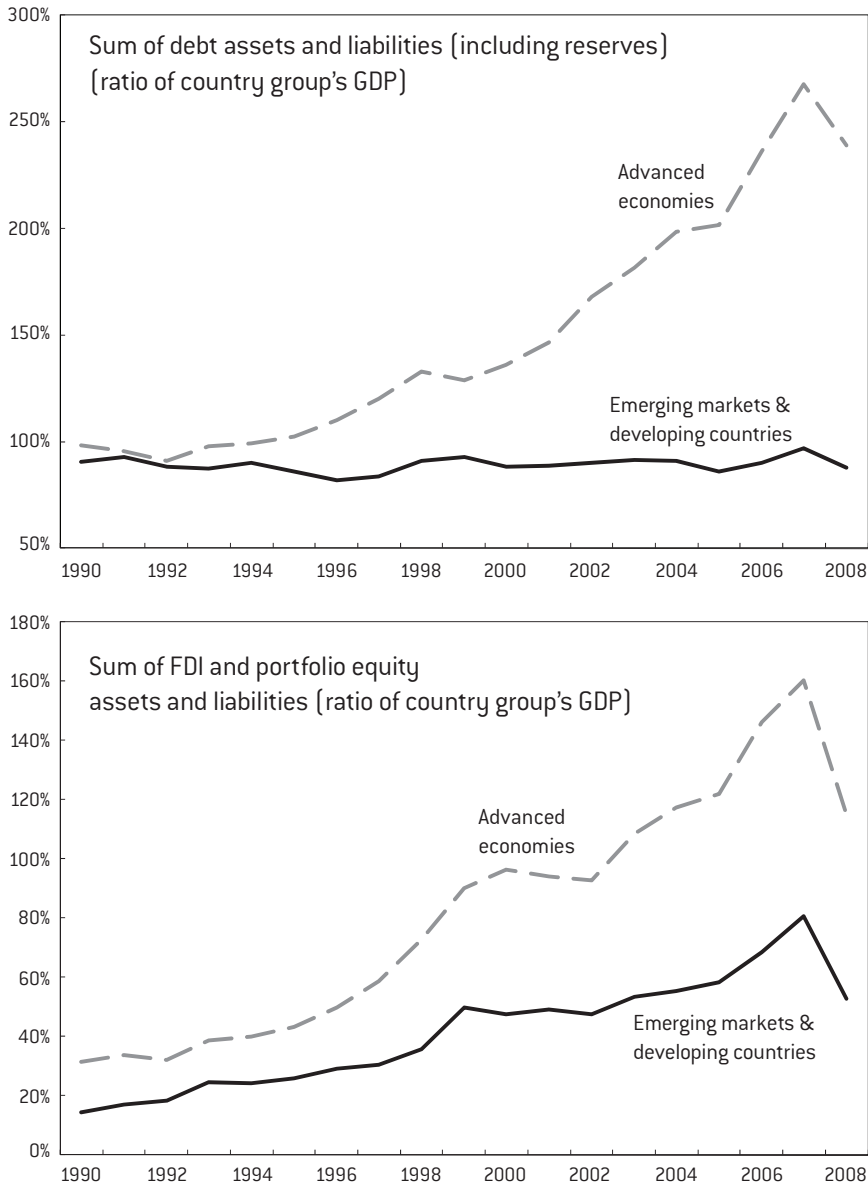
2. Cross-border holdings are defined as the sum of total external assets and liabilities from a country's international investment position. Here euro-area countries are considered separately.

Figure 2: Global capital flows, 1998-2008



Note: the G4+Can-Swi group comprises Canada, the euro area (netting out intra-euro area flows), Japan, Switzerland, the United Kingdom and the United States. Source: IMF, Balance of Payments Statistics and World Economic Outlook.

Figure 3: Composition of cross-border holdings



Source: Lane and Milesi-Ferretti, External Wealth of Nations dataset.

**Table 1: International claims and liabilities of BIS-reporting banks vis-à-vis specific regions (locational banking data, 2001 and 2007)**

|                                   | Bank claims<br>2001 | Bank liabilities<br>2001 | Bank claims<br>2007 | Bank liabilities<br>2007 |
|-----------------------------------|---------------------|--------------------------|---------------------|--------------------------|
| US\$ billions                     |                     |                          |                     |                          |
| All countries                     | 11,364              | 10,115                   | 32,840              | 28,284                   |
| Developed Countries               | 10,512              | 9,065                    | 30,336              | 25,695                   |
| i) Europe                         | 5,902               | 4,628                    | 19,269              | 15,291                   |
| ii) Other                         | 3,138               | 2,413                    | 6,998               | 5,213                    |
| iii) Offshore centres             | 1,472               | 2,024                    | 4,070               | 5,191                    |
| Emerging and developing countries | 851                 | 1,049                    | 2,504               | 2,589                    |
| i) Africa                         | 56                  | 60                       | 100                 | 184                      |
| ii) Middle East                   | 106                 | 283                      | 361                 | 689                      |
| iii) Asia & Pacific               | 267                 | 349                      | 831                 | 859                      |
| iv) Europe                        | 138                 | 110                      | 809                 | 474                      |
| v) Latin America/Caribbean        | 285                 | 247                      | 404                 | 383                      |
| Ratio of region's GDP             |                     |                          |                     |                          |
| All countries                     | 36%                 | 32%                      | 60%                 | 52%                      |
| Developed Countries               | 44%                 | 38%                      | 81%                 | 69%                      |
| i) Europe                         | 69%                 | 54%                      | 116%                | 92%                      |
| ii) Other                         | 20%                 | 16%                      | 34%                 | 25%                      |
| Emerging and developing countries | 11%                 | 14%                      | 15%                 | 15%                      |
| i) Africa                         | 17%                 | 18%                      | 12%                 | 21%                      |
| ii) Middle East                   | 13%                 | 34%                      | 21%                 | 39%                      |
| iii) Asia & Pacific               | 8%                  | 11%                      | 11%                 | 11%                      |
| iv) Europe                        | 14%                 | 11%                      | 24%                 | 14%                      |
| v) Latin America/Caribbean        | 14%                 | 12%                      | 11%                 | 11%                      |

Reported data are claims and liabilities of BIS-reporting banks on a locational basis vis-à-vis the various regions. Source: Bank for International Settlements.

cross-border bank assets and liabilities increased much more slowly – and are much less important in absolute terms – in other advanced economies<sup>3</sup>. For advanced economies as a whole, more than half of the increase in external-debt assets and liabilities over the past decade is explained by the actions of banks.

The increased international role of banks is not fully captured by these statistics, which are based on the residence principle<sup>4</sup>. In recent years, banks expanded their international activity not just through cross-border borrowing and lending, but also by setting up overseas affiliates and branches that would often fund themselves on local markets. And European banks played a particularly important role in this respect. This type of international banking activity is captured by balance of payments statistics only to the extent that the affiliates fund themselves on international markets. Exposures related to this type of banking activity played an important role in the transmission of the crisis, as discussed further below.

For emerging markets (also Figure 3) total cross-border holdings increased too, but both the pace of the increase and the overall size of cross-border exposure remained much smaller. For example, total external liabilities increased from 70 percent of GDP in 1998 to 88 percent of GDP in 2007 for the aggregate of emerging markets, while external assets increased from 57 percent of GDP to 88 percent of GDP. But the most-striking difference is in terms of portfolio composition: for emerging markets, capital flows took increasingly the form of FDI and portfolio equity investment, particularly on the inflows side, with a much-reduced role for external debt liabilities. Indeed, between 1998 and 2007 total debt liabilities fell from 47 to 34 percent of GDP. The stability of debt assets and liabilities as a share of GDP is due to the increase of foreign-exchange reserves on the asset side of the balance sheet. Figure 4 shows how the net external-debt position improved significantly in Latin America and especially emerging Asia, where hefty reserve accumulation implies a large net creditor position in debt instruments. In contrast, the net position in foreign direct investment and portfolio equity became much more negative (especially in the emerging economies of Europe).

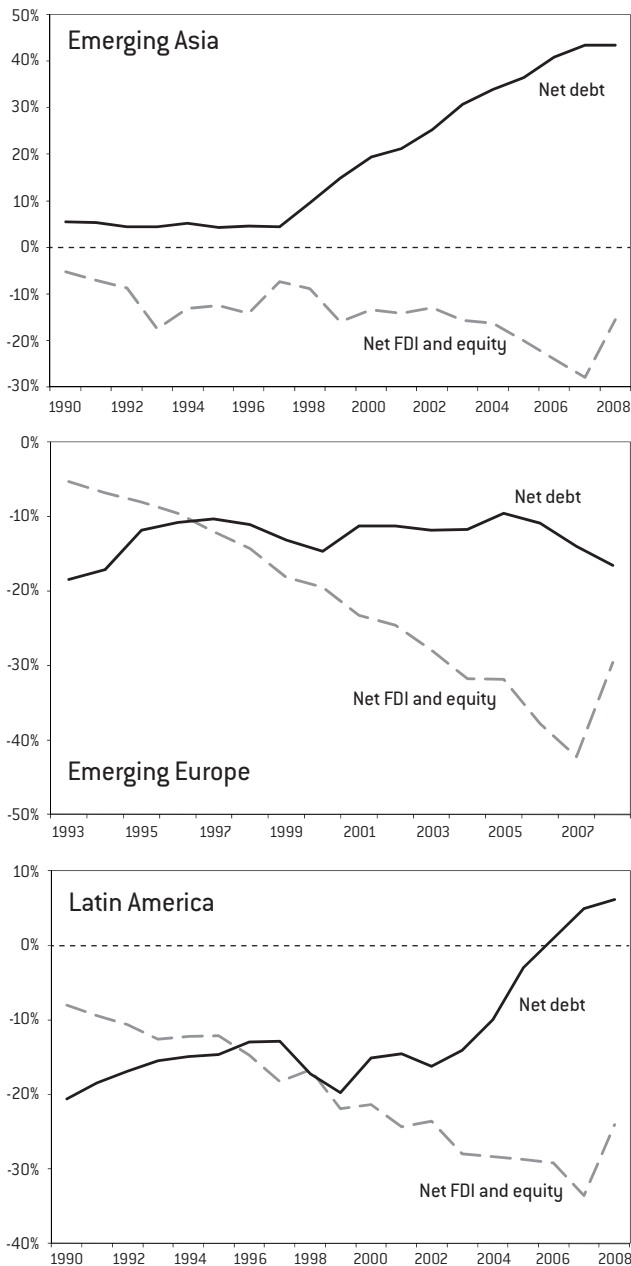
One key implication of the change in the structure of external liabilities in emerging markets (as well as of the improvement in their net external position, particularly in Asia and Latin America) has been a reduction in their exposure to

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3. Netting out intra-euro-area holdings reduces claims and liabilities between euro-area countries by about one half.

4. This implies, for example, that a claim of the US affiliate of Barclays on the UK affiliate of Goldman Sachs is considered a US claim on the UK, while on a consolidated basis this would be a claim of the UK banking system on the US.

Figure 4: Emerging markets: external portfolio structure (% GDP)



Source: Lane and Milesi-Ferretti, External Wealth of Nations dataset.

foreign currencies. External debt liabilities, which declined, are typically denominated in foreign currency, while FDI and portfolio equity liabilities, which increased, are denominated in domestic currency. This change plays an important role in explaining the effects of the crisis on balance sheets in emerging markets, as discussed in section D. Exposure to BIS-reporting banks increased rapidly in emerging Europe (Table 1), while it remained low in relation to the region's GDP in both Asia and Latin America. This is not so surprising in view of the reduction in the level of external debt. Banks from advanced economies increased significantly their presence in emerging markets during this period, but this was achieved primarily by raising funds locally.

External vulnerabilities are, of course, not only affected by the portfolio structure, but also by the overall external position. Table 2 provides a regional summary of current-account balances and net foreign-asset positions in emerging markets at the end of 2007 – the year before the crisis. Regional differences were substantial, with countries in emerging Europe characterised by larger current-account deficits and net external liabilities than countries in other regions.

Table 2: Emerging markets: external position and current account balances, 2007

|                                                  | Asia   | Latin America | Emerging Europe | Middle East & North Africa |
|--------------------------------------------------|--------|---------------|-----------------|----------------------------|
| Median CA balance                                | 1.8%   | -0.8%         | -7.4%           | 2.8%                       |
| Median NFA position                              | -24.3% | -33.6%        | -50.1%          | 25.0%                      |
| Number of countries with CA deficit < -5% of GDP | 3      | 7             | 15              | 7                          |
| Number of countries with NFA < -50% of GDP       | 3      | 3             | 10              | 5                          |
| Total number of countries                        | 21     | 21            | 20              | 25                         |

Source: IMF statistics, national sources, and Lane and Milesi-Ferretti, External Wealth of Nations dataset.

### C. The financial crisis and sudden break in capital flows

The previous section highlighted the extent of cross-border holdings for advanced economies on the eve of the crisis as well as the key role played by banks, both in direct cross-border holdings of debt instruments and more generally through their international banking activity. As is well known, the crisis originated in a segment of the US securities market – namely, privately-issued asset-backed securities (ABS) backed by subprime and other types of mortgages. Figure 5 on the next page shows net foreign purchases of US bonds, the most important source of US current-account deficit financing over the past decade. Purchases of corporate bonds, which include privately-issued ABS, had played a very important role in previous years, but virtually dried up in the third quarter of 2007 and have not recovered since. The decline in the demand for privately-issued US corporate securities, together with the reduction in US short-term interest rates by the Federal Reserve, led to a weakening of the US dollar, which by March 2008 was close to a 40-year low in real effective terms (Figure 6).

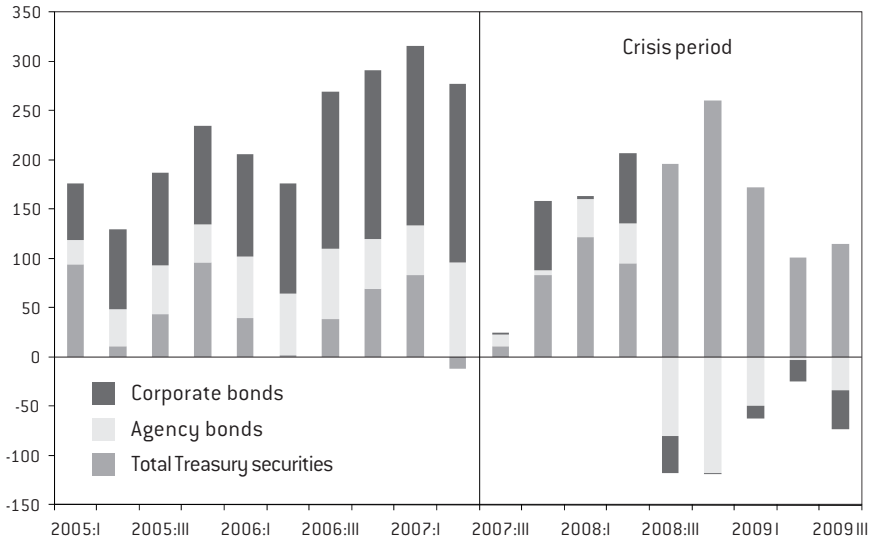
Table 3 helps to explain the initial international transmission of the crisis. It highlights that while total holdings of US debt securities on the eve of the crisis (June 2007) were particularly high in China and Japan, holdings of privately-issued mortgage-backed securities were instead concentrated in advanced economies and offshore centres. Among advanced economies, the largest holders were France, Germany, Switzerland, and the UK, and banking centres such as Belgium and Ireland<sup>5</sup>. Hence a portfolio shock which reduced the value of claims on the US (in principle not dissimilar to the ones considered in scenarios featuring a sudden adjustment in global imbalances) had different cross-border implications to those underscored by these scenarios, and did not have a significant direct impact on large creditor countries such as China, Japan, and oil exporters<sup>6</sup>.

The statistics presented in Table 3 provide a picture of cross-border exposures to US asset-backed securities. Calculating ultimate exposures for different banking systems is considerably more complex for two reasons:

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5. Of course the actual exposures of banks domiciled in these countries could have been larger to the extent that their affiliates in the US or in offshore centres were holders of these securities. For a discussion of foreign exposures to US-issued ABS, see Beltran *et al* (2008).
  6. Scenarios featuring a disruptive unwinding of global imbalances were typically characterised by a decline in demand for US portfolio instruments and a large dollar depreciation (Faruquee *et al*, 2007, Lane and Milesi-Ferretti, 2007), with stronger spillover effects for countries 'long' in dollars (such as China and Japan) rather than for Europe.

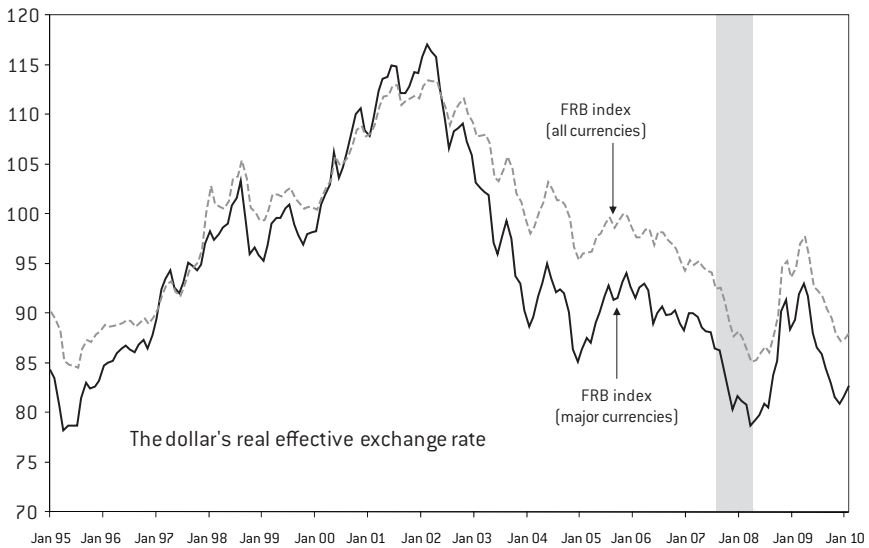


Figure 5: Foreign purchases of US bonds (billions US\$)



Source: US Bureau of Economic Analysis.

Figure 6: The US dollar's real effective exchange rate, January 1995 to January 2010



Source: US Federal Reserve Board.

Table 3: Foreign holdings of US bonds (in billions of US\$)

|                           | June 30 2008 |        |        |         |           | June 30 2007 |        |        |         |           |
|---------------------------|--------------|--------|--------|---------|-----------|--------------|--------|--------|---------|-----------|
|                           | Total bonds  | Treas. | Agency | Corpor. | Corp. MBS | Total bonds  | Treas. | Agency | Corpor. | Corp. MBS |
| Total                     | 7352         | 2589   | 1637   | 3126    | 458       | 6642         | 2194   | 1413   | 3035    | 594       |
| Advanced                  | 3646         | 1032   | 514    | 2100    | 234       | 3508         | 963    | 508    | 2037    | 350       |
| Offshore                  | 810          | 115    | 107    | 587     | 196       | 762          | 85     | 111    | 566     | 204       |
| Emerging and developing   | 2897         | 1442   | 1016   | 438     | 28        | 2373         | 1147   | 794    | 432     | 40        |
| China                     | 1106         | 535    | 544    | 27      | 6         | 894          | 477    | 387    | 29      | 9         |
| Japan                     | 1052         | 628    | 272    | 152     | 16        | 976          | 622    | 231    | 123     | 17        |
| Korea                     | 123          | 41     | 60     | 23      | 2         | 133          | 44     | 70     | 19      | 2         |
| Hong Kong                 | 118          | 65     | 31     | 22      | 9         | 107          | 57     | 24     | 26      | 15        |
| Singapore                 | 67           | 32     | 8      | 27      | 2         | 67           | 36     | 5      | 26      | 3         |
| Cayman Islands            | 515          | 45     | 51     | 419     | 164       | 461          | 29     | 56     | 376     | 157       |
| United Kingdom            | 488          | 52     | 30     | 406     | 46        | 500          | 48     | 28     | 424     | 90        |
| Luxembourg                | 466          | 103    | 32     | 331     | 22        | 469          | 56     | 42     | 371     | 39        |
| Belgium                   | 436          | 15     | 25     | 395     | 11        | 372          | 15     | 33     | 323     | 19        |
| Ireland                   | 325          | 20     | 35     | 270     | 28        | 261          | 16     | 30     | 215     | 33        |
| Switzerland               | 152          | 46     | 19     | 88      | 12        | 155          | 40     | 18     | 97      | 20        |
| Germany                   | 176          | 52     | 12     | 112     | 31        | 166          | 46     | 15     | 105     | 33        |
| Netherlands               | 123          | 18     | 18     | 88      | 21        | 136          | 17     | 24     | 96      | 32        |
| France                    | 89           | 16     | 19     | 55      | 24        | 90           | 17     | 11     | 62      | 31        |
| Italy                     | 16           | 11     | 3      | 2       | 0         | 24           | 14     | 4      | 6       | 2         |
| Spain                     | 21           | 9      | 2      | 10      | 0         | 16           | 6      | 2      | 8       | 0         |
| Russia                    | 223          | 95     | 127    | 0       | ...       | 147          | 34     | 114    | 0       | ...       |
| Mexico                    | 115          | 41     | 38     | 36      | 0         | 89           | 34     | 33     | 22      | 0         |
| Middle East oil exporters | 251          | 140    | 65     | 46      | 5         | 169          | 111    | 34     | 24      | 4         |

Note: The table report a total foreign holdings of US long-term bonds as of June 30, 2008 and June 30, 2007. These holdings are divided into three categories: Treasury bonds, bonds issued by US federal agencies such as Fannie Mae and Freddie Mac; and corporate bonds. The table also provides the amount of corporate bonds that are mortgage-backed securities (MBS). Source: US Treasury, 2007 and 2008 Surveys of US Portfolio Liabilities.

1. Offshore-centre activity makes it more difficult to determine the ultimate ownership of mortgage-backed securities. For example, as of June 2008 close to \$200 billion in US asset-backed securities were held in offshore centres, the large majority in the Cayman Islands, where structured finance is of particular importance (Lane and Milesi-Ferretti, 2010a). While US residents may well have been the ultimate owners of some of these securities, financial institutions from other advanced economies were also exposed, through their conduits and structured investment vehicles (SIVs).
2. Foreign banking systems had exposure to the US mortgage market through their 'local' US activities as well. As of June 2007, US affiliates of foreign banks had \$3.66 trillion in dollar claims on US residents, of which \$3.2 trillion were claims of affiliates of European banks. Swiss banks had the largest local exposure (close to \$1 trillion) followed by British, French and Dutch banks.
3. Finally, these data do not include exposures (or hedges) through derivatives contracts –again, an important factor in the crisis.

As has been already documented in the literature on the financial crisis, initial losses were concentrated in highly-leveraged institutions in the financial sector and in off-budget entities (such as conduits and SIVs) set up by these institutions. An additional source of vulnerability was the funding structure supporting holdings of asset-backed securities (see, for example, Acharya *et al*, 2009, and Arteta *et al*, 2009). Conduits (and to a lesser extent SIVs) financed ABS holdings through issuance of short-term asset-backed commercial paper (ABCP), in turn typically held by investors such as money-market mutual funds. As these sources of funding dried up, sponsoring financial institutions took these off-budget entities 'on budget', increasing their direct exposure to these securities.

While in terms of wealth destruction these losses on investments were initially much smaller than those associated with, say, a stock-market decline, their concentration in highly-leveraged institutions gradually set in train a process of asset sales that triggered sharp declines in asset prices. At the same time, extreme uncertainty about the size of losses and their distribution across banks resulted in a freezing of interbank markets and credit more generally.

Following the collapse of Bear Stearns, there was a major retrenchment in cross-border banking flows in the second quarter of 2008 (Figures 8, 9 and 10), which was particularly dramatic in banking centres such as the UK and Switzerland, but was also significant for the US. In the third quarter, the global reach of the crisis became increasingly evident, with signs of slowing or declining activity across the globe.

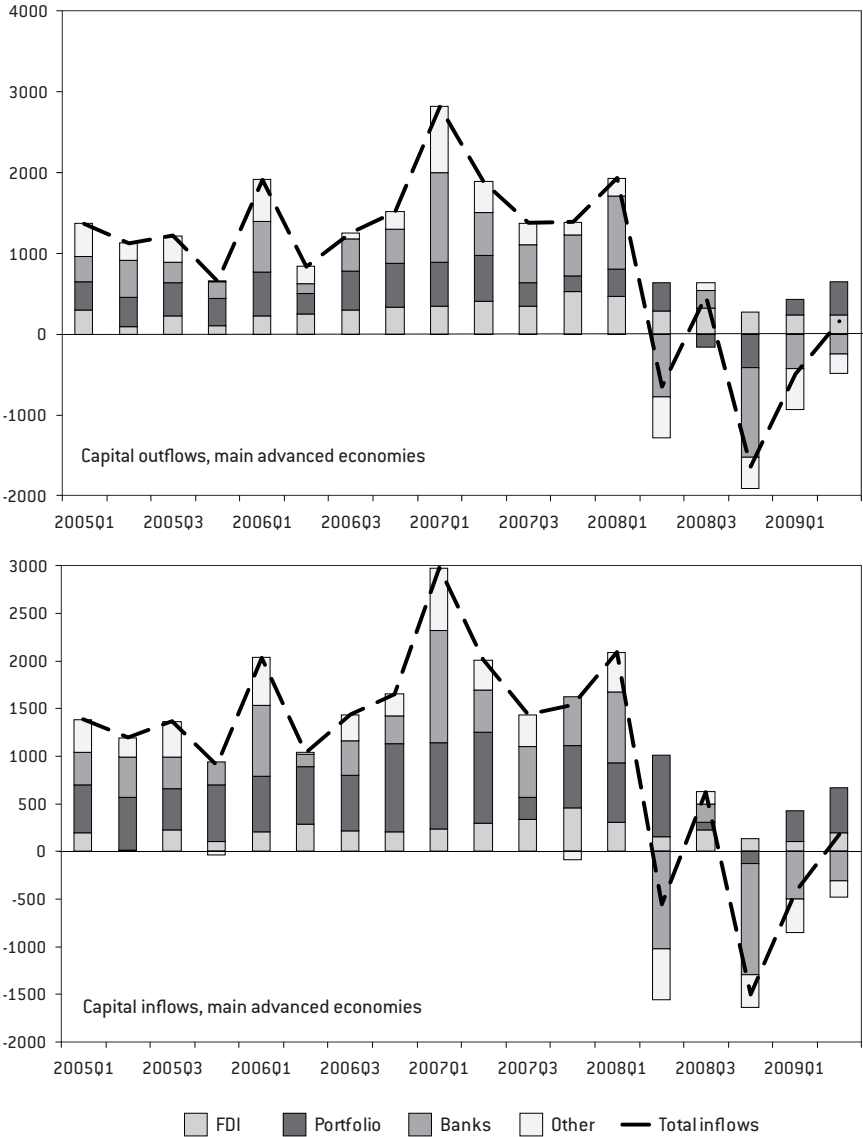
The financial crisis morphed into a financial panic and a global downturn in September 2008. The fourth quarter of 2008 was characterised by a dramatic fall in world demand and a collapse in cross-border flows, as a result of the deleveraging process (Figures 7-10). The end of the period of easy credit and the concentration of losses in the banking system had significant effects on a number of economies in central and eastern Europe that relied more on external finance and particularly on bank credit, as highlighted by Hungary, Latvia and the Ukraine's recourse to IMF programmes. The deleveraging process was associated with sharp depreciations of most floating emerging-market currencies, with the selling by banking institutions compounded by hedge funds reducing the size of their balance sheets to meet redemptions. As shown in the top panel of Figure 9, foreigners were net sellers of portfolio instruments particularly in the fourth quarter of 2008, and there was a net reduction in other foreign claims (primarily bank loans and deposits), which was particularly substantial in emerging Asia. Safe-haven currencies – the US dollar, the Swiss franc and especially the yen – rebounded strongly.

Conceptually, there are three key cross-border aspects of the financial crisis in the second part of 2008:

- Unprecedented deleveraging by financial-market institutions and other financial intermediaries;
- A sharp increase in home bias, likely further influenced by measures implemented nationally to deal with banking-sector problems;
- A dramatic increase in risk aversion and 'flight to safety'.

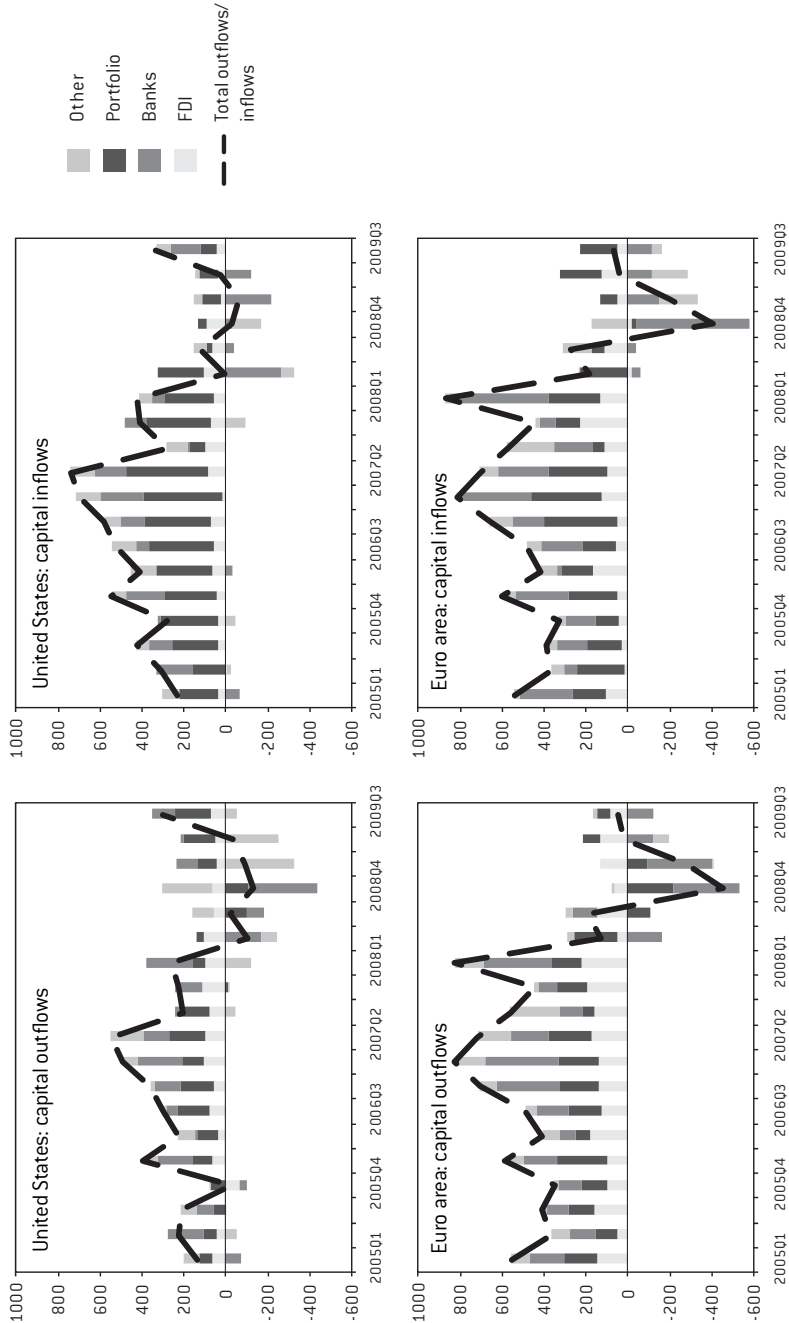
In principle, a homogeneous increase in home bias across countries should lead to an appreciation of creditor-country currencies and a depreciation of debtor-country currencies. However, for the US there were two factors that pushed the dollar higher. The first was the role of US Treasury securities as safe assets – portfolio flows into US Treasuries were very high in the second half of 2008, as shown in Figure 5. The second factor, described in more detail by McGuire and von Peter (2009), was a 'dollar shortage' in the banking system. The cause of this shortage was alluded to in the previous section. Non-US financial institutions had financed their holdings of US asset-backed securities (directly or indirectly through their conduits and SIV) through issuance of short-term dollar-denominated asset-backed commercial paper. This source of funding dried up, both because of concerns about the solvency of the banks and the run on money-market funds, traditional holders of ABCP, following the Lehman bankruptcy and the news that the Reserve Primary money-

Figure 7: The collapse in capital flows – advanced economies (US \$ billions)



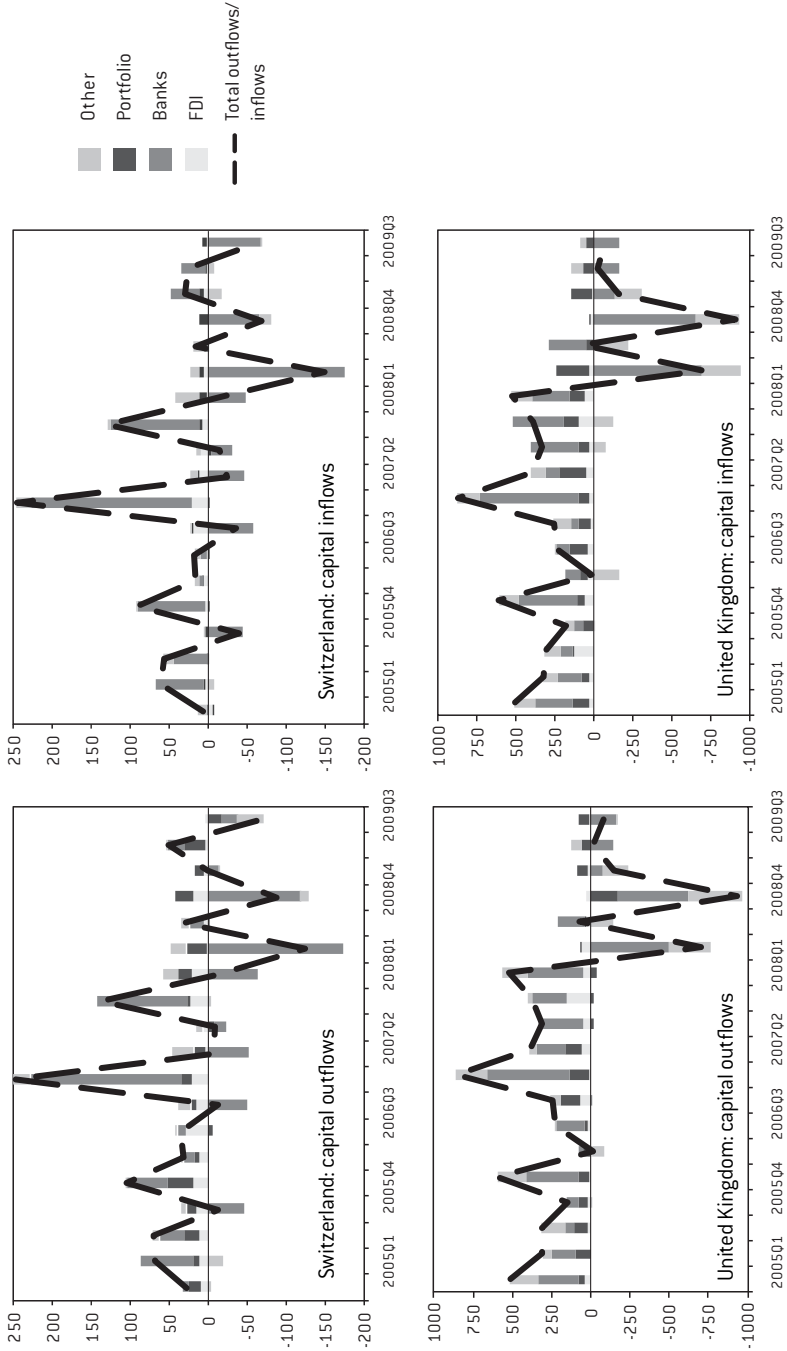
Source: IMF, Balance of Payments Statistics.

Figure 8: United States and euro area: capital inflows and outflows (2005Q1-2009Q3), US \$ billions



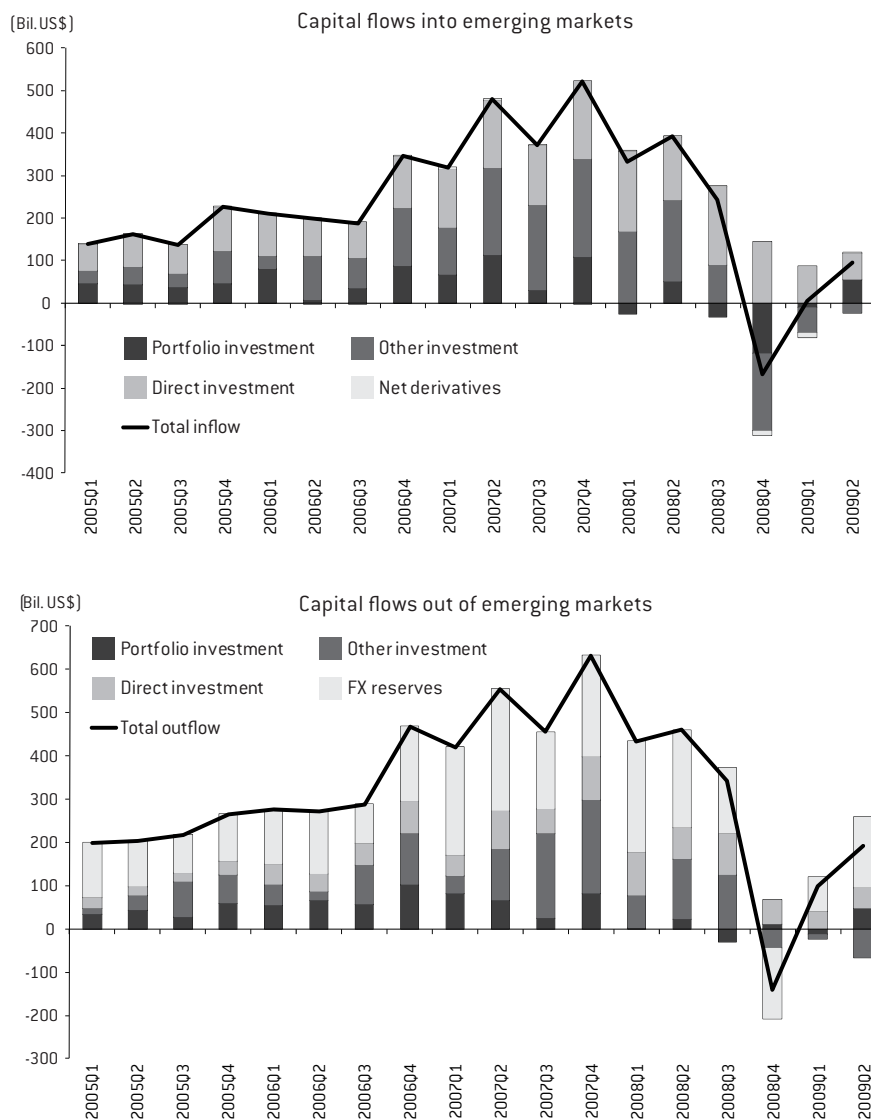
Source: IMF, Balance of Payments Statistics and author's calculations.

Figure 9: Capital inflows and outflows: Switzerland and the United Kingdom (2005Q1-2009Q3), US \$ billions



Source: IMF, Balance of Payments Statistics and author's calculations.

Figure 10: The collapse in capital flows: emerging markets



Source: IMF, Balance of Payments Statistics.



market fund had ‘broken the buck’. Central banks stepped in, with the activation of swap lines between the Federal Reserve on the one hand, and the European Central Bank and several other central banks on the other hand, designed to provide dollar liquidity.

In emerging markets, the deleveraging process and increased risk aversion in advanced economies led to a sudden stop in capital inflows, with net sales of emerging-market assets by foreign residents and large exchange-rate depreciations, particularly in countries where the decline in gross flows was more dramatic (Figure 11). Several emerging markets sold reserves to cushion the impact of the sudden stop in capital inflows and ease pressure on private-sector financing (Figure 10, bottom panel).

More recently, the financial turmoil has abated and there are tentative signs of recovery. The prices of risky assets have rebounded, and in foreign-exchange markets the dramatic exchange-rate changes that took place between the autumn of 2008 and March 2009 have been mostly unwound, with the US dollar depreciating and most floating emerging-market currencies appreciating strongly (Figure 14). It is still too early to tell whether the global recovery will be sustained or whether it is primarily driven by temporary factors such as sharply-expansionary fiscal policies and the end of the process of de-stocking. But in any case, the consequences of the crisis will be long lasting, in terms of its effect on the economy and the structure of the financial system, and in terms of how economic thinking will be shaped in years to come. The next section turns to a selected set of themes drawn from the crisis, primarily related to international macroeconomics and finance.

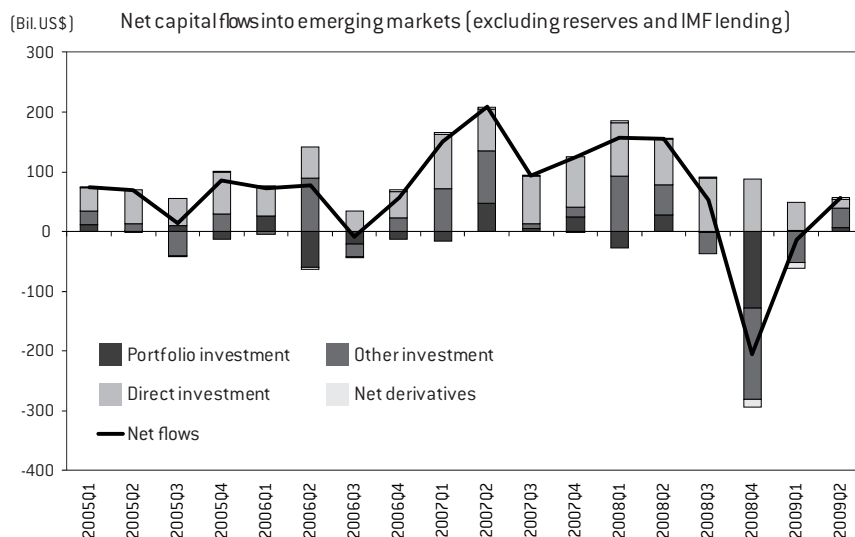
## Selected lessons and open questions

There is a growing literature discussing the lessons learnt from the crisis [see, for example, IMF, 2009; for an emphasis on macroeconomic policy, see Blanchard *et al*, 2009]. The literature’s major emphasis is on the factors that caused the financial excesses and helped create the balance sheet vulnerabilities that the crisis has brought so dramatically into the spotlight. Among these factors are, for example, the architecture and scope of domestic financial regulation; the appropriate mechanisms for cross-border financial supervision; and the conduct of monetary policy in the presence of asset-price bubbles<sup>7</sup>. The aim of this section is more modest.

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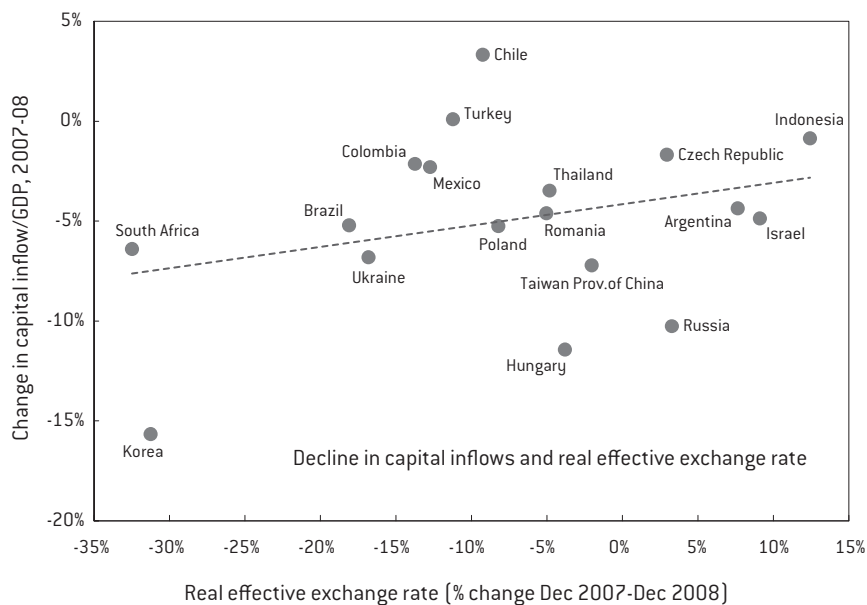
7. On the first topic, see IMF (2009b). On the second see, for example, Claessens (2009).

**Figure 11: Net capital flows to emerging markets**



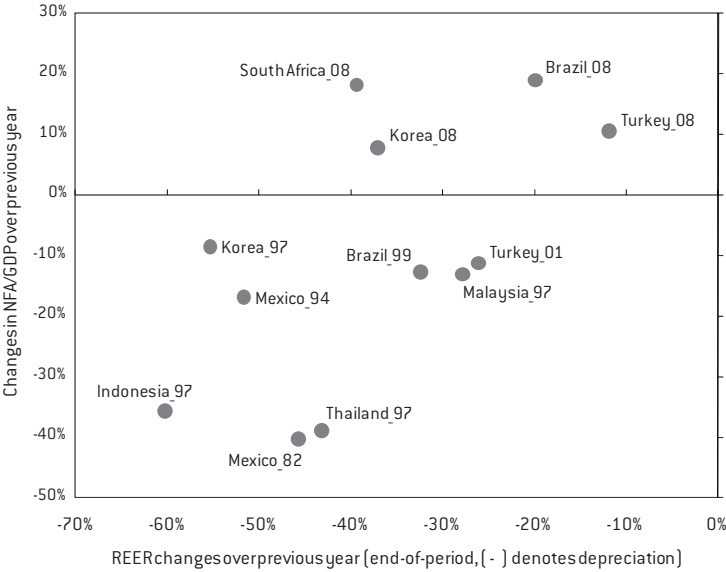
Source: IMF, Balance of Payments Statistics.

**Figure 12: Decline in gross flows and exchange rates, 2007-08**



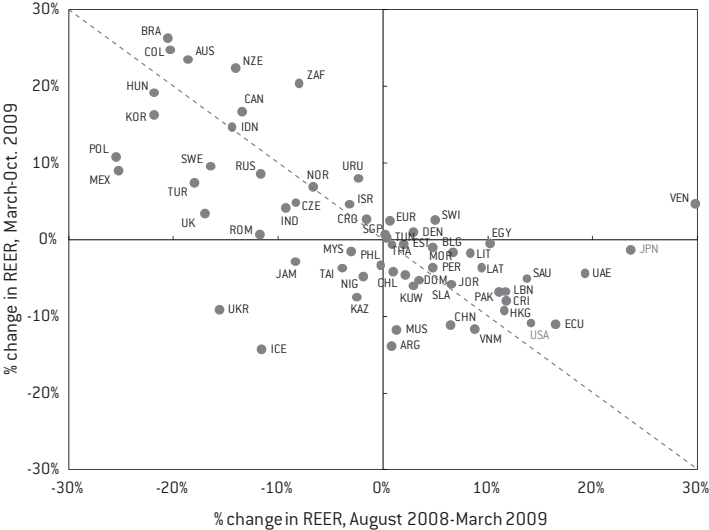
Source: IMF and authors' calculations.

Figure 13: Emerging markets: real depreciation and change in external position: past and present



Source: IMF and Lane and Milesi-Ferretti, External Wealth of Nations dataset. Note: the chart depicts the behaviour of real effective exchange rates and the net foreign asset position around episodes of large exchange rate depreciations.

Figure 14: Real effective exchange rate changes: August 2008 to October 2009



Source: IMF and authors' calculations.

Namely, it focuses on a limited range of topics, primarily related to external stability and vulnerability to external shocks. At least some of these lessons are not new: some featured prominently in the debate on emerging-market crises a decade ago. Indeed, this financial crisis has shown that macroeconomic and financial weaknesses and exposures that were considered potential sources of external vulnerability for emerging markets could become sources of vulnerability for advanced economies as well<sup>8</sup>.

#### D. The importance of sectoral exposures

A key factor in explaining the severity of the domestic and international repercussions of the financial-market shock was the sectoral exposure to losses. This lesson is not new: the Asian crisis provided compelling evidence of the importance of balance-sheet linkages and currency mismatches when there are large changes in exchange rates and asset prices. Sectoral exposures played a key role in the initial transmission of the crisis to countries whose financial institutions were exposed to asset-backed securities. More generally, the concentration of exposure – and initial losses – in the highly-leveraged financial sector led to much more severe multiplier effects. Among emerging markets, several countries in central and eastern Europe that relied extensively on external credit and where euro-area banking institutions played a key role in domestic banking, were severely affected by the seizing up of credit markets and banking sector woes in advanced European countries. And foreign-currency exposures to domestic banks by unhedged sectors (such as households in Hungary) led to a more disruptive impact of exchange-rate depreciation than would otherwise have been the case.

#### E. The dangers of large current-account deficits

There is no theoretical presumption that current-account deficits and surpluses, even if large, are necessarily bad. Indeed, capital should flow to where it has the highest risk-adjusted return. But there are a number of reasons why large current-account imbalances may also reflect a variety of domestic and international problems and distortions. And it is remarkable to observe that virtually all crises triggered by the world financial turmoil happened in countries that were running high current-account deficits and had high external liabilities (Table 4). More

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8. This parallel was noted, early in the crisis, by Reinhart and Rogoff (2008).

systematic analysis confirms this pattern: as documented in Table 5, the decline in output growth rates and especially in domestic-demand growth during 2008-09 was larger in countries that had large external imbalances (Lane and Milesi-Ferretti, 2010b). The boom period of easy credit was associated with a dramatic compression in spreads, as markets took a very benign view of external vulnerabilities. In this regard, the crisis reflected in part an extreme form of ‘a return to fundamentals’. At the country level, the key issue will be how to insure against risks while not precluding net access to foreign capital for countries whose growth prospects warrant higher returns on investment.

Of course, the policy debate prior to the crisis was focused primarily on global imbalances and the risks an abrupt unwinding of such imbalances could pose to the world economy. The crisis was not triggered by a run on the US dollar and a disorderly unwinding of global imbalances, one of the scenarios that had worried policymakers and the IMF, but by failures within the financial system, with a cascading impact on underlying macroeconomic and financial weaknesses. Still, global imbalances clearly reflected ‘financial excesses’ related to these failures (such as low levels of private savings reflecting easy credit and booms in asset prices, or high residential investment fueled by inflated house prices) and a number of other distortions (from export-led growth strategies relying on depreciated real exchange rates to the globally-inefficient accumulation of reserves for insurance purposes). And the concerns and policy recommendations to ease their unwinding were justified (Blanchard and Milesi-Ferretti, 2009; Obstfeld and Rogoff, 2009). If anything, observers may have underestimated the extent to which imbalances were a symptom of domestic distortions and vulnerabilities. The key issue is if the

Table 4: External imbalances in IMF programme countries, 2008 (in percent of GDP)

|          | Current account balance | Net foreign asset position |
|----------|-------------------------|----------------------------|
| Belarus  | -8.4%                   | -23.0%                     |
| Hungary  | -7.8%                   | -105.0%                    |
| Iceland  | -34.7%                  | -302.7%                    |
| Latvia   | -13.2%                  | -81.7%                     |
| Pakistan | -8.4%                   | -44.0%                     |
| Romania  | -12.6%                  | -57.4%                     |
| Serbia   | -17.3%                  | -68.4%                     |
| Ukraine  | -7.2%                   | -37.6%                     |

Sources: IMF and Lane and Milesi-Ferretti, External Wealth of Nations dataset.

Table 5: Change in growth rates: 2008-2009 v 2005-2007

|                                                            | (1)                  | (2)                  | (3)                  | (4)                     | (5)                     | (6)                     |
|------------------------------------------------------------|----------------------|----------------------|----------------------|-------------------------|-------------------------|-------------------------|
| Dependent variable                                         | Change in GDP growth | Change in GDP growth | Change in GDP growth | Change in demand growth | Change in demand growth | Change in demand growth |
| Sample                                                     | All countries        | Excl. oil export.    | Excl. low income     | All countries           | Excl. oil export.       | Excl. low income        |
| GDP growth 2005-07 (relative to LT growth)                 | -0.77***<br>[0.12]   | -0.87***<br>[0.15]   | -0.89***<br>[0.15]   |                         |                         |                         |
| Total demand growth 2005-07 (relative to LT demand growth) |                      |                      |                      | -0.80***<br>[0.09]      | -0.95***<br>[0.10]      | -0.81***<br>[0.12]      |
| Log GDP per capita, 2007                                   | -1.23***<br>[0.25]   | -1.48***<br>[0.27]   | -1.56***<br>[0.42]   | -1.77***<br>[0.38]      | -2.05***<br>[0.37]      | -1.91***<br>[0.66]      |
| CA/GDP, 2007                                               | 0.05**<br>[0.02]     | 0.05*<br>[0.03]      | 0.05*<br>[0.03]      | 0.24***<br>[0.05]       | 0.25***<br>[0.05]       | 0.29***<br>[0.06]       |
| Trade openness                                             | -2.06***<br>[0.58]   | -2.38***<br>[0.60]   | -2.36***<br>[0.68]   | -1.97**<br>[0.86]       | -2.57***<br>[0.83]      | -1.87*<br>[1.06]        |
| Log Financial openness                                     | 1.21**<br>[0.52]     | 1.56***<br>[0.56]    | 1.75***<br>[0.67]    | 1.91**<br>[0.79]        | 2.48***<br>[0.78]       | 1.82*<br>[1.10]         |
| Share of manufacturing in GDP                              | -0.09**<br>[0.04]    | -0.06<br>[0.04]      | -0.06<br>[0.05]      | -0.12**<br>[0.06]       | -0.05<br>[0.06]         | -0.11<br>[0.07]         |
| Change in priv. credit to GDP, 2004-2007                   | -4.74***<br>[1.51]   | -4.76***<br>[1.55]   | -5.17***<br>[1.69]   | -9.10***<br>[2.39]      | -9.12***<br>[2.33]      | -7.80***<br>[2.90]      |
| Oil dummy                                                  | -0.27<br>[0.90]      |                      | 0.47<br>[1.12]       | -1.39<br>[1.43]         |                         | -2.93<br>[1.98]         |
| Constant                                                   | 10.74***<br>[1.99]   | 12.65***<br>[2.13]   | 13.25***<br>[3.62]   | 15.98***<br>[2.91]      | 17.69***<br>[2.88]      | 16.92***<br>[5.80]      |
| Observations                                               | 146                  | 126                  | 112                  | 130                     | 112                     | 96                      |
| R-squared                                                  | 0.46                 | 0.47                 | 0.43                 | 0.55                    | 0.60                    | 0.53                    |

Note: Standard errors in brackets, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. The dependent variable is the difference in the average growth rate between 2008-9 and 2005-7 (GDP growth for columns (1)-(3) and total demand growth for columns (4)-(6)). The regressions in column (2) and (5) exclude oil exporters, and columns (3) and (6) exclude low-income countries (defined as having a GDP per capita below \$1000 in 2007).

contraction in imbalances following the crisis marks their end or if the type of imbalances seen in past years could resurface as the world economy recovers. We briefly take up this issue in the concluding section.

## F. Exchange-rate flexibility and portfolio structure

In a number of emerging-market countries, exchange-rate depreciations during the second half of 2008 were of an order of magnitude that would have wreaked havoc on external accounts in the past because of balance-sheet effects. Even though economic activity suffered, these economies were much more resilient this time, especially considering the extent of the global recession. The changes in portfolio structure discussed in section B played a key role. In fact, external liabilities of a significant number of emerging markets are now denominated in domestic currency – countries are net creditors in foreign-currency terms (see, for example, Figure 4). As a result, the balance-sheet effects of exchange-rate depreciation now work very differently. This point is clearly illustrated in Figure 13, which compares the effects of exchange-rate depreciation on the net foreign-asset position in a number of past crises with the same effects in 2008. While the ratio of external liabilities to GDP rose significantly in all past crises, reflecting a short position in foreign currency, the opposite was true in 2008: the stronger foreign-currency position of countries and the exposure of foreign residents to declining domestic-asset prices (such as equity values) led to an improvement in the net external position for countries such as Brazil, Korea and Turkey.

Conversely, the aftermath of the crisis has further underscored the difficulty and cost of closing current-account deficits and unwinding appreciations caused by (ex-post) unsustainable credit booms under fixed exchange-rate arrangements and particularly when inflation in trading partners is very low. The wrenching recession in Baltic countries illustrates this point very starkly. A key policy issue will be how to control booms – and contain current-account deficits – when monetary policy is tied to the mast. While an obvious policy lever is fiscal policy, one potentially significant problem, further discussed below, is that credit booms tend to flatter fiscal accounts. Under these circumstances, countries may have political difficulties running very large fiscal surpluses even if these were structurally justified. The crisis suggests that countries susceptible to large capital inflows and credit booms should consider a variety of macro-prudential and regulatory tools to discourage excessive risk-taking and control foreign-currency borrowing.

## G. Credit booms can flatter fiscal accounts

The crisis has shown very dramatically how quickly fiscal prospects change when a credit boom comes to an end. Several advanced economies – Ireland, the UK and US – are prime examples of how declining asset prices can have very significant effects on public revenues, well above the traditional cyclical effects of automatic stabilisers<sup>9</sup>. For all countries with a well-developed financial system, especially those with established fiscal frameworks, a better understanding of the impact of asset prices on revenues is key. There are two aspects to consider: first, the extent to which revenues linked to asset prices are more strongly pro-cyclical than general revenues; second, the impact of credit and asset-price booms on estimated potential output. After the crisis the level of potential output and its growth rate are likely to be revised downwards in several countries, suggesting – with the benefit of hindsight – that the fiscal policy stance was much more accommodating during the cyclical upswing than previously thought. These factors, together with the cost of the financial bailouts, help explain the much-diminished outlook for public finances in several advanced economies.

## H. Global financial architecture

In a number of emerging markets, the availability of reserves helped bridge shortfalls in capital inflows without requiring dramatic changes in current-account balances. While the literature makes a strong case that reserve accumulation in a number of emerging markets has been excessive, the crisis clearly shows the need for mechanisms that ensure the rapid availability of resources for countries facing sudden stops in capital flows through no fault of their own. Reforms of the international financial architecture that reduce the incentive to accumulate precautionary saving through ever-higher foreign-exchange reserves would not only be desirable from a country-insurance perspective, but also help rebalance demand in the world economy.

While the benefits of addressing country-insurance issues are clear, the general area of reform of the international financial architecture is one where there are still many unanswered questions and progress is likely to be slow. The increase in IMF resources, as well as the design of contingent mechanisms such as the Flexible Credit Line (FCL), are steps in the right direction, but of course they do not add up to

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9. For an earlier analysis of this issue, see, for example, Jaeger and Schuknecht (2007) and Morris and Schucknecht (2007).



a full solution. Access to the FCL is limited to countries that qualify, and the issue of stigma, and governance concerns, still make countries reluctant to access IMF credit lines. Other cross-border insurance mechanisms, such as regional-reserve pooling and reserve-swap arrangements can also play a role, but will generally have only a limited reach (see, for example, Mateos y Lago *et al* (2009) for a more comprehensive discussion of alternative options to reduce demand for reserves, including private-sector insurance, and a discussion of the potential role of the SDR).

Unanswered questions remain also on the endogenous evolution of the current system –namely, if demand for alternative reserve currencies will increase after the crisis. On the one hand, the fact that the US was the epicentre of the crisis would suggest some erosion of the role of the US dollar as the main reserve currency, a thesis consistent with the steady dollar decline between the onset of the sub-prime crisis in August 2007 and the middle of 2008. On the other hand, during the most acute phase of the financial panic at the end of 2008 and early 2009 the dollar rebounded strongly on safe-haven buying. On balance, though, it is hard to escape the notion that, in many emerging markets, the crisis – as well as their already significant holdings of traditional reserve assets – may encourage them to seek a more diversified portfolio of assets, both in terms of currency and type of instrument.

### Financial integration and imbalances: a look forward

This paper has related the multiplication of cross-border financial linkages over the past decade to the international transmission of the financial crisis. Higher international financial integration broadens the scope for the cross-border transmission of shocks, as exemplified by the dramatic impact of the crisis on large financial institutions in advanced economies. But at the same time the change in the structure of external balance sheets for many emerging markets has actually helped them cope with the global financial panic that followed the collapse of Lehman Brothers, and with the crisis more generally.

So what are the consequences of the crisis for international financial integration and global imbalances? On the global financial integration front, cross-border flows resumed in the second and third quarters of 2009, particularly to emerging markets, driving exchange rates in several of these countries back to levels preceding the financial panic of September 2008. The rebound of capital flows, asset prices and exchange rates has again brought to the fore the issue of reserve accumulation and

the asymmetries in exchange-rate dynamics between floating-rate currencies and those that are pegged to or follow closely the dollar (see again Figure 14). For advanced economies, whose financial balance sheets had expanded both domestically and internationally to a much larger extent, a rapid return to the volume of capital flows seen in 2005-07 seems unlikely. While flows from advanced economies to emerging markets have resumed, capital flows were dominated by cross-border asset trade among advanced economies, with large financial institutions playing a particularly important role. With these institutions still repairing their balance sheets, cross-border bank flows could remain weak for a while.

With regard to net flows, imbalances narrowed substantially in 2009, reflecting lower oil prices but also sharp contractions in domestic demand in several deficit countries. To what extent is this reduction in imbalances permanent? While clearly cyclical variations can help explain small imbalances, other factors are likely to be more persistent<sup>10</sup>. One is the increase in private savings and decline in investment in a number of deficit countries that experienced significant wealth losses through housing and stock-price falls. Arguably, another related factor is downward revisions of potential output. To the extent that the crisis is associated with a permanent output loss – relative to the pre-crisis trend – in countries that were experiencing credit booms and running large current-account deficits, imbalances will narrow as the imports of these countries are going to be lower than previously expected. At the same time, however, several advanced economies with large current-account deficits are projected to experience very protracted declines in net public saving, which will be particularly stark when compared to emerging-market creditor countries. Finally, risk premiums on cross-border borrowing are likely to be higher for debtors than during the capital flow bonanza of the past few years, thereby discouraging massive recourse to external finance.

Should we therefore stop worrying about imbalances? Not really. While deficits and surpluses are projected to fall in absolute terms, creditor and debtor positions among the main economic areas are still projected to widen. And even more importantly, with domestic demand likely to remain weak in the US and other deficit countries dealing with the aftermath of asset-price bubbles, the strength of the global recovery will depend crucially on a sustained increase in domestic demand elsewhere, and countries with surpluses have an important role to play in this respect. Given the pivotal importance of a sustained recovery and in light of the

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10. This part draws on Blanchard and Milesi-Ferretti, (2009).

underlying macroeconomic and financial fragilities in virtually all advanced economies and several emerging and developing countries, addressing the well-known distortions that favoured the emergence of imbalances in the first place remains an important and urgent task.

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# Comments on 'The international transmission of the financial crisis' by Gian Maria Milesi-Ferretti

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Gian Maria Milesi-Ferretti's paper is detailed and insightful, as we have come to expect from this author. There is much to agree with, and much to think about. In this comment I echo some of main points emphasised in the paper, and briefly elaborate on them.

In general terms, the recurrent theme of the paper is that, despite its very specific and localised origins [in the US in the summer of 2007], the crisis rapidly spread to the rest of the world through financial-sector linkages. No country or regional bloc got away unscathed, and 'decoupling' was quite simply not a feasible option. Nevertheless, some areas did better than others, depending on initial conditions and policy strategies.

These considerations go to the very core of any analysis of the crisis that focuses on its international impact, that is, the relative role of country-specific factors (transmitted from one region to another with different degrees of speed and severity) vis-à-vis global shocks (affecting the system as a whole, simultaneously and symmetrically). A narrative of the crisis that emphasises transmission and contagion typically concludes that, by implementing the appropriate domestic policies in a context of effective supervision, a country can be spared from (some of) the devastating effects of turmoil, almost regardless of what the rest of the system does. A narrative of the crisis that emphasises global shocks concludes

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1. Federal Reserve Bank of New York, NBER and CEPR. The views expressed here are those of the author, and do not necessarily reflect the position of the Federal Reserve Bank of New York, the Federal Reserve System, or any other institution to which the author is affiliated.

instead that the only effective solutions are bound to be holistic reforms.

The balancing of these two aspects is very much the key to a comprehensive interpretation of the 2007-08 events and their lessons, as a brief revisiting of the first half of the paper reveals. Erring on the side of simplicity, a reconstruction of the crisis can be articulated in terms of a prologue and two acts (this being an unfinished story at the time of writing, the third act having just started...).

The prologue takes place from the mid-1990s to 2007, a period that witnessed a rapid expansion in world trade and, even more staggering, a boom in financial globalisation. The emergence of global imbalances during this period needs to be assessed in the context of unprecedented capital mobility: while cross-border flows amounted to five percent of world GDP in 1998, they surpassed the 17 percent mark in 2007. Flows to and from the main advanced economies played a dominant role: north-north cross-border holdings increased in all asset/liability categories, and, by the end of 2007, both assets and liabilities represented more than 220 percent of the GDP of advanced economies, twice the ratio observed ten years previously. In emerging markets, total cross-border holdings grew as well, but at a more leisurely pace. Total external liabilities increased from 70 percent in 1998 to 88 percent in 2007, total assets from 57 to 88 percent. For the emerging world as a whole, capital flows mainly concentrated on foreign direct investment and portfolio equity investment, with a much reduced role for debt liabilities (which declined from 47 to 34 percent of GDP). The net external debt position improved in Latin America and especially in Asia, driven by a spectacular upswing in the accumulation of reserves. There are significant asymmetries, however. In some regions, net positions in FDI and equity worsened, and became much more negative, especially in emerging Europe.

At the end of the prologue, total holdings of US debt securities were particularly high in China and Japan, while holdings of privately-issued securities were concentrated in advanced economies and offshore centres. A large part of the emerging world appears to have profoundly taken on board the lessons of the crises of the 1990s (and acted accordingly). The result was a generalised reduction in net currency exposure: external debt liabilities that are typically denominated in foreign currency are down; FDI and equity liabilities mostly denominated in domestic currency are way up. But substantial regional differences persisted: in particular, countries in emerging Europe ran current-account deficits significantly larger than countries in other areas.

Like all dramatically-effective prologues, the dynamics of the events therein affect to a large extent what goes on in the rest of the play. In our case, act one

started in 2007 (and ended with the major cliffhanger of the Lehman shock about one year later). The initial transmission of the sub-prime sector shock went in tandem with the attempt by highly-leveraged institutions in Europe and the US to quickly unravel their exposure to poorly-performing securities and to reduce their balance sheets. This set up a process of financial fire-sales that triggered further asset-price declines. Emerging markets were indirectly affected by the sharp deleveraging in advanced economies' financial institutions. Between the autumn of 2007 and the spring of 2008, the decline in demand for corporate bonds and privately-issued asset-backed securities, coupled with a reduction in policy rates, drove downward the value of the dollar. Following the collapse of Bear Stearns, there was major retrenchment in cross-border banking flows, which was particularly dramatic in the UK and Switzerland. Unlike the crash scenarios stressed in the policy and academic literatures on global imbalances, the crisis did not have a major direct impact on large creditor countries (such as China, Japan and the oil exporters).

Act two started with the Lehman crisis and (tentatively) ended sometime in 2009 (at the time of writing, the jury is still out on the exact details of when and how). In the second half of 2008, the synchronised cyclical downturn metamorphised into global pandemonium, with a dramatic fall in world demand and the virtual collapse of cross-border flows. Transmission to real activity was fast and furious, as lending activity dried up, reflecting sharp increases in home bias, skyrocketing risk aversion and a widespread scramble for liquidity. The reverberations of the deleveraging process were particularly evident in areas such as central and eastern Europe (as a result of their previous reliance on easy credit), although the entire emerging-markets region experienced the sudden cutting-off of capital inflows, and sales of reserves. Several emerging economies also witnessed sharp currency depreciations, while safe-haven currencies (US dollar, Swiss franc, Japanese yen) rebounded.

What emerges from this deliberately-simplified summary of the (author's reconstruction of the international dimensions of the) crisis, is a pattern of substantial similarities between the first and second acts, and the relentless unfolding of the drama announced in the prologue. But a few important differences, and perhaps structural discontinuities, should be highlighted. For instance, the inflationary outlook was remarkably different between the two acts. Strong global inflationary pressures prevailed during act one, driven by the direct and indirect effects of a substantial boom in commodity prices. Instead, in the months of act two, the generalised collapse of production and trade was associated with rapid

disinflation worldwide. Even more important was the role of the US currency: a major loser in the first act due to the frenetic deleveraging rush, the dollar appreciated rapidly in the second act, as global market participants flew to safety.

Going further, one could maintain that a key change in the dynamics of the crisis, and its international dimensions, occurred when we moved from the first to the (more devastating) second act. Using the jargon of international macroeconomics, act one was an international crisis much in the spirit of 'first generation' crisis models, with shocks transmitted across countries through international spillovers and linkages; act two was perhaps closer to the 'second generation' interpretive framework, with emphasis on the effects on market confidence and sentiment of common shocks.

Two notes of explanation are probably required at this point. In the economic literature that studies the global crises of the past 15 years, the bulk of interpretive frameworks (and formal models) are customarily systematised in terms of 'generations' of theoretical approaches, or at least of comfortable containers wherein to organise the flow of thoughts. The so-called 'first' generation puts emphasis on fundamental imbalances, typically fiscal, but possibly extended to a broader set of macroeconomic and policy distortions. The 'second' generation instead highlights non-fundamental factors: coordination failures in financial markets, bank panics and runs, multiple equilibriums, self-validating expectations. During the 1990s, the years of the Tequila and Asian crises, a 'third' generation emerged, stressing the interplay between financial (mostly banking) and monetary (typically, currency) crises, the effects of moral hazard in the presence of implicit guarantees, and the development of over-borrowing syndromes in the aftermath of a rapid process of financial liberalisation. To some extent, the 'third' generation repackages elements already present in the 'first' and 'second' generations, while broadening their scope and refining their conceptual framework. For a concise introduction to this literature and its conventions, the reader is referred to Pesenti and Tille (2000), among others.

With many caveats and nuances, the recent crisis can be approached and interpreted in light of a combination of these two (or three) theoretical apparatuses. The first generation emphasises the role of unsustainable imbalances and excessive global-liquidity creation, and fits well the early stages of the crisis. The second generation highlights confidence downfalls, panic in the interbank market, and the collapse of worldwide credit, as in late 2008. The third generation points to the negative effects of financial liberalisation and innovation (such as the diffusion of asset-backed securities, collateralised debt obligations and credit-default swaps)



as catalysts of excessive exposure. Similarly, and with many heroic simplifications, one can focus on the mechanism of international shock transmission and read the pre-Lehman events as a story of contagion across countries and asset classes, where country-specific elements matter in determining how severely the shocks were transmitted from the epicentre to the rest of the system. Instead, the post-Lehman act two can be substantially interpreted in terms of a global panic in the interbank market and a collapse of world activity driven by common shocks.

Casting these thoughts within some kind of rough-and-ready interpretive synthesis, one can think of the world economy as participating in a large, interconnected, global repo market. Borrowing from recent work by Gary Gorton (2009), think of international savers/lenders (money-market funds, corporations, insurance companies, pension funds, hedge funds and the like) as depositors, that is, firms seeking a safe place to save cash in the short term. And think of borrowers as banks (better, as the 'shadow' banking system comprised of leveraged financial intermediaries).

In this stylised global repo banking system, agents face a liquidity/borrowing/leverage constraint reflecting borrowers' default risk and their inability to commit to repayment:

$$L \leq (1 - h) (p_1 Q_1 + p_2 Q_2 + \dots)$$

Depositors lend funds ( $L$  in the expression above) in the repo market and receive collateral for their deposits. Eligible collateral includes a variety of assets  $Q_1, Q_2, \dots$ , including new financial products such as securitised tranches, evaluated at prices  $p_1, p_2, \dots$ . These securities are somewhat linked to fundamentals (for instance, they are 'backed' by mortgages), but the links to original cash flows from assets are far from direct and transparent, due to the complex packaging inherent to the securitisation process. The key point is that the  $Q$  assets are deemed to be informationally-insensitive, that is, immune to adverse selection by privately-informed agents (after all, they are senior, backed by portfolios and have high credit ratings); in sum, they are perceived by the lenders as (almost as) good as traditional insured deposits.

To formalise the 'almost as good' of the previous sentence, collateral involves a haircut or margin ( $h$ ) to protect the depositors against the risk of borrower default. In its simplest form, a haircut of, say five percent, means that a borrower can borrow \$95 for each \$100 pledged as collateral. Like traditional depositors at regulated commercial banks, our 'depositors' can withdraw their funds from the shadow

banking system by not rolling over their repo agreements and returning the collateral, or by increasing the haircut. Disorderly withdrawal of funds is tantamount to a colossal bank run led by generalised panic. From this vantage point, the global shadow banking system resembles an overgrown pre-Federal Deposit Insurance Corporation US banking system.

We have now the basic heuristic elements to reconsider the two acts of the global financial crisis. During act one, as stressed in Milesi-Ferreti's paper, a correction in asset values somewhere (say the fall in US housing prices) transmits to other asset classes everywhere else through margin calls and widespread deleveraging. The original shock in Region 1, say the US and the euro area, is a fall in  $p_1$ . Leverage constraints become binding. Agents sell illiquid assets to meet margin calls. This leads to further asset-price declines not only in Region 1 but also in Region 2 (Asia, emerging markets...) not hit by the original shock. As  $p_2$  falls accordingly, it leads to further deleveraging. Borrowing  $L$  falls worldwide. Production falls worldwide. Devereux and Yetman (2009) model this transmission channel in detail.

The plot of act two is related but qualitatively and quantitatively different. As mentioned above, it is basically a story of panic in the repo market leading to a run on the shadow banking system as the 'depositors' require increasing haircuts due to concern about the value and liquidity of the collateral. The shock here is a sharp increase in  $h$  (in fact, the average repo haircuts on structured debt were negligible until August 2007, reached 10 percent by the end of 2007, moving around 40 percent after the Lehman shock). Within an interconnected money market, this shock is global in nature. It leads to a worldwide credit-supply freeze. LIBOR-OIS spreads and similar measures, already larger than usual during act one, jump to unprecedented levels during act two. According to this story, the problem is not the sharp rise in borrower defaults. The crucial part is rather creditors' reluctance to lend and to invest in anything more risky than highly-liquid securities such as short-term Treasuries.

To rationalise the spike in  $h$ , different stories can be provided. Gorton (2009) suggests that collateral securities that used to be perceived as informationally-insensitive (as good as insured deposits) suddenly become informationally-sensitive (toxic assets). It becomes profitable to produce information and speculate on the value of these securities. Uncertainty about valuations in a 'market for lemons' makes them illiquid. But this is a thorough regime switch, leading to a worldwide flight to quality and safety. The transmission to the real economy is immediate and devastating. As resources are no longer available to fund

consumption/investment decisions, wealth and demand collapse worldwide. Orders and shipments plunge, industrial production nosedives, trade volumes contract sharply, both because of the direct drying-up of export financing and the indirect fall in world demand. All of this happens simultaneously and everywhere.

Building on these considerations, in the second part of the paper, the author draws a set of valuable lessons, especially for (but not confined to) emerging markets. Avoid large current-account deficits and unsustainable imbalances. Reduce sectoral exposure. Strengthen the fiscal position (the crisis has shown very dramatically how quickly fiscal prospects change when a credit boom comes to an end; declining asset prices can have very significant effects on public revenues). In addition, one may want to emphasise the relevance of policymakers' ability to intervene swiftly and provide liquidity flexibly in act-two conditions. To some extent, this is a restatement of the case for central-bank independence. It is also a warning against intervention of insufficient speed and scale. And a caveat about the negative consequences of premature withdrawal of macroeconomic stimulus. And a call for effective and timely policy coordination.

Ultimately, what is needed is to make sure that concerns about the increased size of the central-bank balance sheet, or the cyclically-adjusted public deficits during the process of crisis management, do not prevent global policymakers from acting as appropriate, and for as long as it takes (you want act three to end on a positive note after act two). At the same time, the lessons of the crisis include making sure that a viable exit strategy does exist, and going for it without hesitation when the right time comes. After all, nobody wants act three to create the pre-conditions for a new act one.

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# Implications of the financial crisis for potential growth: past, present, and future

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In a sense, the financial turmoil that gripped the world's markets in 2008-09 reflects the realisation that large amounts of capital were invested in assets whose returns were substantially less than anticipated<sup>2</sup>. A substantive portion of recent investment was in assets (such as US and Spanish housing, or office space for investment banks) whose productivity has been found to have diminished, and large numbers of workers (in industries such as construction and finance) have been found to be in situations where their wages exceed the value of their marginal products. The resulting losses of values and incomes contributed to the sharp contraction of demand, and surely have deepened (if not created) the industrial world's recession. In light of these events, prior estimates of the physical returns on these assets and the marginal product of these workers could arguably have been overstated.

Looking beyond the current turmoil, does the recognition that resources may have been 'misallocated' in recent years imply that the growth of output was overstated? Will potential and actual output growth in the future be directly impeded

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  2. For the purposes of this paper it is irrelevant whether those low returns reflected draws from the tail of the *a priori* distribution, or draws closer to the central tendency of a distribution with different moments than that assumed at the time of the investment.

by any contraction in finance? One simple calculation might illustrate the potential magnitude of these concerns. Between 2000-06 financial corporate profits in the US more than doubled, rising from \$196 billion (2.0 percent of nominal GDP) to \$462 billion (3.5 percent of nominal GDP)<sup>3</sup>. This profits surge occurred in a period in which the US accounts report that the real value-added of the financial sector rose, on average, around 2 ¼ percentage points more than that of overall real GDP.

A natural presumption would be that the growth in the real output of the sector and the surge in earnings were linked; that the increase in profits largely reflected the increased contribution of the sector to overall GDP growth. However, the scale of the collapse in values in securities markets over the past few years could suggest that the growth of financial output was overstated in the earlier period. Even in calmer times, the output of financial industries is one of the most difficult to measure, with significant problems connected to both the determination of nominal output and the estimation of price indexes (Bosworth and Triplett, 2004), and those difficulties were arguably heightened when financial innovations were accelerating, perhaps working to exaggerate the expansion of the sector's output. Mismeasurement could further suggest that the increase in the financial profit share largely reflected a diversion of productive resources rather than a return to increased productivity. A reduction in estimates of the past growth of financial output may help to raise concerns about the growth of US economic capacity. A reduction of past measured real growth, with no change in employment and inflation, could suggest a reduction of past potential.

In addition to the rapid growth in finance there was an expansion in real estate output. As a recent study notes, on an industry basis, growth in the combined FIRE-finance, insurance and real estate sectors accounted for about one-fourth of the expansion in US GDP in this period (Barrera, Estevao and Keim, 2009). Home purchases and single-family homebuilding (which are counted primarily as output of the construction rather than of the real-estate industry) reached record highs in the middle of this decade, and the subsequent collapse in these activities led and accentuated the recession. While the estimation of real construction output (especially single-family housing) generally raises fewer concerns than those that arise for financial sector output, a plausible argument can be made that the growth

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3. These are pre-tax earnings; reported gains are adjusted to remove nonoperating profits, most importantly, in the case of financial firms, capital gain and losses made in the course of trading. The 31 July 2009 revision of the National Income and Product Accounts did report a marked downward adjustment (of around 20 percent) to the estimate of aggregate domestic financial corporation earnings for 2007, but earlier years were much less noticeably affected – the new estimate for 2006 was \$428

of the housing stock in the US could have been overstated, and thus also the ongoing growth of shelter services (a significant component of US GDP).

A reduction of potential growth in the past has implications for the future. Since potential growth is likely inertial, a downgrading of past potential growth suggests that we might reduce our estimates of potential growth for the near future. In turn, this suggests that monetary and fiscal policymakers might reduce their real growth objectives in order to avoid increased inflation: inflation increases usually lag accelerated output, so one may erroneously think that output gaps are not narrowing and inflationary pressures are not receding if potential is overstated. Such overestimates appear to have been large in the 1970s (Orphanides and van Norden, 2002), and may have played a role in the increase in US inflation in that decade.

An examination of the US data suggests that concerns about past overstatements of growth arising purely from mismeasurement of financial and housing activity are likely modest<sup>4</sup>. A significant portion of the revenue of the financial sector comes from the provision of intermediate services to other sectors of the economy. Changed estimates of the real volume of these intermediate services do not affect estimates of aggregate output, though such changes would affect the industrial composition of output and growth. The portion of financial revenue that stems directly from the provision of services to final users primarily consists of transaction services provided to households. Unusually large recent overstatements of these appear to be unlikely. Reduced estimates of the real rate of return on housing capital earned in recent years would result in a mild markdown in aggregate growth; however, this markdown would not be in the nonfarm business sector, usually viewed as the key area to examine for analysis and projections of inflation and employment. Looking forward, it is conceivable that some of the output lost in the course of the recession may persist in the form of a modestly lower path for potential (or alternatively, a reduced rate of growth of potential for a spell) due to reduced output from finance and real estate, but such losses appear to be modest compared to estimates some have made of the possible loss to US potential, which presumably take into account all factors that may impede growth.

The next section discusses some of the key concepts of the national accounting treatment of finance and the returns from housing and how they relate to measured aggregate activity. This is followed by an analysis of how altered estimates of growth of real financial output and the real output of housing feed into

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4. Both the 2009 and 2010 revisions of the US national accounts resulted in noticeable reductions in 2008 growth, but these reductions reflected the routine incorporation of new source data, rather than any rethinking of the construction of the accounts.

aggregate growth and thus affect potential growth estimates, both in the past and looking forward.

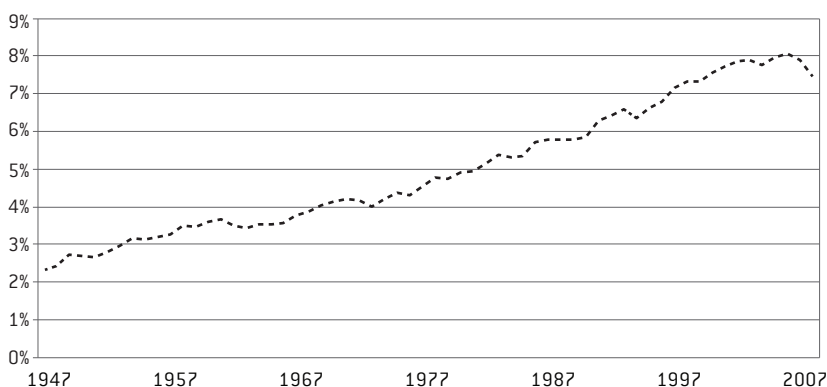
## Finance and housing in the National Accounts

### *Finance*

The financial sector in the United States (consisting of finance and insurance) employed approximately six million people in 2007, or about 4.5 percent of the workforce. Aggregate value-added of this industry in that year amounted to \$1.265 trillion, about eight percent of nominal GDP. This GDP share had been steadily increasing by an average of roughly one-tenth of a percentage point a year since the late 1940s (Figure 1) through a 2006 peak, before leveling off in 2007 and falling fairly sharply in 2008.

Broadly speaking, the financial sector earns its income in two ways. First, it processes payments (income items such as brokerage fees may be thought of in this fashion, as would be, of course, the fees collected for managing loan payments, etc.). Second, it plays a major role in the allocation of capital, for instance by advising investors or borrowers, or taking positions on its own account. In general, the second category has been the area of most rapid growth and higher income: M&A activity, mortgage securitisation, proprietary trading, derivatives originations, etc. have been more lucrative activities than coin and currency processing (though clearly, some portions of payments activities, such as ‘prime’ brokerage, are high-earning). In general, these latter areas are the ones that have expanded the most rapidly, and enhancing our understanding the connections between them and the

Figure 1: Finance and insurance share of GDP (%)



Source: US Bureau of Economic Analysis.

macro economy is of great recent concern (Kohn, 2008).

The distinctions between these two sources of financial sector income are important to keep in mind in looking at the sector's direct contribution to aggregate output<sup>5</sup>. To avoid the double counting of activities and align measures of national incomes and outputs, national output is computed by adding up measures of sales of goods and services to 'final' users. Aggregate national output is not directly affected by the reallocation of existing capital, if the transaction does not include the delivery of a service to a final user. To make this more specific, financial transactions involving domestic businesses do not automatically affect national output. This is a critical point to keep in mind in assessing the impact of the financial sector on aggregate activity. Financial services provided to households and foreigners do directly contribute to national output and income. The income earned by the financial sector from transactions with nonfinancial businesses reduces (in a direct accounting sense—indirect effects will be discussed below) nonfinancial income, but it does not increase national output or income. Importantly, in national income accounting owner-occupiers of homes are viewed as business operators<sup>6</sup>. This means that fee income paid by homeowners in the course of mortgage originations and refinancing is an expense item that reduces aggregate rental income. In an accounting sense, much of the income of the financial sector is an expense paid for out of nonfinancial corporate profits, nonfinancial proprietors' (unincorporated business) income, and rental income.

The other component of financial activity is services provided to final users. These consist of services provided to households (those connected to processing payments or for items such as investment advice and management, and insurance) and foreigners<sup>7</sup>. A large part of the services provided to households are 'imputed' –

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5. As opposed to examining, for instance, the contributions of financial activity to credit formation and asset valuation. Clearly, understanding these linkages is critical for understanding the transmission of financial shocks to the real economy, but they do not necessarily work through changes in the measured output of the financial sector.

6. Although many explanations may be given for this assignment, which opens up the whole issue of accounting for owners' equivalent rent in cost of living measures, a very simple reason, at least in the US, is the large scale migration of existing homes to and from tenant to owner occupancy. Treating all homes as businesses lessens the potential errors and distortions in the national accounts from attempting to keep track of these switches (the errors would arise from missing the changes; the distortions from failing to correct one's analysis of the fundamentals for the changes). Hobijn and Steindel (2009) discusses the implication of corrections of this type for calibrating longer-term US growth; Triplett (2000) and Steindel (2006) defend the inclusion of owners' equivalent rate in cost of living measures.

7. Presumably in principle other sectors may contribute to these final sales, just as consumer spending is supplied by many industries, including manufacturing, transportation, utilities, retailing, etc, but these specialised financial services are surely produced almost solely by the labour employed by, and capital owned by, the finance industry.



households earn below market returns on large portions of the funds held on deposit at institutions such as commercial banks, and the presumption in national accounting is that they are earning and consuming implicit services in return for the sacrifice of income. Borrowers are also assumed to be receiving imputed services, when they pay above-market rates for their funding. The receipt of such imputed services by nonfinancial businesses reduces the output of the nonfinancial business sector by the amount that financial output is increased, and overall GDP is unaffected. The consumption of imputed services by depositors is a component of GDP (Fixler, Reinsdorf and Smith, 2003).

The precise computation of these imputed services is an unsettled matter (Triplett and Bosworth, 2004). In the US accounts, the assumption is that the entire explicit interest margin of depository institutions is paid out as imputed interest. The 'reference rate,' measured as the yield on the industry's US Treasury debt portfolio, determines the split between imputed interest paid to depositors and that paid to borrowers. The difference between the actual interest paid to depositors and the amount they would have earned if their deposits had accrued at the reference rate is defined to be imputed interest paid to depositors. The difference between interest paid by borrowers and the amount they would have paid if they had borrowed at the reference rate provides the estimate of imputed interest paid to borrowers.

Clearly, the computation of these imputed interest flows is rather arbitrary. One particular issue is the use of Treasury rates to set the reference rate to calculate imputed interest paid to borrowers. Obviously, few if any private borrowers can obtain financing at the Treasury rate. Arguably, at the margin, borrowers can be seen as deciding between liquidating funds earning the reference rate and paying higher market rates. Thus the spread between borrowing rates and the reference rate can be said to reflect the implicit costs of services provided by banks to borrowers (Fixler, Reinsdorf and Smith, 2003). Others have argued that higher rates, reflecting the inherent risk in lending to private parties, be used to set the reference rate to compute imputed interest paid to borrowers (Wang, Basu and Fernald, 2004; Basu, Inklaar and Wang, 2008). If such a procedure were adopted the dollar value of imputed interest paid to business borrowers by the financial sector would be reduced, as would recorded financial output. A contrasting view arises from the observation that the payment of imputed interest is assumed to cease when a loan is sold by a depository to a nondepository – for instance, when a loan is purchased for securitisation (Ashcraft and Steindel, 2008). Because, from the borrower's viewpoint, nothing substantive has changed in the servicing of the loan, the disappearance of its imputed interest flow appears hard to justify. Recognition that

imputed interest continues to flow to such borrowers would have the effect of increasing the dollar value of imputed interest paid to borrowers and would shift the composition of industry output toward financial firms<sup>8</sup>.

These issues connected to the computation of imputed interest paid to borrowers bear on the calculation of current-dollar financial output. And a whole host of other questions relate to the computation of the real output of the sector, given the immense difficulties in defining standardised transactions. For instance, even a very simple transaction such as the purchase and sale of corporate stock raises some complexity in determining the real activity involved. Is the unit of transaction a single sale of a block of shares, or the sale of one share? It certainly seems as if the sale of 10 shares in one block involves no more physical services than a sale of 1 share (especially if the nominal values of the transactions were equal and involved the same ownership stake in a firm); however, the sale of multiple shares may also involve transactions with multiple buyers. Such conundrums could multiply exponentially when one attempts to deflate the expenses involved with the creation of securitisation structures or those associated with M&A activity. We are left with the issue that there are serious concerns associated with the computation of current-dollar financial sector output, and likely even greater ones involving the calculation of real output. Many would have associated more intensive use of financial services in recent years with efficiency gains in user industries and across the economy as a whole (Kohn, 2008). Given the subsequent contraction one might argue that either the measures of past usage and the efficiency gains were overstated, or that lessened use in the future will weigh down growth.

Turning from the conceptual issues to the published numbers, Table 1 shows the breakdown of financial sector gross revenues in 2007 based on the categories value-added, services to final users, and intermediate services provided to other industries. Over half the revenues of the financial sector were intermediate services provided to other industries. The bulk of the final sales from the sector are transaction services (including interest paid to depositors) provided to households; this aggregate is comparable in size to its value-added, which is the portion of revenues that is counted on the income side as the industry's contribution to GDP<sup>9</sup>.

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8. Conceivably, imputed interest might be recognised as being paid to investors who accept below-market risk-adjusted returns. Accounting for such interest would increase financial sector output, consumption, and GDP.
  9. An industry or a sector's services to final users need not equal its value-added, though the two aggregates are equal for the economy as a whole. Some industries—for instance, management of companies and enterprises—provide little or no direct services to final users, but have substantial value-added, while others, including a number of manufacturing and transportation industries, provide substantially more services to final users than they earn as value-added. By construction, imputed interest paid to

Table 1: 2007 gross output, value-added, & final sales of finance & insurance

|                                             | Billions of dollars | Percent of GDP |
|---------------------------------------------|---------------------|----------------|
| Gross output                                | 2012.2              |                |
| Value added                                 | 1091.4              | 7.9            |
| Sales to final users                        | 824.0               | 6.0            |
| Consumption                                 | 797.1               | 5.8            |
| Imputed interest                            | 248.7               | 1.8            |
| Insurance services*                         | 255.4               | 1.8            |
| Intermediate services sold to other sectors | 1188.2              |                |

Data on sales to final users and the consumption aggregate comes from the BEA annual input-output table on industry make/use. \* Essentially life and medical insurance premiums less benefits received.

## Housing

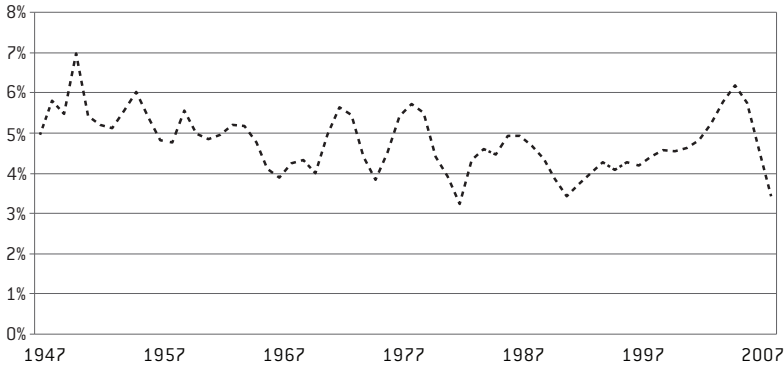
The sector that has been most closely linked to financial developments in recent years is housing. In the US accounts, 'residential fixed investment' encompasses private expenditures on new home construction, repairs and alterations to existing homes, and brokerage commissions earned from the sales of homes. Many sectors – construction, real estate, manufacturing, etc. – are important suppliers to residential investment. In current dollars, this category of spending rose from 3.4 percent of GDP in 1991, to a near-record high of 6.2 percent in 2005, before contracting drastically to 3.4 percent in 2008 (Figure 2). Due to its rapid growth, real residential investment contributed, on average, 0.4 percentage point to the annualised growth rate of real GDP from 2002:Q1 to 2005:Q3. The subsequent plunge in residential investment has meant that it exerted a drag on annualised real GDP growth averaging nearly 0.9 percentage point from 2006:Q1 to 2009:Q1. As is the case for all capital goods sectors, the calculation of real residential outlays is a bit problematic; in the US accounts data on the number of housing units built and sold, along with some of their characteristics (size, etc) are essential parameters.

Housing also plays a major role in the real-estate portion of the broader FIRE sector. Most importantly, the housing stock is assumed to emit a stream of shelter services, reflected in the expenditure side of the accounts as explicit rents paid (for

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depositors is directly related to financial value-added. As to other transaction services, while industries such as utilities and real estate provide input to their creation, it seems reasonable to suppose that the bulk of the value-added stems directly from the labour and capital employed in finance. The financial sector's value-added is somewhat larger than its final sales, likely reflecting income generated from intermediate services provided to nonfinancial businesses.

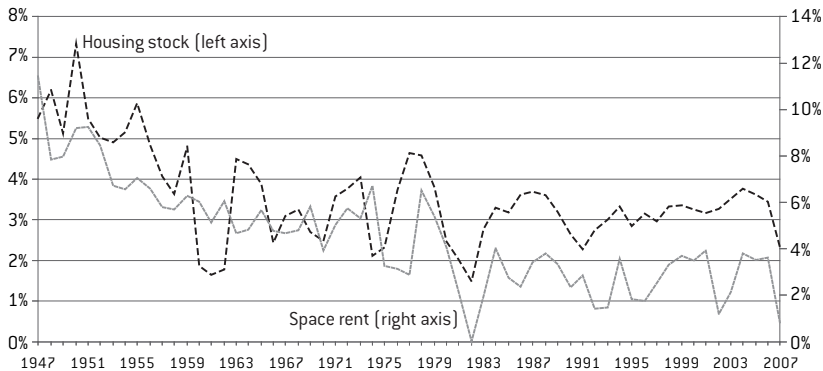
Figure 2: Residential investment share of GDP (%)



Source: US Bureau of Economic Analysis.

tenant-occupied housing) and implicit rents paid (for owner-occupied units). Charged against these rents on the income side are depreciation, property taxes, and net interest paid (netting out imputed interest received), as well as mortgage financing fees; the residual profit-like income series is called 'rental income of persons'. Essentially, the direct effect of mortgage financing activities is to shift the composition of the income side of the shelter service flow (unless the financial transaction involves the sale of a home; in which case the brokerage component of residential investment increases). In real terms, growth in shelter services consumed by household owner-occupiers slowed from a pace as high as four percent in the middle of this decade to be barely positive in the most recent readings, as the growth of the real housing stock cooled off with the slump in construction (Figure 3). Shelter services are a nontrivial part of GDP. Owner-occupied shelter

Figure 3: Growth in real owner-occupied housing stock and space rent



Source: US Bureau of Economic Analysis

services have recently amounted to roughly eight percent of nominal GDP, so the reduction in their real rate of growth has played a substantive role in the overall slowing in the growth of real GDP.

### Was economic growth overstated in recent years?

The value-added of the financial sector grew rapidly for much of the past decade. In nominal terms the average increase was 6.25 percent in the period 1998-2007. This compares to an average growth rate of 5.2 percent for overall GDP (which is, of course, the sum of nominal final demand and inventory accumulation across the economy as a whole). In real terms, finance and insurance value-added (which can be alternatively labelled as industry GDP) rose an average 4.8 percent in these years, compared to 2.85 percent for overall GDP.

If we look at real revenues, rather than value-added, the gap between the financial sector and the rest of the economy has been wider: real gross output of the financial sector increased an average of 5.9 percent over the years 1998-2007, compared to an average gain of 3.1 percent for all industries. The more rapid growth of real gross output compared to value-added suggests that a rising share of the real revenues of the financial sector was used as intermediate product by other industries, as opposed to satisfying final demands.

An argument can be made that the existing numbers overstate the real growth of financial sector activity. The recent financial crisis conceivably reflects a misallocation in capital; some portion of that misallocation could well reflect errors by the financial sector itself. In other words, the real services provided by the financial sector were perhaps not as valuable as they are now counted in the accounts. To draw a simple analogy from another portion of the national accounts, computer output measurement takes into account characteristics of the products produced, such as processing speeds. If it is found that the speed of the products turned out in a year was less than was initially assumed, it is likely that the real output of the industry will be revised down.

On the housing front, it might be argued that real residential investment was also overstated significantly, in that many of the units built (and sold) in recent years will not provide the shelter services assumed at the time of construction. Some units built may never be occupied in the forms for which they were intended at time of construction; for instance units built as high-end single family residences may wind up as poorly-maintained tenant units and depreciate more rapidly than assumed. At the least, the addition of economically useful units to the US housing

stock in recent years may be smaller than currently calculated and thus the supply of, and consumption of, real shelter services may turn out to be smaller than we currently measure.

In both finance and housing, then, counterfactuals can be made assuming that prices have been understated – alternatively, not as much real product was obtained as is currently recorded<sup>10</sup>. If one advances such arguments, how much (plausibly) lower would overall growth in recent years turn out to be, and what is the implication for the future?

Recomputing real output

The counterfactual involves examining the implications for past real output of alternate estimates of the growth of real financial and real housing activity. The assumption will be that nominal spending has been correctly estimated, meaning that we are implicitly assuming alternative assumptions for prices.

We first examine counterfactuals for financial activity (Table 2). Financial activity is multifaceted, and any number of assumptions can be made about which aspect may have been overstated. The overwhelming majority of final sales consists of imputed interest provided to depositors and explicit fees paid by households for transactions. As noted above, the pricing of such activities (and, in

Table 2: Implications of alternative estimates for finance and insurance gross output and value-added, 1998-2007

|                                               | Published average | Alternate |
|-----------------------------------------------|-------------------|-----------|
| I: Reduced real sales of intermediate product |                   |           |
| Real gross output growth                      |                   |           |
| Overall economy                               | 3.1               | 3.0       |
| Finance and insurance                         | 5.9               | 5.0       |
| II: Reduced real value-added                  |                   |           |
| Real added-value                              |                   |           |
| Overall economy                               | 2.85              | 2.6       |
| Finance and insurance                         | 4.8               | 1.7       |
| Growth contribution                           | 0.36              | 0.1       |

10. In housing, the counterfactual can conceivably be made in terms of depreciation rather than real investment: the depreciation rate on the recent additions to the stock may be higher than is currently assumed. However, if the physical and human resources devoted to a home resulted in a structure whose useful life is less than was planned, less of a home was arguably produced than was planned.

the case of imputed interest, the measurement of nominal transactions) is always a bit problematic. The case for an increased understatement of price gains in the recent past appears strained, given that technological advances (such as the increased availability of electronic payment and transactions technologies to households) could, if anything, work in the opposite direction, given the well-known difficulty price statistics have in correcting for such quality improvements<sup>11</sup>.

A more substantive argument might be made that the elements of financial real revenues that are not final sales have been overstated. These consist of services provided as intermediate inputs to nonfinancial businesses. One may contend that slippages in quality and standards could mean that it is unlikely that the real volume of these services expanded by such a wide margin relative to revenues in the economy as a whole. One way to consider the implications of this argument is to assume that the difference between real gross output in finance and the economy as whole averaged two percent (the same as the difference in real value-added, much of which is likely mirrored in the movements in household usage of financial services<sup>12</sup>) in 1998-2007, rather than the reported 2.8 percent. In current dollars, the share of gross revenue by the financial industry was little-changed at around 7.5 percent in those years. Reducing the differential between real growth of industry revenues and that of the economy as whole to average the same 2.0 percent as the corresponding differential for real value-added would mean real revenues in finance increasing an average of roughly 5.0 percent a year in this period. The reduction in the growth of real financial revenues would be associated with a reduction in economy-wide revenues from an average of 3.1 percent a year to around 3.0 percent a year.

Even if the growth of real intermediate services provided by the financial sector was overstated, by itself, the correction of any such error would have no effect on aggregate GDP. Rather, changes in the growth rate of real intermediate services provided by the financial sector would imply changes in the industry composition of growth: the growth of real value-added in finance would be reduced, and the growth of the value-added of nonfinancial industries would be boosted, with

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11. Ultimately what matters in the implications of bias in the growth of a price index is not so much the absolute amount of such bias but its variation over time. A constant bias means that observed variations in real growth rates are valid. Steindel (1999) discusses this in examining the possible implications of price biases for movements in productivity growth.

12. Of course, the value-added of the financial sector is not identical to final sales of its products. However, the average growth rate of real household consumption of insurance services, brokerage charges and other financial fees, and imputed interest, was 4.6 percent from 1998 to 2007, very near that of finance and insurance value-added. In current dollars, these services equalled about two-thirds of the sector's value added in this period and averaged about five percent of GDP.

commensurate changes in the distribution of labour productivity. Estimates of multifactor productivity would also be shifted, with reductions to finance and increases elsewhere (for these industries the same gross output would be produced, but with fewer financial intermediate inputs)<sup>13</sup>.

Turning to value-added, how much would real output growth in the finance and insurance sector have been overestimated to have resulted in an overestimate of real GDP growth by as much as  $\frac{1}{4}$  percentage point? A key point is that financial sector value-added accounts for about 8 percent of nominal GDP. Hence, the result is that the growth in real value-added in finance would need to be revised down a stiff  $3\frac{1}{2}$  percentage points per year to reduce real GDP growth by  $\frac{1}{4}$  percentage point per year (assuming that such a reduction would not be associated with more rapid growth elsewhere). This change would shrink the average rate of value-added growth in finance to a modest 1.7 percent a year in 1998-2007. Given that forces plausibly associated with increased usage of finance-intensive services were ongoing in this period (such as substantial increases in securities trading volumes), this seems a fairly extreme assumption.

The second counterfactual applies to housing (Table 3). There are two aspects of activity that are of concern:

- 1. The valuation of the actual construction of homes, which include the associated services (most notably real estate brokerage) connected to home sales.
- 2. The valuation of the shelter services provided by the housing stock, which relates to estimates of the increase in the real value of that stock.

Table 3: Implications of alternative estimates for residential construction, 1998-2005

|                                                                             | Published average | Alternate |
|-----------------------------------------------------------------------------|-------------------|-----------|
| Growth rate of real investment in permanent 1-4 unit residential structures | 6.7               | 3.7       |
| Contribution to real GDP growth                                             | 0.2               | 0.1       |
| Growth rate of owner-occupied 1-4 unit housing stock                        | 2.9               | 1.9       |
| Growth rate of owner-occupied space rent                                    | 3.2               | 1.2       |
| Contribution to real GDP growth                                             | 0.2               | 0.1       |

13. Schreyer (2001) discusses the general framework for measuring multifactor productivity.



The counterfactual will assume that annual price inflation in the relevant portions of final demand was underestimated by 3 percentage points a year from 1998 to 2005 [the period of most rapid expansion in housing]. The specific GDP component is investment in owner-occupied 1- to 4- family nonfarm homes. The essence of the counterfactual is an assumption that homes were built and purchased which did not and will not provide the vector of shelter services the price indexes assumed.

Nominal spending in this category averaged about 4.2 percent of GDP in 1998-2005, with a peak level of 5.3 percent in 2005. Reducing the real growth of this sector by 3 percentage points a year would have the effect of reducing aggregate real GDP growth by roughly 0.1 percentage point annually. However, increasing the rate of price increase in these categories by 3 percentage points annually would boost their annual price gains to the neighbourhood of 10 percent or more in 2004-05. In other words, the GDP measures were already reporting very high growth in these prices<sup>14</sup>.

If the real value of gross spending on new residential fixed structures rose at a three percentage point a year slower rate over 1998 to 2005 than is current reported, the growth rate of the real owner-occupied housing stock would have been about two percentage points lower than is currently reported over that period (and with the lower level of real net investment this reduced growth would persist, even if one does not adjust the price numbers for more recent years). In turn, the slower growth of the housing stock would reduce the growth of owner-occupied rent by a comparable amount. The net effect on overall real GDP growth of this change would be minimal – around 0.1 percent per year.

The upshot of this analysis is that contentions that overstatements of financial and real estate activity greatly exaggerated US growth during this decade are hard to support. To be sure, the real value of financial services used by other businesses may, arguably, have been overstated by an unusually large amount. However, errors in that calculation do not affect estimates of the size or growth of the US economy, but rather feed into misstatements of the industrial composition of growth. Indeed if estimates of the real value of intermediate services provided by the financial sector were slashed, the finding would be that a larger portion of US output growth would be attributed to technical progress in other industries. In that sense one might argue that the *contribution* of finance to US growth could have been overstated. As noted, the contention that growth in components of final demand that are finance-centric have been overstated to any larger extent in the

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14. Construction price indexes are heavily dependent on the costs of inputs, not the economic value of the structure that is built.

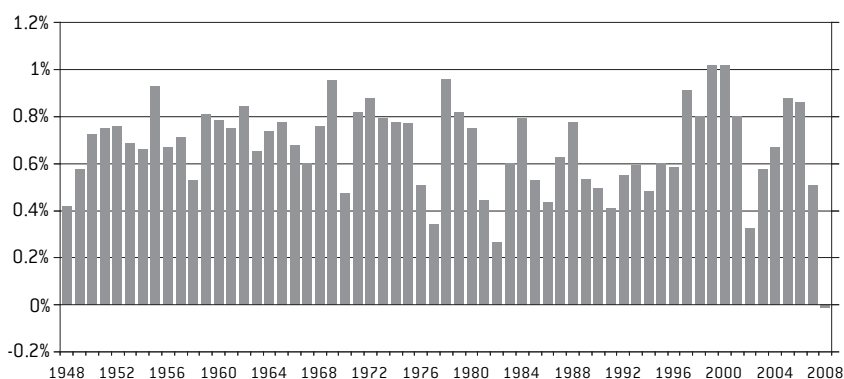
recent past than in earlier days is hard to substantiate. As to real estate, there may, perhaps, be a case that much of the investment in housing was in residences whose ultimate shelter value will be much smaller than anticipated at the time of construction. Nonetheless, if one cuts estimates of the real value of that investment and the ongoing shelter value of the completed structures by what appears to be a very large amount, the resulting downward revision in real GDP growth would be modest – roughly 0.2 percent a year, taking into account both the smaller volume of construction and the lessened stream of shelter services. The portion of that trim that relates to physical investment would feed through as a reduction in the growth of labour productivity in nonfarm business (the shelter services provided by owner-occupied housing is not a part of nonfarm business output, though it is a component of GDP).

Note that these calculations do not bear on the issue of the ‘sustainability’ of US growth during the last decade. The ‘sustainability’ argument appears to start with the observation that much of the growth in real spending in the US was in homebuilding, and at some point the shift of resources to home construction (and the related shift of income to finance associated with housing transactions) was bound to slow. Building on the growth in housing, the rapid expansion in financial sector activity and the surge in home prices helped to drive the substantial increase in US wealth from 2002 to 2007. In turn, the gains in household wealth were likely significant forces supporting growth in consumer spending and overall GDP. The sustainability argument appears to further maintain that households were spending on the basis of wealth that was bound to diminish when the rapidly growing sectors cooled off. In principle, one can then make estimates of the secondary, induced, growth effect of the increase in financial and real estate output through linkages to wealth gains. Perhaps if these sectors had not grown as rapidly, the aggregate increase in wealth may have been smaller, possibly working to constrain the growth of consumer spending (and GDP) to a more ‘sustainable’ pace and limiting the subsequent contraction. It is hard to know, in the absence of any definitive view on how market valuations would have been affected by slower growth in homebuilding and finance, what weight should be given to this line of argument. If these sectors had grown less, would the gain in aggregate wealth have been 10 percent less over these five years? Five percent less? 25 percent less? If any of these were so, how much lower would have been consumer spending? If these sectors and consumer spending had grown less, would other sectors have grown more?

## Implications for the future

The calculations above suggest that the surge in finance and real estate was not connected to any yawning overstatement of US growth in the past decade. The boom and bust in finance and real estate will likely continue to be measured as broadly similar to what the accounts now report. A more fundamental issue may be the future implications of ongoing contractions in these sectors. The last few years have seen major downward adjustments in both, measured by such indexes as construction employment, housing starts and sales, and financial sector income, and the contribution of gains in the broadly defined FIRE sector to overall GDP growth tumbled from 0.8 percentage point in 2005-06 to zero in 2008 (Figure 4). Clearly, much of this adjustment can be related to reduced demand for the products of these industries, some portion of which can surely be considered payback for earlier over-expansion (homebuilding is the most obvious example, but financial activities related to home sales and real estate development are obviously comparable). Looking beyond the current underemployment of resources in construction and finance, how do we think possible downward adjustments in their growth trends will affect the overall US economy? A recent IMF study, for instance, posits that the direct contribution of the FIRE sector to real GDP growth will be in the range of zero to 0.4 percentage point through 2014, compared to a historic average of 0.6 percentage point, and with spillover effects, will reduce potential growth by roughly one-third of one percent to one percent per year for the next five years [Barrera, Estevao and Keim, 2009]. These results appear broadly in line with the Reinhart and Rogoff (2009) findings that financial crises often have major long-

Figure 4: FIRE contribution to real GDP growth

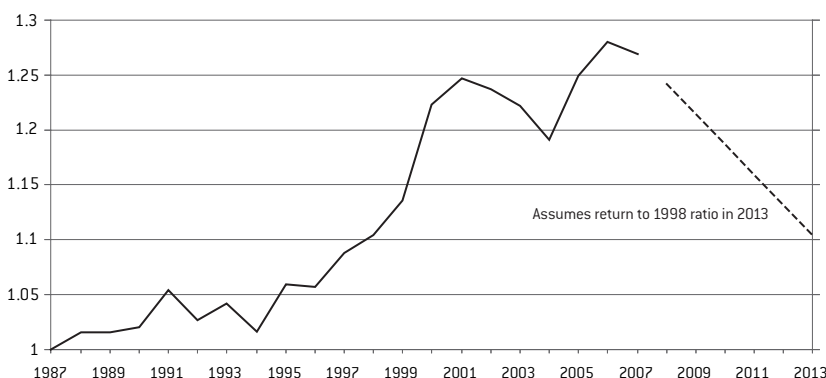


Source: US Bureau of Economic Analysis

term negative effects on real output. The higher end of the range would clearly suggest a considerable downgrade of potential growth for a substantial time and would result in US GDP remaining noticeably short of its earlier growth path throughout most, if not all, of the next decade.

A direct way to gauge some of these downside risks is to look at the potential output shifts that could be associated with shifts of labour and productivity slowdowns in these sectors. In particular, finance and insurance has seen quite rapid growth in real output per worker (for the purpose of this section we assume that the published numbers for the past are correct). From 1998 through 2007 real value-added per person engaged in production in finance and insurance rose at an average 3.4 percent pace, compared to a 1.8 percent rate for all GDP (Figure 5 shows how value-added per worker in finance and insurance performed relative to the economy as a whole). If, at one extreme, that excess were to be reduced by 2013 (in other words, the gap between real output per worker in finance and the rest of the economy was restored to its 2000 figure in 2013), without any compensating shifts elsewhere, the growth of real value-added per worker in finance and insurance would average about 2.5 percent per year less than the economy-wide average. Given the small employment share of this sector (as noted, about 4.5 percent), though, this shortfall would have only a minimal impact on holding down the trend growth of real value-added per worker (about 0.1 percent a year)<sup>15</sup>. Of

Figure 5: Ratio of real value-added per worker, finance and insurance to overall GDP



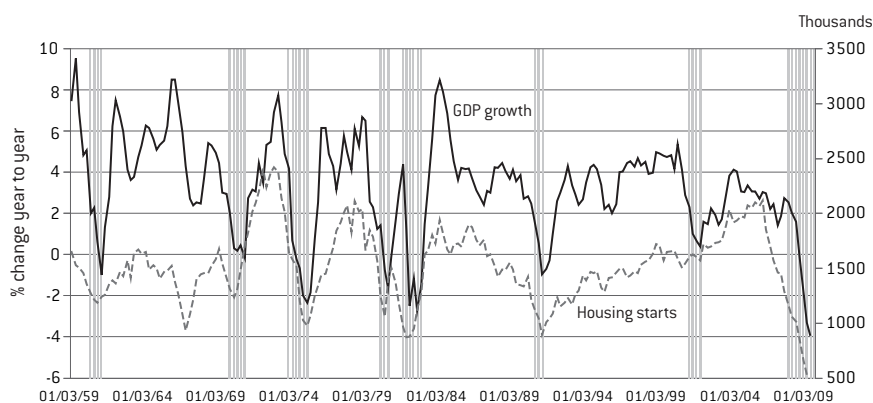
Source: US Bureau of Economic Analysis, author's calculation

15. If the slowdown in value-added per worker in finance was associated with lessened use by other industries of intermediate services from finance, there would be some additional downward pressure on the growth of real output, which would be associated with slower growth of multifactor productivity. Fernald and Matoba (2009) note that US multifactor productivity growth has apparently been well-maintained during the recession.

course, if such an adjustment proceeded more rapidly there could be larger effects in a shorter time period. However, given the longer-term tendency of real output per worker to grow more rapidly in finance and insurance than elsewhere the assumption of a complete reversal of the recent widening seems a bit extreme. Also extreme is the presumption that high-productivity workers in finance will not migrate to higher-wage jobs outside of a diminished finance sector with slower productivity and (presumably) earnings growth than in the past.

Another potential drag on growth comes from the redeployment of labour and capital involved with real estate. Because real estate construction and sales are industries that have historically seen very large and lasting fluctuations in output and employment (and, also, are fairly low wage and have seen only sluggish growth in real value added per worker), an argument that a prolonged low period would hamper overall output significantly is difficult to accept. While homebuilding is clearly a strongly cyclical sector the long-run association between its level of activity and GDP growth is likely rather loose. Figure 6 shows that there have been periods when GDP growth appears to have been high relative to housing starts, such as the late 1960s, while early in this decade GDP growth appears to have been low compared to housing starts. Of course, this is nothing more than a restatement of the obvious: there are independent forces affecting housing and real GDP. As has been noted, though, if much of the expansion of the housing stock in the last few years was unsustainable, new activity will be low for some time (many parts of the nation will have little need to build new housing, while other parts may see less elaborate construction than in the past). This slower growth of the housing stock will lead to modestly slower growth of real shelter services, but, as noted earlier in

Figure 6: Housing starts and GDP growth



Source: US Bureau of the Census and Economic Analysis. Note: Shading represents NBER recessions.

the discussion of the potential impact of ‘correcting’ earlier ‘overstatements’ of housing stock growth, the effect on aggregate GDP would be minimal, and the effect on nonfarm productivity would be nonexistent.

A final channel connecting financial changes to the economy involves indirect spillovers. If financial services indirectly affect output in ways not captured through the usual growth accounting mechanisms, then it is possible that an ongoing contraction in the sector could have larger impacts on growth going forward than currently seen. It is very hard to quantify such effects in past data, and it can be argued that recent developments have altered any relationships that may have been previously charted.<sup>16</sup> One possibility, of course, is that a contraction in finance could be associated with a general retreat from risk-taking, which may hamper technological progress, or that a new regulatory regime for the industry may hamper efficient capital allocation, or that the funding of fiscal initiatives to deal with financial distress could involve increases in distortionary taxes.

Combining the effect of slower growth in the stock of housing (and thus of shelter services) with that of some noticeable contraction in financial output (and adding in some spillover effects from such a slowdown) could produce a deterrent effect on US real GDP growth on the order of 0.3 percentage point per year in the near future: 0.1 percentage point from slower growth of housing services, 0.1 percentage point directly from a financial contraction, and perhaps another 0.1 percentage point from spillovers (essentially, less provision of intermediate services to other industries) arising from a financial contraction. This is roughly comparable to the lower bound of the Barrera, Estevao, and Keim range, though it appears to be something of a worst-case scenario for the direct effects of contractions in these sectors. This would not be a trivial reduction in the growth of near-term potential, but it is dwarfed by the decline in real GDP experienced in the recession and would not seem to be large enough to alter a view that the US economy is currently operating well below its potential.

## Conclusion

Examination of the US data does not suggest that overstatement of real activity in finance and real estate likely exaggerated growth in the last decade to any meaningful degree. First, a definitive claim that real growth in these sectors was

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16. As Vice Chairman Kohn remarked, “financial innovation can induce structural changes that can importantly alter the way financial institutions, markets, and the broader economy respond to shocks” (Kohn, 2008).

overstated to an unusually large degree is hard to sustain when one looks closely at the composition of their activity, particularly their direct contribution to final output. Second, even if some significant overstatements in these areas occurred, the sectors are simply not large enough such that correcting for them would reduce the aggregate data to a marked extent. Looking forward an ongoing retardation of the flow of resources from finance, especially, could work to slow aggregate US growth modestly, but calibrating a substantive effect implies fairly extreme assumptions as to the size and ancillary effects of the industry's slowdown.

One may keep in mind the distinction between economic output and welfare. One can, conceivably, argue that aggregate growth in the last decade may have enhanced aggregate welfare less than comparable past expansions (for instance, one may be concerned that most measures of income inequality expanded). However, such concerns are reasonably distinguishable from issues of the measurement of the scale of activity.

Even if one believes that the composition of US growth in the last expansion contained the seeds of a considerable contraction, the issue of the sustainability of demand can be differentiated from that of the measurement of real output and the evolution of potential. It is useful to distinguish between supply and demand effects when examining the ongoing and future effects of developments in the financial and real estate sectors. The weakness in demand that has propagated from the financial turmoil and the loss of real estate values is anticipated to linger for some time (Federal Open Market Committee, 2009). Quite plausibly the growth of the demand for financial services could also be weaker than in the past, as could the demand for housing. Recent studies contend that potential output growth may suffer as the result of a long and deep recession (Furceri and Mourougane, 2009; OECD, 2009), likely reflecting slow growth in physical capital and the degradation of human capital; and financial factors could well be associated with the onset of long and deep recessions. However, this effect differs from a fundamental loss of potential stemming from a degradation of these industries' abilities to carry out their work of allocating capital to productivity-enhancing activities, and the precise effect of a long and deep recession on potential would presumably depend on its length and depth<sup>17</sup>. We may acknowledge the possibility that changes in the financial

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17. Basu and Fernald (2009) discuss some general issues connected with the estimation of potential output in the framework of a New Keynesian growth model. Their assessment was that as of late 2008 – admittedly before the effects of the worst of the financial crisis showed through to real activity – the near-term outlook for potential seemed to be well-sustained, though their model does not explicitly take into account factors said to be associated with the financial crisis (such as wealth losses and their effect on labour supply, less efficient capital allocation, greater uncertainty).

industry in particular may, in the near term, hamper the transmission of expansionary monetary policy to real activity, which could bear on the length of time in which the economy is operating under its longer-term potential. This effect could in turn work to hamper the growth of potential. Nonetheless, in principle, policies may be designed to offset this process.

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## Comments on 'Implications of the financial crisis for potential growth: past, present and future,' by Charles Steindel

ANGEL UBIDE<sup>1</sup>

Steindel (2009) presents a very interesting analysis of the implications of the financial crisis for potential growth in the United States, approaching the question with an innovative methodology. Rather than trying to construct a production function and identify the evolution of productivity, capital and labour, Steindel explores the possibility that, in the past, activity associated to financial and housing services may have been mismeasured, and thus their contribution to growth, both actual and potential, may have been overstated. If potential growth was in fact lower than previously estimated, it would have clear implications for policy on inflation and monetary policy. The lessons from the inflation scare of the 1970s are very clear: the mismeasurement of potential growth and thus of the output gap might have been a major contribution to the inflation spike. Careful consideration should be given to this matter.

In the event, Steindel finds that the likelihood of past potential growth having been overestimated due purely to mismeasurement is very low. The paper shows that the assumptions needed to arrive at such overstatement would be very extreme, and that even then the impact of the overstatement would not be material. Thus, the paper concludes, the likely slower activity in finance and real estate arising from the crisis is unlikely to exert any substantial downward pressure on US potential GDP growth.

From the very narrow perspective of direct mismeasurement, this conclusion

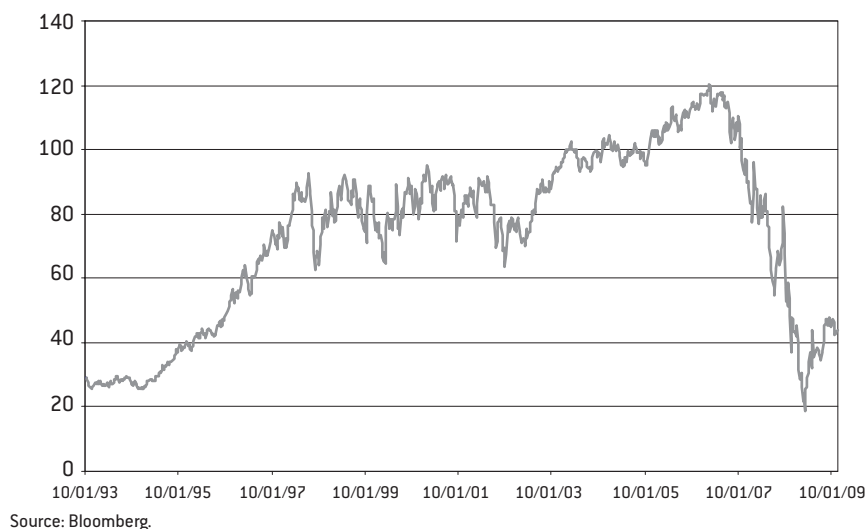
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1. Tudor Investment Corporation and Peterson Institute for International Economics.

seems well founded, but given the importance of the topic it may be worth broadening the scope of the discussion. One could take an extra step and ask if the measured size of the financial sector had any indirect impact on potential growth. For example, if the size of the financial sector was overestimated, leading to higher estimated profits in the sector which, in turn, delivered higher asset valuations and lower spreads and risk premia, it would follow that the overestimation of the size of the financial sector could have led to a lower cost of capital and thus higher potential growth. In fact, given the losses the financial sector has suffered in the last two years, and the decline in market valuations to the level of 1996-97, it can be argued that the US financial sector has added no value in the last decade (see Figure 1). To the extent that these apparent profits served as collateral for balance-sheet expansion, the mismeasurement of financial-sector activity did potentially contribute to a lower cost of capital, and thus to higher apparent potential growth.

Some of the assumptions that the author describes as extreme in computing alternative scenarios may not be that extreme. One example is the assumption that finance workers might not easily be able to move to high-wage jobs outside finance. Given that they are typically highly-qualified workers, it may be reasonable to expect that workers from the financial sector will easily find similar jobs in other areas, but this may not be the case if the financial sector becomes overstretched. In a recent paper, Kirkegaard (2009) argued that employment in the US financial and real-estate sector has experienced structural job losses since 2001 – structural

Figure 1: Market valuation, KBW Bank Index



losses being defined as below-average growth during expansions, and above-average losses during downturns. In the recent downturn, according to Kirkegaard (2009), only commercial banking has continued to experience structural gains, while non-depositary activities, credit intermediation and financial investments have experienced structural losses. Thus some of the highly-paid jobs lost in finance may not return in other areas, or they may return as lower-paid jobs.

Steindel's finding of unchanged potential-growth rates clashes with the recent paper by Barrera, Estevao and Keim (2009), which argues for a sharp decline in US potential growth rates. Barrera *et al* suggest that a sharp increase in the non-accelerating inflation rate of unemployment (NAIRU) will be responsible for the decline of potential growth, leading one to wonder which sectors of the economy will be likely to generate this increase in structural unemployment – finance and real estate being, together with vehicles, the likely candidates. In addition, a smaller financial sector is likely to leave some marginal projects unfunded and to slow down spending on innovation, thus contributing to higher long-term unemployment.

Another related issue is the relationship between the size of the financial sector and the optimal sectoral allocation of resources. An excessive allocation of resources to finance may have been welfare-reducing. It is reasonable to explore whether or not some of the recent activity in finance improved capital allocation – for example, if the very rapid increase in credit-default swap activity really reduced financing costs. It may have also biased the share of talent going to this particular sector, depriving other sectors of much-needed human capital. For example, the share of Harvard graduates going to finance has increased from five to 15 percent over the period 1970-90. It may have biased the share of total profits in GDP – growing from a mere five percent in the early 1980s to almost 40 percent in 2008 – and the share of compensation with respect to the rest of the economy. Overall, the regulatory tightening that will likely ensue in the next few years could reverse some of these trends.

In conclusion, the measurement of potential growth after a sharp financial crisis is a very complicated issue that is likely to be subject to tremendous uncertainty, but which could have a very decisive role in framing economic policies. Steindel (2009) provides a very interesting methodological approach to further deepen our understanding of the issue, though the narrowness of the approach may limit the usefulness of the exercise as an input into policy decisions. Assuming that potential growth rates will remain unchanged after such a large shock to the structure of the economy may not be the best policy from a risk-management standpoint.

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# Central bank responses to the 2007-08 financial crisis: the case for further action

JOSEPH E GAGNON<sup>1</sup>

The first tremors of the global financial crisis and recession began in 2007. Two years later, the worst appears to be over and economies are showing initial signs of recovery. Over this period, central banks have pushed policy interest rates to historically low levels and have engaged in a variety of measures, both traditional and nontraditional, to ease financial market strains and to provide additional macroeconomic stimulus.

These central bank actions generally appear to have made positive contributions to economic and financial conditions. In some cases, the evidence of these positive effects is clear. In other cases, the nature of the policies is such that it is difficult to gauge their effects.

Many of the policies are aimed at returning liquidity and credit-risk spreads on financial assets to normal levels, thereby encouraging a renewed flow of credit through the economy. To the extent that these policies have succeeded, they have reduced the 'headwinds' that restrain economic activity, but they have not augmented macroeconomic stimulus beyond the level that would be implied by the current level of policy interest rates under normal financial conditions. Similarly, policies aimed at preventing the disruptive failure of systemically-important financial institutions can help to prevent a negative shock to economic activity, but they do not provide an independent positive stimulus. One class of nontraditional policies that may be able to provide additional macroeconomic stimulus is the large-

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1. Peterson Institute for International Economics. Thanks to Stefan Gerlach, Heinz Herrmann, Jean Pisani-Ferry, Adam Posen and Ted Truman for helpful comments and advice.

scale purchase of financial assets, particularly assets that mature over long periods. The economic literature and recent evidence suggest that such purchases can stimulate economic activity by reducing the spread between long-term and short-term interest rates. Another tactic pursued by several central banks for lowering longer-term interest rates is to provide guidance aimed at lowering expectations of the future path of short-term interest rates. However, such guidance appears to have had limited success to date. Other approaches to providing additional macroeconomic stimulus have not been adopted widely.

Empirical policy rules in the style of Taylor (1993) support the current setting of near-zero overnight interest rates in all the major developed regions. Indeed, some versions of these rules call for significantly-negative interest rates, suggesting that central banks should be taking substantial nontraditional policy actions. Forecasts of economic activity by central banks, international agencies, and the private sector provide even stronger support for additional policy ease. These forecasts almost universally project a very slow and weak recovery over the next two years, with persistent major shortfalls of output below potential, and inflation rates considerably below the levels desired by central banks. The Bank of England provides an interesting exception to this pattern, as it goes further than other forecasters in projecting faster growth and an earlier return to target inflation in the United Kingdom.

## How have central banks responded to the crisis<sup>2</sup>

### *A timeline of crisis responses*

In early 2007, market participants began to be concerned about potential losses on financial assets that might result from the incipient downturn in housing prices around the world. These concerns were most intense with respect to structured credit products based on US subprime mortgage loans, which the ratings agencies were beginning to downgrade on a widespread basis. The prices of such assets dropped sharply and a number of US mortgage companies specialising in subprime products failed. At the end of July, a mid-sized German bank with substantial exposure to US subprime assets came under severe pressure and was recapitalised by its state-owned largest shareholder.

These concerns spilled over into broader financial markets on 9 August 2007,

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2. This paper focuses on the responses of the four main developed-country central banks: the Federal Reserve Board (Fed), the European Central Bank (ECB), the Bank of Japan and the Bank of England.

when a large European bank suspended withdrawals from three investment funds it sponsored, citing an inability to value some of the mortgage-related assets. Funding pressures quickly emerged across a wide range of European and US financial institutions both because banks decided to hoard cash to meet potential calls on their credit lines to off-balance-sheet conduits, and because of concerns about potential losses in the portfolios of financial institutions. In particular, the spreads of bank term funding rates over comparable-maturity overnight index swap rates soared and liquidity in the interbank and other credit markets vanished. The European Central Bank and the Federal Reserve quickly responded to these pressures by injecting overnight funds into the banking system. By the end of August, both the ECB and the Fed had increased their supplies of longer-term funds to the banks and the Fed had narrowed the spread between the target federal funds rate and the rate on discount window borrowing. The Bank of England and Bank of Japan did not noticeably alter their operating procedures in August 2007. All four central banks held their main policy rates constant that month (see the timeline table at the end of this chapter).

During the rest of 2007, the Fed, the ECB, the Bank of England, and other central banks adopted further measures to increase liquidity in the banking system, including the frontloading of reserves into the banking system during each maintenance period (ECB and Bank of England), widening the penalty-free range for banks' reserve holdings (Bank of England), more frequent auctions of longer-term credit to banks (Fed, ECB, Bank of England), and the provision of term dollar funding to banks outside the United States through swap lines between the Fed and the ECB and Swiss National Bank (SNB). In conjunction with the UK Treasury, the Bank of England set up a special liquidity support facility for Northern Rock. Japanese markets were relatively unaffected by these strains, reflecting a much lower exposure to the housing bubble, and the Bank of Japan did not adopt measures to increase liquidity. The Fed lowered its policy rate 100 basis points during the second half of 2007 and the Bank of England lowered its policy rate 25 basis points late in the year, while the ECB and Bank of Japan held their policy rates steady.

In the first few months of 2008, financial conditions deteriorated sharply, culminating in the nationalisation of Northern Rock and the assisted takeover of Bear Stearns by JPMorgan. By April 2008, the Fed had lowered its policy rate another 225 basis points and the Bank of England had lowered its policy rate another 50 basis points. The ECB and Bank of Japan continued to hold their policy rates steady. During this period, the Fed increased the size of its term credit auctions for banks and its swap lines with the ECB and SNB, established a term securities lending



facility, and established a direct credit facility for nonbank primary bond dealers similar to the discount window for banks. The Fed also made an emergency loan secured by assets of Bear Stearns to facilitate the acquisition of Bear Stearns by JP Morgan. The Bank of England established a term securities lending facility for banks.

During the summer of 2008, financial conditions improved somewhat and inflation became a more prominent concern for central banks as commodity prices soared. The ECB raised its policy rate 25 basis points in July 2008 and the Fed, Bank of England and Bank of Japan held their rates constant.

Financial turbulence returned even more strongly in September 2008, with the failure of Lehman Brothers and the rescue of AIG. The crisis peaked in October 2008 as market participants lost confidence in financial institutions around the world. On October 8, the Fed, the ECB, the Bank of England and other central banks (but not the Bank of Japan) announced an unprecedented coordinated cut in policy rates of 50 basis points. Later in October the Fed cut its policy rate another 50 basis points and the Bank of Japan cut its policy rate 20 basis points. In November and December 2008 all four central banks made further policy rate cuts, totaling 85, 125, 250, and 20 basis points for the Fed, ECB, Bank of England and Bank of Japan respectively<sup>3</sup>. The Fed also tried to dampen expectations of the future path of the policy rate by stating that 'economic conditions are likely to warrant exceptionally low levels of the federal funds rate for some time.'

Central banks aggressively expanded nontraditional measures during the last few months of 2008. All four central banks broadened the collateral they accept in lending operations. The Fed established swap lines with the Bank of England, Bank of Japan and other central banks. The limits on the Fed swap lines with the ECB, SNB, Bank of England and Bank of Japan were eliminated. All four central banks increased their supply of longer-term funding to the banking system. The Fed and the Bank of Japan took measures to support the commercial paper (CP) market. The Fed announced plans to support the asset-backed securities (ABS) market. The Fed announced large-scale purchases of longer-term debt issued or guaranteed by the federal housing agencies. In coordination with the US Treasury, the Fed provided emergency support to AIG, Bank of America, and Citigroup, secured on the assets of those institutions. Governments in the euro area and the UK provided emergency support to several large financial institutions. The ECB narrowed the corridor between its standing deposit and lending facilities from 200 basis points to 100 basis points and coordinated with the SNB to provide term swiss-franc liquidity to

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3. The Fed cut its policy rate in December 2008 to a range of 0 to 25 basis points from a previous level of 100 basis points. The rate was around 15 basis points at year-end 2008.

European banks. The Bank of England converted its temporary securities lending scheme to a permanent discount window facility that lends liquid government bonds against a wide range of collateral. The Bank of Japan announced increased purchases of Japanese government bonds and lowered its securities lending operations fee. In addition to these nontraditional central bank measures, governments in the euro area, the US and the UK increased their guarantees of certain classes of bank liabilities, including deposits and senior debt. The US Treasury also issued a temporary guarantee of money-market mutual fund accounts.

Although the worst of the financial strains had passed by the end of 2008, the outlook for global economic activity continued to be dire during the first few months of 2009. The worsening economic outlook, including notably in eastern Europe, compounded the problems faced by financial institutions. The Fed and the Bank of Japan had already lowered their policy rates to their implicit lower bounds of 0 to 25 and 10 basis points, respectively, but the Fed strengthened its guidance concerning future policy rates by replacing the phrase 'some time' with 'extended period'. The Bank of England lowered its policy rate 150 basis points to an implicit lower bound of 50 basis points by March 2009, and liberalised the payment of interest on reserves by suspending reserve targets for banks. The Bank of England's *Inflation Reports* subsequently hinted that the policy rate was likely to remain at this level for the next two years, since such a policy path was projected to lead to a better inflation outcome than the higher policy path implied by market interest rates. The ECB lowered its main policy rate 150 basis points to a level of 100 basis points by May 2009 but it was not made clear if this level was intended to be a lower bound. The ECB widened the corridor between its standing facilities back to 200 basis points in January 2009 and then narrowed it to 150 basis points in May. With the substantially-increased provision of longer-term liquidity to banks in the euro area, the overnight interbank rate dropped below the main refinancing rate, though not below the 25 basis point rate paid on the standing deposit facility. In this sense, the ECB appears to have eased policy somewhat more than would be implied by holding the main refinancing rate at one percent, and the true lower bound for the overnight interbank rate may be the 25 basis points paid by the ECB's deposit facility, which is equivalent to the 25 basis points paid by the Fed on excess reserves.

In 2009, the Fed expanded its purchases of long-term agency securities, expanded the range of securities eligible for financing under its Term ABS Loan Facility (TALF), and began to purchase longer-term Treasury securities. The Bank of England announced a programme to buy long-term gilts, commercial paper, and corporate bonds. The ECB announced a programme to buy covered bonds, albeit to

a much lesser extent than the Fed and Bank of England programmes. The Bank of Japan began outright purchases of CP and corporate bonds with residual maturities of up to one year, although the amounts undertaken were relatively small.

### *Similarities and differences in responses across the regions*

The similarities in responses across these regions are clear. Central banks moved to supply liquidity to dysfunctional markets by increasing their lending operations, extending loan maturities, broadening the range of collateral accepted and making outright purchases of assets. They also responded to macroeconomic weakness by lowering policy rates. Differences in central bank responses reflect differences in the exposure of local financial institutions, different financial-industry structures and different perceptions of the appropriate role of monetary policy. The Bank of Japan responded far less aggressively in each of these areas – despite suffering an equivalent (indeed greater) shock to output and inflation – mainly because of the much lower exposure of Japanese financial institutions to troubled assets, and because of the perceived limited room for additional monetary stimulus.

With respect to financial strains, all the central banks covered in this chapter moved quickly to deal with problems in individual markets as they arose, with the temporary exception of the Bank of England in the opening weeks of the crisis. Although it is difficult to prove statistically, market participants widely credit these programmes as having prevented a much worse outcome. The Fed appeared to face the greatest obstacles, arising from the greater role of non-bank financial institutions in the US and the limitations on Fed lending to non-bank institutions. Fed loans to non-banks are allowed only under 'unusual and exigent circumstances,' must be fully collateralised and must be approved by a super-majority of the Board of Governors. That the Fed was able to support the CP and ABS markets is a testament to the resolve of its governors and the ingenuity of its lawyers. The obvious exception to this pattern of extraordinary support is the failure of Lehman Brothers. Fed Chairman Ben Bernanke has stated that he lacked the authority to save Lehman because Lehman did not have sufficient collateral to back a loan of the size that was needed<sup>4</sup>. Shortly after the Lehman failure, Congress passed legislation to enable the Treasury to support critical non-bank financial institutions.

With respect to monetary policy, all four central banks lowered their traditional target rates to historically-low levels and took some quantitative measures. The Fed

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4. At the times of their loans, Bear Stearns and AIG were judged to have supplied collateral in excess of the loan amounts.

acted the fastest, in part at least because the US was the initial focal point of the financial crisis. The Bank of Japan and the ECB were more reluctant to ease policy, with the ECB actually raising rates in mid-2008. The Fed and the Bank of England have been the most aggressive in outright purchases of longer-term assets that go beyond measures to stabilise specific markets.

Central bank balance sheet expansion

|                 | July 2007 | Sept. 2009 | Change (%) | Change (% GDP) |
|-----------------|-----------|------------|------------|----------------|
| Fed             | \$850 bn  | \$2200 bn  | 152        | 9.1            |
| ECB             | €1213 bn  | €1790 bn   | 52         | 7.0            |
| Bank of Japan   | ¥108 tn   | ¥117 tn    | 9          | 2.0            |
| Bank of England | £80 bn    | £226 bn    | 181        | 10.3           |

The preceding table presents changes in the size of central-bank balance sheets, which are a crude measure of the overall extent of central-bank responses to the financial crisis. This measure does not capture changes in operating procedures or in the composition of central-bank assets and liabilities. For example, these central banks initially financed the increase in longer-term loans to the banking system by reducing short-term loans or selling short-term government bonds. Nevertheless, efforts designed to increase monetary stimulus beyond that implied by the level of short-term interest rates generally require an increase in the overall balance sheet. By this measure, the Bank of England and the Fed have been most aggressive and the Bank of Japan has been relatively restrained. Much of the increase in the ECB's balance sheet reflects term loans (up to one year) to the banking system, which probably have less effect on the term structure of interest rates than the Bank of England's and the Fed's purchases of longer-term assets.

### Is it working?

All the central banks covered here lowered their traditional policy rates in response to the financial crisis. It is widely accepted that lower short-term interest rates do provide macroeconomic stimulus<sup>5</sup>. The Fed and Bank of England have gone somewhat further and attempted to lower longer-term interest rates by indicating that policy rates are likely to remain close to their current levels for an extended period.

5. It is an open question whether financial strains reduce the magnitude of stimulus for a given policy-rate reduction. Many nontraditional policy measures may be viewed as attempts to unblock the transmission channels for traditional policy.

However, the term structure of interest rates continues to slope upwards in both countries over the next two years to a greater extent than implied by historical estimates of the term premium<sup>6</sup>, suggesting that these communications have had only limited success in persuading markets that ultra-low policy rates will last more than a few months<sup>7</sup>.

Another common policy response has been to combat elevated spreads and reduced liquidity in the interbank funding market. Policies include increasing the amount and term of collateralised lending to financial institutions, frontloading the provision of bank reserves, broadening the range of collateral accepted and narrowing the spreads between deposit and credit facilities. Central banks surely have lowered spreads in this market below what they would otherwise be. But, measuring this effect is extremely difficult. A simple correlation of the size of these central bank programmes with the size of the spreads is not informative because causality runs in both directions: higher spreads induced central banks to expand their programmes and larger programmes helped to hold down spreads. The former effect clearly dominated between mid-2007 and late-2008. Christensen *et al* (2009) attempt to disentangle these effects by comparing the behaviour of interest rates in markets with and without a Fed lending programme. They conclude that the Fed's Term Auction Facility (TAF) lowered three-month dollar interbank rates roughly 300 basis points as of late 2008<sup>8</sup>. Spreads in the interbank funding market have declined considerably this year, but they remain somewhat higher than before the onset of the financial crisis.

Central banks also have adopted programmes to help specific nonbank credit markets. For these programmes, particularly in the US, the evidence is clear that the programmes did succeed in lowering spreads. Spreads on eligible CP dropped

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6. Kim and Orphanides (2007) show that the term premium over a two-year horizon has been close to zero in recent years and the average over a longer period is much lower than the current level of two-year Treasury yields. It is plausible that the term premium could have increased in response to the financial crisis. However, two-year interest rates did not exhibit substantial and sustained declines immediately after Fed and Bank of England announcements aimed at guiding near-term policy expectations lower.
  7. Central banks could, in principle, exert a stronger effect on market expectations by committing to a path of future policy rates. But such a commitment entails a significant risk to future economic outcomes because circumstances may not turn out as projected, and the central bank's scope for addressing any unexpected developments will be restricted. Even a commitment to a policy path conditional on specific macroeconomic outcomes is risky because of the difficulty of incorporating every contingency into the terms of conditionality.
  8. Taylor and Williams (2008) argue that TAF had no effect on interbank rates because the estimated coefficient on a temporary dummy variable for TAF *auction* dates is not statistically significant. However, McAndrews, Sarkar, and Wang (2008) show that there is a significant and sustained effect on interbank rates on the TAF *announcement* dates. Wu (2008) also finds that TAF significantly lowered term interbank rates in a term structure model that controls for macroeconomic and financial effects.

sharply immediately after the launch of the Fed's CP programmes and these spreads have remained near normal levels since then (the first vertical line in Figure 1 denotes the announcement of the Commercial Paper Funding Facility and the second vertical line denotes the beginning of its operations). CP spreads in Japan did not rise to the extent that they did in the US, but a series of Bank of Japan measures to support this market, denoted by the vertical lines in Figure 1 on the next page, appear to have reduced spreads to very low levels<sup>9</sup>.

Spreads on consumer ABS began to decline immediately after the announcement of the Fed's TALF programme, and there were further declines as the programme began operations (although consumer ABS spreads remain somewhat above historic norms). Moreover, consumer ABS issuance jumped to near-normal levels after the start of the Fed's programme from near-zero levels.

In the bond markets, spreads on agency securities over comparable-maturity Treasury securities, which had been elevated before the announced Fed purchase programme, declined sharply with the announcement of the agency purchase programme, and have drifted down further since then. Spreads on conventional mortgages, which adjust slowly to changes in agency spreads, also have declined, as Figure 1 shows<sup>10</sup>. Spreads on corporate bonds in the UK and on covered bonds in the euro area have declined since the Bank of England and ECB started to purchase these securities, but the declines have occurred in the context of global reductions in corporate yield spreads. Given that the sizes of these programmes are rather limited, it is not surprising that the effects have been less-readily apparent.

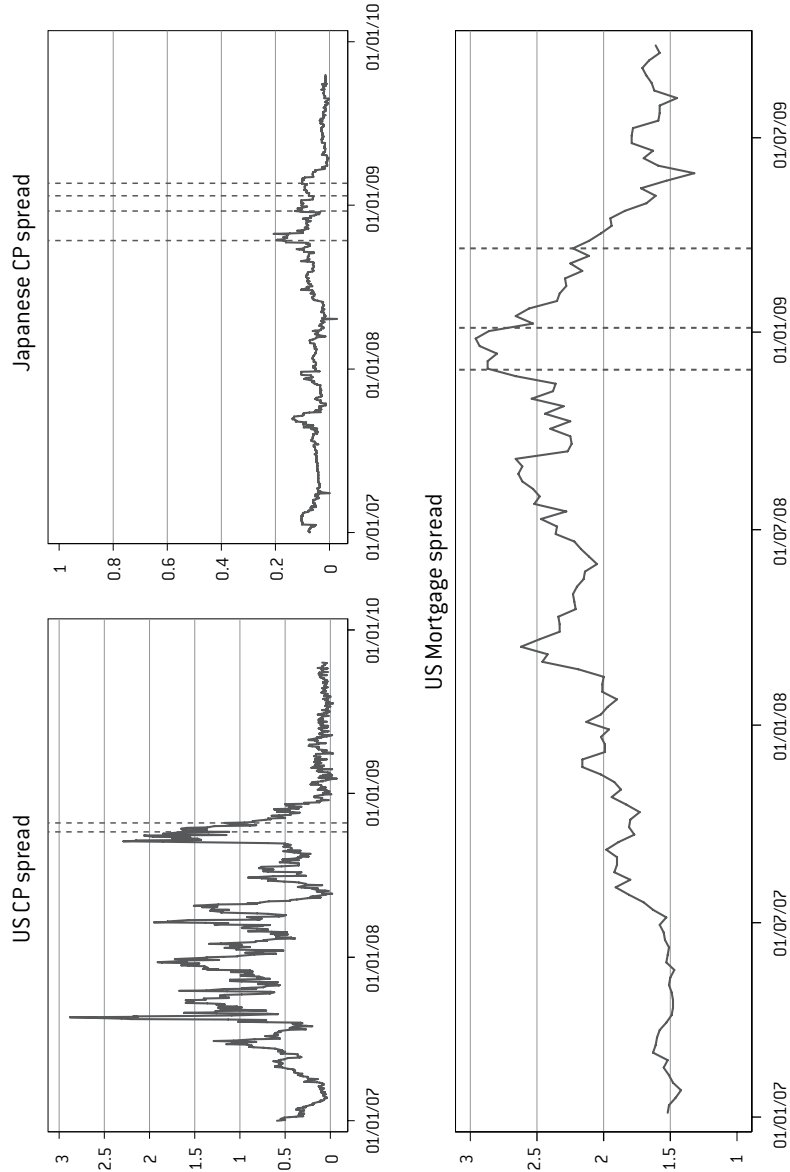
For central bank asset-purchase programmes that focus on relatively liquid long-term government and government-backed securities, the major effect is likely to be through the spread between long-term and short-term interest rates on all debt securities. For example, the Fed explained that its decision to purchase longer-term Treasury securities was intended to 'help improve conditions in *private* credit markets' (*italics added*). This view is based on theories such as the habitat-preference model, in which investors have preferences over the maturity distribution of their portfolios. To induce investors to sell longer-term assets to the central bank requires a reduction in the yield (increase in the price) of such assets.

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9. On 14 October 2008, the Bank of Japan increased its operations in the CP repo market. On 19 December 2008, the Bank of Japan began outright purchases of small quantities of CP. On 22 January 2009, the Bank of Japan increased its outright purchases of CP. On 19 February 2009, the Bank of Japan further relaxed rules regarding the use of CP as collateral for Bank of Japan loans.

10. The vertical lines in this panel denote 25 November 2008, when the Fed announced \$600 billion in planned purchases of agency securities, 5 January 2009, when the first purchases took place, and 19 March 2009, when planned agency purchases were raised to \$1.45 trillion.

Figure 1: Private spreads to comparable-maturity treasury yields (vertical lines denote policy actions, see text)



Many economists believe that altering the maturity of assets available to the public is likely to have minimal effects on the term structure of interest rates. This view reflects the literature on Operation Twist in the early 1960s, which did not find robustly significant effects of a swap between short-term and longer-term Treasury securities in the Fed's portfolio<sup>11</sup>. However, as noted by Solow and Tobin (1987), the Federal Reserve purchases during Operation Twist were small and were soon more than offset by increased Treasury issuance of long-term debt. Overall, there was little movement in the average maturity of Treasury debt held by the public and thus little hope of estimating a statistically significant and robust effect. A new generation of studies, using a longer span of data, consistently does find a noticeable effect of shifts in the maturity structure of Treasury debt on the term structure<sup>12</sup>. The estimated size of this effect depends on the degree of theoretical restrictions imposed on the estimating equation and it is somewhat sensitive to sample period. Nevertheless, the effect always has the correct sign. Based on these studies, a plausible range for the effect of central-bank purchases of long-term Treasury securities equivalent to one percent of the outstanding stock of Treasury debt is a reduction in the 10-year term spread of one to 10 basis points, with a number of estimates clustered around five to seven basis points<sup>13</sup>. These estimates are lower than the proponents of Operation Twist appear to have assumed, implying that only very large operations are likely to have substantial effects.

The movements of long-term yields immediately after the announcements of large-scale purchases of long-term assets by the Fed and the Bank of England provide further evidence on the effect of such policies on the term spread. The following table lists the movements in various interest rates over one- and two-day event windows surrounding Fed and Bank of England communications about such asset purchases<sup>14</sup>. Note that the movements are common across all long-term interest rates, including private-sector rates, but are much smaller for short-term

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11. The current programme differs from Operation Twist in that the reduction in long-term bonds is financed by reserve creation rather than sales of short-term Treasury bills. However, with interest rates on bank reserves and short-term bills roughly equal in the current environment, the two assets should be viewed as close substitutes and thus the effect on the term spread should be similar.

12. All of the studies focused on the US. See Friedman (1981), Frankel (1985), Agell and Persson (1992), Kuttner (2006) and Greenwood and Vayanos (2008).

13. The studies differed in their definitions of 'long term' and in their definitions of the relevant stock of assets by which shifts are normalised. I have attempted to translate the results into a common metric, defining long-term assets as those with maturities greater than two or three years.

14. On 25 November 2008 the Fed announced a programme to purchase up to \$100 billion of agency debt and \$500 billion of agency MBS. On 1 December, Chairman Bernanke raised the possibility of buying longer-term Treasury securities. On 16 December the FOMC confirmed the agency programme and reiterated the possibility of buying Treasury securities. On 28 January the FOMC disappointed markets



rates. The movements are in the expected direction on all dates except 7 May, when the announced increase in purchases had been widely anticipated and global sovereign yields were rising. The continued evidence of such effects on 6 August (the final column) suggest that the rise in long-term government bond rates between April and June reflected other factors, such as rising government debt issuance and an unwinding of safe-haven flows, rather than a change in the market's assessment of the impact of asset purchases<sup>15</sup>.

These announcement effects are roughly consistent with the range of plausible estimates reported in the econometric literature. A precise comparison is complicated by issues such as 1) the substitutability between agency securities and corporate debt on the one hand and Treasury securities and gilts on the other

Interest rate movements after central bank communications on asset purchases  
(basis points)

|                 | United States |             |               | 2009          |               | United Kingdom |               |             |
|-----------------|---------------|-------------|---------------|---------------|---------------|----------------|---------------|-------------|
|                 | 2008          |             |               |               |               |                | 2009          |             |
|                 | Nov.<br>25    | Dec.<br>1-2 | Dec.<br>16-17 | Jan.<br>28-29 | Mar.<br>18-19 | Mar.<br>5      | May<br>7      | Aug.<br>6   |
|                 | buy<br>more   | buy<br>more | buy<br>more   | buy<br>less   | buy<br>more   | buy<br>more*   | buy<br>more** | buy<br>more |
| 1-Yr. Treasury  | 0             | -13         | -5            | 4             | -9            | 0              | 0             | 2           |
| 10-Yr. Treasury | -24           | -27         | -33           | 30            | -40           | -28            | 8             | -9          |
| 10-Yr. Swap     | -32           | -23         | -53           | 5             | -37           | -12            | 15            | -1          |
| 10+Yr.          | -16           | -27         | -57           | 23            | -29           | -15            | 2             | -6          |
| Corporate***    |               |             |               |               |               |                |               |             |

Source: Datastream.

Note: Event windows are 1-day for morning announcements and 2-day for afternoon announcements.

\*All long-term rates fell significantly further the following day.

\*\*The announced increase was close to market expectations. An initial drop in yields was reversed over the course of the day as global bond yields rose strongly.

\*\*\*Based on price indexes assuming 6 percent coupon and 12 years to maturity. US data are Barclays long-term corporate aggregate. UK data are FTSE Sterling 10-15 year corporate.

by not announcing Treasury purchases. On 18 March the FOMC announced a Treasury purchase programme of up to \$300 billion and expanded the agency MBS programme to \$1.25 trillion. On 5 March the Bank of England announced an asset purchase programme of £75 billion, potentially expandable to £150 billion. On 7 May the Bank of England expanded the asset purchase programme to £125 billion, below the ceiling of £150 billion set by the Chancellor of the Exchequer. On 6 August the Bank of England expanded the programme to £175 billion, and the Chancellor approved an increase in the ceiling to this amount.

hand; 2) the extent to which markets anticipated these announcements; 3) the extent to which markets extrapolated additional purchases beyond those announced; 4) the extent to which the programmes affected market expectations of future short-term interest rates; 5) the length of time markets expect central banks to hold these assets; and 6) the speed with which markets price-in the full effects of announced purchases.

Overall, the evidence supports the view that large-scale alterations in the relative supply of short-term and long-term debt in private hands can affect the term structure of interest rates. The size of this effect is relatively small, so large quantities must be purchased. Importantly, the effect seems to spill over across all long-term debt securities, including classes that are not included in the purchase programmes, such as corporate debt in the US and swaps in the UK and US.

### Is it enough?

Clearly, central banks on both sides of the Atlantic have been very responsive to the financial crisis, both in terms of traditional monetary policy and in terms of nontraditional monetary policies and the provision of liquidity<sup>16</sup>. Nevertheless, further policy easing is warranted. Monetary-policy rules in the style of Taylor (1993) generally point to policy rates around or below zero for these regions. Moreover, these simple rules do not factor in the effects of exceptional financial strains on the transmission of monetary ease to economic activity<sup>17</sup>. Thus they may understate the effective tightness of monetary policy. To some extent, non-traditional policy measures are helping traditional policy channels to function more normally, but for the most part such measures are not providing additional macroeconomic stimulus beyond that implied by traditional policy measures<sup>18</sup>. An alternative gauge of the appropriate stance of policy derives from forecasts of output and inflation over the next year or so. Economic forecasts by central banks, other official institutions and the private sector overwhelmingly show a disappointing rebound from the deep recession. Given the potential danger of falling into deflation, policymakers should aim at a more vigorous return to growth.

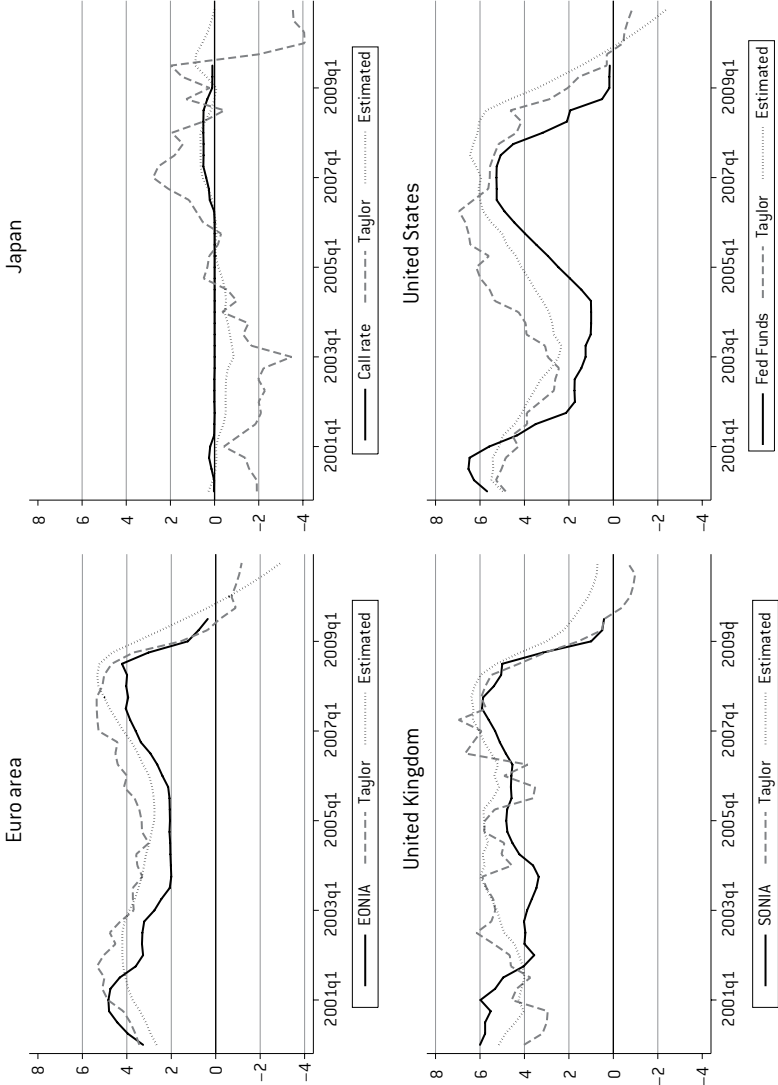
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16. As this conference volume was being prepared for publication, two new studies were released that support this conclusion. See Gagnon *et al* (2010) and Joyce *et al* (2010).

17. Surveys of bank lending standards in these four regions show a pronounced tightening of credit terms and conditions in 2008 with very little easing (or even further tightening) in 2009.

18. The main caveat to this conclusion arises from the potential effects of purchases of long-term liquid assets on long-term interest rates.

Figure 2: Overnight rates and policy rules



## The Taylor rule

Figure 2 shows that overnight interbank interest rates (the solid lines) are close to zero in each of the main regions<sup>19</sup>. Taylor-style policy rules (the dashed and dotted lines) support the rapid drop in policy rates, and, in some cases, call for significantly negative interest rates next year as inflation is projected to decline. The dashed lines are the original Taylor (1993) rule, shown in equation (1), using output gaps ( $y - y^*$ ) estimated by the OECD and assuming a target inflation rate ( $\pi^*$ ) of two percent in the euro area, UK and US, and one percent in Japan. As in the original rule, the equilibrium real interest rate is assumed to be two percent<sup>20</sup>.

$$1) \quad r_t = 2 + \pi_t - \pi_{t-4} + 0.5(\pi_t - \pi_{t-4}) - \pi^* + 0.5(y_t - y_t^*)$$

The dotted lines are dynamic simulations of estimated policy rules beginning in 1984Q2 using the specification in equation (2)<sup>21</sup>. The estimation sample is 1984Q1-2007Q2<sup>22</sup>. This specification allows for slow adjustment of the policy rate with a different (generally faster) adjustment speed allowed for changes in the output gap<sup>23</sup>. Estimation results are presented in the following table. The coefficient on inflation does not differ significantly from that in Taylor's original rule for any region. The coefficient on the output gap is significantly larger than in Taylor's original rule in the euro area and the US, whereas it is smaller than in Taylor's original rule in Japan.

$$2) \quad r_t = \rho r_{t-1} + (1 - \rho) \alpha + \pi_t - \pi_{t-4} + \beta(\pi_t - \pi_{t-4}) + \theta(y_t - y_t^*) + \delta \Delta(y_t - y_t^*)$$

Figure 2 shows that both policy rules called for a sharp drop in short-term

19. The interest rates are observed through 2009Q3. From 2009Q2 until 2010Q4, the policy rules are based on OECD estimates and projections of real GDP and GDP deflators.

20. Data are quarterly, from OECD Economic Outlook database. Inflation is the (logarithmic) percentage change in the GDP deflator.

21. Dynamic simulations use the previous period's fitted value for the lagged interest rate rather than the actual value.

22. Prior to 1999, euro-area data are GDP-weighted averages of the six largest member countries. This sample corresponds to the period of relative macroeconomic stability in these regions. However, there have been notable shifts in the framework or goals of monetary policy since 1984. For example, US inflation appeared to move down persistently in 1991, the Bank of England moved to inflation targeting in 1993 and was granted independence in 1997, the Bank of Japan was granted increased independence in 1998, and the ECB began operations in 1998. Estimating the policy rules over these shorter samples yielded less sensible coefficients, including much smaller and even negative coefficients on inflation.

23. Levin, Wieland, and Williams (1998) show that policy in the US has a significant lag component and that it appears to respond to both output growth and the output gap.

Estimated policy rules, equation (2), 1984Q1 – 2007Q2

|          | Euro Area     | Japan*        | UK             | US             |
|----------|---------------|---------------|----------------|----------------|
|          | 0.91<br>(.02) | 0.88<br>(.04) | 0.84<br>(.05)  | 0.92<br>(.02)  |
|          | 0.18<br>(.86) | 1.68<br>(.39) | 0.73<br>(1.41) | 1.09<br>(1.99) |
|          | 0.79<br>(.30) | 0.52<br>(.22) | 0.80<br>(.35)  | 0.53<br>(.74)  |
|          | 1.99<br>(.43) | 0.11<br>(.17) | 0.39<br>(.38)  | 2.18<br>(.64)  |
|          | 0.09<br>(.07) | 0.11<br>(.05) | 0.39<br>(.20)  | 0.24<br>(.10)  |
| Root MSE | 0.27          | 0.37          | 0.90           | 0.45           |

Note: Coefficient standard errors in parentheses. Data are from the *OECD Economic Outlook* database.

\*A four-quarter dummy was added for the imposition of the consumption tax in 1997, but the estimated effect was not significant at any level.

interest rates beginning in 2008Q4 in the euro area, the UK and the US. In every region, the original Taylor rule calls for a negative short-term interest rate by the beginning of 2010, based on OECD forecasts of output and inflation. The estimated rule calls for negative policy rates next year in the euro area and the US. An estimated Taylor-style rule based on the growth rate of GDP (not shown), instead of the output gap, points to negative policy rates in all four regions by late 2009.

There exists an extensive literature discussing the conditions under which Taylor-style rules may represent optimal monetary policy<sup>24</sup>. Many of these papers try to estimate the optimal values of the coefficients in the policy rule. These studies typically find that optimal rules would have coefficients at least as large, and often larger, than those in the original Taylor rule. More activist rules generally point to more negative policy rates in the current situation. Some papers have argued for the inclusion of exchange rates, equity prices, house prices, or measures of financial stress in the policy rule. Some have argued for basing the rule on forecasts of inflation and output gaps. Some have noted that it is difficult to measure the output gap in real time and that estimates of output gaps are subject to substantial revisions. Based on these and other considerations, some argue against the use of any fixed rule as a guide to monetary policy<sup>25</sup>. Krugman (2009), Guha (2009) and

24. See for example Levin *et al* (1998), Gerlach and Schnabel (1999), Clarida *et al* (2000), Orphanides (2001), Woodford (2001), Borio and Lowe (2002) and Rudebusch (2002).

25. See Svensson (2003) and Kuttner and Posen (2004).

Rudebusch (2009) have cited different variants of Taylor-style rules to suggest that the ideal policy rate in the US (as of mid-2009) should be much lower than zero, around minus five to minus seven percent. On the other hand, John Taylor recently argued that his original rule's conclusion of a rate near zero is about right and that the next policy move is more likely to be up than down<sup>26</sup>. It is beyond the scope of this chapter to sort out the vast literature on Taylor-style policy rules. Rather, I simply note that many proposed implementations of Taylor-style rules point to policy interest rates at or below zero in all four regions, in some cases substantially below zero.

### *Economic forecasts*<sup>27</sup>

Forecasts of economic activity and inflation provide another basis on which to judge the policy position. Given the lags in monetary transmission, the policy position in mid-2009 will have only a marginal effect on output and inflation in 2009. However, current policy can have a significant effect on output and inflation in 2010. A minimum standard for countercyclical policy in the face of a large output gap is that output should be forecast to grow faster than potential over the next year or so unless inflation is expected to be higher than desired<sup>28</sup>.

2009 GDP forecasts

|           | OECD (June)                    |                         | Consensus<br>(Sept)*           |                                | IMF (October)                  |                       |                           |
|-----------|--------------------------------|-------------------------|--------------------------------|--------------------------------|--------------------------------|-----------------------|---------------------------|
|           | 2010<br>Q4/Q4<br>GDP<br>Growth | 2010Q4<br>Output<br>Gap | 2010<br>Q4/Q4<br>Gap<br>Change | 2010<br>Q4/Q4<br>GDP<br>Growth | 2010<br>Q4/Q4<br>GDP<br>Growth | 2010<br>Output<br>Gap | 2010<br>Y/Y Gap<br>Change |
| Euro area | 0.9                            | -5.8                    | 0.3                            | 1.2                            | 0.9                            | -3.1                  | -0.1                      |
| Japan     | 0.8                            | -6.1                    | 0.0                            | 1.0                            | 1.4                            | -5.5                  | 1.5                       |
| UK        | 1.1                            | -6.2                    | 0.0                            | 1.9                            | 1.3                            | -4.7                  | 0.2                       |
| US        | 1.4                            | -5.3                    | 0.1                            | 2.8                            | 1.9                            | -3.9                  | 0.6                       |

\*Consensus Forecasts survey averages from Consensus Economics, Inc.

26. Wall Street Journal, 'Q&A: John Taylor on His Rule and Fed's Balance Sheet,' <http://blogs.wsj.com/economics/2009/10/14/> (accessed on 22 October 2009).

27. This section is based on economic forecasts that were available as of 1 October 2009.

28. A common rule of thumb is that monetary policy affects output with a one-year lag and inflation with a two-year lag. See Svensson (1997) and Debelle (1999).

The above table shows that the OECD, the International Monetary Fund and the consensus of private-sector forecasters expect weak growth in 2010, with the sole exception of the consensus forecast for the US, which is slightly above its historical average. The OECD projects large negative output gaps in each of these regions with no significant reduction in output gaps over the four quarters of 2010. The IMF projects somewhat smaller, but still substantial, negative output gaps in all four regions next year. Only Japan, which is estimated to have the largest output gap of these regions in 2009, is projected by the IMF to grow substantially faster than potential in 2010. At the rates of growth projected for 2010, it would take many years for these regions to return to potential output based on either the IMF or the OECD estimates of the output gaps.

The very small reductions in output gaps projected for 2010 by the IMF and the OECD are all the more remarkable in light of the sharp reductions these institutions have made to their estimates of potential growth rates for these regions. Indeed, both the IMF and the OECD estimate that potential growth dropped by a percentage point or more in each of these regions in 2009 and that it will remain low in 2010. Not all observers share this pessimism about the prospects for potential output<sup>29</sup>.

Consensus, IMF, and OECD projections of inflation in 2010 are at or below the levels desired by central banks in each of these regions. Overall, these forecasts of growth and inflation generally support the conclusion that further policy easing is desirable in order to avoid persistent weakness in economic activity and the risk of harmful deflation.

Central-bank forecasts from three of these four regions also support the case for looser monetary policy.

- The midpoint of Eurosystem (ECB and national central banks, September 2009) staff projections of GDP growth in 2010 is 0.2 percent with an inflation midpoint of 1.2 percent. Both of these are clearly below desired levels, even after allowing for a possible decline in the potential growth rate.
- The midpoint of Bank of Japan policy-board members' (July 2009) forecasts of GDP growth in fiscal year 2010 is 1.0 percent, below the recent historical average of output growth, but close to the Bank of Japan's assessment of the current potential growth rate. The midpoint of policy-board members' inflation forecasts is -1.0 percent, well below the Bank of Japan's definition of price stability, which is centred around 1.0 percent.

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29. The Congressional Budget Office (2009) projects the potential growth rate of US output in 2009 and 2010 at two percent.

- The midpoint of the central tendency of Federal Open Market Committee (FOMC) participants' (June 2009) projections for the US unemployment rate at the end of 2011 is 8.6 percent, far above the midpoint of their estimates of the 'longer-run' rate of 4.9 percent<sup>30</sup>. FOMC participants project core inflation to be about 1.3 percent in 2011, compared to a desired inflation rate of around 1.8 percent.

It is not clear when policymakers at these central banks expect inflation to return to its desired level, but it is surely further out than the commonly-used two-year horizon.

The Bank of England provides an exception to this pattern. The Bank of England projects output and inflation under two alternative assumptions: market expectations of future policy rates and a constant policy rate. Under a constant policy rate at 0.5 percent and planned long-term asset purchases of £175 billion, the Bank of England (August 2009 median) projects that output will grow 2.5 percent in 2010 (Q4/Q4) and that inflation will return to its target rate by late 2011. Under market expectations of somewhat-higher interest rates, the Bank of England projects slightly lower growth and a continued undershooting of its inflation target. From these projections we infer that the Bank of England expects to hold policy rates at their current level until at least early 2011 and that looser policy is not needed to attain a desired outcome for inflation. Under either set of assumptions, the Bank of England projects more rapid growth of GDP in 2010 than most outside forecasters. It may be that the Bank of England believes that its asset-purchase programme will have a significant stimulant effect.

Altogether then, the evidence from a wide range of economic forecasts suggests that further monetary-policy stimulus would be appropriate in the major developed regions. A notable exception to this conclusion is found in the Bank of England forecast for the UK economy, which suggests that maintaining the current policy stance over the next two years will lead to a satisfactory outcome. However, most other forecasters have a more downbeat view on the UK economy. It is also notable that in the euro area and Japan, where projections of near-term inflation are furthest below desired levels, central banks have been least aggressive in pursuing nontraditional monetary policies.

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30. This forecast also suggests that FOMC participants are not expecting a very large stimulant effect from the Fed's long-term asset-purchase programme.



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## Annex: Timeline of central bank responses to the financial crisis

| Japan                                                                                                                                                                                      | United States                                                                                                                                                                                                                                         |                           | United Kingdom                                                                                                                                 | Euro area                                                                                                                                                                                                                                        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                            | increased liquidity and expanded term loans to banks, narrowed spread on discount window loans                                                                                                                                                        | Aug 2007                  |                                                                                                                                                | increased liquidity and expanded term loans to banks                                                                                                                                                                                             |
|                                                                                                                                                                                            | increased term liquidity to banks, lowered policy rate 100 b.p.                                                                                                                                                                                       | Sep 2007 through Dec 2007 | frontloaded bank reserves, widened reserve target range, increased term liquidity to banks, loan to Northern Rock, lowered policy rate 25 b.p. | frontloaded bank reserves, increased term liquidity to banks, provided dollar liquidity through Fed swaps                                                                                                                                        |
|                                                                                                                                                                                            | increased term liquidity to banks, began term loans to primary dealers, established term securities lending, loan for Bear Stearns, lowered policy rate 225 b.p.                                                                                      | Jan 2008 through Apr 2008 | established term securities lending, lowered policy rate 50 b.p.                                                                               | increased dollar liquidity through Fed swaps                                                                                                                                                                                                     |
|                                                                                                                                                                                            |                                                                                                                                                                                                                                                       | May 2008 through Aug 2008 |                                                                                                                                                | raised policy rate 25 b.p.                                                                                                                                                                                                                       |
| increased term liquidity to banks, supported CP market, provided dollar liquidity through Fed swaps, increased JGB purchases, lowered fee on security lending, lowered policy rate 40 b.p. | increased term liquidity to banks, supported CP market, broadened collateral accepted, began outright purchases of agency securities, loans for AIG, Bank of America, and Citigroup, lowered policy rate 185 b.p. and guided down future expectations | Sep 2008 through Dec 2008 | increased term liquidity to banks, provided dollar liquidity through Fed swaps, broadened collateral accepted, lowered policy rate 250 b.p.    | increased term liquidity to banks, increased dollar liquidity through Fed swaps and provided swiss franc liquidity through SNB swaps, broadened collateral accepted, narrowed corridor between standing facilities, lowered policy rate 125 b.p. |
| began outright purchases of CP and short-term corporate bonds                                                                                                                              | began purchasing longer-term Treasury securities and expanded purchases of agency securities, began to support ABS market                                                                                                                             | Jan 2009 through Aug 2009 | began purchasing longer-term gilts, corporate bonds, and CP, suspended reserve targets, lowered policy rate 150 b.p.                           | increased term liquidity to banks, began purchasing covered bonds, lowered policy rate 150 b.p.                                                                                                                                                  |

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# Comments on 'Central bank responses to the 2007-08 financial crisis: the case for further action' by Joseph Gagnon

STEFAN GERLACH<sup>1</sup>

It is a pleasure to have been asked to comment on Joe Gagnon's contribution to this volume. His paper is interesting for at least three reasons: (i) it provides a timeline of the crisis; (ii) it argues that quantitative easing has been effective; and (iii) it concludes that given their historical interest-rate setting behaviour, the Bank of England, the Bank of Japan, the European Central Bank and the Federal Reserve should now all have set interest rates much below zero, if that had been possible. To demonstrate this, Joe uses a Taylor rule and an empirical reaction function on pre-crisis data to compute hypothetical three-month interest rates during the crisis.

I agree with much of the analysis in the paper. I will focus my comments on the pitfalls of using the Taylor rule and empirical reaction functions in judging whether the stance of monetary policy is appropriate. In doing so, in the interest of brevity I will consider only the euro area. My main conclusion is that a better-specified empirical reaction function than that used by Joe shows that interest rates in the euro area are in fact quite close to where one would expect them to be, given the ECB's interest-rate setting before the crisis erupted.

Joe estimates empirical reaction functions on quarterly data for the period 1984Q1 – 2007Q2 measuring inflation by the GDP deflator, the growth rate of which has fallen sharply as a consequence of the crisis. Furthermore, he uses the growth of real GDP, which has also slowed considerably, as a measure of the state of the business cycle. Together these developments lead the model to predict a big cut in

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interest rates.

In the first row of Table 1, I estimate Joe's equation using only data for the period of EU economic and monetary union, that is, starting in 1999Q1. The implied long-run effect of a one percentage point fall in inflation is to reduce the interest rate by  $0.27/(1-0.86) = 1.69$  percent, which is very similar to Joe's estimate of 1.79.

Figure 1 provides dynamic out-of-sample predictions from the model, which show that three-month interest rates in the euro area in 2009Q2 should have been about minus one percent, with a 95 percent confidence band that excludes zero. As Joe concludes, monetary policy in the euro area looks far tighter than one would expect on the basis of the historical record.

But one problem with using empirical reaction functions in this way to characterise monetary policy is that misspecification can have a large cumulative effect on out-of-sample predictions. In a recent paper, I estimated a reaction function for the euro area using monthly data from the period before the financial crisis and discussed at some length specification issues<sup>2</sup>.

Here I estimate a quarterly version of that model<sup>3</sup>. To capture real GDP, it uses the Purchasing Managers' Index (PMI), which declines in much the same way as real GDP growth during the crisis, but starts to recover in 2009Q2 since it is a forward-looking variable. Moreover, the model uses core inflation, which fell much less than inflation computed using the GDP deflator. Finally, it incorporates both M3 growth and year-on-year changes in the euro's nominal effective exchange rates.

The estimates are presented in the second row of Table 1. The improvement in fit is dramatic: the adjusted R-squared rises from 0.48 to 0.83. More intuitively, the standard error of the estimate falls sharply from 0.24 basis point to 0.14 basis points.

Figure 2 shows the dynamic out-of-sample predictions of the model. Interestingly, these are very close to the actual interest rate, which lies well inside the 95 percent confidence bands, except during 2008Q3-Q4, when the turmoil after the collapse of Lehman Brothers led interbank rates to rise sharply across the world.

Three-month euro Libor are thus about where one would have expected them to be, given the ECB's conduct of policy between 1999-2007. Of course, that does not imply that they are at the appropriate level, but it does show that the results from

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2. See Stefan Gerlach (2007) 'Interest rate setting by the ECB, 1999-2006: Words and deeds', *International Journal of Central Banking*, 3, 1-45.

3. The model differs from that in Gerlach (2007) in three ways: the data are quarterly rather than monthly; the dependent variable is the three-month Libor rather than the ECB's repo rate; and core inflation is significant in the new model and is therefore included.

Table 1

|    | Lagged<br>interest<br>rate | Output<br>growth | PMI            | Inflation      | Core<br>inflation<br>rate | Effective<br>exchange<br>rate | M3<br>growth   | Adj. R2<br>(changes) |
|----|----------------------------|------------------|----------------|----------------|---------------------------|-------------------------------|----------------|----------------------|
| 1. | 0.84<br>(14.82)            | 0.31<br>(4.56)   |                | 0.27<br>(1.84) |                           |                               |                | 0.48                 |
| 2. | 0.94<br>(32.39)            |                  | 0.06<br>(7.25) |                | 0.15<br>(2.19)            | -0.02<br>(4.11)               | 0.04<br>(2.06) | 0.83                 |

Dependent variable: 3-month interest rate. Sample period: 1999Q1 – 2007Q2. The model is  $i(t) = a \cdot i(t-1) + b \cdot x(t) + v(t)$ ; the adjusted R-squared is from the equivalent model  $i(t) - i(t-1) = (a-1)i(t-1) + b \cdot x(t) + v(t)$ .

Figure 1: Dynamic out-of-sample forecasts of three-month Libor in the euro area  
(using real GDP growth and inflation computed using the GDP deflator)

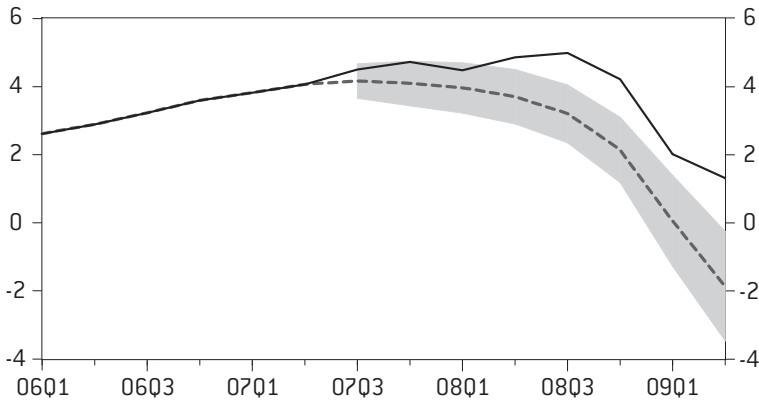
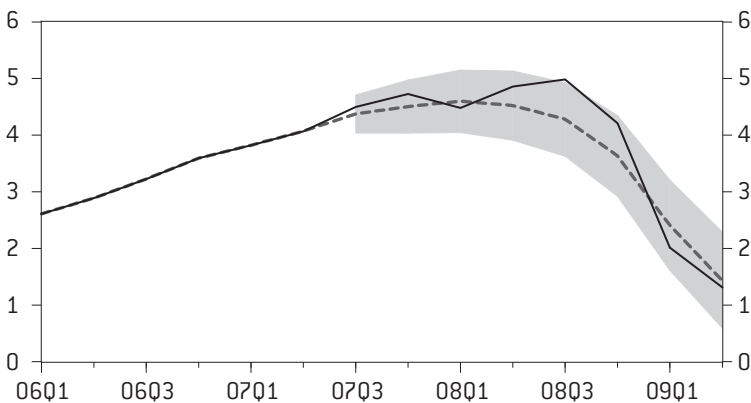


Figure 2: Dynamic out-of-sample forecasts of three-month Libor rates in the euro area  
(using a version of Gerlach, 2007)



Joe's out-of-sample forecasts using estimated monetary policy reaction functions are highly sensitive to the specification of the model used.

But despite that small quibble, Joe has given us a very interesting paper which I generally agree with.

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# Comments on 'Central bank responses to the 2007-08 financial crisis: the case for further action' by Joseph Gagnon

HEINZ HERRMANN<sup>1</sup>

In his paper, Joseph Gagnon gives a brief overview of the development of the financial crisis, which started in 2007, and describes the responses of the major central banks. All central banks reduced their interest rates to levels close to zero and used 'non-standard measures' to ease conditions in the financial markets. For example, the European Central Bank has lengthened significantly the maturity of its operations and extended the range of securities it accepts as collateral. This extension of accepted collateral was very important because it ensured banks could access liquidity from central banks and it allowed banks to offer new loans or, at least, to renew existing contracts. Although Gagnon acknowledges these steps, he doubts that they were sufficient. To underline his point, he makes three arguments:

- Most forecasts looking ahead to the next few years remain gloomy.
- Based on a conventional Taylor rule, most short-term interest rates should have been negative, which meant that the zero lower bound was severely binding.
- Although short-term interest rates are at a low level, the yield curve is sloping upwards, and long-term interest rates are clearly above short-term rates. On the basis of this observation, he proposes that central banks should engage in the purchase of longer-term assets.

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1. Deutsche Bundesbank. The comments reflect the author's personal views and not necessarily those of the Bundesbank.



My comments concentrate on the reliability of conventional Taylor rules as a guide for central banks during the recent crisis, and on whether it is desirable for central banks to engage in financial markets other than the money market.

Taylor rules have often been used as a simple benchmark to evaluate the restrictiveness of monetary policy. However, the weaknesses of this are well known, such as difficulties in measuring (the current or forecast) output gaps and the natural interest rate (particularly in real time), or if a simple rule does justice to all the information central banks should take into account<sup>2</sup>. Therefore, it is not surprising that central bankers usually hesitate to accept such interest rates as a benchmark for evaluating their policies<sup>3</sup>. The use of the Taylor rule as a guide for monetary policy during the turmoil of the past few years raises some specific problems.

First, making forecasts of inflation and GDP, or the output gap, was clearly more difficult than it would have been under normal circumstances. For example, the Bank of England revised its (mean) forecast for 2009Q2 GDP from -1.9 percent (in 2008Q4) to -4.6 percent (in 2009Q2). This should be compared with normal times when such revisions are usually much smaller (for example from 3.1 percent to 2.9 percent over the comparable time span two years previously). Similar drastic revisions were observed in most other countries. These experiences clearly influenced banks' confidence in the outlook, as can be seen in the fan charts published by the Bank of England (although it is not always clear how to measure uncertainty) (see Figures 1 and 2). In particular, increased uncertainty with respect to future GDP has to be taken into account, as the sharp decline in the Taylor interest rate is, to a large extent, the result of the sombre outlook for real growth given by most forecasters. In addition to uncertainty about future output, the crisis has also increased our uncertainty regarding potential output. Several structural shocks (from oil prices to the uncovering of structural weaknesses in the financial industry and its consequences for future real growth) and the dramatic increase in public debt in the course of the crisis, which may have negative consequences for longer-term growth in our economies, may well require a downward revision of our estimated future output gap.

Second, the links between short-term interest rates, long-term interest rates and the real economy – in other words, the transmission process – have probably

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2. See, for example, S. Zozicki: How useful are Taylor rules for monetary policy?, Federal Reserve Bank of Kansas City Economic Review, 2nd quarter, 1999 and A. Orphanides/J. C. Williams: Monetary policy under imperfect knowledge, Journal of European Economic Association, 2006, 366-375.

3. See, for example, J C Trichet: Activism and alertness in monetary policy, lecture at the conference on Central Banks in the 21st Century, Madrid, June 2006.

Figure 1: Current GDP projection based on constant nominal interest rates at 5%

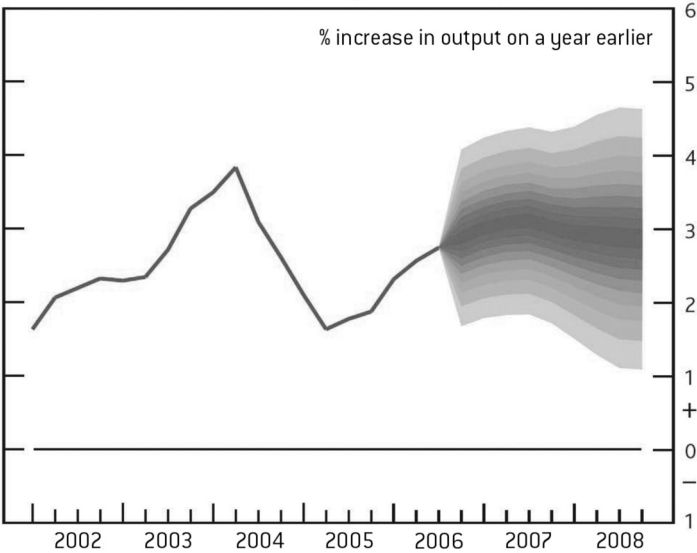
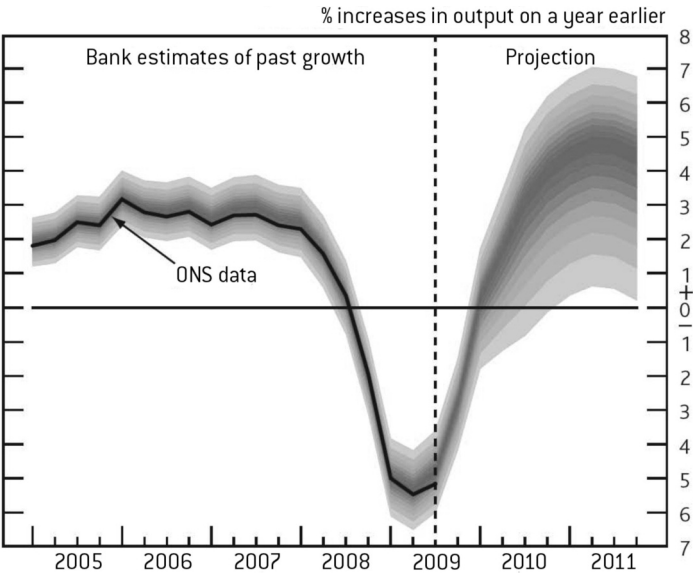


Figure 2: Current GDP projection based on constant nominal interest rates at 0.5 percent and £200 billion asset purchases



Source for both figures: Bank of England.

changed during the crisis. This may reduce the usefulness of short-term interest rates as indicators for monetary policy. In fact, central banks used a broad range of other measures to ensure the functioning of the financial system, including instruments that aimed to support credit markets directly instead of through the traditional channels.

Acknowledging the zero lower bound of interest rates and the fact that the yield curve is upward-sloping (albeit to different degrees, depending on the economies considered), the paper recommends more purchases of long-term assets by central banks. In my view, such a policy has various drawbacks, and central banks would be well advised to limit such interventions to a minimum. Intervening in the money market reduces the danger that central banks may distort financial markets and the allocation of scarce resources to the private sector<sup>4</sup>. Buying public debt outright might be in conflict the overall aim of not being involved in financing public deficits – historically one of the, if not the, main peril for stable prices. On the other hand, in the case of outright purchases of private assets, central banks should always be aware of the risk that their counterparty defaults (with unpleasant consequences for profits and possible resulting dependence on governments – not the best precondition for a credible central bank; it is self-evident that these risks are more serious in a sharp recession than in normal times). All in all, such a (massive) shifting of central-bank operations toward the longer end of the financial markets would be a risky experiment. Indeed, it is not clear why – if it is needed – it should not be carried out by the government itself.

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4. The guidelines of the ECB state that “the Eurosystem has to act in accordance with the principle of an open economy with free competition favouring an efficient allocation of resources”.

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# Comparing transatlantic responses to the financial crisis: the fiscal policy response

MARK A. HORTON<sup>1</sup>

## Policy context and guidance from the IMF

With the sharp deterioration of global economic conditions, prospects for a prolonged recession, and significant downside risks, the managing director of the International Monetary Fund called in late 2008 for fiscal policy to play a major role in supporting global demand. The managing director noted that counter-cyclical fiscal policy would not be advisable in all countries, particularly in those with greater vulnerabilities or where debt sustainability is a major concern. He called on countries with the strongest policy frameworks and those with clearly sustainable debt positions to take the lead, both by allowing automatic stabilisers to function, and through global co-ordination, pursuing additional discretionary stimulus of two percent of world GDP<sup>2</sup>.

The Fund also provided guidance on the design of crisis-related discretionary fiscal stimulus<sup>3</sup>. Specifically, the Fund staff suggested that stimulus should be:

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1. Fiscal affairs department, International Monetary Fund. This chapter is based on the July and November 2009 editions of 'The State of Public Finances Cross-Country Fiscal Monitor', prepared by the staff of the fiscal affairs department of the International Monetary Fund and co-ordinated by the author. See the July edition at <http://www.imf.org/external/pubs/ft/spn/2009/spn0921.pdf> and the November edition at <http://www.imf.org/external/pubs/ft/spn/2009/spn0925.pdf>.
  2. See, for example, <http://www.imf.org/external/np/speeches/2008/101308.htm> and <http://www.imf.org/external/np/speeches/2008/121008.htm>.
  3. See, for example, 'Fiscal Policy for the Crisis', <http://www.imf.org/external/pubs/ft/spn/2008/spn0801.pdf>.

- *Timely*, given the urgent need for action.
- *Large*, because of the sizable drop in demand.
- *Lasting*, as the recession would likely persist for some time<sup>4</sup>.
- *Diversified*, given uncertainty over which measures would be most effective.
- *Contingent*, indicating that further action would be taken, if needed.
- *Collective*, as countries that have the fiscal space should use it given the severity and global nature of the downturn.
- *Sustainable*, to avoid adverse effects in the short run and debt explosion in the long run.
- The Fund staff observed that the challenge would be to find the right balance among these potentially competing goals – particularly, large and lasting actions versus the need to ensure fiscal sustainability.

### The fiscal policy response

Fiscal policy is providing substantial support to aggregate demand globally and across the Atlantic. For the world as a whole, overall fiscal deficits are expected to widen on average by more than six percentage points from their pre-crisis levels in 2007, before narrowing in 2010 (Table 1). Reflecting smaller automatic stabilisers, financing constraints in some countries, and institutional constraints, the extent of fiscal expansion is significantly less in emerging economies and low-income countries than advanced countries. Across the G20, the average overall deficit is projected to widen by 6.9 percent of GDP this year, and to narrow next year<sup>5</sup>. Looking across the Atlantic, the fiscal expansion from pre-crisis levels is significantly larger in the UK and the US than in the G20 as a whole and in the other European G20 countries such as France, Germany and Italy (Figure 1).

The more sizable overall fiscal expansion in the advanced G20 countries reflects, in part, larger automatic stabilisers. These reflect, in turn, larger governments (eg, as measured by the revenue-to-GDP ratio) and a more sizable

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4. This would also suggest that the fiscal stimulus could rely, more than usual, on spending measures. The common argument that implementation lags are long for spending was seen as less relevant given the risk of a more prolonged downturn. Also, the direct nature of spending measures offers an advantage over tax cuts or increases in transfers, given the high degree of uncertainty in the crisis and prospects that tax breaks or transfers would be saved.

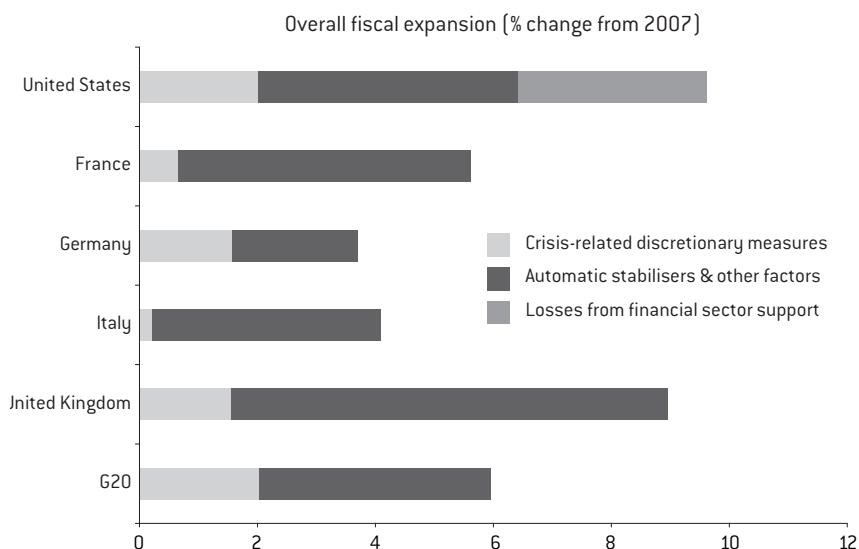
5. Much of the projected fall in the deficit in 2010 reflects declining losses from financial-sector support operations in the US. Net of these – which are unlikely to have a direct impact on aggregate demand – the deficit is projected to widen in advanced G20 economies in 2010, with reduced discretionary anti-crisis measures more than offset by larger automatic stabilisers as the output gap widens further, and by increases in other types of spending (especially in Japan the UK and the US).

**Table 1: Fiscal balances**  
(In percent of PPP-weighted GDP)

| Overall fiscal balance                       |                      |      |      |      |
|----------------------------------------------|----------------------|------|------|------|
|                                              | 2007<br>(Pre-crisis) | 2009 | 2010 | 2014 |
| World                                        | -0.5                 | -6.7 | -5.6 | -2.8 |
| Advanced economies                           | -1.2                 | -8.9 | -8.1 | -4.7 |
| Emerging economies                           | 0.7                  | -4.0 | -2.8 | -0.7 |
| Least-developed economies                    | -0.2                 | -3.8 | -2.0 | -1.4 |
| G20 Countries                                | -1.0                 | -7.9 | -6.9 | -3.7 |
| Advanced G20 economies                       | -1.9                 | -9.7 | -8.7 | -5.3 |
| Emerging G20 economies                       | 0.3                  | -5.1 | -4.1 | -1.3 |
| Memorandum item: excluding financial support |                      |      |      |      |
| 20 Countries                                 | -1.0                 | -7.0 | -6.7 | -3.7 |
| Advanced G20 economies                       | -1.9                 | -8.2 | -8.4 | -5.3 |
| Emerging G20 economies                       | 0.3                  | -5.1 | -4.1 | -1.3 |

Source: Staff estimates based on the October 2009 WEO. See Annex Tables 1 and 2 for country-by-country information for the G20.

**Figure 1: Transatlantic fiscal policy response, 2009**



Source: Staff estimates based on the October 2009 WEO.

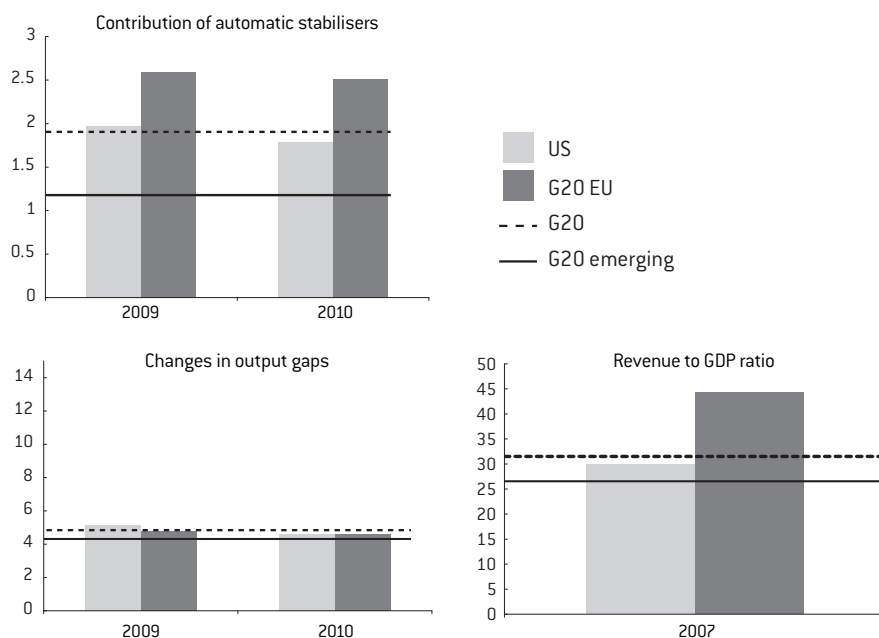
**Table 2: G20 countries: automatic stabilisers and other factors**  
(In percent of GDP and change in percentage points)

|                             | Revenue-<br>to-GDP<br>ratio | Change in<br>output<br>gaps* |      | Contribution of<br>automatic<br>stabilizers */ |      | Contribution of<br>other<br>factors* |      |
|-----------------------------|-----------------------------|------------------------------|------|------------------------------------------------|------|--------------------------------------|------|
|                             |                             | 2009                         | 2010 | 2009                                           | 2010 | 2009                                 | 2010 |
| Total                       | 31.3                        | -4.8                         | -4.6 | -1.8                                           | -1.7 | -2.1                                 | -2.3 |
| Advanced countries          | 34.7                        | -5.3                         | -4.7 | -2.2                                           | -2.0 | -2.2                                 | -2.8 |
| Emerging and Developing G20 | 26.3                        | -4.1                         | -4.4 | -1.1                                           | -1.1 | -2.1                                 | -1.6 |

Source: Staff estimates based on the October 2009 WEO.

\*Changes in the GDP PPP weighted country group averages with respect to 2007. Other factors include non-crisis related discretionary spending or revenue measures (eg, changes in defence spending), as well as the impact of non-discretionary effects on revenues beyond the normal cycle. These include the revenue impacts of the extraordinary decline in commodity (eg, Russia, Saudi Arabia) and real estate prices and financial sector profits (estimated to be larger for the UK and the US).

**Figure 2: Automatic stabilisers in the US and the G20 countries**



Source: Staff estimates based on the October 2009 WEO.

deterioration of output gaps (Table 2). The impact of automatic stabilisers is expected to be larger in Europe from 2009-10 than in the US. As changes in output gaps have been broadly similar across the Atlantic, the larger automatic stabilisers in Europe are a reflection of larger government size (Figure 2).

Three other factors help explain differences in the degree of fiscal expansion across the G20 and the Atlantic:

- Crisis-related discretionary stimulus.* Stimulus measures taken in response to the crisis are estimated at two percent of GDP, on average, for the G20 in 2009 and 1.6 percent of GDP in 2010 (both with respect to 2007). Emerging G20 countries have announced somewhat larger stimulus packages for 2009, 2.2 percent of GDP on average, than advanced G20 countries – 1.9 percent of GDP. Similarly, the stimulus package in the US is nearly twice as large on average as those in the EU G20 countries (Table 3). In both comparisons, larger stimulus reflects, at least in part, smaller automatic stabilisers and consequently greater need<sup>6</sup>. In addition, key emerging markets entered the crisis with substantial fiscal space, and China, Russia, Saudi Arabia, and South Africa introduced particularly large packages. By contrast, among the advanced G20 countries, Italy entered the crisis with relatively less fiscal space and put in place a small fiscal stimulus.

Table 3: Stimulus packages in the US and G20 countries of the EU  
(In percent of GDP, change from 2007)

|                                  | 2009    |                |         | 2010    |                |         |
|----------------------------------|---------|----------------|---------|---------|----------------|---------|
|                                  | Overall | of which       |         | Overall | of which       |         |
|                                  | balance | Crisis-related | Other   | balance | Crisis-related | Other   |
|                                  |         | discretionary  | Factors |         | discretionary  | factors |
|                                  |         | measures       |         |         |                |         |
| France                           | -4.3    | -0.7           | -3.6    | -4.4    | -0.8           | -3.6    |
| Germany                          | -3.7    | -1.6           | -2.1    | -4.2    | -2.0           | -2.2    |
| Italy                            | -4.1    | -0.2           | -3.9    | -4.1    | -0.1           | -4.0    |
| United Kingdom                   | -8.9    | -1.6           | -7.4    | -10.6   | 0.0            | -10.6   |
| United States                    | -6.4    | -2.0           | -4.4    | -6.5    | -1.8           | -4.7    |
| G20 Countries (GDP PPP weighted) | -5.9    | -2.0           | -3.9    | -5.6    | -1.6           | -4.0    |
| Advanced G20 economies           | -6.2    | -1.9           | -4.3    | -6.4    | -1.6           | -4.7    |
| of which EU G20                  | -5.2    | -1.1           | -4.1    | -5.8    | -0.9           | -4.9    |
| Emerging G20 economies           | -5.4    | -2.2           | -3.2    | -4.4    | -1.6           | -2.8    |

Source: Staff estimates based on the October 2009 WEO. See Annex Tables 2 for country-by-country information for the G20.

6. See [www.imf.org/external/np/pp/eng/2009/020109.pdf](http://www.imf.org/external/np/pp/eng/2009/020109.pdf), 'The size of the fiscal expansion: an analysis for the largest countries'.

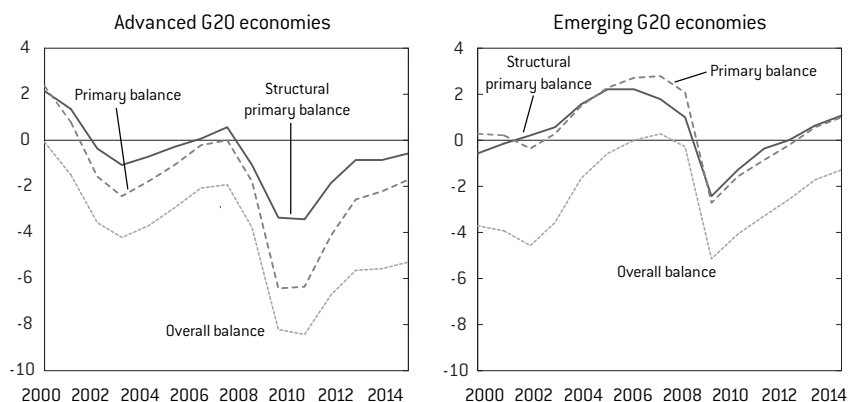


- *Non-discretionary impacts on fiscal revenues of effects beyond the normal cycle.* For the emerging markets, these are driven by sharply lower commodity prices compared with 2007 (eg, Russia, Saudi Arabia). For the advanced countries, these reflect lower revenues linked to declines in property and asset prices, as well as lower financial sector profits. These are larger in the UK and the US, given the property boom and the importance of the financial sector in both countries.
- *Non-crisis-related discretionary spending.* Many advanced economies entered the crisis with relatively weak structural fiscal positions, and these have been further eroded, not only by discretionary anti-crisis measures, but also by underlying spending pressures.
- Advanced country structural primary balances are projected to deteriorate by four percentage points of GDP between 2007 and 2010 (Figure 3 and Table 4). This is due only in part to fiscal-stimulus packages linked to the crisis (1.6 percent of GDP in 2010). Higher spending in other areas explains another 1.7 percentage points. This includes higher defence and entitlement outlays in the US, higher social spending in Japan, and generally higher expenditures in Italy and the UK, the latter related to programmed spending increases in the 2008-10 multi-year plan. The rest is explained by structural revenue losses (see previous point).
- For the emerging G20 countries, structural primary balances are also projected to weaken between 2007 and 2010, by three percentage points of GDP on average. Once again, this is only partly explained by discretionary fiscal stimulus (1.6 percent of GDP in 2010). The remaining 1.5 percentage points is split roughly evenly between revenue losses and expenditure increases. Spending pressures affect nearly all emerging G20 countries.

The composition of discretionary-stimulus measures has differed across countries – both across the G20 and the Atlantic. For the G20 as a whole, spending represents more than three-quarters of planned stimulus in 2009, but its share is expected to drop to around two-thirds in 2010, as projects are completed (Figure 4).

- Discretionary measures in emerging G20 countries are more heavily weighted to infrastructure investment and less focused on cuts in corporate and personal income taxes (Figure 5). Given that their governments are larger, it was expected that advanced countries would focus more on tax cuts, while emerging economies would aim to address infrastructure gaps and weaknesses.

**Figure 3: G20 countries: evolution of fiscal balances during 2000–14**  
(In percent of potential GDP)



Source: Staff estimates based on the October 2009 WEO. Note: Based on WEO projections, which assume some fiscal tightening beginning in 2010 in emerging economies and 2011 for advanced economies.

**Table 4: G20 countries: changes in structural balances and cyclically adjusted revenues and expenditures, 2007–10**  
(In percent of GDP; 2010, change with respect to 2007)

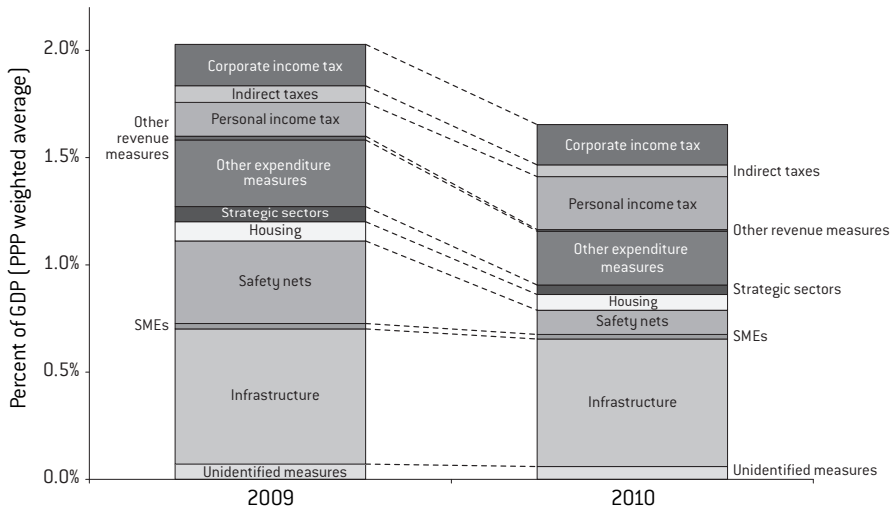
|                                  | Change 2010-2007            |                 |                  |                    | Changes beyond introduction of |         |                                |       |         |             |
|----------------------------------|-----------------------------|-----------------|------------------|--------------------|--------------------------------|---------|--------------------------------|-------|---------|-------------|
|                                  | Cyclically-adjusted*        |                 |                  |                    | Discretionary measures 2010**  |         | discretionary measures in 2010 |       |         |             |
|                                  | Structural primary balance* | Primary revenue | Primary spending | Temporary factors* | Total                          | Revenue | Expenditure                    | Total | Revenue | Expenditure |
| G20 Countries (GDP PPP weighted) | -3.6                        | -1.4            | 2.5              | -0.3               | 1.6                            | 0.5     | 1.1                            | -2.3  | -0.9    | 1.4         |
| excluding United States          | -2.4                        | -0.7            | 1.8              | -0.1               | 1.1                            | 0.3     | 0.8                            | -1.4  | -0.4    | 0.9         |
| Advanced G20 economies           | -4.0                        | -1.7            | 2.7              | -0.3               | 1.6                            | 0.7     | 1.0                            | -2.7  | -1.0    | 1.7         |
| excluding United States          | -2.0                        | -0.5            | 1.5              | 0.0                | 0.8                            | 0.3     | 0.5                            | -1.2  | -0.2    | 1.0         |
| Emerging G20 economies           | -3.0                        | -1.0            | 2.2              | -0.2               | 1.6                            | 0.3     | 1.3                            | -1.6  | -0.8    | 0.9         |

Source: Staff estimates based on the October 2009 WEO.

\*The cyclical adjustment to revenues and expenditures corrects for the effect of the economic cycle (see [www.imf.org/external/np/pp/eng/2009/030609a.pdf](http://www.imf.org/external/np/pp/eng/2009/030609a.pdf) for details on the cyclical adjustment methodology). Structural balances correct for effects of the economic cycle and for one-off, or temporary, factors not attributable to the cycle, where applicable. All series refer to primary aggregates, ie before interest expenditures and revenues.

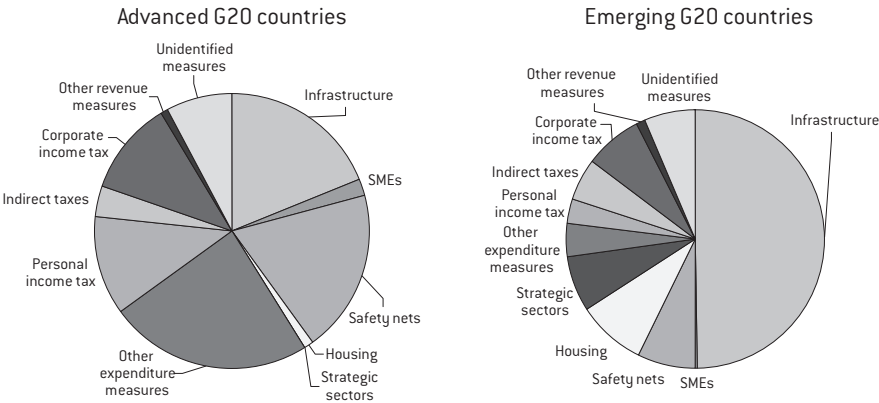
\*\*Positive sign denotes expansionary measure.

Figure 4: G20 countries: composition of fiscal stimulus measures



Source: IMF staff estimates. Note: Where explicit information was not available for 2010, the 2009 composition was assumed.

Figure 5: G20 countries, fiscal stimulus by category, 2009-10



Source: IMF staff estimates.

Figure 6: Stimulus packages in the US and in the G20 countries of the EU

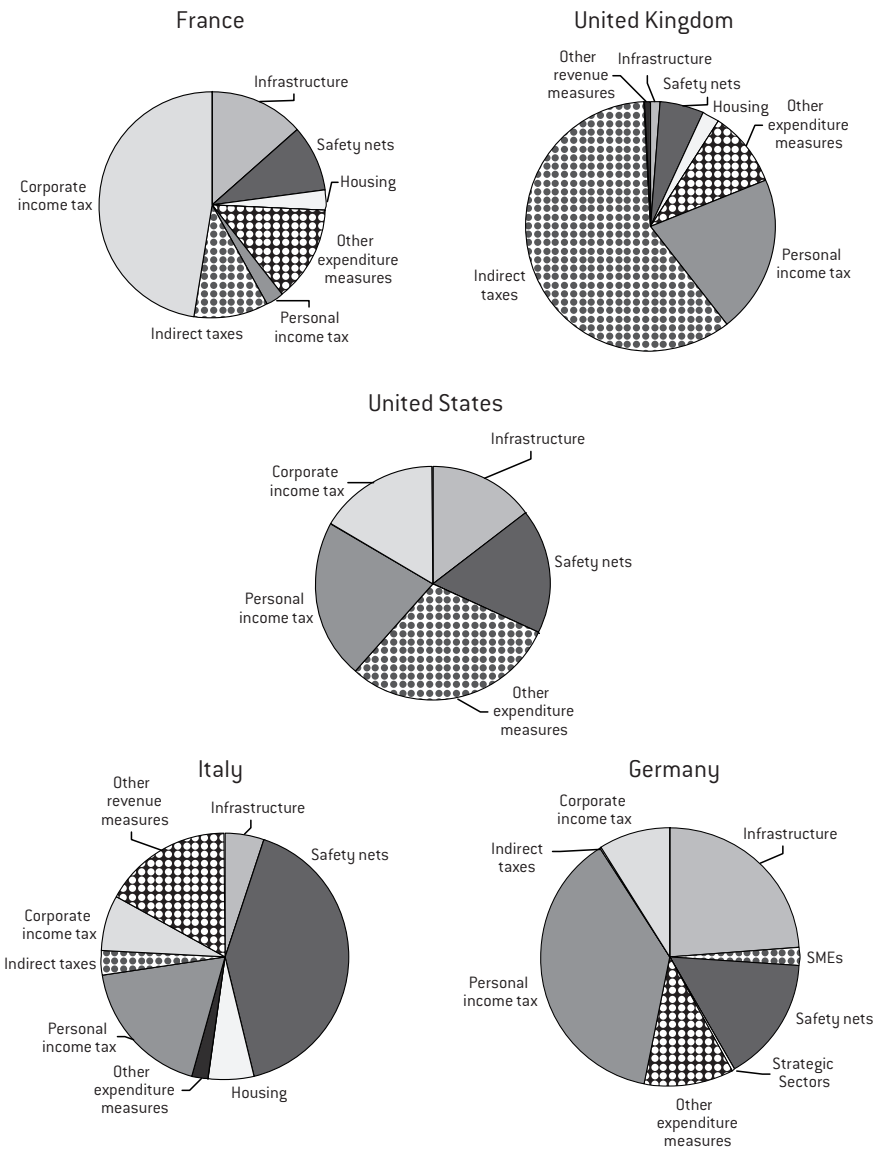


**Table 5: G20 countries: implementation of stimulus packages**

|                | Implementation Status                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Argentina      | Discretionary stimulus spending is not tracked separately from already-in-force spending lines. Reporting will follow existing public financial management and accountability provisions.                                                                                                                                                                                                                                                                                                                                                                             |
| Australia      | Nearly all individual tax rebates (one-quarter of the total expected stimulus for 2009) had been paid by early August. Small business tax breaks will be realized with a lag, due to filing schedules. Nearly all jobs-related transfers to households under the main economic stimulus plan have been paid out (one-third of the expected stimulus for 2009). Funding has been approved for investment projects under the plan. However, monitoring is complicated by the need for more detailed information from line agencies and state and territory governments. |
| Brazil         | IMF staff estimate that 40 percent of the planned stimulus for 2009 was likely implemented through end-June. Over 60 percent of tax relief—cuts in personal income taxes and in indirect taxes on vehicles and other goods—is estimated to have been delivered, while half of the expected cash transfers to the poor are likely to have been disbursed. No information is available on implementation of the housing support package.                                                                                                                                |
| Canada         | Necessary steps for 90 percent of the pledged funds to be flowing by June have been taken. Tax measures are being administered on an ongoing basis, including through lower payroll tax deductions. An updated progress report on implementation was issued in September.                                                                                                                                                                                                                                                                                             |
| China          | As of end-June, about 40 percent of the central government's pledged (and already allocated) stimulus spending for 2009 has been approved by the planning agency (NDRC).                                                                                                                                                                                                                                                                                                                                                                                              |
| France         | 53 percent of the approved fiscal stimulus for 2009 had been implemented through end-June. Revenue and current spending measures have been implemented faster than capital spending (61 percent of revenue measures and 55 percent of expenditure measures; among expenditure measures, safety net spending has been fastest at 73 percent versus 35 percent of capital spending).                                                                                                                                                                                    |
| Germany        | Ex post analyses of revenue measures have not yet been undertaken due to lags in the filing of income taxes. On the expenditure side, disbursements are on schedule, although a considerable number of measures fall under the responsibility of the Länder, particularly infrastructure projects. The Länder are expected to produce quarterly updates on their projects.                                                                                                                                                                                            |
| India          | A committee of senior officials was established to ensure that stimulus measures are carried out. The committee and a temporary secretariat have established a detailed monitoring framework that follows the status of each measure and assesses preliminary impacts. The full stimulus amount has been allocated and released to spending units. However, in India's highly federal system, it is not possible to ensure or monitor that amounts allocated have actually been spent.                                                                                |
| Indonesia      | IMF staff estimate that 36 percent of the 2009 stimulus package was implemented through end-June: 44 percent of tax measures, 35 percent of energy subsidies, and 100 percent of anti-poverty programs. Infrastructure spending, which comprises 15 percent of the package, is moving more slowly.                                                                                                                                                                                                                                                                    |
| Italy          | Implementation is considered to be in line with plans. The focus of monitoring has been on procedures to implement stimulus—most of these are completed. Information on actual implementation is limited to the provision of guarantees for private sector borrowing by a newly replenished Guarantee Fund.                                                                                                                                                                                                                                                           |
| Japan          | It is difficult to track implementation of stimulus measures separately from regular budgets, although cash transfers have been quickly implemented and public works expenditures are intended to be substantially front-loaded. IMF staff estimate that about 60 percent of the total stimulus budgeted for 2009 had been disbursed through September (FY begins in April).                                                                                                                                                                                          |
| Korea          | By mid-year, about 60 percent of the combined annual original and supplementary budgets had been executed. In this context, IMF staff estimate that by mid-year about 37 percent of announced expenditure measures for 2009 had been implemented while about 34 percent of estimated revenue costs had been incurred. In contrast to other countries, the implementation rate on capital investment projects has been higher than on other stimulus measures: 54 percent of the committed investment stimulus for 2009 has been implemented through June.             |
| Mexico         | There is no specific mechanism for tracking stimulus implementation. Some aspects, such as energy price relief, were implemented directly. There has reportedly been a high level of approvals for infrastructure spending, and program spending grew strongly in the first semester, although at lower rates than planned in the budget. However, with weakening revenue performance, some spending will be reduced in the second semester, lowering the overall stimulus.                                                                                           |
| Russia         | IMF staff estimate that 53 percent of the pledged annual stimulus had been implemented through end-August. The implementation rate for tax breaks is estimated to be higher, at 67 percent, than for spending, at 47 percent (including 28 percent for support for strategic sectors). Expenditure estimates reflect funds made available to spending agencies rather than funds paid out.                                                                                                                                                                            |
| Saudi Arabia   | About 45 percent of the US\$37 billion capital budget for 2009 had already been implemented as of end-March.                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| South Africa   | Discretionary stimulus spending is not tracked separately, although the National Treasury is working with agencies to improve the links from additional spending to performance targets.                                                                                                                                                                                                                                                                                                                                                                              |
| Turkey         | The authorities expect to report on stimulus implementation during the fourth quarter of 2009.                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| United Kingdom | The bulk of the stimulus is through revenue measures, all of which have been enacted. Tax breaks are expected to be realized equally by quarter. Information on implementation of expenditure measures is not yet available.                                                                                                                                                                                                                                                                                                                                          |
| United States  | Recovery.gov reports that \$86 billion worth of spending had been released by federal agencies through mid-September, while over \$62 billion of tax relief had been granted. This implies that more than half of the total expected stimulus for CY 2009 has been paid out to date. A large share of the stimulus is being implemented at the state level, where tracking is more difficult.                                                                                                                                                                         |

Sources: IMF staff estimates; joint IMF-UK Treasury survey; <http://www.recovery.gov>. Unless other indicated, the information refers to the authorities' estimates and views as reported in the survey.

- Important differences also emerge in comparing the composition of Trans-atlantic stimulus packages (Figure 6). Measures in France, Germany and the UK are focused on tax relief – corporate, personal, and indirect, respectively, although the UK package also has a sizable personal-income tax component. The relatively small stimulus package in Italy consists mostly of safety-net measures. The US package is made up of a diverse range of measures, including tax rebates and transfers to state and local governments.

Projections of the fiscal expansion assume that all discretionary stimulus envisaged for 2009–10 will be implemented, although a sizable share remains in the pipeline. A recent IMF and UK Treasury survey found that stimulus implementation is proceeding broadly as planned (Table 5). However, information is mostly qualitative, except for that for France, Korea and the US. Implementation rates appear to be higher for revenue measures and social transfers, and lower for infrastructure spending. Country authorities reported that tracking stimulus implementation involves operational challenges. However, stepping up monitoring would be desirable, including evaluating the impact of measures taken<sup>7</sup>.

The growth impact of the overall fiscal expansion, once fully implemented, may be sizable. Given the uncertainty about the size of fiscal multipliers, growth impacts are estimated using ranges of multipliers (Table 6 and Box 1). Estimates for growth impacts range from 1.2 to 4.7 percentage points in 2009 and from 0.1 to 1.0 percentage point in 2010, both with respect to the previous year. These estimates also consider the effect of spillovers to other countries (via imports), a key element of the crisis response and the efforts to pursue co-ordinated global action. The estimates are broadly consistent with the findings of structural models, although they reflect the impact of the *full* fiscal expansion and not only the discretionary stimulus. The multipliers suggest that the growth impacts of the stimulus may be relatively large in emerging G20 economies, given the emphasis on investment spending, although the overall fiscal expansion is larger in advanced countries, particularly in 2010. Across the Atlantic, the heavy weight to tax cuts in the UK-stimulus package suggests relatively lower growth impacts than in Germany and the US, where the stimulus is larger and more diverse.

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7. For spending, complications arise if stimulus programmes do not represent a separate item in the budget, if budgetary data fail to distinguish among stages of implementation and if spending is at the sub-national level. Monitoring tax cuts is in principle easier, although quantifying their impact is complicated by statutory lags in tax filing schedules and differences in tax bases relative to initial projections.

### BOX 1: TAKING STOCK OF FISCAL MULTIPLIERS

Fiscal multipliers measure the effectiveness of fiscal policy in stimulating output\*. The size of multipliers depends on the type of policy—spending increases or tax cuts—and country circumstances. Two broad methodologies are applied to compute multipliers:

- Structural models, based on household and firm optimising behaviour, such as the IMF's Global Integrated Monetary and Fiscal Model (GIMF).
- Empirical estimations (VARs, narrative studies, micro studies, cross-country analyses), which allow for investigating real events, but face the challenge of identifying exogenous effects of fiscal policy.

Estimates of multipliers vary. According to structural models, multipliers vary from 3.9 to -1.3 (Al-Eyd and Barrell, 2005, Cogan *et al*, 2009, Dalsgaard *et al*, 2001, Freedman *et al*, 2008). For empirical studies, estimates range from 3.8 to 5 (Perotti, 2006, Romer and Romer, 2008) to -1.5 (Perotti, 2005).

Increasing spending—either for consumption or investment—appears to be more effective than cutting taxes. While government spending results in a direct increase in aggregate demand, tax cuts might not be fully spent (although increased saving may have a beneficial impact over the medium term in repairing household balance sheets). The GIMF yields low fiscal multipliers for cuts in labour taxes and lump-sum transfers (0.2–0.5); and high multipliers for government expenditure (1.6–3.9) and targeted transfers (0.5–1.7). Zandi (2008) finds larger fiscal multipliers for infrastructure spending and targeted transfers (1.7) than for general tax cuts (0.3). Finally, a 2003 UK Treasury study based on the European Commission's QUEST model finds larger one-year fiscal multipliers for government spending (0.3–0.7) than for tax cuts (0–0.3). This said, as noted earlier, it often takes a long time to activate spending without wasting public resources, especially for new programmes.

Multipliers are larger when monetary policy is accommodative. In the GIMF, fiscal multipliers are 2 to 3 times larger with accommodative monetary policy than without\*\*. Fiscal policy action is also more effective when coordinated across countries. The GIMF finds multipliers of 3.7 for the United States under coordinated fiscal policy, compared to 2.4 without coordination. The channel is the 'leakage' of the fiscal stimulus into demand for imports. Empirical work confirms that more open economies have lower fiscal multipliers than those less exposed to international trade.

Lack of policy credibility (real or perceived) lowers multipliers by increasing risk premia and raising real interest rates. The GIMF shows that, depending on the extent of fiscal sustainability problems, higher public spending or tax cuts can have a negative impact on output by inducing, more than offsetting, increases in private saving.

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\* See <http://www.imf.org/external/pubs/ft/spn/2009/spn0911.pdf> for further discussion.

\*\* The multipliers derived in GIMF simulations are in the absence of automatic stabilisers.

Table 6: G20 countries: impact of fiscal expansion on growth  
(Change in percentage points)

+

|                               | 2009      | 2010      | Average   |
|-------------------------------|-----------|-----------|-----------|
| Low-high range impact 2/ 3/   |           |           |           |
| G20 total                     | 1.2 - 4.7 | 0.1 - 1.0 | 0.7 - 2.8 |
| Advanced G20 countries        | 1.3 - 4.4 | 0.1 - 1.1 | 0.7 - 2.7 |
| Emerging market G20 countries | 1.1 - 5.0 | 0.0 - 0.8 | 0.6 - 2.9 |

Source: IMF Staff estimates based on the July 2009 WEO Update.

1/ Fiscal expansion and growth are calculated with respect to the previous year. Fiscal expansion is measured as the change in the real overall fiscal balance between the two years in relation to real GDP of the previous year.

2/ The range of growth estimates reflects different assumptions on fiscal multipliers. The low set included a multiplier of 0.3 on revenues, 0.5 on capital spending and 0.3 on other spending. The high set included a multiplier of 0.6 on revenues, 1.8 on capital spending and 1 for other spending. For calculation of the growth impact of total fiscal expansion a weighted average of current and capital expenditure multipliers was used.

3/ For the calculation of growth impacts, the change of the overall fiscal balance was adjusted: for Russia and Saudi Arabia, the change in non-oil revenues was used (rather than total revenues); for Saudi Arabia, the change in discretionary measures was used (rather than total expenditures); for the US and Japan estimates of losses from financial-sector support were excluded.

Table 7: Support for financial and other sectors and upfront financing need  
(As of August 2009; in percent of 2008 GDP unless otherwise noted; PPP GDP weighted)

|                     | Capital<br>Injection | Purchase of<br>Assets and<br>Lending by<br>Treasury | Guarantees | Liquidity<br>Provision and<br>Other Support<br>by Central Bank | Upfront<br>Government<br>Financing |
|---------------------|----------------------|-----------------------------------------------------|------------|----------------------------------------------------------------|------------------------------------|
|                     | (A)                  | (B)                                                 | (C)        | (D)                                                            | (E)                                |
| Average             |                      |                                                     |            |                                                                |                                    |
| G20                 | 2.2                  | 2.7                                                 | 8.8        | 9.7                                                            | 3.7                                |
| Advanced Economies  | 3.4                  | 4.1                                                 | 13.9       | 7.6                                                            | 5.7                                |
| In billions of US\$ | 1,160                | 1,436                                               | 4,638      | 2,804                                                          | 1,887                              |
| Emerging Economies  | 0.2                  | 0.3                                                 | 0.1        | 13.5                                                           | 0.4                                |
| In billions of US\$ | 22                   | 38                                                  | 7          | 1,581                                                          | 47                                 |

Source: IMF staff estimates based on official announcement by agencies. Columns A, B, C and E indicate *announced or pledged amounts, and not actual uptake*. Column D indicates the *actual changes in central bank balance sheets from June 2007 to June 2009*. While these changes are mostly related to measures aimed at enhancing market liquidity and providing financial-sector support, they may occasionally have other causes, and also may not capture other types of support, including that due to changes in regulatory policies. For country details, see Annex Table 3.



## Support to the financial and other sectors

Governments and central banks have also provided direct support to the financial and other sectors on both sides of the Atlantic and across the G20. Upfront government-financing needs connected with financial support operations are estimated at 5.7 percent of GDP for the advanced G20 countries and 0.4 percent of GDP for the emerging G20 countries (Table 7). However, while announced support measures have been large, immediate impacts on government financing needs have been more limited, as transactions do not always have an immediate or direct impact on the overall fiscal position<sup>8</sup>. A key transatlantic difference: upfront financing needs for financial sector support are larger for the UK and the US than for France, Germany and Italy (Annex Table 3 and Figure 7).

Financial sector support provided by G20 governments has so far generally been considerably less than originally announced. Outlays are less than half of pledged amounts for capital injections in financial institutions and about one-quarter of pledges for the purchase of assets and lending by treasuries (Table 8). This outcome reflects a variety of factors including the precautionary nature of initial announcements, indications of increasing stability and improved bank liquidity,

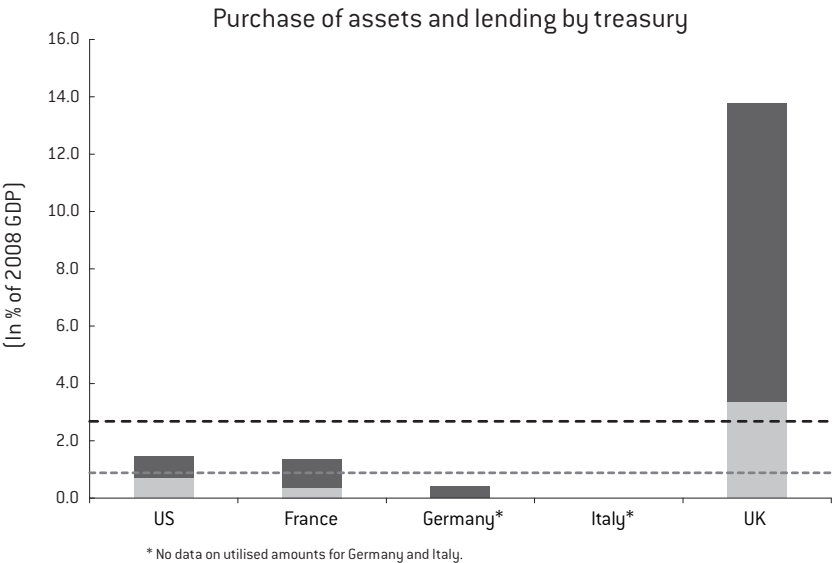
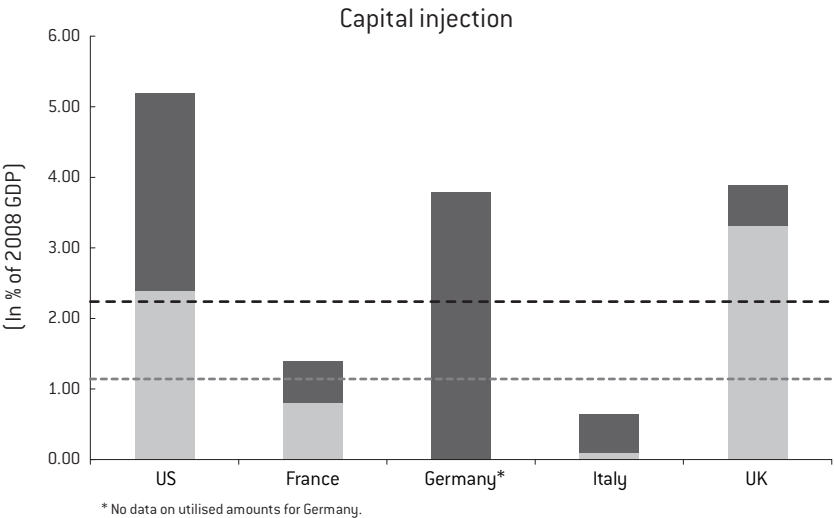
Table 8: Financial sector support utilised relative to announcement  
(In percent of 2008 GDP, unless otherwise indicated)

| Countries           | Capital Injection |                            | Purchase of Assets and Lending by Treasury |                            |
|---------------------|-------------------|----------------------------|--------------------------------------------|----------------------------|
|                     | Amount used       | In percent of announcement | Amount used                                | In percent of announcement |
| Average             |                   |                            |                                            |                            |
| G20                 | 1.2               | 44.4                       | 1.0                                        | 27.0                       |
| Advanced Economies  | 1.5               | 44.4                       | 1.2                                        | 26.1                       |
| In billions of US\$ | 446               | ...                        | 366                                        | ...                        |
| Emerging Economies  | 0.2               | 44.6                       | 0.3                                        | 50.3                       |
| In billions of US\$ | 11                | ...                        | 17                                         | ...                        |

Source: Staff estimates. PPP GDP weighted averages. For details, see Annex Table 4.

8. For example, if no corresponding claim results from a capital injection, the transaction would be regarded as a capital transfer with a corresponding impact on the overall balance. However, if an intervention results in the acquisition of a claim, there may be no immediate or direct impact on the overall fiscal balance. Guarantees do not require upfront government financing and institutions providing other support measures have often been outside the government sector (central banks, state-owned financial institutions, and special corporations).

Figure 7: Financial sector support in the US and in the G20 countries of the EU

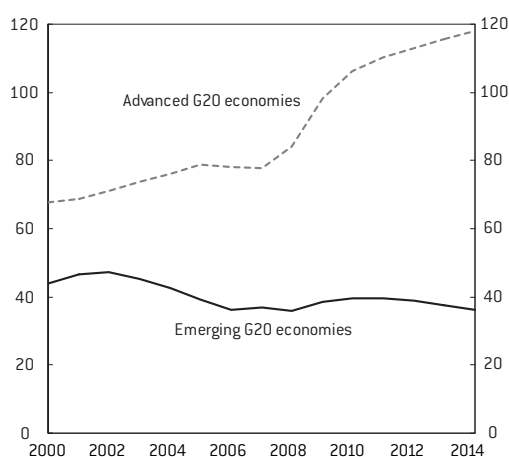


and lags in implementation of programmes for recapitalisation and purchase of assets. Central bank credit facilities also appear to have been taken up only to a limited extent in many countries, as conditions have not turned out to be as dire as expected at the time of their announcement. For example, several liquidity support programmes in the US are expiring, including the Money Market Investor Funding Facility in October and the Term-Security Lending and Primary Dealer Credit Facilities in February 2010. These facilities, which could in principle provide support of up to nearly 4.5 percentage points of GDP, have not been active.

## Future prospects

Although fiscal balances are expected to improve gradually over the next few years as the global economy recovers, the outlook for the public debt is more worrying in many countries. Removing the fiscal stimulus once a private sector-led recovery develops should be relatively straightforward, as most stimulus measures have been temporary (Box 2). However, spending pressures are expected to continue in advanced countries, particularly in Japan and in the United States. Even assuming the expiration of Bush Administration tax cuts in the United States, structural primary balances would remain negative, and government debt for advanced G20 countries would reach 118 percent of GDP on average by 2014 (Figure 8 and Annex Table 1), an increase of about 40 percentage points of GDP. Debt levels will reach

Figure 8: G20 countries: general government debt ratios, 2000–14  
(% GDP)



Source: Staff estimates based on the October 2009 WEO.

## BOX 2: UNWINDING THE FISCAL STIMULUS

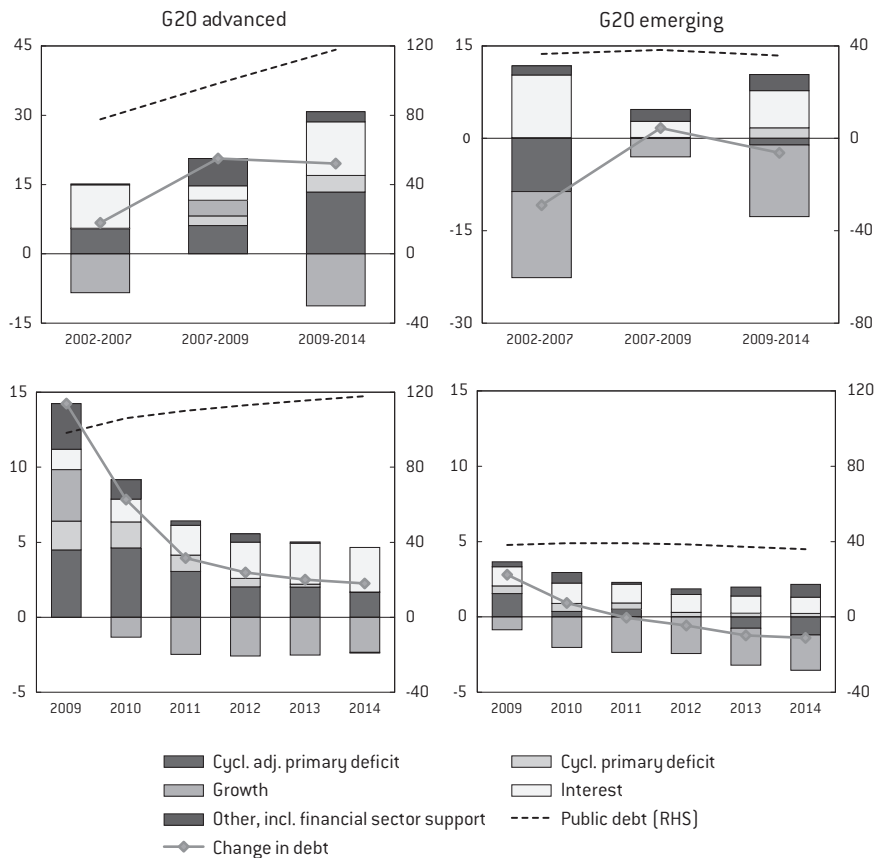
The fiscal stimulus put in place in response to the crisis should be relatively straightforward to unwind as economic conditions improve, as a large share of packages is temporary. Stimulus often encompassed time-bound measures (eg, investment projects or one-off tax rebates) or contained explicit sunset provisions. This is particularly true for expenditure items, where only a small fraction of measures is permanent. By contrast, about half of tax measures introduced are permanent (see table below). Altogether, one-fifth of the stimulus is permanent and would require discretionary action for reversal. The share of permanent measures is higher in advanced countries – one-quarter – than in emerging G20 countries – one-tenth. However, the higher share of infrastructure spending in emerging countries' stimulus packages – half, versus one-fifth for advanced countries – will lead to higher recurrent outlays for operations and maintenance over the medium-term.

G20 countries: temporary and permanent stimulus measures  
(In share of total and of revenue measures, by value)

|                               | Total     |           | of which: Revenues |           |
|-------------------------------|-----------|-----------|--------------------|-----------|
|                               | Temporary | Permanent | Temporary          | Permanent |
| G20 total                     | 80        | 20        | 54                 | 46        |
| Advanced G20 countries        | 75        | 25        | 14                 | 86        |
| Emerging market G20 countries | 91        | 9         | 88                 | 12        |

Source: Staff estimates. Share of total stimulus and revenue measures by the expected cost of specific measures.

Figure 9: G20 countries: decomposition of debt dynamics, 2002-14



Source: October 2009 WEO projections, weighted by PPP GDP, excluding Argentina. Note: figure shows the decomposition of the change in the general government gross debt-to-GDP ratio due to contributions from the primary deficit (cyclically adjusted and cyclical), non-fiscal factors (growth and interest payments), as well as other factors. These include financial sector support and valuation changes. The upper charts show the cumulative change over the period indicated; the solid black line represents the end-of-period debt-to-GDP ratio.

90 percent of GDP or higher in the US and EU G20 countries. Debt trends are more favourable for emerging economies, however, projected strong potential growth in emerging markets is a key factor that will drive a reduction in debt ratios, underscoring risks of a 'slow-growth' scenario (Figure 9). There are also risks to emerging market countries from possible renewed financial market strains, with implications for debt rollover and exchange rates, and from increased debt issuance in advanced markets, which could add to funding costs. This highlights the importance for emerging economies of securing the projected medium-term fiscal adjustment.

Higher debt stocks, compounded by higher interest rates, will involve a weakening of debt service indicators in advanced G20 economies. Net interest payments as a percentage of GDP are projected to nearly double for advanced economies –from 1.9 percent of GDP in 2007 to 3.6 percent in 2014 (Annex Table 5). Increases will be particularly large in absolute terms for the UK and the US, where debt levels will rise sharply, and for Italy and Japan, where higher interest rates are especially costly, given already high debt levels. At higher debt levels, fiscal balances will be more sensitive to interest rates. For example, if real interest rates in 2014 are at the 30-year peak for the G7 countries (5.1 percent in 1985) rather than at 2.5 percent as projected, interest payments and budget deficits could be as much as 3.5 percentage points of GDP higher than foreseen.

## Policy challenges

While fiscal policy should continue to support economic activity until the recovery has taken hold, the positive growth impact of the fiscal expansion would be enhanced by the identification of clear strategies to ensure that fiscal solvency is preserved over the medium term. The reaction of financial markets to the deterioration of the fiscal outlook has so far remained moderate. However, this should not lead to complacency. First, interest rates are now cyclically low. Second, markets in the past have reacted late and abruptly to changes in fundamentals. Third, the relatively benign response so far is likely to reflect confidence that advanced-country governments have a strategy to strengthen their fiscal accounts when the moment comes. This confidence may wane if consolidation strategies are not identified soon.

The sharp increase in government debt has complicated the management of pre-existing challenges from population ageing, especially in advanced economies. Under current policies, spending on pensions and health care is projected to increase substantially over the next two decades in several countries, especially

across the Atlantic (Box 3)<sup>9</sup>. Governments have also taken on contingent liabilities – guarantees and other commitments to future expenditures – that may materialise. Owing to these pressures, which existed prior to the global financial and economic crisis, attaining a given primary surplus will present challenges that were not experienced to the same extent in the past.

A fiscal exit strategy limited to unwinding discretionary fiscal stimulus and financial-sector support would be far from sufficient. Simply letting the stimulus expire would still leave the government debt of many advanced countries on an explosive path. While maximising the recovery value of assets acquired through financial-sector support is important, it will not materially alter the medium-term outlook, as the receipts would be small compared to the overall projected increase in gross debt.

Even stabilising debt ratios at their post-crisis levels is not enough:

- Living with high debt would reduce the capacity of fiscal policy to respond to future shocks. Indeed, the fiscal stimulus of 2008-10 was inversely related to the level of public debt, at least in large countries<sup>10</sup>.
- High debt would likely lead to high real interest rates. Recent IMF staff research on the effect of fiscal variables on interest rates suggests that the 40 percentage-point increase in government-debt ratios projected for advanced countries from 2008-14 could raise interest rates by two percentage points<sup>11</sup>. The effects are likely to be even larger for countries that start from high-debt ratios or deficit levels, or that confront faster population ageing. Moreover, the results suggest that the impact of debt and deficits on interest rates is greater during periods when the global supply of sovereign bonds is high. Living with high debt could be a costly option.
- High debt may ultimately retard growth. The cases of Italy and Japan – two high-debt countries that have experienced prolonged periods of slow output growth – are noteworthy here<sup>12</sup>.

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9. For more discussion, see: <http://www.imf.org/external/pubs/ft/spn/2009/spn0913.pdf>.

10. See <http://www.imf.org/external/np/pp/eng/2009/020109.pdf>, "The Size of the Fiscal Expansion: An Analysis for the Largest Countries."

11. See the November Fiscal Monitor at <http://www.imf.org/external/pubs/ft/spn/2009/spn0925.pdf>.

12. However, the causality may also run from slow growth to high debt ratios. In addition, factors such as labour and product market rigidities or financial strains may have played an important role in explaining slow growth in Italy and Japan.

### BOX 3: AGEING AND HEALTH CARE SPENDING PRESSURES IN EUROPE AND THE US

Growth in age-related and health-care spending (the latter reflecting in part demographics) is likely to be relatively contained over the next five years, but will pick up sharply in the following decade. Based on the European Commission's recent Ageing Report, under the assumption of no policy changes (eg, reflecting only already enacted legislation), pension, health, and long-term care spending in the European Union is expected to grow by about 0.5 percent of GDP over the period up to 2015 (compared to 2007), with the increase accelerating after 2015. These expenditures are projected to rise by 1.9 percent of GDP over 2015–30 and by a further 2.9 percent of GDP between 2030 and 2060. This reflects the timing of the baby boom in Europe, which implies a marked increase in the cohorts reaching retirement age starting in 2020–30. In the short run, net age-related costs may be partially reduced by lower spending on education, as a result of declining fertility and the smaller size of childbearing-age cohorts up to 2030.

These projections are subject to a number of upward risks, in particular with regard to health-care spending. A key risk relates to weaker productivity growth in the medium term due to population ageing and the effects of the public debt build-up in response to the crisis. Spending pressures on health care and long-term care have been conservatively estimated by the EC as they are based on the assumption of unchanged relative prices, contrary to recent trends. Higher relative prices for health services and wider availability of high-tech treatments, as well as greater demand for health-care services due in part to the rapidly expanding share of the elderly population, could also escalate health-care spending. (In alternative scenarios, the Commission estimates additional health-care expenditures that could arise from non-demographic factors to range from 2.5 to 4.5 percent of GDP by 2060). Population ageing also could be more rapid, if life expectancy gains are faster (due in part to better health-care services). Unemployment may also remain high several years after the crisis, and labour force participation may not increase as expected, leading to lower output growth and higher spending ratios.

However, there is considerable uncertainty regarding the impact of structural factors on future spending trends. For example, technological progress could improve well-being at older ages and foster more active labour participation, ameliorating spending dynamics. Labour supply may also increase in response to lower pensions due to depletion of pension assets during the crisis.

Policy implementation challenges are an additional source of upward risk to these projections. In some countries, existing rules for social security benefits imply a sharp reduction in replacement rates over the medium term. While this



may help contain upward pressures on pension-expenditure trends, the changes may be politically difficult for governments to enact once benefit levels fall below certain thresholds. Moreover, the changes could trigger increases in other areas of government spending (eg, social assistance benefits), since a larger number of elderly people could qualify for these programmes as a result of falling social-security incomes. The specific age-related components in Europe are projected to develop as follows:

- Pension expenditure is expected to expand only by 0.2 percent of GDP by 2015, compared to 2007. However spending is expected to grow rapidly after 2015 and rise by 1.1 percent of GDP over the period until 2030 and a further 1.1 percent of GDP until 2060.
- Health-care spending is projected to grow by 0.2 percent of GDP overall during the period 2007–15, 0.5 percent of GDP during 2015–30 and one percent of GDP during 2030–60.
- Long-term care spending is projected to grow by 0.1 percent of GDP over the period until 2015, 0.3 percent of GDP during 2015–30 and 0.8 percent of GDP after 2030.
- Education spending is projected to fall by 0.3 percent of GDP by 2015, to stabilise by 2030 (falling by another 0.1 percent of GDP) and grow by 0.2 percent of GDP thereafter. The overall change through 2060 is -0.2 percent of GDP.

In the US, age-related spending and health-care outlays (beyond demographics) are projected to increase at a faster pace. Based on the most recent US, CBO long-term budget projections, which assume no change in current legislation, budget spending for social security plus health care (including the Medicare programme, which only in part covers seniors) is expected to grow by 0.5 percent of GDP by 2015, an additional 4.2 percent of GDP between 2015 and 2030, and 5.1 percent of GDP between 2030 and 2060. The bulk of the increase is accounted for by rapidly expanding health-care spending for Medicaid and Medicare programmes (+3.2 percent of GDP in 2015–30 and +5.2 percent in 2030–60) owing to escalating unit cost growth and increases in the number of beneficiaries. These programmes are now under review to contain spending growth while expanding coverage. Social security spending will step up in 2015–30 by one percent of GDP but stabilise thereafter (at about six percent of GDP) as the baby-boom cohorts fully retire.

Instead, an exit strategy should be understood as involving a set of measures that will bring debt ratios down to moderate levels and keep them there on a sustainable basis. This will require a sharp correction in the structural primary balance of advanced countries. On average, bringing government debt-to-GDP ratios in advanced economies below 60 percent by 2030 would require steadily raising the structural primary balance from a deficit of 3.5 percent of GDP in 2010 to a surplus of 4.5 percent of GDP in 2020 – an eight percentage point swing in one decade – and keeping it at that level for the following decade (Table 9). Considering adjustment needs across the Atlantic, the requirements are particularly large in the UK and the US and smaller in France, Germany and Italy.

While the precise magnitude of primary adjustment that is required over the medium term is sensitive to assumptions, the scale of the fiscal problem is large for any reasonable set of parameter values. Assumptions about the differential between the rate of output growth and the rate of interest have an impact on estimated adjustment needs (Table 10). However, even if the differential were to fall to zero, the required adjustment for the advanced G20 to bring debt ratios to 60 percent of GDP or lower would remain sizable – nearly seven percentage points of GDP between 2010 and 2020. The required degree of adjustment is also sensitive to the medium-term debt objective: stabilising the debt ratio at its 2014 level would cut the required volume of adjustment by almost half. For the reasons noted earlier, however, this would be a risky strategy.

The adjustment needed in many advanced economies will be difficult, but it is not unprecedented. More than twenty advanced economies have achieved improvements in their structural primary balances of at least five percent of GDP at least once in the last four decades; 10 of them have achieved improvements in excess of 10 percent of GDP in that period (Table 11). As noted, however, future adjustments will be more challenging than in the past because they will have to be undertaken in an environment of adverse demographics and potentially sluggish potential growth.

Few G20 countries have so far developed fully fledged medium-term fiscal adjustment strategies, although some have announced medium-term targets or have extended the horizon of their fiscal projections. However, medium-term consolidation policies have yet to be articulated. Where they have been mooted, measures have focused on fuel-tax increases and progressive income taxes, and in some cases on limiting growth of current spending or cutting capital expenditure. Table 12 provides an overview of preliminary strategies to ensure fiscal sustainability in the US and among the EU G20 countries.

**Table 9: Debt and primary balances**  
(In percent of GDP)

Sources: IMF, World Economic Outlook, October 2009 and IMF staff calculations. 1/ Excludes losses from financial system support measures in Japan and the US. Structural balances are reported in percent of nominal GDP. 2/ Primary balance is assumed to improve gradually during 2011–20; thereafter, it is maintained constant until 2030. The last column shows the primary balance improvement needed to stabilise debt at end-2011 level if the respective debt-to-GDP ratio is less than 60 percent (no shading, 'lower debt'); or to bring debt ratio to 60 percent in 2030 (shaded entries, 'higher debt'). Illustrative scenarios for Japan are based on its net debt, and assume a target of 80 percent of GDP. For Norway, maintenance of primary surpluses at their projected 2012 level is assumed. The analysis has used simplified assumptions: in particular, beyond 2011, an interest rate/growth rate differential of one percent is assumed, regardless of country-specific circumstances.

|                        | Current WEO projections, 2010 |                 |                  | Illustrative fiscal adjustment strategy to achieve debt target in 2030 |                                           |
|------------------------|-------------------------------|-----------------|------------------|------------------------------------------------------------------------|-------------------------------------------|
|                        | Gross Debt                    | Primary Balance | Structural PB 1/ | Structural PB in                                                       |                                           |
|                        |                               |                 |                  | 2020-30 2/                                                             | Required adjustment between 2010 and 2020 |
| Advanced economies     |                               |                 |                  |                                                                        |                                           |
| Australia              | 22.7                          | -4.9            | -3.4             | 0.3                                                                    | 3.7                                       |
| Austria                | 74.9                          | -3.1            | -2.1             | 3.1                                                                    | 5.1                                       |
| Belgium                | 102.7                         | -2.3            | -0.4             | 5.3                                                                    | 5.6                                       |
| Canada                 | 79.3                          | -3.5            | -1.0             | 2.1                                                                    | 3.1                                       |
| Denmark                | 26.9                          | -2.8            | 1.9              | 0.2                                                                    | -1.7                                      |
| Finland                | 48.1                          | -4.8            | -2.3             | 0.5                                                                    | 2.8                                       |
| France                 | 85.4                          | -6.2            | -2.1             | 4.0                                                                    | 6.1                                       |
| Germany                | 84.5                          | -2.3            | -0.4             | 3.0                                                                    | 3.4                                       |
| Greece                 | 115.0                         | -2.0            | -2.2             | 6.8                                                                    | 9.0                                       |
| Iceland                | 137.3                         | -2.3            | 0.4              | 4.8                                                                    | 4.4                                       |
| Ireland                | 75.7                          | -11.1           | -8.2             | 3.6                                                                    | 11.8                                      |
| Italy                  | 120.1                         | -0.7            | 1.0              | 5.8                                                                    | 4.8                                       |
| Japan                  | 227.0                         | -8.8            | -6.9             | 6.5                                                                    | 13.4                                      |
| Korea                  | 39.4                          | -1.0            | 0.3              | 0.4                                                                    | 0.1                                       |
| Netherlands            | 68.8                          | -3.6            | -2.1             | 1.4                                                                    | 3.5                                       |
| New Zealand            | 30.2                          | -3.2            | -1.9             | 0.4                                                                    | 2.3                                       |
| Norway                 | 67.2                          | 8.6             | 9.2              | 10.5                                                                   | 1.3                                       |
| Portugal               | 81.9                          | -3.9            | -2.9             | 3.6                                                                    | 6.5                                       |
| Spain                  | 69.6                          | -11.0           | -5.8             | 4.9                                                                    | 10.7                                      |
| Sweden                 | 45.0                          | -4.5            | -1.5             | 0.5                                                                    | 1.9                                       |
| United Kingdom         | 81.7                          | -10.9           | -7.8             | 5.0                                                                    | 12.8                                      |
| United States          | 93.6                          | -8.1            | -3.7             | 5.1                                                                    | 8.8                                       |
| Average (PPP-weighted) | 102.1                         | -6.5            | -3.3             | 4.5                                                                    | 7.8                                       |
| G20 Advanced economies | 106.7                         | -6.7            | -3.4             | 4.6                                                                    | 8.1                                       |
| Higher debt            | 108.2                         | -6.9            | -3.5             | 4.9                                                                    | 8.4                                       |
| Lower debt             | 34.9                          | -2.9            | -0.5             | 0.4                                                                    | 1.4                                       |

Table 10: Required adjustment of structural primary balance: sensitivity to variations in interest and growth rates (r-g) and debt targets (in percent of GDP)

| Required adjustment of structural primary balance between 2010 and 2020 |     |     |     |
|-------------------------------------------------------------------------|-----|-----|-----|
| 2030 Debt target                                                        | r-g |     |     |
|                                                                         | 0   | 1   | 2   |
| 60 percent of GDP                                                       |     |     |     |
| All advanced economies                                                  | 6.6 | 7.8 | 9.1 |
| G20 advanced economies                                                  | 6.8 | 8.0 | 9.4 |
| High debt                                                               | 7.1 | 8.4 | 9.8 |
| Low debt                                                                | 0.5 | 0.9 | 1.3 |
| 80 percent of GDP                                                       |     |     |     |
| All advanced economies                                                  | 5.2 | 6.5 | 7.9 |
| G20 advanced economies                                                  | 5.4 | 6.7 | 8.1 |
| High debt                                                               | 5.7 | 7.0 | 8.5 |
| Low debt                                                                | 0.5 | 0.9 | 1.3 |
| Pre-crisis levels                                                       |     |     |     |
| All advanced economies                                                  | 6.5 | 7.7 | 9.0 |
| G20 advanced economies                                                  | 6.5 | 7.8 | 9.2 |
| High debt                                                               | 7.0 | 8.3 | 9.6 |
| Low debt                                                                | 1.2 | 1.5 | 1.9 |
| Post-crisis levels                                                      |     |     |     |
| All advanced economies                                                  | 3.4 | 4.3 | 5.2 |
| G20 advanced economies                                                  | 3.4 | 4.4 | 5.3 |
| High debt                                                               | 3.6 | 4.6 | 5.6 |
| Low debt                                                                | 0.5 | 0.9 | 1.3 |

Sources: IMF, World Economics Outlook, October 2009 and IMF staff calculations

This table reports the adjustment in the structural primary balance required from 2011-20, in order to reach various objectives (as listed) by 2030. The primary balance would be gradually improved through 2020 and maintained constant thereafter. The objectives 'pre-crisis levels' and 'post-crisis levels' indicate that each country would reduce its debt-to-GDP ratio to its pre-crisis (2007) or post-crisis (2012) level, respectively, by 2030. On average (PPP-weighted), the pre- (post-) crisis debt target is 61.5 (96.1) percent of GDP. For Japan, all data refer to net debt, and the target level is set to 80 percent of GDP in the first two rows of this table. For Norway, maintenance of primary surpluses at their projected 2012 level is assumed throughout. For the first and second exercises, for economies with a debt/GDP level below 60 percent in the first exercise (or below 80 percent in the second exercise), the illustration is based on a primary balance path needed to stabilise the debt/GDP ratios at their end-2012 levels. 'r-g' indicates the assumed difference between the interest rate and the rate of economic growth.

Table 11: Country experiences with large fiscal adjustment 1/ 2/

| Country (end year)      | Size of adjustment | Length (years) | Cyclically adjusted primary balance |                                                     |
|-------------------------|--------------------|----------------|-------------------------------------|-----------------------------------------------------|
|                         |                    |                | At year end                         | Average over the five years after end of adjustment |
| Advanced economies      |                    |                |                                     |                                                     |
| Ireland (1989)          | 20.0               | 11             | 4.4                                 | 3.6                                                 |
| Sweden (2000)           | 13.3               | 7              | 3.8                                 | 1.1                                                 |
| Finland (2000)          | 13.3               | 7              | 7.1                                 | 3.7                                                 |
| Sweden (1987)           | 12.5               | 7              | 4.8                                 | 0.2                                                 |
| Denmark (1986)          | 12.3               | 4              | 6.6                                 | 4.3                                                 |
| Greece (1995)           | 12.1               | 6              | 4.8                                 | 4.1                                                 |
| Israel (1983)           | 11.1               | 3              | 2.6                                 | 7.9                                                 |
| Belgium (1998)          | 11.1               | 15             | 6.7                                 | 6.1                                                 |
| Canada (1999)           | 10.4               | 14             | 5.6                                 | 3.2                                                 |
| Cyprus (2007)           | 8.5                | 4              | 6.1                                 | ...                                                 |
| United Kingdom (2000)   | 8.3                | 7              | 2.9                                 | -0.6                                                |
| Japan (1990)            | 8.1                | 12             | 2.7                                 | -0.5                                                |
| Italy (1993)            | 7.9                | 8              | 3.0                                 | 4.0                                                 |
| Portugal (1985)         | 7.5                | 4              | 2.6                                 | 0.3                                                 |
| Luxembourg (1985)       | 6.9                | 4              | 5.1                                 | 3.2                                                 |
| Luxembourg (2001)       | 6.7                | 10             | 6.1                                 | 1.0                                                 |
| Iceland (2006)          | 6.3                | 4              | 5.9                                 | ...                                                 |
| Netherlands (2000)      | 6.3                | 10             | 4.1                                 | 1.0                                                 |
| Denmark (2005)          | 5.9                | 11             | 6.4                                 | ...                                                 |
| Australia (1988)        | 5.8                | 4              | 3.7                                 | 0.3                                                 |
| Hong Kong SAR (2005) 3/ | 5.8                | 4              | 1.0                                 | ...                                                 |
| New Zealand (1995)      | 5.8                | 4              | 7.1                                 | 3.9                                                 |
| Austria (2001)          | 5.8                | 6              | 2.2                                 | 0.7                                                 |
| Iceland (2000)          | 5.7                | 6              | 3.1                                 | 1.6                                                 |
| United States (2000)    | 5.7                | 8              | 3.7                                 | -1.0                                                |
| Germany (2000)          | 5.3                | 9              | 3.5                                 | -0.7                                                |
| Germany (1989)          | 5.3                | 10             | 2.7                                 | -0.4                                                |
| Switzerland (2000)      | 5.2                | 7              | 3.6                                 | 1.3                                                 |
| Cyprus (1994)           | 5.2                | 3              | 4.0                                 | 0.6                                                 |
| Spain (2006)            | 5.2                | 11             | 3.0                                 | ...                                                 |

Sources: IMF, World Economic Outlook, October 2009 and IMF staff calculations.

1/ Cumulative change in cyclically adjusted primary balance in percentage of GDP. In a given consolidation episode, the cyclically adjusted primary balance should not be reversed by more than one percentage point from one year to the next.

2/ Table lists largest adjustments per country, unless episodes for a given country are fully non-overlapping.

3/ Further adjustment through 2006 to 2007 as a result of asset-price effects is not taken into account.

A strategy to deliver the eight percentage points of GDP primary structural adjustment needed in advanced countries could be based on three main elements:

- Non-renewal of existing stimulus measures (equal to 1.5 percent of GDP).
- A freeze on real per capita spending excluding pension and health (saving 3.5 percentage points of GDP, if sustained for 10 years), which would require a thorough review and targeted cuts in less effective and low-priority outlays. Reforms to contain pension- and health-spending growth in line with GDP would also be critical. Lowering spending ratios in these areas would be very difficult, but without reforms spending would increase by 3-4 percentage points of GDP from 2015-30.
- Revenue measures to deliver the remaining three percent of GDP. To the extent possible, those should incorporate base-widening and evasion-reducing measures, although realistically some tax-rate increases may also be needed to achieve the targeted revenue increases. Adjustment efforts should avoid reliance on one-off measures, and revenue over-performance should be saved rather than spent.
- The exact composition of the primary adjustment under this scenario would differ country by country, depending on the level and structure of expenditures, revenues and tax rates. Reforms to fiscal rules and institutions could also support the adjustment process.

Table 12: Preliminary strategies to ensure fiscal sustainability in G20 countries

|                | Target                                                                                                                                                                     | Measures 1/                                                                                                                                                                                                                |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| France         |                                                                                                                                                                            | Nonrenewal of stimulus; spending restraint once recovery underway. Consolidation measures initiated prior to crisis (civil service reductions, containment of expenditures, restrictions on tax loopholes).                |
| Germany        | Constitutional fiscal rule for federal and state levels—ceiling of structural deficit of 0.35 percent of GDP for FG from 2015 and structural balance for states from 2020. | Nonrenewal of stimulus; spending restraint once recovery underway.                                                                                                                                                         |
| Italy          | Consolidation over the medium-term towards the Medium-term Objective                                                                                                       | Budget system and public administration reforms, enhanced tax compliance, and fiscal federalism.                                                                                                                           |
| United Kingdom | An annual average fiscal consolidation of 1½ percent of GDP from 2010 to 2014, projected to result in falling debt by 2015–16. 2/                                          | Nonrenewal of stimulus; increases in the marginal income tax of high-income earners, restrictions of tax allowances for high income households, fuel duty increases; efficiency savings; cuts in public sector investment. |
| United States  | Stabilisation of debt ratio through 2019. 2/                                                                                                                               | Nonrenewal of most stimulus; proposed reintroduction of statutory PAYGO rules.                                                                                                                                             |

Source: Survey of IMF desks.

1/ Views of staff of the intentions of G20 country authorities, based on discussions and announcements and in addition to functioning of automatic stabilisers (recovery of revenues).

2/ Note that this is a projection rather than a target.

## The bottom line? Major transatlantic differences?

Comparing transatlantic fiscal policy responses to the financial crisis thus far suggests more similarities than differences. As noted, the overall fiscal expansion has been considerably larger in the US and the UK than in France, Germany or Italy, although this reflects more the origin and nature of the crisis – in particular, the importance of the financial sector in the US and the UK – than differences in the policy response. The stimulus package in the US is considerably larger than those in Europe, but this has helped compensate for smaller automatic stabilisers than in Europe and also aimed to provide support to US states, which are constrained by balanced budget rules. The composition of stimulus has also been different across the Atlantic, but this seems to reflect pre-existing fiscal policy conditions – for example, higher fiscal revenues in Europe and a consequent focus on tax cuts – as well as political economy considerations including measures in the package that would generate broad support and help ensure a large and timely response.

Countries on both sides of the Atlantic are confronted with sharp increases in government debt, which will complicate the management of pre-existing challenges from population ageing, especially in advanced economies. The challenges are particularly strong in the US and the UK. Exit strategies involving a sharp correction in the structural primary balance will be needed to bring down debt ratios to moderate levels and keep them there on a sustainable basis.

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**Annex Table 1: G20 countries: fiscal balances and general government debt 1/ 2/ (In percent of GDP)**

| Overall fiscal balance                       |              |       |       |      |                                 |      |      |
|----------------------------------------------|--------------|-------|-------|------|---------------------------------|------|------|
| Country                                      | 2007         |       |       |      | Change from July Fiscal Monitor |      |      |
|                                              | (Pre-crisis) | 2009  | 2010  | 2014 | 2009                            | 2010 | 2014 |
| Argentina                                    | -2.1         | -3.9  | -2.4  | -1.7 | -0.6                            | -0.9 | -1.3 |
| Australia                                    | 1.5          | -4.3  | -5.3  | -1.1 | 0.0                             | 0.0  | 0.2  |
| Brazil                                       | -2.8         | -3.8  | -1.2  | -1.0 | -0.6                            | 0.1  | 0.4  |
| Canada                                       | 1.6          | -4.9  | -4.1  | 0.0  | -0.8                            | -0.4 | -0.4 |
| China                                        | 0.9          | -3.9  | -3.9  | -0.8 | 0.4                             | 0.4  | 0.2  |
| France                                       | -2.7         | -8.3  | -8.6  | -5.2 | -0.9                            | -1.1 | 0.0  |
| Germany                                      | -0.5         | -4.2  | -4.6  | 0.0  | 0.4                             | 0.8  | 0.5  |
| India                                        | -4.4         | -10.4 | -10.0 | -5.7 | -0.5                            | -1.5 | -1.1 |
| Indonesia                                    | -1.2         | -2.6  | -2.1  | -1.3 | 0.0                             | 0.0  | 0.4  |
| Italy                                        | -1.5         | -5.6  | -5.6  | -5.3 | 0.3                             | 0.7  | -0.5 |
| Japan 3/                                     | -2.5         | -10.5 | -10.2 | -8.0 | -0.2                            | 0.0  | -0.4 |
| Korea                                        | 3.5          | -2.8  | -2.7  | 2.6  | 0.4                             | 1.6  | 0.4  |
| Mexico                                       | -1.4         | -4.9  | -3.7  | -3.1 | -1.0                            | 0.3  | -0.2 |
| Russia                                       | 6.8          | -6.6  | -3.2  | 2.2  | -1.2                            | 1.8  | 0.2  |
| Saudi Arabia                                 | 15.7         | 5.0   | 10.0  | 14.5 | 0.8                             | 1.3  | 1.2  |
| South Africa                                 | 1.2          | -4.4  | -4.7  | -2.5 | -1.6                            | -1.6 | -0.2 |
| Turkey 4/                                    | -2.1         | -7.0  | -5.3  | -4.8 | -1.2                            | 0.1  | 0.3  |
| United Kingdom                               | -2.6         | -11.6 | -13.2 | -6.8 | 0.0                             | 0.1  | 0.1  |
| United States 5/                             | -2.8         | -12.5 | -10.0 | -6.7 | 1.1                             | -0.2 | -2.0 |
| G20 Countries (GDP PPP weighted)             | -1.0         | -7.9  | -6.9  | -3.7 | 0.1                             | 0.0  | -0.6 |
| Advanced G20 economies                       | -1.9         | -9.7  | -8.7  | -5.3 | 0.4                             | 0.0  | -1.0 |
| Emerging G20 economies                       | 0.3          | -5.1  | -4.1  | -1.3 | -0.3                            | 0.1  | 0.0  |
| Memorandum item: Excluding financial support |              |       |       |      |                                 |      |      |
| G20 Countries (GDP PPP weighted)             | -1.0         | -7.0  | -6.7  | -3.7 | -0.3                            | -0.1 | -0.6 |
| Advanced G20 economies                       | -1.9         | -8.2  | -8.4  | -5.3 | -0.4                            | -0.3 | -0.9 |
| Emerging G20 economies                       | 0.3          | -5.1  | -4.1  | -1.3 | -0.3                            | 0.1  | 0.0  |

| General government debt (gross)  |              |       |       |       |                                 |      |      |
|----------------------------------|--------------|-------|-------|-------|---------------------------------|------|------|
| Country                          | 2007         |       |       |       | Change from July Fiscal Monitor |      |      |
|                                  | (Pre-crisis) | 2009  | 2010  | 2014  | 2009                            | 2010 | 2014 |
| Argentina                        | 67.9         | 60.5  | 58.1  | 46.4  | 10.1                            | 7.5  | -2.0 |
| Australia                        | 9.8          | 16.9  | 22.7  | 27.8  | 3.2                             | 3.7  | 1.8  |
| Brazil                           | 66.8         | 68.5  | 65.9  | 58.8  | -1.6                            | -2.7 | -3.4 |
| Canada                           | 64.2         | 78.2  | 79.3  | 68.9  | 2.6                             | 2.7  | 3.5  |
| China                            | 20.2         | 20.2  | 22.2  | 20.0  | -0.6                            | -1.2 | -1.3 |
| France                           | 63.8         | 78.0  | 85.4  | 96.3  | 0.6                             | 1.6  | 0.9  |
| Germany                          | 63.4         | 78.7  | 84.5  | 89.3  | -1.1                            | -2.3 | -2.0 |
| India                            | 80.5         | 84.7  | 85.9  | 78.6  | 1.0                             | 0.9  | 5.3  |
| Indonesia                        | 35.1         | 31.5  | 31.2  | 27.1  | 0.4                             | 0.2  | -1.3 |
| Italy                            | 103.5        | 115.8 | 120.1 | 128.5 | -1.5                            | -3.1 | -3.8 |
| Japan                            | 187.7        | 218.6 | 227.0 | 245.6 | 1.3                             | 0.9  | 6.4  |
| Korea                            | 29.6         | 34.9  | 39.4  | 35.4  | -0.9                            | -2.6 | -4.0 |
| Mexico                           | 38.2         | 47.8  | 47.9  | 44.3  | -1.4                            | -2.5 | -0.2 |
| Russia                           | 7.4          | 7.2   | 7.7   | 7.2   | -0.1                            | -0.1 | -0.1 |
| Saudi Arabia                     | 18.5         | 14.5  | 12.5  | 9.3   | -0.1                            | -0.1 | -0.1 |
| South Africa                     | 28.5         | 30.8  | 33.5  | 34.8  | 1.9                             | 3.0  | 5.4  |
| Turkey 4/                        | 39.4         | 48.1  | 49.6  | 52.8  | 1.1                             | -1.1 | -5.3 |
| United Kingdom                   | 44.1         | 68.7  | 81.7  | 98.3  | 0.1                             | -0.5 | -1.3 |
| United States                    | 61.9         | 84.8  | 93.6  | 108.2 | -4.0                            | -6.2 | -3.7 |
| G20 Countries (GDP PPP weighted) | 62.0         | 75.1  | 80.2  | 85.9  | -0.9                            | -1.9 | -0.8 |
| Advanced G20 economies           | 78.2         | 98.9  | 106.7 | 118.4 | -1.7                            | -3.0 | -1.3 |
| Emerging G20 economies           | 37.4         | 38.9  | 39.6  | 36.2  | 0.0                             | -0.5 | -0.2 |

Source: IMF, World Economic Outlook, October 2009 Update. More recent data for France and Mexico.

1/ Data are on calendar-year basis for the general government if available [otherwise central government]. Debt is on gross basis for general government, except for Argentina and Korea (central government).

2/ Averages are based on 2008 PPP GDP weights.

3/ Includes financial sector-related measures of 0.5 percent of GDP in 2009, and 0.2 percent of GDP in 2010. These measures cover both subsidies to and capital injections in public financial institutions.

4/ Fiscal projections reflect staff's assessment of the policy measures underpinning the authorities' Medium-term Program.

5/ Includes financial sector support (3.2 percent of GDP in 2009 and 0.6 percent of GDP in 2010)

Annex Table 2: G20 countries: fiscal expansion (in percent of GDP, change with respect to pre-crisis year 2007)

|                                             | 2009               |                                                |                     |                    | 2010                                           |                     |                    |                                                | Fiscal expansion<br>Change from July WEO |      |
|---------------------------------------------|--------------------|------------------------------------------------|---------------------|--------------------|------------------------------------------------|---------------------|--------------------|------------------------------------------------|------------------------------------------|------|
|                                             | of which           |                                                | of which            |                    | of which                                       |                     | of which           |                                                | 2009                                     | 2010 |
|                                             |                    |                                                |                     |                    |                                                |                     |                    |                                                |                                          |      |
|                                             | Overall<br>balance | Crisis-Related<br>discretionary<br>measures 1/ | Other<br>factors 2/ | Overall<br>balance | Crisis-Related<br>discretionary<br>measures 1/ | Other<br>factors 2/ | Overall<br>balance | Crisis-Related<br>discretionary<br>measures 1/ | Other<br>factors 2/                      |      |
| Argentina 3/                                | -1.8               | -1.5                                           | -0.3                | -0.4               | 0.0                                            | -0.4                | -0.7               | 0.0                                            | -0.4                                     | -1.0 |
| Australia                                   | -5.8               | -2.9                                           | -2.9                | -6.8               | -2.0                                           | -4.8                | 0.0                | -2.0                                           | -4.8                                     | 0.0  |
| Brazil                                      | -1.0               | -0.6                                           | -0.4                | 1.6                | -0.6                                           | 2.1                 | -0.4               | -0.6                                           | 2.1                                      | 0.3  |
| Canada                                      | -6.5               | -1.9                                           | -4.6                | -5.7               | -1.7                                           | -4.0                | -0.8               | -1.7                                           | -4.0                                     | -0.4 |
| China                                       | -4.8               | -3.1                                           | -1.7                | -4.8               | -2.7                                           | -2.1                | 0.4                | -2.7                                           | -2.1                                     | 0.4  |
| France                                      | -5.6               | -0.7                                           | -5.0                | -5.9               | -0.8                                           | -5.0                | -0.9               | -0.8                                           | -5.0                                     | -1.1 |
| Germany                                     | -3.7               | -1.6                                           | -2.1                | -4.2               | -2.0                                           | -2.2                | 0.4                | -2.0                                           | -2.2                                     | 0.8  |
| India 4/                                    | -6.0               | -0.6                                           | -5.4                | -5.6               | -0.6                                           | -5.0                | -1.3               | -0.6                                           | -5.0                                     | -2.3 |
| Indonesia                                   | -1.4               | -1.4                                           | 0.0                 | -0.9               | -0.6                                           | -0.2                | 0.0                | -0.6                                           | -0.2                                     | 0.0  |
| Italy                                       | -4.1               | -4.1                                           | -3.9                | -4.1               | -0.1                                           | -4.0                | 0.3                | -0.1                                           | -4.0                                     | 0.7  |
| Japan 5/                                    | -7.4               | -2.4                                           | -5.0                | -7.5               | -1.8                                           | -5.7                | -0.2               | -1.8                                           | -5.7                                     | 0.0  |
| Korea                                       | -6.2               | -3.6                                           | -2.6                | -6.2               | -4.7                                           | -1.5                | 0.4                | -4.7                                           | -1.5                                     | 1.6  |
| Mexico                                      | -3.5               | -1.5                                           | -2.0                | -2.3               | -1.0                                           | -1.3                | -1.0               | -1.0                                           | -1.3                                     | 0.3  |
| Russia                                      | -13.4              | -4.1                                           | -9.3                | -10.0              | -1.3                                           | -8.6                | -1.2               | -1.3                                           | -8.6                                     | 1.8  |
| Saudi Arabia                                | -10.8              | -3.3                                           | -7.5                | -5.7               | -3.5                                           | -2.2                | 0.8                | -3.5                                           | -2.2                                     | 1.3  |
| South Africa 6/                             | -5.6               | -3.0                                           | -2.6                | -5.9               | -2.1                                           | -3.8                | -1.6               | -2.1                                           | -3.8                                     | -1.6 |
| Turkey 7/                                   | -4.9               | -1.2                                           | -3.7                | -3.2               | -0.5                                           | -2.7                | -1.2               | -0.5                                           | -2.7                                     | 0.1  |
| United Kingdom                              | -8.9               | -1.6                                           | -7.4                | -10.6              | 0.0                                            | -10.6               | 0.0                | 0.0                                            | -10.6                                    | 0.1  |
| United States 8/                            | -6.4               | -2.0                                           | -4.4                | -6.5               | -1.8                                           | -4.7                | -0.8               | -1.8                                           | -4.7                                     | -0.9 |
| G20 countries (GDP PPP-weighted)            | -5.9               | -2.0                                           | -3.9                | -6.5               | -1.6                                           | -4.0                | -0.4               | -1.6                                           | -4.0                                     | -0.2 |
| Advanced G20 economies                      | -6.3               | -1.9                                           | -4.4                | -6.5               | -1.6                                           | -4.8                | -0.4               | -1.6                                           | -4.8                                     | -0.3 |
| Emerging G20 economies                      | -5.4               | -2.2                                           | -3.2                | -4.4               | -1.6                                           | -2.8                | -0.4               | -1.6                                           | -2.8                                     | 0.0  |
| United States 9/                            | -9.6               | -2.0                                           | -7.6                | -7.1               | -1.8                                           | -5.3                | 1.0                | -1.8                                           | -5.3                                     | -0.3 |
| Japan 9/                                    | -7.9               | -2.4                                           | -5.5                | -7.7               | -1.8                                           | -5.9                | -0.2               | -1.8                                           | -5.9                                     | 0.0  |
| G20 weighted average including financial se | -6.9               | -2.0                                           | -4.9                | -5.8               | -1.6                                           | -4.2                | 0.1                | -1.6                                           | -4.2                                     | 0.0  |

Source: Staff estimates based on the October 2009 WEO. More recent data for France and Mexico.

1/ Figures reflect the budgetary cost of crisis-related discretionary measures in each year compared to 2007 (baseline), based on measures announced through mid-October. They do not include (i) acquisition of assets (including financial sector support) or (ii) measures that were planned before the crisis. 2/ Includes estimates of the impact of automatic stabilisers, plus non-crisis discretionary spending or revenue measures and the impact of nondiscretionary effects on revenues beyond the normal cycle (e.g., the revenue impact of the extraordinary decline in commodity and real estate prices and financial sector profits). A positive amount reflects factors limiting the size of permissible deficits (e.g., assumed compliance with fiscal rules). 3/ Based on staff's analysis. 4/ Discretionary measures on fiscal-year basis. Includes only on-budget measures. Additional off-budget measures amount to 0.8 percent of GDP in 2008/09 and 1.6 percent of GDP in 2009/10 (including 0.4 percent of GDP for bank recapitalisation). 5/ Based on staff preliminary analysis; financial sector-related measures of 0.5 percent of GDP in 2009, and 0.2 percent of GDP in 2010 are excluded. In order to focus on the fiscal measures with direct effect on demand. These measures cover both subsidies to and capital injections in public financial institutions. 6/ Fiscal-year basis. Based on staff estimates of the cyclically adjusted general government balance. Additional stimulus in the form of infrastructure investment is being provided by the broader public sector, so that the total fiscal stimulus (as measured by the public-sector borrowing requirement) is 4.2 percent of GDP in 2008, 6.2 percent in 2009, and 4.9 percent in 2010. 7/ Fiscal projections reflect staff's assessment of the policy measures underpinning the authorities' medium-term programme. Includes only discretionary measures that could be quantified. 8/ Excludes losses from financial-system support measures (estimated at 3.2 percent of GDP in 2009 and 0.6 percent of GDP in 2010), in order to focus on the fiscal measures that directly effect demand. 9/ Includes cost of financial-system support measures.

**Annex Table 3: Support for financial and other sectors and upfront financing need (as of August 2009; % 2008 GDP; average using PPP GDP weights) 1/**

|                                  | Capital Injection | Purchase of assets and lending by treasury 2/ | Guarantees 3/ | Liquidity provision and other support by central bank | Upfront government financing 4/ |
|----------------------------------|-------------------|-----------------------------------------------|---------------|-------------------------------------------------------|---------------------------------|
|                                  | (A)               | (B)                                           | (C)           | (D)                                                   |                                 |
| <b>Advanced North America</b>    |                   |                                               |               |                                                       |                                 |
| Canada                           | 0.0               | 10.9                                          | 13.5          | 1.5                                                   | 10.9                            |
| United States 5/                 | 5.2               | 1.5                                           | 10.6          | 8.1                                                   | 6.9                             |
| <b>Advanced Europe</b>           |                   |                                               |               |                                                       |                                 |
| Austria                          | 5.3               | 0.0                                           | 30.1          | ...                                                   | 8.9                             |
| Belgium                          | 4.8               | 0.0                                           | 26.4          | ...                                                   | 4.8                             |
| France 6/                        | 1.4               | 1.3                                           | 16.4          | ...                                                   | 1.6                             |
| Germany                          | 3.8               | 0.4                                           | 18.0          | ...                                                   | 3.7                             |
| Greece                           | 2.1               | 3.3                                           | 6.2           | ...                                                   | 5.4                             |
| Ireland                          | 5.9               | 0.0                                           | 198.1         | ...                                                   | 5.9                             |
| Italy 7/                         | 0.6               | 0.0                                           | 0.0           | ...                                                   | 0.6                             |
| Netherlands                      | 3.4               | 11.2                                          | 33.6          | ...                                                   | 14.6                            |
| Norway 8/                        | 2.0               | 15.8                                          | 0.0           | 21.0                                                  | 15.8                            |
| Portugal 9/                      | 2.4               | 0.0                                           | 12.0          | ...                                                   | 2.4                             |
| Spain 10/                        | 0.8               | 3.9                                           | 15.8          | ...                                                   | 4.6                             |
| Sweden 11/                       | 1.6               | 4.8                                           | 47.5          | 13.9                                                  | 5.2                             |
| Switzerland                      | 1.1               | 0.0                                           | 0.0           | 24.9                                                  | 1.1                             |
| United Kingdom 12/               | 3.9               | 13.8                                          | 53.2          | 19.0                                                  | 20.0                            |
| European Central Bank            | ...               | ...                                           | ...           | 8.5                                                   | ...                             |
| <b>Advanced Asia and Pacific</b> |                   |                                               |               |                                                       |                                 |
| Australia                        | 0.0               | 0.7                                           | 8.8           | ...                                                   | 0.7                             |
| Japan 13/                        | 2.4               | 11.4                                          | 7.3           | 1.9                                                   | 0.8                             |
| Korea 14/                        | 2.3               | 5.5                                           | 14.5          | 6.5                                                   | 0.8                             |
| <b>Emerging economies</b>        |                   |                                               |               |                                                       |                                 |
| Argentina 15/                    | 0.0               | 0.9                                           | 0.0           | 5.4                                                   | 0.9                             |
| Brazil 16/                       | 0.0               | 0.8                                           | 0.0           | 10.8                                                  | 0.0                             |
| China                            | 0.0               | 0.0                                           | 0.0           | 22.5                                                  | 0.0                             |
| India                            | 0.4               | 0.0                                           | 0.0           | 8.3                                                   | 0.4                             |
| Indonesia 17/                    | 0.0               | 0.0                                           | 0.1           | 1.2                                                   | 0.1                             |
| Hungary 18/                      | 1.1               | 2.4                                           | 1.1           | 13.6                                                  | 3.5                             |
| Poland                           | 0.0               | 0.0                                           | 3.2           | 5.4                                                   | 0.0                             |
| Russia                           | 1.2               | 1.2                                           | 0.5           | 11.6                                                  | 2.3                             |
| Saudi Arabia 19/                 | 0.0               | 1.2                                           | N/A           | 30.6                                                  | 1.2                             |
| Turkey 20/                       | 0.0               | 0.3                                           | 0.0           | 3.7                                                   | 0.0                             |
| <b>Average</b>                   |                   |                                               |               |                                                       |                                 |
| G20                              | 2.2               | 2.7                                           | 8.8           | 9.7                                                   | 3.7                             |
| Advanced economies               | 3.4               | 4.1                                           | 13.9          | 7.6                                                   | 5.7                             |
| In billions of US\$              | 1,160             | 1,436                                         | 4,638         | 2,804                                                 | 1,887                           |
| Emerging economies               | 0.2               | 0.3                                           | 0.1           | 13.5                                                  | 0.4                             |
| In billions of US\$              | 22                | 38                                            | 7             | 1,581                                                 | 47                              |

Sources: FAD-MCM database; IMF staff estimates based on announcements by official agencies. Among G20 countries, Mexico and South Africa have not provided any direct support to the financial sector.

1/ Columns A, B, C, and E indicate announced or pledged amounts, and not actual uptake. Column D indicates the actual changes in central bank balance sheets from June 2007 to June 2009. While these changes are mostly related to measures aimed at enhancing market liquidity and providing financial sector support, they may occasionally have other causes, and also may not capture other types of support, including that due to changes in regulatory policies. For the euro area countries, see the ECB row. Averages for column D include the euro area as a whole. 2/ Column B does not include treasury funds provided in support of central bank operations. These amount to 0.5 percent of GDP in the US, and 12.8 percent in the UK. 3/ Excludes deposit insurance provided by deposit insurance agencies. 4/ Includes gross support measures that require upfront government outlays. Excludes recovery from the sale of acquired assets. 5/ Estimated upfront financing need for 2009–10 is US\$990 billion [6.9 percent of GDP], consisting of the allocated amount under TARP (US\$510 bn); Treasury purchases of GSE preferred stocks (US\$400 bn); and treasury support for Commercial Paper Funding Facility (US\$50 bn).

Notes to Annex Table 3 (continued):

- 6/ Support to the country's strategic companies is recorded under (B) of which €20 billion will be financed by a state-owned bank, Caisse des Dépôts et Consignations, not requiring upfront treasury financing.
- 7/ Does not include the temporary swap of government securities for assets held by Italian banks undertaken by the Bank of Italy.
- 8/ Excluding asset accumulation in sovereign wealth funds, the balance sheet expansion during the period was only 4.5 percent of GDP (Column D).
- 9/ A maximum amount of €20 bn (12% of GDP) is allocated to both guarantees and capital injection, with the latter not exceeding €4 bn.
- 10/ Spain created a bank restructuring fund (FROB) in June, with the current legislative framework providing for €9 billion (direct government financing of €6.75 billion, complemented by €2.25 billion from the deposit insurance funds), to support the possible eventual restructuring of the financial sector. The size of the FROB could potentially be increased up to €99 billion (nine percent of GDP) through debt issuance. Column C includes approved bank debt guarantees up to €100 bn, and another €100 bn that would be extended, if needed.
- 11/ Some capital injection (SEK50 bn) will be undertaken by the stabilisation fund
- 12/ Estimated upfront financing need is £289 bn (20 percent of GDP), consisting of bank recapitalisation fund (£56 bn), special liquidity scheme (£185 bn) and financing for the nationalisation of Northern Rock and Bradford & Bingley (£48 bn).
- 13/ Budget provides JPY 3,900 bn (0.8 percent of GDP) to support capital injection by a special corporation and lending and purchase of commercial paper by policy-based financing institutions.
- 14/ In 2009, KRW 8 trillion will be provided from the budget to support for SMEs.
- 15/ Staff estimates.
- 16/ Liquidity support and loan purchases are provided through public banks and deposit insurance fund entailing no upfront financing.
- 17/ Small interventions have been recently implemented through the deposit insurance agency that are not yet quantified.
- 18/ The expansion of the central bank balance sheet reflects mostly the increase in net foreign assets as a result of IMF and EU disbursements in the context of the SBA-supported program. During this period, the increase in central bank domestic assets was limited to 2.3 percent of GDP.
- 19/ A significant part of the central bank balance sheet expansion is due to a large accumulation of foreign assets during 2008.
- 20/ Column B shows loans by the SME industry development organisation not requiring direct treasury financing.

**Annex Table 4: Financial sector support utilised relative to announcement**  
(in percent of 2008 GDP, unless otherwise indicated)

| Countries                        | Capital injection |                            | Purchase of assets and lending by treasury |                            |
|----------------------------------|-------------------|----------------------------|--------------------------------------------|----------------------------|
|                                  | Amount used       | In percent of announcement | Amount used                                | In percent of announcement |
| <b>Advanced North America</b>    |                   |                            |                                            |                            |
| Canada                           | ...               | ...                        | 5.8                                        | 53.5                       |
| United States                    | 2.4               | 46.1                       | 0.7                                        | 48.0                       |
| <b>Advanced Europe</b>           |                   |                            |                                            |                            |
| Austria                          | 1.7               | 32.7                       | ...                                        | ...                        |
| Belgium                          | 4.7               | 97.6                       | ...                                        | ...                        |
| France                           | 0.8               | 58.1                       | 0.4                                        | 26.5                       |
| Greece                           | 1.7               | 82.0                       | 1.8                                        | 55.0                       |
| Ireland                          | 5.4               | 90.9                       | ...                                        | ...                        |
| Italy                            | 0.1               | 14.5                       | ...                                        | ...                        |
| Netherlands                      | 2.4               | 72.8                       | 5.5                                        | 49.1                       |
| Norway                           | 0.0               | 0.0                        | 7.2                                        | 45.5                       |
| Portugal                         | ...               | ...                        | ...                                        | ...                        |
| Spain                            | 0.0               | 0.0                        | 1.8                                        | 44.6                       |
| Sweden                           | 0.2               | 11.2                       | ...                                        | ...                        |
| Switzerland                      | 1.1               | 100.0                      | ...                                        | ...                        |
| United Kingdom                   | 3.3               | 85.2                       | 3.4                                        | 24.4                       |
| <b>Advanced Asia and Pacific</b> |                   |                            |                                            |                            |
| Australia                        | ...               | ...                        | 0.5                                        | 77.5                       |
| Japan                            | 0.0               | 1.0                        | 1.2                                        | 10.9                       |
| Korea                            | 0.8               | 33.0                       | 0.3                                        | 4.8                        |
| <b>Emerging economies</b>        |                   |                            |                                            |                            |
| Brazil                           | ...               | ...                        | 0.3                                        | 43.5                       |
| India                            | 0.0               | 9.5                        | 0.0                                        | ...                        |
| Indonesia                        | ...               | ...                        | ...                                        | ...                        |
| Hungary                          | 0.1               | 9.3                        | 2.0                                        | 82.3                       |
| Russia                           | 0.7               | 60.4                       | 0.6                                        | 54.0                       |
| Saudi Arabia                     | ...               | ...                        | 0.6                                        | 51.4                       |
| <b>Average 1/</b>                |                   |                            |                                            |                            |
| G20                              | 1.2               | 43.9                       | 1.0                                        | 27.0                       |
| Advanced economies               | 1.5               | 43.9                       | 1.2                                        | 26.1                       |
| In billions of US\$              | 446               | ...                        | 366                                        | ...                        |
| Emerging economies               | 0.2               | 44.6                       | 0.3                                        | 50.3                       |
| In billions of US\$              | 11                | ...                        | 17                                         | ...                        |

Source: Staff estimates.

1/ PPP weighted averages for the countries listed above.

Annex Table 5: G20 countries: selected fiscal risk indicators

|                                  | Ratio:<br>net interest payments to<br>GDP |      | Ratio:<br>net interest payments to<br>expenditure |      | Ratio:<br>net interest payments to<br>fiscal revenues |      | Ratio:<br>general government gross<br>debt to fiscal revenues |       |
|----------------------------------|-------------------------------------------|------|---------------------------------------------------|------|-------------------------------------------------------|------|---------------------------------------------------------------|-------|
|                                  | 2007                                      | 2014 | 2007                                              | 2014 | 2007                                                  | 2014 | 2007                                                          | 2014  |
| Argentina                        | 4.5                                       | 2.6  | 13.5                                              | 7.0  | 14.4                                                  | 7.3  | 215.1                                                         | 131.9 |
| Australia                        | -0.4                                      | 0.9  | -1.2                                              | 2.4  | -1.1                                                  | 2.5  | 26.4                                                          | 77.1  |
| Brazil                           | 6.3                                       | 4.3  | 16.8                                              | 11.5 | 18.1                                                  | 11.8 | 190.2                                                         | 162.4 |
| Canada                           | 0.6                                       | 0.2  | 1.5                                               | 0.5  | 1.5                                                   | 0.5  | 158.4                                                         | 166.8 |
| China                            | 0.4                                       | 0.6  | 2.0                                               | 2.5  | 1.9                                                   | 2.6  | 98.9                                                          | 90.2  |
| France                           | 2.3                                       | 3.2  | 4.5                                               | 5.9  | 4.7                                                   | 6.5  | 128.7                                                         | 197.2 |
| Germany                          | 2.4                                       | 2.1  | 5.4                                               | 4.8  | 5.5                                                   | 4.8  | 144.5                                                         | 203.4 |
| India                            | 5.5                                       | 5.6  | 20.3                                              | 19.1 | 24.2                                                  | 23.8 | 353.2                                                         | 336.5 |
| Indonesia                        | 2.0                                       | 1.8  | 10.2                                              | 10.2 | 10.9                                                  | 11.0 | 189.3                                                         | 168.2 |
| Italy                            | 4.8                                       | 6.2  | 9.9                                               | 11.8 | 10.3                                                  | 13.1 | 220.7                                                         | 272.9 |
| Japan (net debt)                 | 0.5                                       | 2.6  | 1.5                                               | 6.5  | 1.6                                                   | 8.1  | 604.5                                                         | 446.2 |
| Korea                            | 1.4                                       | 1.5  | 6.4                                               | 6.4  | 5.5                                                   | 5.8  | 118.7                                                         | 136.6 |
| Mexico                           | 2.7                                       | 2.8  | 11.7                                              | 11.2 | 12.4                                                  | 12.8 | 178.4                                                         | 204.2 |
| Russia                           | 0.6                                       | 0.6  | 1.7                                               | 2.1  | 1.4                                                   | 1.9  | 18.5                                                          | 21.4  |
| Saudi Arabia                     | 1.5                                       | 0.6  | 4.3                                               | 1.8  | 2.9                                                   | 1.3  | 36.9                                                          | 19.2  |
| South Africa                     | 1.1                                       | 1.4  | 2.9                                               | 3.3  | 2.7                                                   | 4.0  | 88.1                                                          | 276.8 |
| Turkey                           | 5.9                                       | 5.4  | 17.4                                              | 14.8 | 18.6                                                  | 17.0 | 124.5                                                         | 165.1 |
| United Kingdom                   | 1.6                                       | 3.1  | 3.9                                               | 7.0  | 4.2                                                   | 8.3  | 116.8                                                         | 267.4 |
| United States                    | 2.2                                       | 4.5  | 6.6                                               | 12.4 | 7.2                                                   | 15.2 | 206.9                                                         | 364.4 |
| G20 Countries (GDP PPP weighted) | 2.1                                       | 3.0  | 6.6                                               | 8.7  | 6.8                                                   | 10.0 | 197.9                                                         | 246.0 |
| Advanced G20 economies           | 1.9                                       | 3.5  | 5.2                                               | 8.8  | 5.5                                                   | 10.7 | 225.5                                                         | 300.5 |
| Emerging G20 economies           | 2.5                                       | 2.3  | 9.6                                               | 8.3  | 9.5                                                   | 8.9  | 142.3                                                         | 137.1 |

Source: Staff estimates based on the October 2009 WEO. Projections for Turkey reflect staff's assessment of the policy measures underpinning the authorities' medium-term programme

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## Comments on: 'Comparing transatlantic responses to the crisis: the fiscal policy response' by Mark Horton

ROBERTO PEROTTI<sup>1</sup>

The contribution by Horton *et al* (2009) is a very useful review of the state of implementation of fiscal stimulus measures around the world. This issue is important because there is a widespread view that fiscal stimulus has been key to avoiding disaster, and that there is a risk of a double dip should stimulus packages be withdrawn prematurely.

Horton *et al* (2009) make the following useful points, which in most cases are not well known among most economists and practitioners:

- There is very limited information on the state of disbursement, except for France (in the case of taxes) and possibly the United States;
- Even the existing information is not always clear. For instance, in the US in July 2009, 41 percent of funds had been 'paid out'. But it seems this includes funds to state authorities, which in turn must actually disburse them.
- There is an enormous disparity, in size and composition, in the responses of industrialised countries: it appears that nothing systematic can be said.

Where do we go from here? The trade-off is obvious (at least in terms of a neo-Keynesian approach): if the stimulus is withdrawn, there is a negative demand effect; if we keep going, there could be negative-expectation and crowding-out effects.

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1. Università Bocconi.

A widely-held view is that stimulus packages should be maintained until the end of 2010 at least. Maybe. It all boils down to multipliers, and perhaps nonlinearities: is the effect stronger in recessions, with less crowding out? There is some tentative evidence for this, but not yet enough yet.

Horton *et al* (2009), like many others recently, advocates the use of long-term projections to reassure the markets: government spending and deficits are going up now, but they will come down soon, hence the markets should not fear a crowding-out effect.

Although I understand the rationale behind this proposal, I am not sure it is necessarily a good idea: the experience shows that governments use multi-year projections merely to postpone adjustments. Spending and deficit cuts are continually postponed to 'three years from now'; when the future comes, the same trick will be used. The (announced) intertemporal budget constraint is always in good shape, but the budget cuts never materialise.

There is also an obvious rationale behind looking at the nonfinancial public sector, and maybe even the financial public sector in certain countries that have de facto nationalised some banks. There is a similar rationale for looking at contingent liabilities. But the further away we move from the standard definition, the more we open the door to *ad hoc* definition, budget gimmickry, and unending contention. To give just one example, what do we define as contingent liabilities? There is no end to candidates. And should we count the right to tax future incomes as a contingent asset?



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# The response of the Federal Reserve to the recent banking and financial crisis

RANDALL S. KROSZNER AND WILLIAM MELICK<sup>1</sup>

The financial-market crisis shifted US central-bank policy from a well-established routine of interest-rate targeting to a multi-pronged triage that wedded traditional policy tools with new initiatives aimed at reviving an ailing financial system. The triage was controversial because it entailed support that required choices to be made over targeting particular markets and firms. These changes in the operation of central-bank policy have been especially jarring following a quarter century of generally quiescent macroeconomic activity and policy, a period often characterised as the 'Great Moderation'. With the crisis receding, the timing, size, appropriateness and effectiveness of the measures taken by the Federal Reserve are the subject of much discussion, analysis and controversy.

In this chapter, first, we present an account of the multitude of policy actions taken by the Fed, providing a readable narrative that brings together information that otherwise would require consulting a variety of sources. Second, we present a framework for thinking about the central-bank policy response that gives the reader a means of organising her or his own understanding of the response. A key theme is that the traditional tools at the disposal of the Federal Reserve, and much of the structure of banking regulation such as deposit insurance, focused on banks as being at the centre of the financial system. With the emergence of markets, such as those for securitised assets and credit derivatives, and institutions such as Money Market Mutual Funds, the traditional tools were not sufficient to deal with a

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1. Respectively, University of Chicago, Graduate School of Business, and Kenyon College, Department of Economics.

greater variety of institutions and markets that had become closely interconnected and central to the function – and dysfunction – of the banking and financial system. The Federal Reserve responded by creating facilities that have broadened the types of counterparties receiving support, broadened the collateral accepted in exchange for access to the support and lengthened the maturity of the support. These innovations and uses by the Fed of 'emergency' powers were a recognition of the limits of traditional tools for responding to the greatest financial crisis in the US since the 1930s. We then conclude with preliminary thoughts on unwinding the Fed's extraordinary actions and creating a regulation and supervision framework that acknowledges the dramatic changes that have occurred in the financial system over the last 75 years.

The next section of the paper addresses some broader themes that provide context for analysing the Fed's response during the crisis. The second section describes the evolution of traditional policy tools during the turmoil. The third section presents a taxonomy for classifying the nontraditional policy initiatives and then uses this taxonomy to describe the new initiatives. Conclusions and preliminary lessons for reform are offered in the final section.

### **Context: evolution of the financial system and role of non-bank institutions**

Putting aside the chicken-and-egg question of whether finance leads development or vice versa, there is near universal agreement that a well-functioning financial system is part and parcel of a thriving modern economy and that the financial system is an important conduit through which central-bank policy influences prices and economic activity. Naturally, a well-functioning financial system will evolve with the economy, and this has certainly been true in the US. In 1950, depository institutions (banks for short) accounted for 60 percent of the assets held by the financial sector. By 2006 that share had fallen to 30 percent. To paraphrase the work of Shin (2009) and Adrian and Shin (2009), financial-intermediation chains have grown much longer and many of the links in the chain are market-based, non-bank financial intermediaries that do not rely on deposits for their funding. Money-market mutual funds (MMMFs) alone, for example, hold roughly \$4 trillion, while total bank deposits are roughly \$8 trillion. Rather than a single bank accepting deposits from households and making commercial loans to firms or mortgage loans to other households, the financial system has evolved so that a lending household might purchase shares in a money-market mutual fund that holds commercial paper issued by a bank that engages in a repurchase agreement with a securities firm that

has a special purpose vehicle that issues asset-backed securities that funds a pool of residential mortgages and that purchases credit derivatives from other financial institutions to hedge its exposure to these securities and others in its portfolio. You get the picture.

No matter what the driving forces were behind this increase in the layers of financial intermediation – ranging from more-efficient allocation of risk, to regulatory arbitrage aimed at avoiding capital requirements – the many layers of intermediation create chains of inter-linkages that can make the entire system more vulnerable to shocks in any one market or at any single institution. These inter-linkages dramatically complicate supervision and increase the information necessary for monitoring by both market participants and regulators.

Similarly, these intermediation chains and inter-linkages also significantly complicate the ability of a central bank and regulatory authorities to respond to a financial crisis. In a crisis, the classic admonition from Bagehot was for central banks to lend freely but at a high rate of interest to illiquid but not insolvent firms. Fair enough, but does this lending need to be extended to every firm in a long intermediation chain and how do you disentangle liquidity and solvency for some of these market-based intermediaries when price discovery in the markets that would allow for the valuation of assets and liabilities may be significantly impaired and, in some cases, has essentially disappeared?

Suffice to say that, at least in the US, the tools available to the Fed did not evolve along with the financial system. The Fed's toolkit was essentially set in the 1930s. Open-market operations and discount lending, in addition to affecting the overall level of interest rates, are also designed to impact bank reserves and thereby the larger economy via the bank lending channel. When banks are the largest players in the financial system, these tools can be sufficient for quelling a crisis, but they are unlikely to be sufficient in a financial system characterised by long intermediation chains with many market-based intermediaries.

An important legacy of the 1933 Glass-Steagall Act that separated commercial banking from investment banking in the US was to restrict the traditional tools of the Fed to focus narrowly on commercial banks and bank holding companies. The 1999 Gramm-Leach-Bliley Act repealed a number of the legal obstacles erected by Glass-Steagall that prevented a commercial bank from affiliating with entities engaged in investment banking (although it still prohibited a commercial bank from directly underwriting or dealing in many types of securities). Few financial institutions that were not long-standing commercial-bank holding companies, however, chose to become 'financial holding companies' (FHCs), which would

permit access to the Fed's discount window. The large investment banks, for example, preferred not to be regulated by the Federal Reserve and, in particular, be subject to the minimum leverage ratio (that is, capital to total assets ratio) that banks in the US had to comply with. In addition, the Money Market Mutual Fund (MMMF) industry developed to provide a close substitute to traditional checkable deposits at banks. Thus, the Fed had no tools in its traditional repertoire to provide liquidity during a crisis to large and increasingly important segments of the financial system, ranging from investment banks to money-market mutual funds.

The current crisis is characterised both by a sharp fall in the market value of assets held by financial intermediaries and uncertainty about which intermediaries are most affected by the drop in asset values. Funding dried up for all intermediaries due to lack of information on intermediaries' exposures to the troubled assets and potentially troubled institutions along with an increase in risk aversion (see Garber and Weisbrod, 1992, and Gorton, 2009). Long intermediation chains compound this effect, as firms were concerned not only about the balance sheet of their immediate counterparty, but the balance sheets of firms throughout the intermediation chain. The balance sheet of their counterparty's counterparty thus became crucial to evaluating the soundness of an institution. It was not sufficient, for example, to know the amount of asset-backed securities (ABS) or credit protection purchased by an institution but information was also needed about the health of monoline insurers of those ABS and the soundness of sellers of insurance through credit derivatives held by the institution. Concerns about the 'fire sale' of assets, due to liquidity or funding problems or requirements to post additional collateral, and the uncertainties of the exposures, led to 'funding runs'. It then became extremely difficult to disentangle liquidity from solvency, in particular because in such circumstances bid-ask spreads widen so much that in many markets the price-discovery process breaks down. As confidence collapsed, the financial system slammed to a halt, and with it economic activity.

Traditional central-bank policy tools can flood the banking system with liquidity, but this liquidity may not spill over to the market-based intermediaries when the financial markets linking the various institutions are not functioning. Open-market operations and discount-window lending will increase bank reserves, but there is no guarantee that these bank reserves will revive bank lending, much less the entire chain of intermediation. Bank deposits, protected by deposit insurance, may be slow to runoff, but bank deposits are a much smaller fraction of the funding of financial activity than once was the case. Institutions increasingly came to rely on the ability to securitise (that is, to sell) assets, to issue short-term commercial

paper, to finance portfolios through secured repurchase agreements, that is, they relied on market-based intermediation rather deposits. Thus, traditional policy tools can liquefy banks but have little direct effect on either bank traditional lending or market-based intermediaries. Even for banks, but more so for market-based intermediaries, questions remain about asset quality and capital adequacy.

In a crisis, financial firms need access to sufficient liquidity and capital to instill confidence in counterparties in order to successfully intermediate and thereby keep the credit channel open to support economic activity. And this liquidity and capital must be accessed in a timely matter. The US experience during the turmoil indicates that speed is essential in preventing the unravelling of intermediation chains.

As this framework makes clear, the Fed's response to the banking and financial crisis must be understood first within the context of the limits to its traditional toolkit, and second by the need to innovate to keep up with recent changes in the financial system. We begin by focusing on the traditional tools of central-bank financial-crisis response, followed by a careful consideration of the new initiatives, which we label the nontraditional response.

### Traditional responses

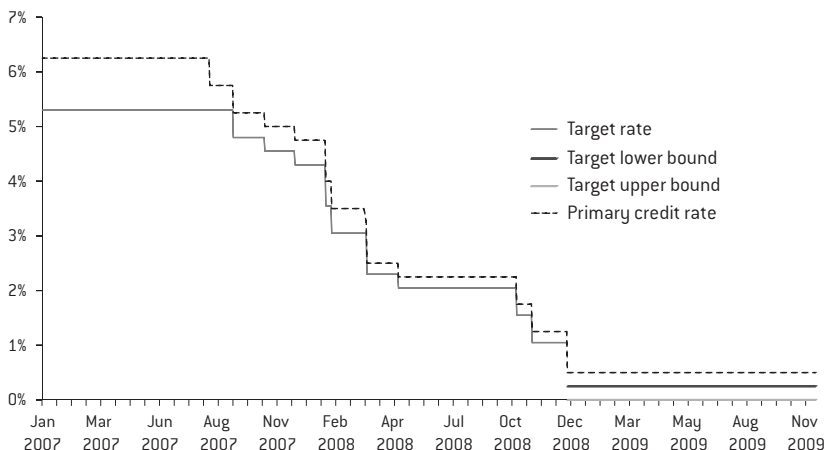
Textbook descriptions of central-bank policy usually list three key tools: open-market operations, discount lending and reserve requirements, before going on to say that reserve requirements are a relatively blunt and rarely-used tool. As the financial-market turmoil spread in August 2007, the Fed responded in what can certainly be described as a textbook or traditional manner, with an emphasis on the target federal funds rate (open-market operations) and the primary credit rate (discount lending). By way of background, from June 2006 until August 2007, the target federal funds rate was 5.25 percent and the primary credit rate was 6.25 percent – the 100 basis-point wedge between the two rates having been adopted at the time of the discount window overhaul in early 2003.

On August 10, 2007, three days after the August Federal Open Market Committee (FOMC) meeting, in a press release reminiscent of those following the October 1987 stock-market crash and the September 2001 terrorist attacks, the Federal Reserve Board announced that it would 'provide reserves as necessary' to keep the fed funds rate close to its target, and reminded market participants that 'the discount window is available as a source of funding'. One week later, the Board voted to reduce the primary credit rate by 50 basis points, halving the usual 100

basis-point gap between the primary credit rate and the target federal-funds rate, to reduce not only borrowing costs but the stigma associated with discount-window borrowing. At the September 2007 FOMC meeting, both the target federal-funds rate and the primary credit rate were reduced by 50 basis points, the largest reduction in rates since the November 2002 FOMC meeting.

Figure 1 depicts these changes and shows the subsequent reduction in these two rates over the next two years. From September 2007 until the end of the year, the FOMC reverted to traditional operating easing procedure – reducing the target fed funds rate by 25 basis points at each meeting with the Board bringing down the discount rate in lock-step. In response to the intensification of the market turmoil, however, the FOMC reduced rates by a total of 125 basis points in an unscheduled conference call and at its regularly scheduled meeting in January 2008. Rates were cut an additional 75 basis points at the March FOMC meeting and the spread between the target fed funds rate and the primary credit rate was reduced to 25 basis points (non-traditional steps to assist the merger of Bear Stearns and JP Morgan Chase in March will be discussed below). Following a 25 basis-point reduction in April, rates were cut another 100 basis points in October, which included an unprecedented internationally-coordinated rate cut of 50 basis points,

Figure 1: Target Federal Funds Rate and Primary Credit Rate



Source: Federal Reserve Bank of St. Louis

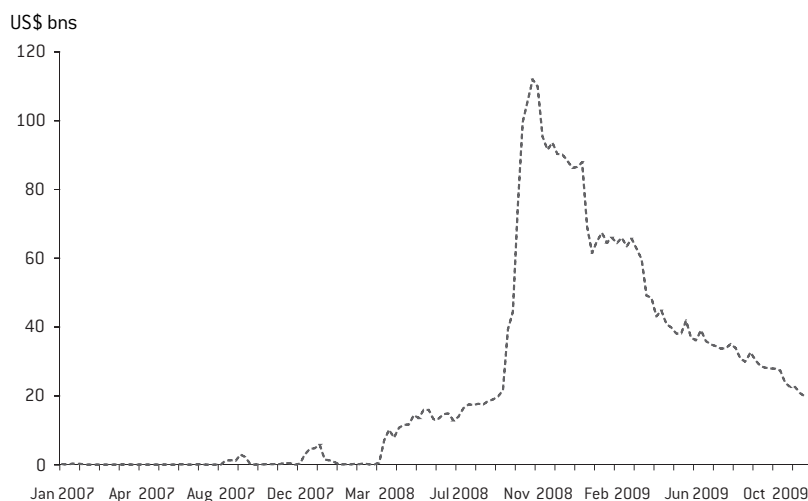
and effectively another 100 basis points in December when the FOMC moved to a target federal funds range of 0 to 25 basis points, hitting the zero lower bound.

A pattern of a gradual increase in the virulence of the crisis can be clearly seen in Figure 2, which plots discount-window borrowing at the primary credit rate. Given the huge demand for funds since September 2008, the onset of the crisis in August 2007 appears relatively modest. At that time, however, an increase in primary borrowing from essentially zero to almost \$3 billion was quite large. Pressures emerged again at year-end 2007 with borrowing reaching almost \$6 billion.

### Non-traditional responses

By December 2007 it was clear that the traditional financial crisis response was not achieving the desired result<sup>2</sup>. From December 2007 until March 2009 the Federal Reserve put in place 16 different facilities or programmes to combat the crisis. Temporarily setting aside the question of the effectiveness of these initiatives, the list is impressive both in its length and breadth. Even describing, much less assessing, the initiatives is a daunting task that can get bogged down in a long list

Figure 2: Primary Discount Window Lending



Source: Federal Reserve Board Release H.4.1

2. Note that in a speech in 2002, then Governor Bernanke outlined non-traditional policy responses to prevent deflation that did provide a guidebook for Fed actions during the crisis. See Bernanke (2002).

of easily confused and easily forgotten acronyms. Any attempt at analysis requires an organising framework.

Bernanke (2009a) presents a framework that classifies each non-traditional initiative into three descriptive categories: lending to financial institutions, providing liquidity to key credit markets and purchasing longer-term securities<sup>3</sup>. For our purposes, an alternative, functional framework may shed more light on the means by which the non-traditional initiatives supported the banking and financial sector. In particular, the policy initiatives can all be thought of as supplementing the traditional central-bank policy tools in three ways: broadening the types of counterparties receiving support, broadening the collateral required to access the support and lengthening the maturity of the support. As discussed earlier, the traditional tools of open-market operations and discount lending are almost exclusively aimed at short-term liquidity support for the bank-based piece of the financial system. In particular, the direct effect of these traditional tools is felt on bank balance sheets via either short-term transactions involving Treasury securities or the lending of reserves against high-quality collateral. Dealing with new counterparties is critical to extending assistance to important markets and firms in the intermediation chain, thereby acknowledging the interconnectedness of institutions and markets that has evolved. Accepting a wider range of collateral allows the Fed to support a financial system that has evolved from simple bank-based lending towards greater reliance upon securitisation and market-based intermediation. Finally, extending the maturity of the support gives flexibility in countering a long-lived crisis and gives confidence to market participants that institutions and counterparties will have a source of funding for longer periods, reducing the likelihood that sudden liquidity problems force 'fire sales' of assets that could compromise their solvency.

Table 1 presents a chronological list of and some information about the non-traditional policies, including an assessment of the function(s) served by each. The list is remarkable in its length and in the size of some of the policy initiatives. The list demonstrates the determination on the part of the Federal Reserve to contain the crisis – 'whatever it takes' in the words of Chairman Bernanke. The Fed was bound by and determined to learn the lessons of history – lessons taught both by the US experience during the Great Depression and by the Japanese experience in the 1990s. Three of the five members of the Fed Board at this time (Bernanke, Kroszner

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3. This framework has proven quite popular, see Carlson *et al* (2009) and the charts available at ([http://www.clevelandfed.org/research/data/credit\\_easing/index.cfm](http://www.clevelandfed.org/research/data/credit_easing/index.cfm)). Cecchetti and Disyatat (2009) present a framework based on liquidity.



Table 1: Federal Reserve non-traditional policy initiatives – chronological [as of April 2010]

| Initiative                                  | Announced  | First used             | Date closed            | Maximum size<br>[\$ billions] | Average size<br>[\$ billions] | Lengthen<br>maturity | Broaden<br>collateral | Expand<br>counterparties |
|---------------------------------------------|------------|------------------------|------------------------|-------------------------------|-------------------------------|----------------------|-----------------------|--------------------------|
| Term Auction Facility                       | 12/12/07   | 12/17/2007             | 03/08/10               | 493                           | 203                           | x                    |                       |                          |
| Central Bank Swap Lines                     | 12/12/07   | 12/20/2007             | 02/01/10               | 583                           | 157                           |                      |                       | x                        |
| Term Securities Lending Facility            | 03/11/08   | 3/27/2008              | 2/1/2010 <sup>4</sup>  | 234                           | 80                            | x                    |                       |                          |
| Maiden Lane (Bear Stearns)                  | 3/14/2008  | 6/26/2008              | Ongoing                | 30                            | 27                            |                      | x                     | x                        |
| Primary Dealer Credit Facility <sup>1</sup> | 3/16/2008  | 3/19/2007 <sup>2</sup> | 02/01/10               | 148                           | 19                            |                      |                       | x                        |
| Term Securities Lending Facility Options    | 7/30/2008  | 8/27/2008              | 6/25/2009              | 50                            | 33                            | x                    |                       |                          |
| ALG                                         |            |                        |                        |                               |                               |                      |                       |                          |
| FRBNY Lending to ALG                        | 9/16/2008  | 9/17/2008 <sup>2</sup> | Ongoing                | 90                            | 41                            |                      | x                     | x                        |
| Maiden Lane II                              | 11/10/08   | 12/12/08               | Ongoing                | 20                            | 16                            |                      | x                     | x                        |
| Maiden Lane III                             | 11/10/08   | 11/25/2008             | Ongoing                | 28                            | 23                            |                      | x                     | x                        |
| Asset-Backed Commercial Paper Money         |            |                        |                        |                               |                               |                      |                       |                          |
| Market Mutual Fund Liquidity Facility       | 9/19/2008  | 9/24/2008 <sup>2</sup> | 02/01/10               | 152                           | 21                            |                      | x                     |                          |
| Commercial Paper Funding Facility           | 10/07/08   | 10/27/2008             | 02/01/10               | 351                           | 127                           |                      | x                     | x                        |
| Money Market Investor Funding Facility      | 10/21/2008 | Not used               | 10/30/2009             | 0                             | 0                             |                      | x                     | x                        |
| Citigroup support                           | 11/23/2008 | Not used               | 12/23/2009             | 0                             | 0                             |                      |                       | x                        |
| Term Asset-Backed Securities Loan Facility  | 11/25/2008 | 3/25/2009              | 3/31/2010              |                               |                               | x                    | x                     | x                        |
|                                             |            |                        | 6/30/2010 <sup>3</sup> | 48                            | 34                            |                      |                       |                          |
| Purchase of MBS guaranteed by GSEs          | 11/25/2008 | 01/05/09               | 3/31/2010              | 1078                          | 598                           | x                    |                       | x                        |
| Purchases of direct GSE Debt                | 11/25/2008 | 12/05/08               | 3/31/2010              | 169                           | 104                           | x                    |                       | x                        |
| Bank of America support                     | 1/16/2009  | Not used               | Sept. 2009             | 0                             | 0                             |                      |                       | x                        |
| Purchases of longer-term treasuries         | 3/18/2009  | 3/25/2009              | 10/31/2009             | 325                           | 230                           | x                    |                       |                          |

Source: Federal Reserve Board of Governors weekly H.4.1 statistical release.

1. Includes transitional support for Goldman Sachs, Morgan Stanley, and Merrill Lynch announced on 9/21/2008

2. Based on first appearance in the H.4.1

3. Loans against newly issued ABS and legacy CMBS authorized through March 31, 2010, loans against newly issued CMBS through June 30, 2010.

4. Auctions against Schedule 1 collateral suspended on 7/1/2009

and Mishkin) had done research on the 1930s and financial crises around the globe. Bernanke (2000) lays out these lessons quite clearly.

But Roosevelt's specific policy actions were less important than his willingness to be aggressive and experiment – in short, to do whatever it took to get the country moving again. Many of his policies did not work as intended, but in the end FDR deserves great credit for having the courage to abandon failed paradigms and to do what was needed to be done. Japanese monetary policy seems to be suffering from a self-induced paralysis. Most striking is the apparent unwillingness of the monetary authorities to experiment, to try anything that isn't absolutely guaranteed to work. Perhaps it is time for some Rooseveltian resolve in Japan.

In the remainder of this section we will provide a short description of the non-traditional initiatives, commenting where possible on the success of each programme.

In an effort to remove the stigma associated with discount-window borrowing and to allow depository institutions access to longer-term federal funds, the Term Auction Facility (TAF) was put in place in December 2007<sup>4</sup>. Rather than the mainly overnight borrowing of funds available at the discount window, the TAF initially made 28-day funds available, with the term increasing to as long as 84 days in August 2008. Figure 3 shows the allocations for each of the auctions as well as the amount of the bids submitted. As can be seen, the Fed only gradually increased the size of the allocations, despite bid-to-cover ratios that averaged 1.7 during the first nine months of operations. Allocations doubled in October 2008 at the peak of the crisis and since then bids have never exhausted the allocation. Outstanding borrowing under the TAF peaked at almost \$500 billion in March, 2009. Most recently, allocations have been gradually reduced in line with improving financial conditions. The TAF was designed to mimic the tenders conducted by the European Central Bank and provides a useful tool, in both crisis and more normal periods, to smooth out fluctuations in the fed funds rate. Armantier, Krieger and McAndrews (2008) provide an detailed analysis of the TAF.

At the same time as the TAF was established, the Fed also opened up reciprocal currency arrangements, swap lines, with other central banks. Financial institutions abroad had very strong demand for dollars during the crisis. High demand from European banks, for example, would often send the federal funds rate up sharply in the mornings US time before the European markets closed. After the close in

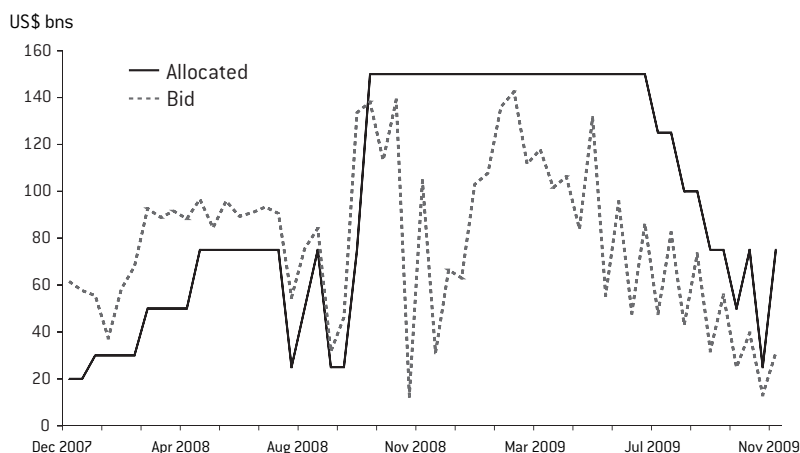
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4. The replacement of discount window adjustment credit with primary credit in 2003 was clearly not enough to remove the perceived stigma associated with access to the discount window by institutions judged to be 'sound'.

Europe and European institutions had satisfied their demands, reserves would flow back into the system and the federal funds rate would then often fall sharply. This international connection introduced volatility and complicated the task of the desk at the Federal Reserve Bank of New York to maintain the target rate. We classify these swap lines as non-traditional in that they are not typically one of the tools used to implement central-bank policy; however, they have a long history dating back to 1962. The upper half of Table 2 gives data on the introduction and limits for the swap lines, while the bottom half shows the outstanding balances for each line at quarterly intervals. All told, swap lines were established with 14 different central banks during the crisis.

Under the swap, the Fed provides dollars to the foreign central bank, while at the same time, the foreign central bank provides the equivalent amount of funds in its currency to the Fed, based on the market exchange rate at the time of the transaction. The exchange of funds is reversed in as little as one day or as long as

Figure 3: Term Auction Facility



Source: Federal Reserve Board

5. See Bordo, Humpage and Schwartz (2009) for details. Most notably, swap lines were used to support the Canadian dollar in 1962 and pound sterling in 1967. Under NAFTA, the Fed maintains two ongoing swap lines with Canada and Mexico. Swap lines were reestablished with the Bank of Canada, Bank of England, ECB, Bank of Japan and the Swiss National Bank in May 2010 due to turmoil associated with the Greek fiscal position. These lines are set to expire in January 2011.

Table 2:  
Federal Reserve reciprocal currency arrangements (swap lines) with other central banks (\$ billions)

|                                 | Dates of arrangement and limits on lines |         |       |         |         |                 |         |         |            |            |
|---------------------------------|------------------------------------------|---------|-------|---------|---------|-----------------|---------|---------|------------|------------|
|                                 | 2007<br>Dec. 12                          | Mar. 11 | May 2 | July 30 | Sep. 18 | 2008<br>Sep. 24 | Sep. 26 | Sep. 29 | Oct. 13/14 | Oct. 28/29 |
| European Central Bank           | 20                                       | 30      | 50    | 55      | 110     | 110             | 120     | 240     | Unlimited  | Unlimited  |
| Swiss National Bank             | 4                                        | 6       | 12    | 12      | 27      | 27              | 30      | 60      | Unlimited  | Unlimited  |
| Bank of Japan                   |                                          |         |       |         | 60      | 60              | 60      | 120     | Unlimited  | Unlimited  |
| Bank of England                 |                                          |         |       |         | 40      | 40              | 40      | 80      | Unlimited  | Unlimited  |
| Bank of Canada                  |                                          |         |       |         | 10      | 10              | 10      | 30      | 30         | 30         |
| Reserve Bank of Australia       |                                          |         |       |         |         | 10              | 10      | 30      | 30         | 30         |
| Sveriges Riksbank               |                                          |         |       |         |         | 10              | 10      | 30      | 30         | 30         |
| Danmarks National Bank          |                                          |         |       |         |         | 5               | 5       | 15      | 15         | 15         |
| Norges Bank                     |                                          |         |       |         |         | 5               | 5       | 15      | 15         | 15         |
| Reserve Bank of New Zealand     |                                          |         |       |         |         |                 |         |         |            |            |
| Banco de Mexico                 |                                          |         |       |         |         |                 |         |         |            |            |
| Bank of Korea                   |                                          |         |       |         |         |                 |         |         |            |            |
| Banco Central do Brasil         |                                          |         |       |         |         |                 |         |         |            |            |
| Monetary Authority of Singapore |                                          |         |       |         |         |                 |         |         |            |            |

|                                 | Draws on lines, end-of-quarter |         |         |                 |         |         |         |         |         |  |
|---------------------------------|--------------------------------|---------|---------|-----------------|---------|---------|---------|---------|---------|--|
|                                 | 2007<br>Dec. 31                | Mar. 31 | Jun. 30 | 2008<br>Sep. 30 | Dec. 31 | Mar. 31 | Jun. 30 | Sep. 30 | Dec. 30 |  |
| European Central Bank           | 20                             | 15      | 50      | 175             | 291     | 166     | 60      | 44      | 7       |  |
| Swiss National Bank             | 4                              | 6       | 12      | 29              | 25      | 7       | 0*      | 0       | 0       |  |
| Bank of Japan                   |                                |         |         | 30              | 123     | 61      | 18      | 2       | 1       |  |
| Bank of England                 |                                |         |         | 40              | 33      | 15      | 3       | 0*      | 0       |  |
| Bank of Canada                  |                                |         |         | 0               | 0       | 0       | 0       | 0       | 0       |  |
| Reserve Bank of Australia       |                                |         |         | 10              | 23      | 10      | 0*      | 0       | 0       |  |
| Sveriges Riksbank               |                                |         |         | 0               | 25      | 23      | 12      | 3       | 0       |  |
| Danmarks National Bank          |                                |         |         | 5               | 15      | 5       | 4       | 1       | 0       |  |
| Norges Bank                     |                                |         |         | 0               | 8       | 7       | 5       | 1       | 0       |  |
| Reserve Bank of New Zealand     |                                |         |         |                 | 0       | 0       | 0       | 0       | 0       |  |
| Banco de Mexico                 |                                |         |         |                 | 0       | 0       | 3       | 3       | 3       |  |
| Bank of Korea                   |                                |         |         |                 | 10      | 16      | 10      | 4       | 0       |  |
| Banco Central do Brasil         |                                |         |         |                 | 0       | 0       | 0       | 0       | 0       |  |
| Monetary Authority of Singapore |                                |         |         |                 | 0       | 0       | 0       | 0       | 0       |  |

Source: Federal Reserve Board of Governors, monthly report *Credit and Liquidity Programs and the Balance Sheet* and Federal Reserve Bank of New York, quarterly report *Treasury and Federal Reserve Foreign Exchange Operations*

\*Less than \$0.5 Billion

three months, using the same exchange rate as the initial transaction. Under these most recent arrangements, the Fed agrees to hold foreign exchange over the term of the swaps in special accounts at the foreign central banks. The System will earn no interest on these accounts and has agreed not to withdraw foreign currencies from these accounts. Foreign central banks will only draw dollars through the swap lines as they need them. They will use these dollars to provide liquidity to their banking institutions and financial markets. The foreign central banks guarantee full repayment of any drawing, and any interest earnings from lending these dollars revert to the System. The asymmetric interest payments act as a penalty rate for the foreign central bank, providing some incentive to discontinue the lines as financial markets improve.

In December 2007, lines were established with the ECB and the Swiss National Bank. As the crisis peaked in September and October 2008, lines were established with additional central banks and the sizes of the lines were increased. Baba *et al* (2009) document the importance of increasing the swap lines as a result of runs on MMMFs in September 2008 (discussed below). Total drawings under the lines peaked in December 2008 and have declined since then, standing at less than \$40 billion at the time of writing. In terms of our taxonomy, the swaps expand the counterparties to which the Fed can provide assistance via the foreign central banks, which then could lend these dollars directly to their domestic institutions.

Just prior to the December 2007 policy innovations, market anxiety began to breach the levels seen in September 2007. The LIBOR/OIS spread (discussed below) rose to more than 100 basis points in late November, more than ten times the average during the years prior to the crisis. Following the implementation of TAF and the swap lines, this spread dropped relatively quickly, returning to 20 basis points in January 2008. By this measure, the TAF and swap lines would be judged an initial success at relieving pressure in the inter-bank funding market (see McAndrews *et al*, 2009). By March 2008, however, the spread had returned to 65 basis points on concerns over the viability of Bear Stearns and the consequences for other players of its collapse.

At this point in time, newer measures were needed to relieve pressures on non-depository institutions that did not have access to either the discount window or the TAF. The ghost of Glass-Steagall haunted the halls of the Fed because the Fed did not have traditional tools to provide liquidity to key institutions facing liquidity crises, whose demise could have had profound effects on the financial system. Moving quickly to mitigate the potential turmoil associated with the troubles at Bear Stearns, the Fed introduced the Term Securities Lending Facility (TSLF), the Primary

Dealer Credit Facility (PDCF) and provided assistance to facilitate the merger of Bear Stearns with JPMorgan Chase, assistance that was channelled through the Maiden Lane limited liability corporation.

In the week prior to the merger of Bear Stearns, the Term Securities Lending Facility (TSLF) was put in place to lengthen the term over which Treasury securities could be borrowed by primary dealers from the System Open Market Account (SOMA). The usual overnight lending of Treasuries reached \$20 billion in late February 2008, signalling a clear appetite for a risk-free asset. In an attempt to relieve additional pressure in the Treasury markets, the maturity on lending was extended to 28 days in a series of weekly, rather than daily, auctions. Roughly every other week, auctions were held requiring Schedule 1 collateral, followed the next week with an auction backed by Schedule 2 collateral. Schedule 1 collateral includes Treasury securities, agency securities and agency mortgage-backed securities. Schedule 2 collateral adds highly-rated private securities to the list of eligible collateral. Fleming *et al* (2009) discuss the TSLF in detail.

Bear Stearns' troubles made the Fed acutely aware of the constraints that it faced under the traditional policy of lending in a crisis, because the traditional tools could not provide liquidity directly to crucial financial institutions that were not bank holding companies but that might be crucial, directly or indirectly, to the availability of market-based funding for the banking system. The inter-linkages of market-based intermediaries raised concerns about the consequences for counterparties of the failure of an institution such as Bear Stearns, and thus for the stability of the financial system as a whole.

In these circumstances, the Fed Board exercised the so-called 13(3) emergency powers, granted to it in the 1932 amendments to the Federal Reserve Act, to go beyond its traditional tools to provide lending to 'any individual, partnership or corporation' in 'unusual and exigent circumstances' to stabilise the financial system [see Fetting, 2008]. The Congress required a supermajority of five votes or more of the seven Board members to make a determination that the situation was 'unusual and exigent'. Since the Fed Board has had only five members during 2008 and 2009, this meant that each Board member had the ability to veto any of the exercises of these emergency powers. In particular, during the weekend of the Bear Stearns collapse, the Board unanimously agreed to create a facility that would allow wider access to Fed liquidity to a significant class of non-depository institutions in the financial markets.

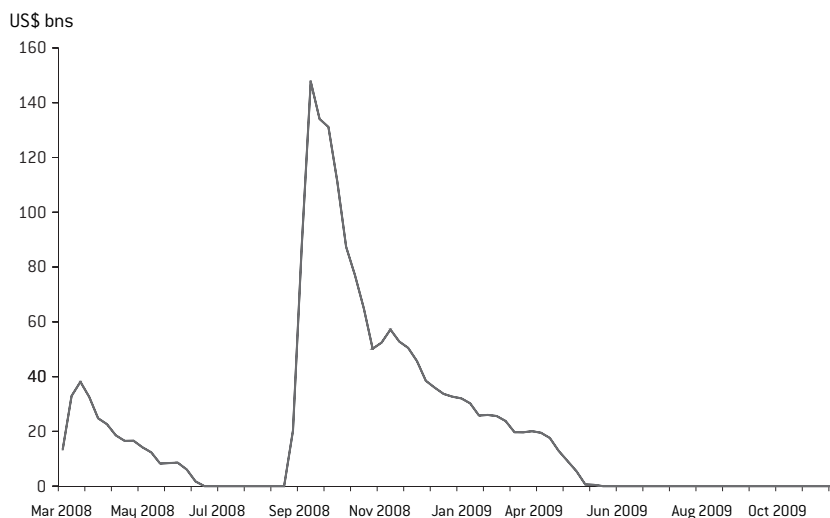
The Primary Dealer Credit Facility (PDCF) was established to give primary dealers (mostly investment banks) access to overnight federal funds – effectively

discount-window access. These dealers pay the same primary credit rate that depository institutions are charged. As can be seen in Figure 4, borrowings quickly reached almost \$40 billion in early April 2008 but fell off quite rapidly as market conditions improved. In July and August 2008 the PDCF was almost completely inactive. Lending soared with the September and October 2008 market turmoil, reaching almost \$150 billion. While TSLF allocations did not move in September and October, the PDCF accommodated additional demand. Obviously, the two facilities did not prevent the re-emergence of financial stress during September and October, but it is likely that the strains would have been much greater without these facilities, in particular the PDCF (see Adrian *et al*, 2009, and Atruc and Demiralp, forthcoming).

The assistance to facilitate the March 2008 Bear Stearns-JP Morgan Chase merger was the first of the Fed's initiatives aimed at particular financial institutions. As the merger was being finalised in June 2008, the New York Fed extended a \$28.8 billion dollar 10-year loan to Maiden Lane to provide liquidity support to finance \$30 billion in former Bear Stearns assets.

The policy measures put in place in early March 2008 generated an enormous amount of controversy (see Volcker, 2008). In effect, the Fed 'crossed the Rubicon' by both dramatically expanding the number of its counterparties and by facilitating

Figure 4: Primary Dealer Credit Facility



Source: Federal Reserve Board Release H.4.1

the resolution of Bear Stearns. The broadening of collateral and expansion of the number of counterparties undertaken in early March 2008 were unprecedented, and raised concerns at the Fed and the Treasury about the inability of the existing bankruptcy regime to deal with the failure and resolution of a large non-depository institution (see Kroszner, 2009a, and Swagel, 2009).

Markets remained under heightened stress for roughly 10 weeks from March 2008. Conditions eased slightly and were much less volatile from the middle of May 2008 until early September, and this period saw only one additional initiative on the part of the Fed – the introduction of options on the TSLF (TOP). These options were designed to help relieve quarter-end pressures when firms might feel heightened need for risk-free assets and all the options required Schedule 2 collateral. Through 2008, auctions were heavily subscribed with bid-to-cover ratios averaging 1.75. The two auctions conducted in 2009 generated much less interest and the programme has been suspended. These options programmes bore some resemblance to a programme that the Fed created to accommodate the strong liquidity demand that occurred in 2000.

The conservatorship of Fannie Mae (FNMA) and Freddie Mac (FHLMC) marked the beginning of the most virulent phase of the financial crisis – September until December 2008. In the second week of September, investment banks and many commercial banks faced extraordinary funding pressures and the Libor-OIS spread was rising rapidly. Their funding horizons had been shortening as risk appetites declined, meaning that an enormous amount of paper had to be rolled overnight or over very short horizons. In many cases, these institutions were having great difficulty obtaining funding even at these short horizons and even in fully-secured overnight borrowing markets, the repo markets. In addition, a number of market participants were pulling away from institutions where there were rumours or concerns about solvency – not only as counterparties but as clients. This implosion of their business model stemming from uncertainty about how different parties would be treated in bankruptcy (see Kroszner, 2009a) only made market participants more concerned about their viability.

In one momentous weekend in mid-September 2008, the ghost of Glass-Steagall was truly banished. In a transformation that in normal circumstances might have taken years, large independent investment banks disappeared in a couple of days. Morgan Stanley and Goldman Sachs requested and received permission on an emergency expedited basis to become commercial bank holding companies regulated by the Fed. Bank of America purchased Merrill Lynch. Despite efforts by the Fed and the Treasury, a merger partner for Lehman, which had been struggling



to survive for months prior to the conservatorship of Freddie and Fannie, could not be found and Lehman entered bankruptcy.

At the same time, one of the world's largest insurance companies AIG (a thrift holding company, because it owned a thrift, hence supervised by the Office of Thrift Supervision) was on the verge of collapse. AIG faced credit-ratings downgrades and large requirements to post collateral due to enormous exposure in the credit-derivatives markets (particularly credit-default swaps – CDS) taken on by its AIG Financial Products subsidiary. It had effectively sold large amounts of insurance in the CDS market but had done so with few reserves. The potential collapse of AIG raised the possibility of two types of significant disruption. First, the impact of its failure through its enormous set of counterparty inter-linkages could have been damaging to many institutions and markets. Second, its downgrading and possible default would have triggered state insurance regulators to force the underlying insurance operating companies into receivership which could have voided the insurance policies of millions of individuals and companies.

To avoid these potentially deep disruptions, on 16 September, the Fed Board authorised the New York Fed to provide up to \$85 billion in secured lending for up to two years to AIG at a rate of 850 basis points above three-month LIBOR, an offer that was immediately taken up<sup>6</sup>. This was the first of a number of actions to stabilise AIG. The second, announced in October 2008, provided an additional \$37.8 billion in liquidity to AIG via New York Fed borrowings of securities from AIG backed by cash collateral posted by the New York Fed. On 10 November 2008, Fed assistance to AIG was restructured. AIG used TARP funds to reduce the balance on the \$85 billion loan to \$60 billion. In addition, the New York Fed extended credit to the newly created Maiden Lane II and Maiden Lane III corporations that respectively purchased \$22.5 billion in residential mortgage-backed securities and \$30 billion in collateralised debt obligations from AIG. The Maiden Lane II facility replaced the October \$37.8 billion facility. Both the Maiden Lane II and Maiden Lane III loans have a term of six years with an interest rate 100 basis points above one-month LIBOR.

Another key non-bank intermediary began to experience extraordinary liquidity pressure, namely money-market mutual funds (MMMFs, also called 2a-7 funds). As noted above, MMMFs hold roughly half as much as banks do in deposits and the MMMFs were key funding sources for short-term bank paper and repo agreements. MMMF shareholders had traditionally treated MMMFs as near-perfect substitutes for deposits because they had consistently been able to maintain the value of each share at \$1. That began to change in this period because shareholders became

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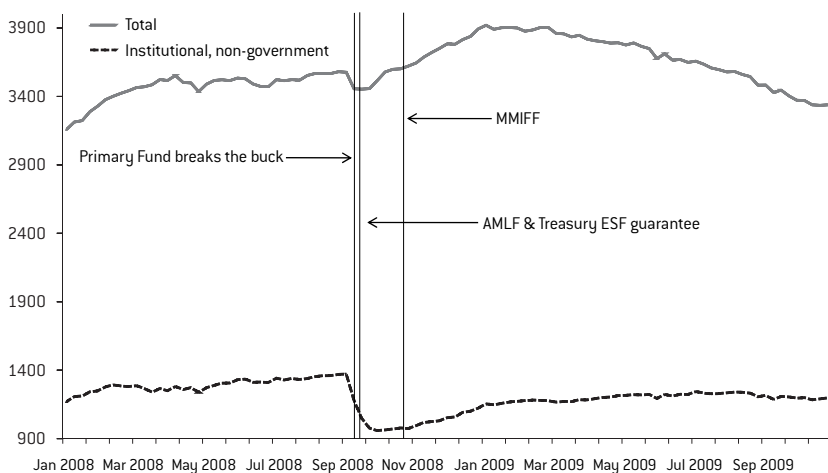
6. On 10 November 2008 the rate was reduced to 300 basis points above LIBOR.

concerned about the value and liquidity of their investments and began to withdraw their money. As can be seen in Figure 5, the biggest withdrawals were made by institutional shareholders.

The net asset value of the Primary Fund, a heavy purchaser of Lehman notes and the flagship fund in the historically important Reserve Funds complex, fell below \$1 per share on 16 September 2008 – the first time such a major money-market mutual fund had 'broken the buck'. This significantly exacerbated the run that had begun on MMMFs: redemptions totaled \$300 billion in the week of 15 September. In turn, the MMMFs rushed for the liquidity and safety of Treasury securities and shunned their long-standing role as funders of the banking system. The run on the MMMFs thus led to a 'funding run' on the banks, since the banks suddenly lost much of this significant source of financing. Baba *et al* (2009) document that this source of funding was important not only for US banks but also crucial for European banks, eventually leading to the increase in central bank swap lines discussed above as a partial replacement for this funding source. The impact of the MMMF run provides a clear example of the global and interconnected nature of the crisis.

To stop the runs on the MMMFs, on 19 September, the Treasury, using the

Figure 5: Money Market Mutual Fund Assets

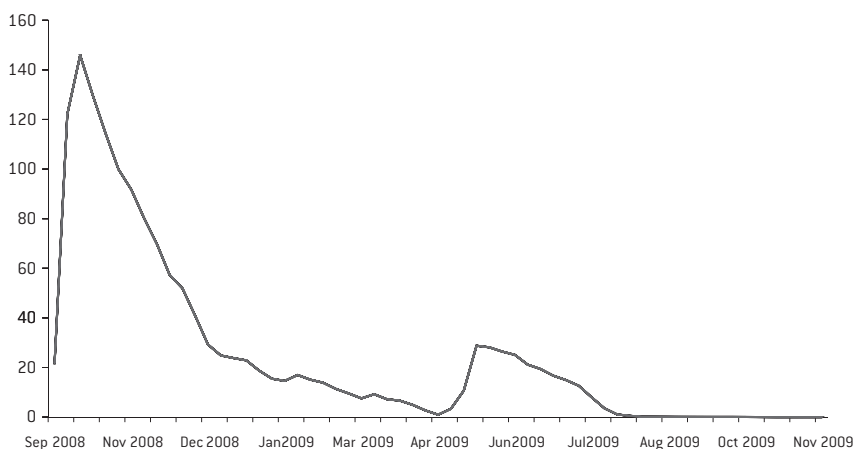


Source: Investment Company Institute

Exchange Stabilisation Fund, provided a temporary guarantee of \$1 per share for MMMF accounts, and funds began to flow back into these accounts. Importantly, the guarantee was only for the amount in a MMMF account as of the date of the announcement of the programme. A full guarantee that covered future inflows could have precipitated a liquidity drain, or even a run, on bank deposits, which at the time were guaranteed up to only \$100,000. Soon after, the Federal Deposit Insurance Corporation (FDIC) was authorised to increase deposit insurance to \$250,000 and provide unlimited guarantees for non-interest-bearing transaction accounts that are typically used by businesses.

The Fed also announced a significant new programme on 19 September to try to restore the ability of banks to obtain short-term secured financing. The Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility (AMLF) extends non-recourse loans at the primary credit rate to US depository institutions and bank holding companies to finance purchases of asset-backed commercial paper (ABCP) from money-market mutual funds at amortised cost rather than market prices. Loans under AMLF could be used to purchase ABCP with maturities up to 120 days for depository institutions or 270 days for bank holding companies. The cash raised by the funds from selling the ABCP then allows the MMMFs to

Figure 6: Asset-backed commercial paper money market mutual fund liquidity facility (US\$ billions)



Source: Federal Reserve Board Release H.4.1

honour their redemptions and, thus, increase the willingness of MMMFs to return to their role of providing short-term secured funding to the banking system. The AMLF was accessed immediately (Figure 6) reaching \$152 billion on 1 October 2008.

With the turmoil in the financial markets reaching a fever pitch, on 20 September, the Treasury department, with the support of the Federal Reserve, submitted legislation to Congress to request \$700 billion for a Troubled Asset Relief Program (TARP) [see Swagel, 2009, for a comprehensive discussion of the programme and the politics]. In the following week, major financial institutions were either failing or facing significant funding and liquidity pressures. Evidence of these strains can be seen in Figure 7, which shows one measure of bank fragility, the LIBOR-OIS spread, which was reaching extraordinary levels.

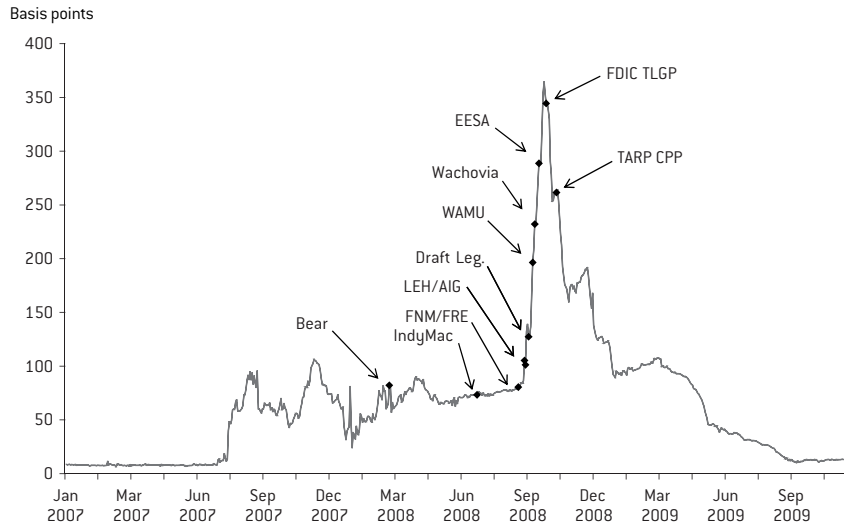
On 25 September, Washington Mutual (WaMu), a thrift holding company that had been suffering for many months from large exposures in mortgage lending in some of the hardest-hit areas of the country, failed and was acquired by JP Morgan Chase. Wachovia, the fourth largest bank at the time, was also on the brink of failure, and on 29 September reached an agreement in principle to be acquired by Citigroup with FDIC assistance. Roughly a week later, Wells Fargo agreed to acquire Wachovia without FDIC assistance, and the FDIC approved the Wells acquisition of Wachovia. On the same day, 3 October, the Emergency Economic Stabilisation Act of 2008 (EESA) was passed by Congress.

During early October, the Federal Reserve continued to work on relieving the stress and strains in the commercial paper market and on 7 October announced the establishment of the Commercial Paper Funding Facility (CPFF). After growing very rapidly during the 2000s to become a more-than \$1 trillion source of financing, asset-backed commercial paper (ABCP) issuance had been falling steadily since the turmoil began in the summer of 2007 (see Figure 8).

In September and early October 2008, financial firm issuance fell precipitously as risk appetites waned. Spreads on commercial paper jumped, most notably for the riskier A2/P2 variant shown in Figure 9. The CPFF is a special purpose vehicle funded by a New York Fed loan and supported by the US Treasury, which makes direct purchases of three-month unsecured and asset-backed commercial paper. The commercial paper purchased through the CPFF is discounted using a rate equal to the three-month overnight index swap (OIS) rate plus a spread. The spread for unsecured commercial paper is 100 basis points and the spread for ABCP is 300 basis points. Unsecured commercial-paper issues also pay a 100 basis points surcharge. The spreads were chosen to discourage use of the CPFF as market conditions stabilise.

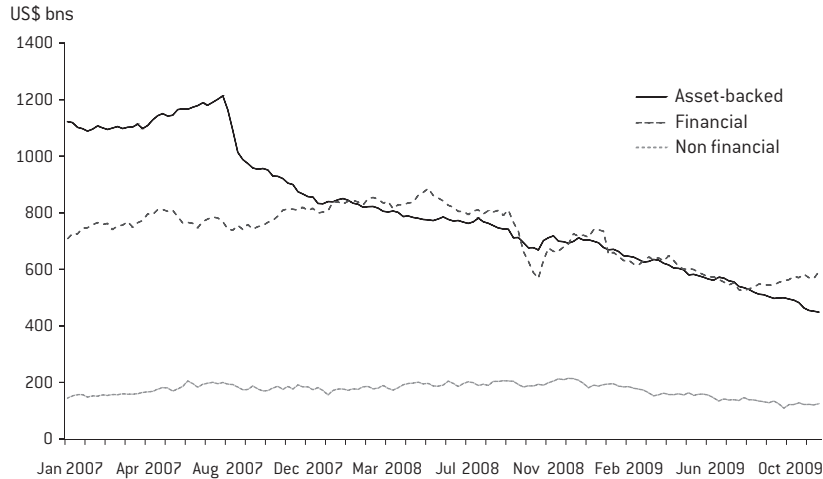
The first purchases under the CPFF were made in late October and the facility

Figure 7: Three-Month LIBOR OIS Spread



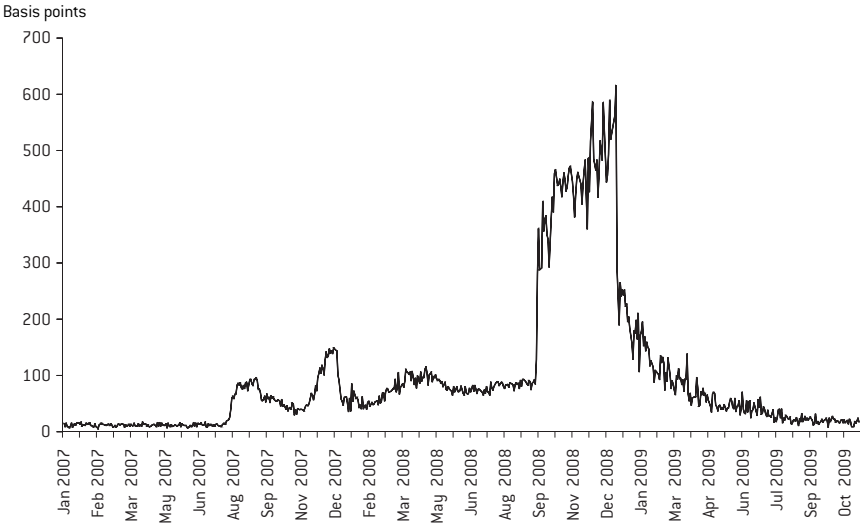
Source: Bloomberg Tickers US0003M and USSOC

Figure 8: Commercial Paper Outstanding



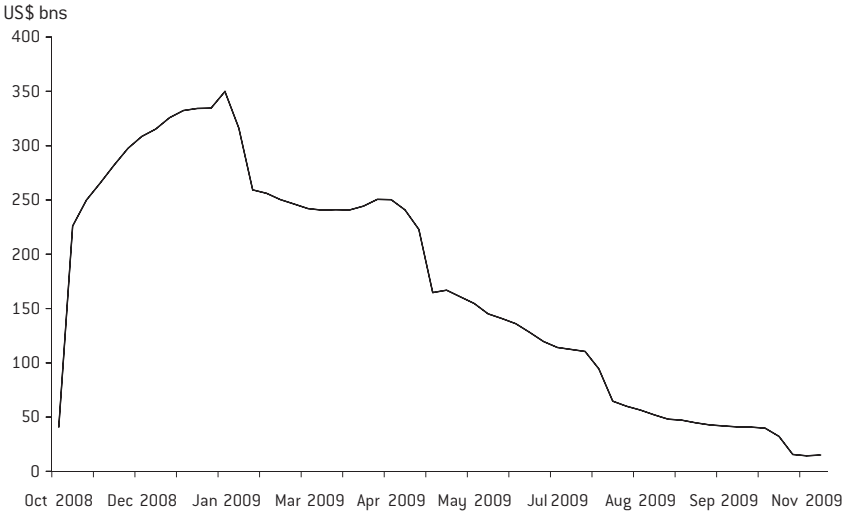
Source: Federal Reserve Board

Figure 9: 30-Day A2/P2 Minus AA Nonfinancial Commercial Paper Interest Rate



Source: Federal Reserve Board

Figure 10: Commercial Paper Funding Facility



Source: Federal Reserve Board Release H.4.1

held \$300 billion in commercial paper by early December (Figure 10). Holdings of the CPFF have gradually run off since January 2009 and now stand at around \$15 billion. The effectiveness of the CPFF can be assessed by looking at both commercial paper outstanding and commercial paper interest rates. By the former measure, the CPFF can be judged to have slowed the decline in issuance while, by the latter, it has relieved pressures in the commercial paper by sharply reducing A2/P2 rates [see Anderson, 2009].

In an effort to further support money-market mutual funds, the Money Market Investor Funding Facility (MMIFF) was also established in October 2008. The MMIFF was designed to complement both the AMLF and CPFF by providing funding to private special purpose vehicles created to purchase certificates of deposit, bank notes and financial commercial paper with maturities of less than 90 days from money-market mutual funds. Thus, the AMLF financed purchases of asset-backed commercial paper from money-market mutual funds by banks and bank holding companies, the CPFF supported the purchase of commercial paper from any seller, not just money-market mutual funds, and the MMIFF was designed to broaden the class of assets to be purchased from money-market mutual funds. Originally, the New York Fed was given authorisation to lend as much as \$540 billion to the special purpose vehicles under the MMIFF. However, the pressures on money-market funds eased in late October and November, and the New York Fed has yet to extend any loans under the MMIFF.

Also during this period, effective 9 October 2008, as authorised by the Emergency Economic Stabilisation Act, the Fed began to pay interest on banks' required and excess reserve balances. Initially, banks earned 75 basis points less than the target federal funds rate on excess reserves; two weeks later the 75 basis-point differential was narrowed to 35 basis points; and after another two weeks, in early November, the differential was eliminated. At the December Federal Open Market Committee meeting, the rate on excess reserves was set at 0.25 percent, where it has since remained.

For many years the Fed sought the ability to pay interest on reserves. Authorisation was granted, effective 1 October 2011, under the Financial Services Regulatory Relief Act of 2006. Paying interest on reserves removes the deadweight losses associated with the implicit tax on required reserves and allows for better targeting of the federal funds rate via enhanced control of holdings of excess reserves. Moreover, the ability to pay interest allows the Fed to better manage its balance sheet independently of the Treasury, both during the expansion of the balance sheet during the crisis and the managing of its balance sheet and reserves

as the crisis fades (see Bernanke, 2009b, and Kroszner, 2009b). While paying interest on excess reserves may have provided an incentive for banks to hold more reserves in late 2008 and 2009, this move does not appear to have been all that quantitatively important<sup>7</sup>.

On 14 October, two key initiatives supporting the banking sector were announced. First, the Treasury would use TARP funds to inject capital into financial institutions through the purchase of preferred stock and warrants, the Capital Purchase Program (CPP). This is similar to the purchase of preferred stock in banks by the Reconstruction Finance Corporation during the 1930s (see Kroszner, 1994, and Jones, 1951). On 14 October, nine of the largest banks announced that they would accept \$125 billion of government capital under this programme. Second, the FDIC would guarantee the senior debt obligations of FDIC-insured depositories and their holding companies under the Temporary Liquidity Guarantee Program (TLGP). As Figure 7 shows, after the announcement of these programmes and the Fed actions of early October, the Libor-OIS spread began to come down from unprecedented heights. Table 3 provides some information on the size and usage of the FDIC loan guarantee, and Table 4 presents information on the TARP allocations and repayments for 17 of the largest financial institutions through September 2009.

Late November 2008 also saw a flurry of new initiatives. The Fed joined Treasury and the FDIC in providing a package of support to Citigroup, in particular guaranteeing \$306 billion in Citigroup assets backed by residential and commercial real estate. The Fed agreed to provide a non-recourse loan to Citigroup in the event that losses on the asset pool amounted to more than \$46 billion, with losses above this amount split 90/10 between the Fed and Citigroup. The loan would carry an interest rate of 300 basis points above the OIS rate. This guarantee is in place for 10 years for residential assets and five years for non-residential assets. To date, no Fed lending has been provided to Citigroup.

Two programmes were announced on 25 November 2008. The Term Asset-Backed Securities Loan Facility (TALF) is a joint operation of the Fed and Treasury. Again exercising its 13(3) emergency powers to lend to individuals, partnerships,

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7. The initiatives put in place in September and October 2008 would result in a large increase in the monetary base. At the time, Federal Reserve officials did not welcome such an increase. Therefore, on 17 September 2008, the Treasury announced, at the request of the Federal Reserve, a supplementary financing programme under which proceeds from the sale of newly issued Treasury bills would be deposited at the Fed in a special account. The Treasury sale of supplemental Treasury bills drained bank reserves even as the lending under the new initiatives added to bank reserves. This supplemental account diminished in importance over the next few months as it became clear that an increase in reserves was not an inflationary concern.



**Table 3:**  
**FDIC Temporary Liquidity Guarantee Program (As of March 31, 2010)**  
**Issuance and revenues (Dollar figures in millions)**

| Number of issuers                  | Debt outstanding | Guarantee fees        | Surcharges |
|------------------------------------|------------------|-----------------------|------------|
| 79                                 | \$305,376        | \$9,491               | \$872      |
| Issuance detail (Percent of total) |                  |                       |            |
| Instrument                         | Maturity         |                       |            |
| Commercial paper                   | 0.0              | < 2 years             | 20.5       |
| Notes                              | 91.1             | Between 2 and 3 years | 29.4       |
| Other                              | 8.9              | Over 3 years          | 50.1       |

Source: Federal Deposit Insurance Corporation *Monthly Report on Debt Issuance Under the Temporary Liquidity Guarantee Program*

**Table 4:**  
**TARP Capital Purchase Program for the largest financial institutions**  
**(As of September 1, 2009, dollar figures in millions)**

|                               | Mean    | Median  | Maximum  | Minimum | Total     |
|-------------------------------|---------|---------|----------|---------|-----------|
| Warrants                      |         |         |          |         |           |
| Initial investment            | \$9,618 | \$4,850 | \$25,000 | \$2,000 | \$163,514 |
| Repaid                        | \$7,409 | \$3,555 | \$25,000 | \$2,000 | \$66,677  |
| Percent of total              |         |         |          |         | 40.8      |
| Proceeds                      |         |         |          |         |           |
| Dividends accrued             | \$340   | \$185   | \$1,055  | \$64    | \$5,776   |
| Warrants liquidated           | \$399   | \$139   | \$1,100  | \$60    | \$2,792   |
| Gain on Citigroup stock       |         |         |          |         | \$9,922   |
|                               |         |         |          |         | \$18,490  |
| Percent of initial investment |         |         |          |         | 11.3      |

Source: [www.FinancialStability.gov](http://www.FinancialStability.gov) Capital Purchase Program transactions. The sample includes 17 of the 19 institutions included in government stress tests: Bank of America, Bank of New York, BB&T, Citigroup, Capital One, Fifth Third, Goldman Sachs, JPMorgan, KeyCorp, Morgan Stanley, PNC, Regions, State Street, SunTrust, U.S. Bancorp, and Wells Fargo. The two excluded are MetLife and GMAC – companies that did not receive CPP funds. Gains on Citigroup stock holdings values the government's position in Citigroup stock at \$4.54 a share (the price as of September 1, 2009) and subtracts the initial capital investment of \$25 billion.

and corporations in 'unusual and exigent' circumstances, the Fed Board unanimously authorised the New York Fed to provide non-recourse loans to owners of newly-issued and highly-rated asset-backed securities (ABS). TARP funds would be used to capitalise a special purpose vehicle (SPV) that would purchase and manage any assets received by the New York Fed in connection with the TALF loans. By putting the Treasury in the first loss position through its purchase of subordinated debt in the SPV, the structure of the TALF then permitted the Fed to be able to accept a wider variety of collateral and for longer horizons and hence provide direct liquidity support to a broader set of securitised credit markets than previous facilities had permitted.

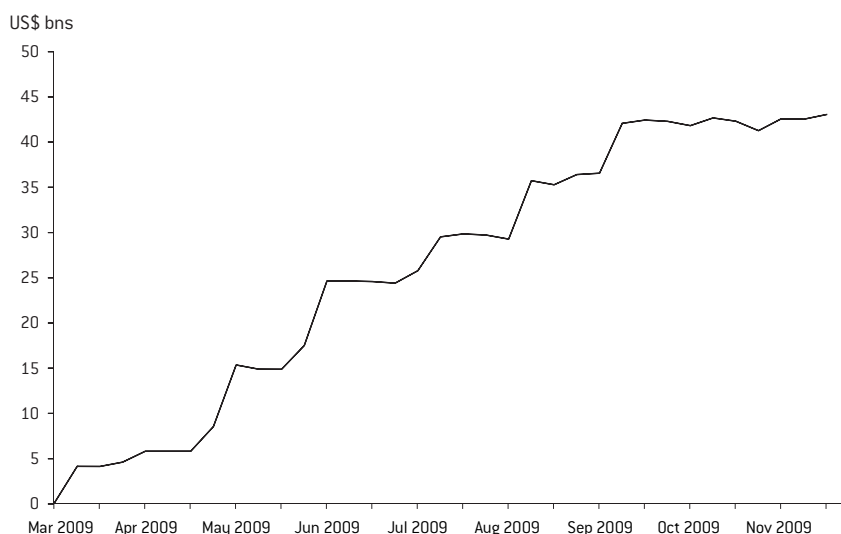
As the TALF was originally constructed, the New York Fed would lend on a non-recourse basis to owners of newly issued, AAA-rated, asset-backed securities (ABS) collateralised by student loans, auto loans, credit card loans, and loans guaranteed by the Small Business Administration. This lending was meant to revive the securitised-credit markets serving households and small businesses. Initially, the Treasury provided \$20 billion in TARP funds for loss protection to the New York Fed and the TALF was limited to \$200 billion. In February 2009, the TALF was expanded to include newly issued ABS collateralised by commercial and residential mortgage-backed securities. At the same time, the limit on the TALF was increased to \$1 trillion with the Treasury TARP loss protection increasing to \$100 billion. In May 2009, CMBS issued before 1 January 2009 (legacy CMBS) were added to the list of eligible collateral for the TALF. The rates charged on the TALF loans vary by collateral, ranging from 50 basis points over one-month LIBOR to 100 basis points over the five-year LIBOR swap rate. Loan amounts are determined by haircuts that vary across sector and maturity, ranging from a low of five percent applied to prime credit card assets with a maturity of less than one year to 16 percent for auto rentals with a maturity between four and five years. Here again, this rate and haircut structure should discourage TALF issuance when market conditions normalise.

The TALF was designed to offer liquidity and reduce uncertainty during times of stress to revive the functioning of these markets. The creation of the TALF seems to have had an impact on stabilising these markets even before the first lending under the programme took place in late March 2009. Spreads on ABS issuances have come down significantly since the TALF and its extension were announced. Prices for CMBS securities moved up, for example, upon announcement that the programme was expanded to include that class of securities. Lending under this programme has grown slowly as markets for these securities have normalised and currently stands at \$44 billion (Figure 11). In some sense, the slow growth of the

programme suggests that it is a victim of its own success. According to Dudley (2009), TALF lending supported roughly half of all the consumer ABS issuance since March, although new ABS issuance is still down significantly from its peak in early 2007.

On the same day that the TALF was announced, the Fed also announced plans to purchase direct obligations of housing-related government sponsored enterprises<sup>8</sup> (GSEs) as well as mortgage-backed securities guaranteed by Fannie Mae, Freddie Mac, and Ginnie Mae. Upon announcement of the programme, their costs of funding dropped noticeably. Initially, purchases were capped at \$100 billion for the direct obligations and \$500 billion for the mortgage-backed securities. Purchases commenced in early December 2008 for the direct obligations and early January 2009 for the guaranteed mortgage backed securities. At the March 2009 FOMC meeting, the caps were increased to \$1.25 trillion for mortgage-backed securities and \$200 billion for the direct obligations. To date, almost \$850 billion in mortgage-backed securities have been purchased and more than \$150 billion in direct obligations, as Figure 12 shows.

Figure 11: Term Asset-Backed Securities Loan Facility



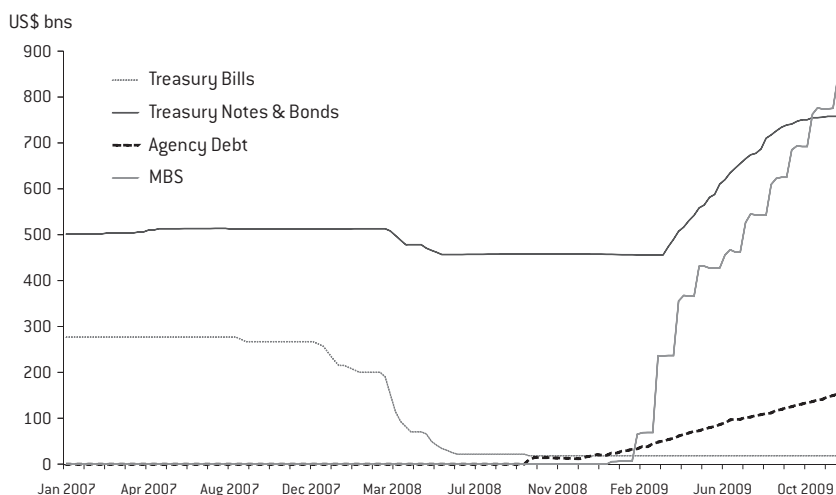
Source: Federal Reserve Board Release H.4.1

8. Federal National Mortgage Association (Fannie Mae), Federal Home Loan Mortgage Corporation (Freddie Mac), and the Federal Home Loan Banks.

These purchases were designed to 'reduce the cost and increase the availability of credit for the purchase of houses, which in turn should support housing markets and foster improved conditions in financial markets more generally'. With regard to cost, the spread of 30-year conventional mortgages over 30-year Treasuries has fallen from almost 250 basis points in late November 2008 to a spread at the time of writing of roughly 60 basis points. Availability is harder to judge, given data lags, but it appears to be mixed. In the first quarter of 2009, net borrowing via agency and GSE-backed securities fell, while net borrowing via mortgages increased. As of November 2009, these purchases are to be completed by the end of the first quarter of 2010 and the size of direct obligation purchases was reduced to \$175 billion.

In January 2009, the Fed joined the Treasury and the FDIC in providing a package of support to Bank of America that is quite similar in structure to the support provided to Citigroup. The Fed's non-recourse loan guarantees the return on a pool of \$118 billion in Bank of America assets backed by residential and commercial real estate. Fed lending would be tapped in the event that losses on the asset pool amounted to more than \$18 billion, with losses above this amount split

Figure 12: Federal Reserve holdings of securities



Source: Federal Reserve Board of Governors

90/10 between the Fed and Bank of America. To date, no Fed lending has been provided to Bank of America.

The last nontraditional policy measure to be introduced is the purchase of longer-term Treasury issues 'to help improve conditions in private credit markets'. This announcement was made at the conclusion of the March 2009 FOMC meeting and a cap of \$300 billion was placed on longer-term Treasury purchases. At the August 2009 FOMC meeting, it was announced that the full \$300 billion is to be purchased by the end of October 2009. At the time of writing, the \$300 billion in longer-term Treasuries purchases have been completed (Figure 12). The bulk of these purchases, about 85 percent, have involved maturities between two and 10 years, with most of the balance in maturities greater than 10 years. When the 18 March 2009 announcement was made, the yield on the 10-year Treasury fell almost 50 basis points but since then has risen, on balance, more than 120 basis points. Obviously, movements in Treasury yields give little indication of the programme's success or failure considering all the other determinants of Treasury yields, in particular, the evolution of the government's fiscal situation. Even after these purchases are completed, the amount of Treasuries on the Fed's balance sheet will be roughly the same (\$800 billion) as in early August 2007. Of course the maturity of these Treasury securities will have lengthened significantly. In early August 2007 only 20 percent of the Treasuries had a maturity of greater than five years, now that figure stands at 45 percent.

## Conclusions and lessons for reform

One of the main lessons from the recent crisis is that supervision, regulation and the tools of the central bank must keep pace with developments and changes in financial markets and institutions. In the US, the focus had been too narrow on commercial banks and commercial bank deposits, partially a legacy of the Glass-Steagall Act. As the crisis revealed, many institutions beyond commercial banks are crucial to the healthy functioning and stability of the financial system and 'funding runs' can pose perhaps a greater threat to the stability of banking and financial institutions than traditional depositor runs. The interconnectedness of financial institutions and markets globally through long market-based intermediation chains should be taken into account when assessing the winding down of new facilities and proposals for regulatory reform.

The actions undertaken by the Fed during the crisis to expand lending to non-traditional counterparties, broaden the acceptable collateral against which it would

lend and lengthen the maturity of its lending were an acknowledgement of the narrowness of the traditional tool-set for dealing with a modern financial crisis. Judging the effectiveness of the new facilities and emergency actions of the Fed is of course a complicated task, plagued, as always in economics, by the absence of the counterfactual had the policies not been followed. As the tone of the previous sections makes clear, and with recovery seeming to take hold, we judge the combination of traditional and non-traditional responses to have been, on balance, successful in preventing the Great Recession from turning into a repeat of the Great Depression. While the effectiveness of individual initiatives will continue to be debated, the key point is to consider what comes next for the initiatives and how supervisory and regulatory policy can be shaped to improve the resilience of the system.

As noted above, all of the facilities and initiatives summarised in Table 1, with the exception of the three Maiden Lane LLCs and direct purchases of longer-term assets, were structured to naturally wind down as their charges and fees become more onerous with declining risk spreads brought about by a return to normal market functioning. This natural diminution can be clearly seen with the TAF, TSLF, PDCF, AMLF, CPFF, and the swap lines. In addition, in the December 2009 FOMC statement, the Federal Reserve reiterated its intention to shutter these facilities by 1 February 2010, with the exception of the TAF which will gradually be reduced in size (as noted above, the TAF is an effective way to provide the equivalent of discount window lending while avoiding stigma, similar to ECB credit provision programmes, so it may make sense to maintain a facility like this over time). The TALF is scheduled to be phased out by mid-2010. For the longer-term securities purchases, the Treasury purchase programme was completed in October 2009, and the Fed intends to complete the purchase of the Agency and MBS debt by the first quarter of 2010 at the maximum amounts previously stated. Although this will leave the Fed's balance sheet roughly two and a half times larger than when the crisis began, the Fed has a variety of tools – such as the newly-granted power to provide interest on reserves and offer interest-bearing term deposits for excess reserves, as well as the traditional tool of reverse repurchase agreements – to maintain control of growth of the monetary base and the Fed funds rate as the economy recovers (see Bernanke, 2009b, and Kroszner, 2009b). The initiatives put in place by the Treasury and FDIC also have, to differing extents, built-in exit strategies. Capital injections under TARP are being gradually repaid and the FDIC guarantee programme for new bank securities issues expired in October 2009.

Nonetheless, moral hazard issues will remain. The Rubicon cannot be

uncrossed and financial market behaviour will surely anticipate the return of the 'temporary' programmes and guarantees in the event of another crisis. To maintain the stability of the system and to protect taxpayers, the 'too interconnected to fail' problem needs to be addressed in two ways: through improvements in the supervision and regulation framework and through improvements in the legal and market infrastructure to make markets more robust globally (Kroszner, 2009a).

Giving supervisors the information and ability to monitor risks throughout the system, not just in traditional banks, is an important part of the improvements that could be made, and international cooperation will be a necessary part of this. Exactly who should bear the responsibility of being the 'systemic-risk regulator' and what authorities would be necessary for effective systemic-risk monitoring and mitigation is the subject of much controversy. In the US, proposals have ranged from giving those powers to the Federal Reserve, to setting up a systemic-risk council of existing regulators including the Federal Reserve, to taking away those powers from existing regulators and giving them to a stand-alone Financial Supervisory Agency, much like the FSA in the United Kingdom. We will not attempt to resolve this debate here, but do want to caution that the task of defining the boundaries of what types of organisations and activities would be subject to systemic-risk monitoring is particularly vexing, given the ability of financial institutions and markets to innovate and move risk-taking activity just one step beyond those boundaries.

Some have argued that a return to the separation of commercial and investment banking embodied in the Glass-Steagall Act would insulate banks from financial-market shocks and help to promote stability. The experience of the last few years, however, does not provide strong support for such an argument<sup>9</sup>. In the US, for example, the interconnectedness problems arose not primarily from the mixing of commercial and investment banking at individual institutions. Recall that Bear Stearns, Merrill Lynch and Lehman Brothers were not commercial bank holding companies and so their troubles had nothing to do with allowing commercial and investment banking to occur in the same holding company. The exposures that led to the downfall of Indymac, Washington Mutual and Wachovia, for example, were primarily related to risky choices and concentrations within the traditional commercial banking sphere of mortgage origination and lending, again not related to investment-banking activities of underwriting or dealing in securities. In addition, re-introducing a Glass-Steagall separation in the US would likely result in greater fragmentation of the financial system, with the likely consequence of increasing

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9. The historical evidence also does not support an argument in favour of the Glass-Steagall separation (see for instance, Kroszner and Rajan, 1994, and Kroszner, 1996).

rather than decreasing the interconnectedness of banking institutions as funding sources for other financial institutions and markets. Pushing risk-taking activities just outside of the commercial banking system could have the unintended consequence of making the entire system more, rather than less, fragile.

Certainly, ensuring that financial firms have enough 'skin in the game' through appropriate capital requirements against their risk-taking activities is important for mitigating moral-hazard problems and maintaining confidence in the system. Appropriate capital requirements, however, are only one piece of the puzzle. High capital requirements on banks or other classes of financial institutions, for example, can lead to strong incentives for getting around them, through either off balance-sheet activities or activities being undertaken by entities not facing the requirements. After all, regulatory burden and high capital requirements are part of the reasons that finance moved to the long and increasingly complex intermediation chains.

It is thus crucial for reform to acknowledge the challenges posed by modern financial market developments and to focus on making market infrastructure more robust to mitigate the fragilities of the intermediation chains. Of primary importance is improving the resolution regime for large financial institutions (see Kroszner, 2009a). Uncertainties associated with contract enforcement and delays in bankruptcy made it difficult or impossible for firms to obtain even secured funding, leading customers and counterparties to pull away, as was evident in September of 2008. The market-based intermediation chain relies heavily upon clarity in contract enforcement and rules for resolution. The stress situation in 2008 revealed the extent of those uncertainties and how they could lead to 'funding runs'. Greater reliance on 'living wills' would give greater clarity about how a troubled institution will operate as it winds down operations. Pre-packaged bankruptcy could reduce uncertainty about how various stakeholders will be treated if an institution fails. Greater international cooperation and clarity on the cross-border aspects of bankruptcy resolution also are important for reducing uncertainty and, hence, fragility.

Many other proposals have been put forward to enhance market resilience and mitigate the interconnectedness problems in a modern financial system, such as central clearing of derivatives (see Kroszner, 2009a). An important lesson to draw from the recent financial crisis is that a key criterion for judging the effectiveness of the reforms is how they deal with the interconnectedness of financial institutions and markets both within and across national borders.



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# Comments on 'The response of the Federal Reserve to the recent banking and financial crisis' by Randall S. Kroszner and William Melick

THOMAS WIESER<sup>1</sup>

The authors of this very thorough paper have provided us with a detailed month-by-month and instrument-by-instrument account of the Fed's response to the financial crisis. We are given a wealth of information that may be used for mapping how a rather traditional central bank moved into uncharted policy and instrument territory; for analysing how successful it was; and for assessing the limitations it faced due to historical policy choices. In this short note I will confine myself to commenting on those aspects that stand out in comparison to the European response.

As the crisis in the US started to unfold, other jurisdictions at first tended to watch the incipient US drama with moral and regulatory superiority. This was followed by a stage of disbelief that these problems could migrate (and mutate) with such rapidity. The stage of mutual learning while clearing up the debris finally produced a sense of shared destiny, which has been in evidence in the context of G20 discussions and decisions. How much longer this sense of shared purpose will remain with us is an open question, and will depend on how constructively different sides approach the issue of global problem solving.

With, at the time of writing, one in eight mortgages in the US delinquent or in foreclosure, Kroszner and Melick's inherent optimism that the crisis is increasingly something seen in the rearview mirror still needs to be proven correct.

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1. Economic and Financial Committee.

## The changing nature and length of the intermediation chains

While the changes to financial systems in developed economies during recent decades were not necessarily instrumental in precipitating the present crisis, these changes have played a significant role in how stabilisation and rescue measures had to be designed and applied.

As the authors note, financial intermediation chains have grown significantly longer. Many links in the chain are non-bank financial institutions that do not rely on deposits for their funding. Within half a century the share of assets of the financial sector held by banks has fallen by half in the US.

In terms of risk management these developments *per se* increase systemic vulnerability as, other things being constant, risk in a value chain increases relative to the number of links. Regulation and supervision of financial systems increasingly have been undermined by systemic gaps in the chain. These 'black holes' of supervision and regulation, through their backward and forward linkages, increase risks throughout the intermediation chain in a non-linear manner. Non-bank financial intermediaries and unregulated products have increased innovation in the sector, but have rendered obsolete the concept of the financial system as a comprehensively supervised and regulated sector.

These developments hampered the Fed's reaction to the crisis, and generally have led global central bank responses to be eclectic, with interesting differences in instruments between the different continents. As there had not been a systemic crisis of these proportions in the US financial system for decades, classical crisis intervention and prevention instruments became outdated, *inter alia* because – see above – of the lengthening of the value chains and the systemic importance of the non-financial intermediaries. At the outbreak of the crisis the Fed therefore had to deal with a sector where, depending on one's viewpoint, there was either regulatory failure in the sense of incomplete or patchy sectoral coverage of regulation and supervision; or a systemic supervisory breakdown in terms of the crisis instruments available for the patchy value chain. Either way, central banks and Treasuries had to learn by doing.

Whilst this may not play a big role in an *ex-post* analysis of what happened when and why, it is important in determining the future regulatory landscape for the sector. The discussion, for example, of separating a heavily regulated 'utility banking sector' from a lightly regulated innovative but riskier sector has its origins in recognising these problems. Carving out those parts of the sector that are not systemically interlinked with the rest of the economy, and thus cannot cause a

systemic crisis in cases of endogenous failures, would leave only a very small segment of the overall sector as the unregulated terrain for what has been called 'casino banking'. This therefore does not seem to be a practical way forward, even though it is a useful concept for clarifying the different roles of finance in a modern economy.

A further consequence of this elongated value and information chain is the breakdown of the pricing system because the market valuation of firms becomes dependent not only on the health of their own balance sheet, nor even mainly dependant on the health of the balance sheet of their immediate counterparties, but on the presumed health of balance sheets of unknown intermediaries far down or up the chain. Thus, systemic confidence or lack of confidence has come to play a greater role in determining the liquidity and solvency of the system than the actual rating of firms based on balance-sheet analysis, and an assessment of counterparty risk.

Kroszner and Melick provide a detailed overview of what happened as a direct consequence of these problems when the classical central-bank policy tools of open-market operations, discount lending and reserve requirements failed to jump-start the frozen system. Although these instruments were heavily used up to the end of 2007, they had to be complemented by non-traditional responses from the end of 2007 onwards. The authors provide a very useful categorisation of these instruments, which also serves well for a taxonomy of post-crisis policy prescriptions: expanding the type of counterparty receiving support; broadening the collateral required to access the support; and lengthening the maturity of the support. Their list in its length and diversity is testimony to the variety and volume of policies the Fed experimented with.

### **First mover: advantage or not?**

The US authorities at the outset of the crisis had the advantage and disadvantage of having to move first when the crisis started to impact the US financial system well before it left its mark on the systems of other countries and regions. Their reactions were, as was to be expected, forceful and pragmatic, and appear to have avoided the mistakes committed by the Japanese in previous episodes. By comparison, the Europeans reacted in a more deliberate manner.

Japan's monetary policy approach, including non-traditional measures, had fortunately been extensively studied at the Fed, including at the highest level. This ensured a fairly rapid and firm response. Indeed, the Fed (as other US authorities)

could have enjoyed an even longer time-span for preparing itself, as public warnings by Fed officials about the problems of the sub-prime sector and its interlinkages with the rest of the financial sector are known to have come long before the issue became a systemic one.

To some extent these inter-continental differences stem from the fact that the rest of the world could already draw on US experience, or at least US examples. The Fed could not but experiment, with the risk of some instruments being well designed, others well meant. The European central banks could, when it was their turn, build on the analysis and experience of the Fed and therefore did not need to resort to some of the measures that had been shown to be ineffective.

### An experimental approach to policy design?

Another reason for the US ability to use 'trial and error' policy approaches is that because of its institutional design and policy approach the US can afford to be much more 'experimental' than Europe. Policies in Europe need to be carefully designed and then steered through institutions that reflect a carefully-crafted compromise of national policy objectives and parameters. Going back to the drawing board wastes valuable time, and reopens debates nobody wants to revisit. Thus, while the US can afford to try out policies and then eventually discard or redesign some as needed, the Europeans have strong incentives to get it right from the outset. Otherwise, they risk being stuck with ill-designed instruments for longer than can be tolerated in times of crisis.

Further, the US has a proven ability to unwind measures that have become obsolete. While this may be disputed by US analysts critical of their own system, the US indeed appears to have a higher capability for policy reversal than the majority of European and Asian systems (albeit with significant time-lags). This facilitates experimental policymaking, because the negative consequences of mis-design may be felt for a shorter time than in Japan or Europe.

One may argue that these considerations play less of a role in the design of central-bank policies than in design of government policies. This is certainly correct, but I would argue that in this specific case we need to look at the interaction of financial rescue and mitigation policies of central banks, supervisors and governments in an holistic manner. Given that the distribution of tasks between these three types of institutions follows political choices, the overall design also of central bank policies will exhibit the design peculiarities of the different countries in these circumstances.

## Delimitations of sectors

Changes to the perimeter of the financial sector will influence regulatory and supervisory design and practices. While data on this aspect may not be quite clear, the US financial system appears to be more differentiated than the European system in functional terms. In Europe, the intermediation chain in many cases is considerably shorter than in the US, with non-financial intermediaries playing less of a role than in the US. The European system of retail, commercial and investment banking (with important exceptions, of course) is subject to identical regulatory and supervisory rules across the different sub-sectors of finance. This has facilitated the crisis response of European regulators in functional terms.

Of course the structure of the chain of intermediation and bank finance differs widely within Europe, as does the structure of ownership. In a number of countries the deposit/loan ratio is so near to 100 percent that the financial crisis produced hardly any liquidity stress in national systems. In some European countries, the degree of foreign ownership in the banking sector is nearly total, which raises important questions of home- and host-country supervision, and of burden-sharing. The experience of the crisis is that none of the host-country governments showed any willingness to provide support to banks or financial systems in difficulties. This remaining fragmentation of the European banking system along national lines compared to the US made it easier, by comparison, for the US authorities to design and implement a set of consistent measures.

For central-bank measures the European landscape also implied that there was a significant differentiation between countries inside and outside the euro area. These are institutional considerations the Fed obviously does not have to contend with, making life easier for the Fed compared to the ECB.

This is obviously not the place to discuss the future regulatory landscape. Suffice to say that the perimeters of regulation and supervision need to become more clearly defined. Differences in applicable rules and regulations, and responsibilities, for regulated versus non-regulated sectors, need to be more clearly perceptible. The US may have more of an issue from this point of view than the majority of other jurisdictions.

In terms of unity and clarity of supervisory structures, Japan appears to enjoy an advantage over the US and Europe. Looking at the financial sector as a whole, the US at this stage has an even higher degree of supervisory fragmentation than Europe, especially if one includes the insurance sector. Both for Europe and the US more centralised and unitary regulatory structures will help in achieving a seamless



stream of regulation and supervision along integral parts of the value chain. In the US, as Kroszner and Melick show, this not unexpectedly appears to have been less of a problem for the Fed's activities in crisis resolution. In crisis prevention this may not be the case.

## Competition

Competition aspects do not play a role in Kroszner and Melick's paper. This adds to the evidence that the competition aspects of rescue measures may have been one of the main divergences between the US and Europe in the resolution of the crisis. This, in the case of Europe, stems from the design of the EU Treaty itself, with state aid and competition policies being among the truly supranational policies with strong executive powers concentrated in Brussels. National aid and rescue measures can only go ahead with the consent of the European Commission. Minimising competitive distortions of the stabilisation policies of the last year has been a main plank of EU financial sector policies.

This is not so, it would appear, in the US. While some design elements, such as limitations on executive pay and other policies address the relative role of firms receiving aid compared to others, the overall lack of focus on distortions of competition because of rescue measures has been quite remarkable when compared to Europe. This has facilitated rapid disbursements in the US, while in Europe implementation lags of several months have not been uncommon. The concerns of European policymakers on the international spillover effects of state aid are not replicated in the US.

## Conclusion

Kroszner and Melick's very complete paper on Fed policy actions allows us to draw a number of conclusions on the differences and similarities in policymaking in a globalised financial system.

If regulatory and supervisory cooperation at the global level should become an operational reality, both the US and Europe will need to make significant progress in streamlining their systems along functional (US) and national (Europe) delimitations. We will require greater clarity on the boundaries of the financial system in order to better distinguish between unregulated and regulated sectors, products and functions. And these differences will need to be spelled out with greater clarity. Supervision at the interface of regulated and unregulated activity should become

more of a challenge than at present. Competition aspects at the global level will increasingly play a role, and we lack institutional set-ups to deal with such cases. Central-bank cooperation in crises will continue to play an important role, and with the increasing importance of the euro as a global reserve currency, the ECB will want to emulate some of the instruments of the Fed in a wider manner than over the last year.

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# The European Union and the management of the banking crisis

JEAN PISANI-FERRY AND ANDRÉ SAPIR<sup>1</sup>

## 1. Sudden crisis

The banking crisis that erupted in the last quarter of 2008 was a test of the European Union's ability to deal with the unexpected. To say that the EU was institutionally ill prepared for it is an understatement.

Well before the crisis, many authors, from both academic and policy circles, warned that the architecture for resolving difficulties within the European financial single market was deficient. There was concern about the ability to manage liquidity or solvency difficulties. On the liquidity side, concern centred on the absence of clear guidelines for implementing the EU lender-of-last-resort function in cases when pan-European banks experience problems. On the solvency side, there was similar concern over the lack of clear arrangements for the resolution of cross-border banking crises, in particular fiscal burden-sharing mechanisms<sup>2</sup>. Even Alexandre Lamfalussy, former president of the European Monetary Institute, concluded that existing European arrangements were 'suboptimal' (Lamfalussy, 2004).

Against this background, this chapter assesses the response of EU and national authorities to the banking crisis. Our main finding is that their policy performance was better than had been expected prior to the crisis, but only because the

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1. Respectively Bruegel and Université Paris-Dauphine, and Université Libre de Bruxelles, Bruegel and CEPR. This paper is a revised and updated version of Pisani-Ferry and Sapir (2010).

2. As regards liquidity see Prati and Schinasi (1998 and 1999), Schinasi and Teixeira (2006) and Nieto and Schinasi (2007). On solvency, see Goodhart (2004), Goodhart and Schoenmaker (2006), Mayes, Nieto and Wall (2007) and Nieto and Schinasi (2007).

institutional arrangements then in place were so suboptimal.

Section 2 describes the pre-crisis EU banking scene in terms of both market integration and crisis management arrangements. Section 3 describes the main events and the policy responses from the early days of the crisis in mid-2007 to publication of the 'stress tests' in mid-2010. Section 4 assesses how the crisis was managed and its lessons for EU governance. Section 5 contains three short concluding observations.

## 2. The pre-crisis landscape

### *2.1 Market integration and the internationalisation of the EU banking sector*

Financial integration – and banking integration in particular – have been regarded by EU policymakers as goals since the early days of the European single market. The cross-border provision of financial services was envisaged in very much the same way as the provision of any other service, with an emphasis on the efficiency gains of a more integrated market. This meant relying on the home-country principle that allowed a financial institution legally established in any EU country to provide cross-border banking services.

The single market for banking was slow to take off. Cross-border provision of consumer-oriented services proved illusory, largely because of tax and regulatory differences across countries. But European banking witnessed important changes after the liberalisation of capital movements in the early 1990s, the introduction of the euro in 1999 and EU enlargement to include the new member states (NMS) in 2004 and 2007. These changes were conducive to greater consolidation and internationalisation in EU banking. There was extensive activity in the area of mergers and acquisitions (M&A), mostly involving domestic institutions in an initial phase, after which cross-border mergers gradually became predominant in value terms. Through foreign direct investment, western European banks acquired a dominant position in most NMS in central and eastern Europe. As a result, European banks were significantly more internationalised by 2007 than banks in the US, Japan or China (Véron, 2007, and Figure 1).

While the single market had not managed to promote cross-border services, it had largely succeeded in activating a process of cross-border competition and integration. However, its early logic was still evident in the predominance of the home-country principle: banks could operate through branches, they were supervised by the authorities of the country in which they were headquartered, and

only the fiscal authorities of that country were responsible for bailing them out.

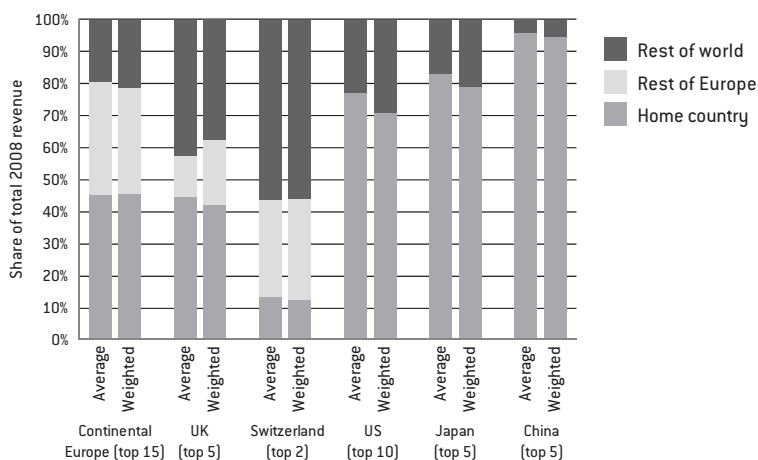
## 2.2 Crisis prevention: the supervisory system

The slow but steady growth of banking integration gradually forced the EU to confront what Schoenmaker and Oosterloo (2007) have called the trilemma of financial supervision. Just as in the famous Mundell trilemma, there is an inherent incompatibility between integration, financial stability and independent national supervision. Furthermore, there was – and still is – a fundamental tension between home-country responsibility for the supervision of financial *institutions* and host-country responsibility for the stability of the financial *system*.

Despite early recognition of this problem, there was no will to tackle it in the radical way the Mundell trilemma was addressed when the euro was introduced. No competence was transferred to the EU level. Instead, two main principles, decentralisation and cooperation, were emphasised in the hope that coordination within specialised committees and procedures for information exchange would, temporarily at least, counter the deficiencies of the system<sup>3</sup>.

It was argued mainly that supervisory arrangements should not be reformed

Figure 1: Comparative internationalisation of large banks



Source: Forbes 2000 ranking (Apr. 2009), Worldscope, company reports, SEC filings, authors' assumptions.

Rankings based on total 2008 assets; right-hand bars weighted by assets.

With special thanks to Martín Saldías Zambrana for great research assistance.

because of the informational benefits of maintaining supervision at national level, given that most banks were national. However when mergers and acquisitions led to the emergence of pan-European banks, supervisory arrangements did not keep pace.

### *2.3 The architecture for crisis management*

The main responsibility for financial stability and crisis management in the European Union lies with national authorities. However several EU bodies and procedures provide for some degree of harmonisation between national rules and for cooperation between those authorities.

#### Lender-of-last resort

The provision of liquidity assistance to banks in the EU is the responsibility of national central banks. In the case of cross-border banking institutions, the central bank of the host country is responsible, regardless of whether the foreign bank in its territory operates as a branch or a subsidiary. Since banking supervision is also national but with the main responsibility for cross-border institutions assigned to the home country, there is a risk that the flow of information between home and host authorities will be insufficient where there is market stress.

Information exchange in times of crisis is based on a March 2003 Memorandum of Understanding (MoU). It contains principles and procedures that deal specifically with the identification of the authorities responsible for crisis management, the information flows required between all authorities involved and the practical conditions for sharing information at cross-border level. The MoU also provides for the setting up of a logistical infrastructure to support enhanced cross-border cooperation between authorities.

The situation in the euro area is similar. Liquidity assistance is decentralised and the European Central Bank (ECB) has not been formally assigned lender-of-last-resort responsibility under the Maastricht treaty. Neither does it have any supervisory authority over national supervisors, or privileged access to information from them.

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3. Cooperation was developed in three areas. First, the prudential framework followed by national supervisors was largely harmonised by EU legislation. Second, a Committee of European Banking Supervisors (CEBS) was established in 2003, with a role limited to facilitating consultation among supervisors and to providing technical advice to the European Commission on regulation and convergence of supervisory practices. Third, provisions were made for cooperation in time of crisis.

However, these points require qualification. First, mechanisms have been in place since 1999 to ensure an adequate flow of information *within the Eurosystem* in case a national central bank decides to provide Emergency Liquidity Assistance (ELA) to an institution operating within its jurisdiction. The purpose is to ensure that the provision of liquidity is consistent with maintaining the appropriate single monetary stance (ECB, 2000). Second, although the ECB is not the lender-of-last-resort responsible for providing liquidity to individual banks, it is responsible, at least implicitly, for providing liquidity to the euro area as a whole. Cooperation among central banks on liquidity provision is therefore stronger within the euro area, but the area has no special provisions for stronger cooperation between supervisors, even where this role is assigned to the central bank.

### Crisis resolution

If solvency became the key issue, responsibility for crisis management would shift from central banks to treasuries. With no EU or even eurozone treasury, or a common pool of resources available for this purpose, crisis resolution has been entirely the responsibility of national treasuries. And there has been no special provision for it where pan-European banks are affected.

Treasuries cooperate with central banks and among themselves, through the work of ministers and central bank governors for the ECOFIN Council. ECOFIN decisions in all matters, including crisis management, are prepared by the Economic and Financial Committee (EFC) consisting of deputy finance ministers, deputy central bank governors and EU authorities.

Before 2007, the only EU financial crisis management arrangement that existed was a May 2005 MoU on cooperation in times of crisis between banking supervisors, central banks and finance ministries in EU countries. It consisted of principles and procedures that dealt specifically with the sharing of information, views and assessments among the authorities likely to be involved in a crisis, the procedures entailed, and the conditions for cooperating and exchanging information nationally and across borders. The MoU also envisaged the development, at national and EU levels, of contingency plans for managing crises, along with stress-testing and simulation exercises. But it was non-binding and contained no advance arrangement for burden-sharing between national treasuries.

Deposit guarantee schemes

All deposit guarantee schemes within the EU are nationally based and have largely developed in independent ways. Depositors are insured in accordance with the rules of the home country of bank headquarters so that, in a given market, the guarantees for those holding deposits with domestic and foreign banks are not the same.

However, a 1994 EU directive (framework law) provided a harmonised minimum level of deposit protection throughout the EU. Such protection required that every credit institution should join one of a number of Deposit Guarantee Schemes (DGS), each of which guaranteed any depositor up to a minimum level of €20,000. This amount remained unchanged until the crisis.

Yet the directive failed to address the issue of systemic risk either within countries or across Europe, and most schemes were only able to handle minor problems within national borders.

2.4 Summing up

The years preceding the crisis witnessed rapid internationalisation of the EU banking sector. Yet the EU institutional architecture for financial crisis management relied mainly on cooperation and remained based on weak procedures, if not mere declarations of intent. As Table 1 shows, national authorities bore the brunt of responsibility for confronting any crisis.

The deficiencies of the system were plain enough. Frustration with the lack of progress was clearly expressed in the literature and at policy conferences. The flaws had also become clear to the EFC, which in April 2006 ran a simulation exercise for banking supervisors, central banks and finance ministries in all EU-25 countries. The simulation clearly pointed to basic problems in cooperation for managing cross-border crises, which led the ECOFIN Council to create an *ad hoc* EFC group to report on ways of improving matters.

| Table 1: Essential features of the pre-crisis state of play |          |               |    |        |
|-------------------------------------------------------------|----------|---------------|----|--------|
|                                                             | National | Currency area | EU | Global |
| Regulation (CAR...)                                         |          |               |    |        |
| Supervision                                                 |          |               |    |        |
| Deposit insurance                                           |          |               |    |        |
| Liquidity provision                                         |          |               |    |        |
| Rescue/restructuring                                        |          |               |    |        |



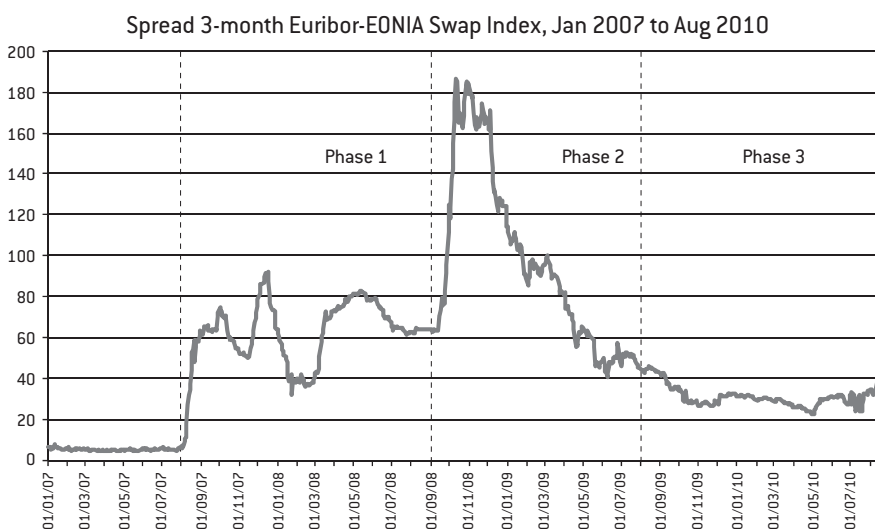
This clearly suboptimal situation stemmed from an EU strategy which put market integration first and sought to build policy integration only as a response to it. Here, the same approach was adopted for finance as had been successfully applied elsewhere. The logic was that integration should be driven primarily by market forces. The next step of policy integration could come later when the progress of market integration called for it with the support of its participants. It was hoped that crises could be avoided until the integration process was complete.

### 3. The management of the crisis

The crisis went through three phases:

- Phase one started in August 2007 with a general liquidity strain, which gradually became a crisis of securitisation and leverage. Tensions on money markets, as measured by the EURIBOR-OIS spread, had ups and downs but remained consistently above pre-crisis levels (Figure 2). Solvency problems were faced by certain institutions, none of which were engaged in (significant) cross-border activities. All EU financial systems were affected, but with no evidence of financial fragmentation along national lines.

Figure 2: Three phases of the crisis



Source: Datastream.

- The second and most acute phase started in September 2008 and was over by mid-2009. It witnessed both a general loss of confidence and institution-specific solvency crises at major banks, including two significant cross-border institutions, Dexia and Fortis. The EURIBOR-OIS spread shot up in September 2008 and then fell only gradually. During this phase there were signs of financial fragmentation, such as the increase in the dispersion of EURIBOR rates across countries (ECB, 2009a).
- The third phase saw renewed concerns about the situation of banks in several EU countries, following tensions affecting sovereign debt markets in the second quarter of 2010. Unlike the US in May 2009, the EU did not carry out systematic, area-wide stress tests to assess the potential vulnerability of big banking institutions. There were also concerns over the extent of potential write-downs in the banking system. It was finally decided to conduct stress tests in spite of the reluctance of several national supervisors who felt the move undermined their own authority. The results of the tests were published in July 2010 and this apparent transparency went some way to alleviating market fears.

### *3.1 The first phase: August 2007 to August 2008*

The first sign of an EU financial crisis appeared in August 2007 when BNP Paribas froze redemption for three investment funds, citing its inability to value structured products. As a result, counterparty risk between banks increased sharply. Liquidity evaporated from the inter-bank market, forcing central banks to provide massive liquidity to their banking systems. In the euro area, this general liquidity crisis was handled by the ECB, with no need for detailed supervisory information on individual institutions.

Unlike the Federal Reserve, which had to introduce new facilities providing liquidity to financial institutions, the ECB was able to do so without really reforming its procedures and operational framework (ECB, 2009b). It could already accept a very wide range of collateral in repo lending because it was based on existing practices in eurozone countries, which proved to be an asset. The ECB therefore essentially fine-tuned the provision of liquidity to the banking sector. In December 2007, it also entered into a swap agreement with the Federal Reserve to provide dollar liquidity to European banks unable to access it easily.

As general liquidity crises often tend to become solvency crises, it was fortunate that the EFC *ad hoc* group set up by ECOFIN in 2006 had already started work. By September 2007, the EFC was able to issue a report containing basic

principles for crisis management in the EU<sup>4</sup>. Besides basic principles, the Committee called for a common analytical framework for crisis assessment and for a new MoU involving all relevant authorities. Crucially, the report committed all EU countries to viewing any crisis in a pan-European financial institution as a 'matter of common interest'.

The ECOFIN Council of October 2007 further agreed on common principles for cooperation among national authorities to preserve financial stability. These principles were meant to be respected in the management of any cross-border financial crisis with potential systemic implications and to 'constitute a consistent and sound basis for responding to any financial crisis situations in the EU' (Council of the European Union, 2007, p. 23).

The common principles committed EU countries to cooperation in crisis management. It was felt that management of a cross-border crisis in particular was a matter of common interest to all countries affected. Where a bank group had significant cross-border activities in different EU countries, the Council agreed to 'carefully cooperate and prepare in normal times as much as possible for sharing a potential fiscal burden' on the basis of 'equitable and balanced criteria'. Yet once again, there was no mention of the incentives required. The European Commission was invited to propose ways of clarifying cooperation commitments, for adoption by the end of 2009. Meanwhile, EU countries were simply encouraged to sign 'voluntary cooperation agreements' between their appropriate national authorities as soon as possible. Competition and state aid rules were still the only real EU instrument for crisis management. During this period, several EU countries intervened with rescue measures to prevent insolvency at certain banks, none of which engaged in (substantial) cross-border activities<sup>5</sup>. These state measures were handled by the EU competition authority, the European Commission, on the basis of standard rescue and restructuring (R&R) aid rules.

In June 2008, a new MoU on cooperation between banking supervisors, central banks and finance ministries was adopted, updating the May 2005 MoU. The new document incorporated the common principles agreed by the October 2007 ECOFIN Council and added procedures specifically to improve cooperation within and between EU countries<sup>6</sup>. Its main innovation was the recommendation that countries with common financial stability concerns stemming from the presence of cross-

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4. The report [ECFIN/CEFCPE(2007)REP/53990] has not been made public.

5. IKB, Sachsen LB and WestLB in Germany; Northern Rock in the United Kingdom; and Roskilde Bank in Denmark.

6. Unlike earlier ones, this MoU [ECFIN/CEFCPE(2008)REP/53106 REV] was made public.

border financial institutions should develop voluntary but clear cooperation agreements. They included the creation of cross-border stability groups to facilitate the management and resolution of cross-border financial crises.

All in all, the first phase of the crisis certainly generated much activity within the European financial stability community. More striking however is that, despite the urgency, little progress was achieved in terms of building a European crisis management framework. In fact, the recommendations of the October 2007 ECOFIN Council conclusions and the June 2008 MoU were very close to those of the April 2001 EFC report on financial crisis management (the so-called 'Brouwer Report')<sup>7</sup>.

### *3.2 The second phase: September 2008 to summer 2009*

Confidence among banks was severely undermined in mid-September 2008 by the bankruptcy of Lehman Brothers. Besides sharply reducing the already deficient liquidity in various markets, the Lehman debacle inflicted serious problems of solvency on several major European banks. On 27 September, the Belgian/Dutch bank Fortis became the first systemic EU bank to be rescued by governments, in this case those of Belgium, Luxembourg and the Netherlands. On 30 September, further action was taken by Belgium, France and Luxembourg to rescue the Belgian/French bank Dexia. The same day, the Irish Minister of Finance announced a unilateral government decision to guarantee all the deposits and debts of six Irish banks and their foreign subsidiaries – a move sharply criticised by other EU countries for undermining their own deposit guarantee schemes. This was the beginning of a series of national initiatives with cross-border implications and potential risks for the entire EU banking system.

It was clear from the systemic nature of the crisis and government responses to it that the R&R Guidelines no longer provided the right framework for handling state aid to the banking sector. A meeting of the heads of state or government of France, Germany and Italy on 4 October failed to deliver a meaningful result. At the Eurogroup and ECOFIN meetings on 6-7 October, finance ministers agreed that the economic situation called 'for a coordinated response at the EU level'. Yet apart from deciding to increase guarantees on deposits to a minimum €50,000, the ministers failed to adopt anything except broad principles and a declaration of intent that 'negative spillover effects should be avoided' (Council of the European Union, 2008, p. 1)<sup>8</sup>.

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7. EFC/ECFIN/251/01-en-Final.

8. Tellingly, the British bank rescue plan was unilaterally introduced a day later, on 8 October.

Meanwhile, the ECB changed its procedure for refinancing operations. On 8 October, it announced a fixed-rate procedure with full allotment instead of its variable rate tender. As a result, banks could be certain that their bids for liquidity would be satisfied in full at the ECB rate. This removed uncertainty and lowered the cost of liquidity<sup>9</sup>. At the same time, the list of assets eligible as collateral was temporarily expanded (the rating threshold was lowered from A- to BBB- and debt instruments denominated in foreign currency became eligible). In contrast with the first period, therefore, the ECB did far more than fine-tune existing procedures. It introduced genuinely innovative operations<sup>10</sup>.

On Thursday 9 October, markets throughout the world suffered one of their worst days in history, prompting the French presidency of the EU to convene the first-ever meeting of the heads of state or government in the euro area. Held in Paris on 12 October, this emergency summit is generally viewed as the turning point in efforts to bring about a concerted European response to the financial crisis.

At the European Council of 15-16 October, the Paris Declaration<sup>11</sup> on 'a concerted European action plan for the euro area countries', was endorsed by all EU countries. Largely inspired by the British plan of 8 October<sup>12</sup>, it covered the same points: a commitment to further liquidity provision by the central bank; a commitment to the public recapitalisation of banking institutions that needed capital; and public guarantees for bank borrowing. It also committed the signatories to enhanced cooperation.

The Paris Declaration paved the way for three important Commission documents. Between them, they provided a consistent framework for the rescue and restructuring of EU banks, so that negative spillover effects between EU countries could be minimised:

- The 'Banking Communication' of 13 October 2008 focused mainly on the conditions that national guarantees covering bank liabilities had to fulfil to comply with EU state aid rules<sup>13</sup>. These conditions were mainly meant to lessen the danger of substantial funds flowing freely towards EU countries with the

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9. Details of the new procedure are provided by ECB (2009b).

10. Further innovations were introduced in June 2009 with the creation of 12-months fixed-rate, full allotment refinancing operations.

11. See [http://www.eu2008.fr/PFUE/lang/en/accueil/PFUE-10\\_2008/PFUE-12.10.2008/sommet\\_pays\\_zone\\_euro\\_declaration\\_plan\\_action\\_concertee.html](http://www.eu2008.fr/PFUE/lang/en/accueil/PFUE-10_2008/PFUE-12.10.2008/sommet_pays_zone_euro_declaration_plan_action_concertee.html).

12. HM Treasury, "Financial support to the banking industry", [http://www.hm-treasury.gov.uk/press\\_100\\_08.htm](http://www.hm-treasury.gov.uk/press_100_08.htm).

13. Communication from the Commission on 'The application of the State aid rules to measures taken in relation to financial institutions in the context of the current global financial crisis', OJ C 270, 5.10.2008.

highest levels of protection and to shield competition from massive distortions. The Banking Communication was accompanied by ECB recommendations on the pricing of guarantees<sup>14</sup>, which also sought to avoid distortions resulting from different pricing practices among EU countries.

- The 'Recapitalisation Communication' of 5 December 2008 provided conditions that national funds would need to meet in recapitalising banks to ensure adequate levels of lending to the economy<sup>15</sup>.
- Finally, the 'Impaired Assets Communication' of 25 February 2009 provided the framework for cleaning up the balance sheets of financial institutions by removing toxic assets and underperforming loans<sup>16</sup>.

In October 2008, the Commission called for an increase in the minimum level of deposit guarantees. Then on 11 March 2009, it issued a Directive setting a new minimum level of €100,000 and shortening the maximum payout period from nine months to 20 working days (eventually meant to become 10 working days)<sup>17</sup>.

In contrast to their inertia in the first phase of the crisis, EU authorities moved swiftly in the fourth quarter of 2008 and in 2009 to put in place a framework that responded to it.

Implementation was also swift. From October 2008 to July 2009, the Commission approved over €3500 billion in state aid to financial institutions, of which €1500 billion were used. Support measures fell under the four main headings of capital injections (recapitalisation), guarantees on bank liabilities, relief of impaired assets, and liquidity and bank funding support. Table 2 shows both the approved and real state interventions for the EU, the euro area (EA) and individual EU countries, by type of support measure during the period from October 2008 to August 2009.

By the end of August 2009, the total of all approved measures amounted to nearly 44 percent of GDP in the entire euro area, a staggering figure compared to the United States in which the corresponding percentage was only just above 2. In individual EU countries, the situation ranged from over 100 percent in Denmark and

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14. "Recommendations of the Governing Council of the European Central Bank on government guarantees for bank debt", of 20 October 2008, [http://www.ecb.int/pub/pdf/other/recommendations\\_on\\_guarantees\\_en.pdf](http://www.ecb.int/pub/pdf/other/recommendations_on_guarantees_en.pdf).

15. Communication from the Commission on 'The recapitalisation of financial institutions in the current financial crisis: limitation of the aid to the minimum necessary and safeguards against undue distortions of competition', OJ C 10, 15.1.2009.

16. Communication from the Commission on 'The treatment of impaired assets in the Community banking sector', OJ C 72, 26.3.2009.

17. Directive 2009/14/EC of 11 March 2009 amending Directive 94/19/EC.

Table 2: State aid to the banking sector (October 2008-August 2009)

|       | Public interventions in the banking sector (% GDP) |                              |                                |                    |                                                         |                        |
|-------|----------------------------------------------------|------------------------------|--------------------------------|--------------------|---------------------------------------------------------|------------------------|
|       | Capital injections                                 |                              | Guarantees on bank liabilities |                    | Relief of impaired asset and liquidity and bank support |                        |
|       | Total approved measures                            | Effective capital injections | Total approved measures        | Guarantees granted | Total approved measures                                 | Effective intervention |
| BE    | 5.3                                                | 6.1                          | 70.8                           | 16.3               | 8.1                                                     | 8.1                    |
| BG    | 0.0                                                | 0.0                          | 0.0                            | 0.0                | 0.0                                                     | 0.0                    |
| CZ    | 0.0                                                | 0.0                          | 0.0                            | 0.0                | 0.0                                                     | 0.0                    |
| DK    | 6.1                                                | 2.4                          | 253.0                          | 2.5                | 0.3                                                     | 0.3                    |
| DE    | 4.4                                                | 2.0                          | 18.6                           | 7.2                | 1.4                                                     | 1.4                    |
| EE    | 0.0                                                | 0.0                          | 0.0                            | 0.0                | 0.0                                                     | 0.0                    |
| IE    | 6.6                                                | 6.5                          | 164.7                          | 164.7              | 0.0                                                     | 0.0                    |
| EL    | 2.0                                                | 1.5                          | 6.1                            | 1.2                | 3.3                                                     | 1.8                    |
| ES    | 0.0                                                | 0.0                          | 18.6                           | 2.1                | 2.8                                                     | 1.8                    |
| FR    | 1.2                                                | 1.2                          | 16.6                           | 5.5                | 0.2                                                     | 0.2                    |
| IT    | 1.3                                                | 0.1                          | NA                             | 0.0                | 0.0                                                     | 0.0                    |
| CY    | 0.0                                                | 0.0                          | 0.0                            | 0.0                | 0.0                                                     | 0.0                    |
| LV    | 1.4                                                | 0.9                          | 25.7                           | 2.8                | 10.9                                                    | 4.7                    |
| LT    | 0.0                                                | 0.0                          | 0.0                            | 0.0                | 0.0                                                     | 0.0                    |
| LU    | 6.9                                                | 7.9                          | 12.4                           | NR                 | 0.9                                                     | 0.9                    |
| HU    | 1.1                                                | 0.1                          | 5.9                            | 0.0                | 0.0                                                     | 2.6                    |
| MT    | 0.0                                                | 0.0                          | 0.0                            | 0.0                | 0.0                                                     | 0.0                    |
| NL    | 6.4                                                | 6.8                          | 34.3                           | 7.7                | 11.4                                                    | 5.5                    |
| AT    | 5.5                                                | 1.7                          | 25.7                           | 6.8                | 7.1                                                     | 2.0                    |
| PL    | 0.0                                                | 0.0                          | 0.0                            | 0.0                | 0.0                                                     | 0.0                    |
| PT    | 2.4                                                | 0.0                          | 10.0                           | 3.3                | 0.0                                                     | 0.0                    |
| RO    | 0.0                                                | 0.0                          | 0.0                            | 0.0                | 0.0                                                     | 0.0                    |
| SI    | 0.0                                                | 0.4                          | 32.8                           | 6.3                | 0.0                                                     | 0.0                    |
| SK    | 0.0                                                | 0.0                          | 0.0                            | 0.0                | 0.0                                                     | 0.0                    |
| F1    | 0.0                                                | 0.0                          | 27.7                           | 0.0                | 0.0                                                     | 0.0                    |
| SE    | 1.6                                                | 0.2                          | 48.5                           | 11.0               | 12.6                                                    | 0.0                    |
| UK    | 3.5                                                | 2.6                          | 21.7                           | 11.3               | 16.4                                                    | 14.7                   |
| EA-16 | 2.7                                                | 1.7                          | 24.6                           | 7.8                | 4.1                                                     | 3.0                    |
| EU-27 | 2.7                                                | 1.7                          | 20.5                           | 7.8                | 2.1                                                     | 1.4                    |

Source: European Commission (2009).

Ireland to zero in several new member states. In general, the NMS approved very few support measures, partly because their banking sectors were mainly controlled by foreign banks and partly because of the home-country principle. By contrast, approved support was considerable in small EU-15 countries with broad exposure to the NMS, such as Austria, Belgium, the Netherlands and Sweden.

The total of all effective measures stood at nearly 12 percent of GDP for the entire EU. This too was huge compared to the United States in which the corresponding percentage was just under 2. Individual member states come under five headings: countries with support measures comprising over 100 percent of their GDP (Ireland); those with measures of between 20 and 30 percent of their GDP (Belgium, the UK, Netherlands and, subject to official confirmation, Luxembourg); those with measures of around 10 percent of their GDP (Sweden, Germany, Austria and Latvia); those with measures totalling some 5 percent of their GDP (Spain, Denmark, France, Portugal, Hungary, Slovenia and Greece); and those contributing very few or no support measures (Italy, Finland and nine NMS).

In terms of categories of support, guarantees were the most important category for the EU as a whole, accounting for over half the amount in approved measures and two-thirds of the effective amount at EU level. However there were major differences between countries. Of the five countries with the highest effective amounts relative to GDP, Ireland focused almost exclusively on state guarantees, while the UK used mainly liquidity and bank funding support. In Luxembourg, as in Ireland, guarantees played an important role, but so did recapitalisation. By contrast Belgium and the Netherlands used all four types of measure – recapitalisation, guarantees, impaired assets relief and bank funding support.

EU countries thus made extensive use of various forms of national support to their banking sector during the second phase of the financial crisis. Meanwhile, the Commission probably prevented the worst excesses in terms of negative spillover by quickly adapting its R&R Guidelines to the situation. The national banking crises that occurred in countries such as Ireland, Belgium, the UK and the Netherlands did not turn into a real EU banking crisis.

Since these data were compiled, further assistance has been announced in the UK, Germany and Austria. By contrast, healthier banks in other countries have started raising private capital and repaying government support. Hence, the variance between different EU countries has actually increased.



### 3.3 The third phase: summer 2009 to summer 2010

The third phase of the crisis was not as severe as the second one, at least for the banks. But concerns over the extent of the damage to the banking sector remained, after the provision of official support to it in phase two. IMF evaluations of potential write-downs repeatedly highlighted that the EU was behind the US in recognising the extent of the need for recapitalisation. While the ECB findings were less clear-cut, they too pointed to significant potential for write-downs<sup>18</sup>. Furthermore, it was suspected that there were marked differences both between and within countries. The German *Landesbanken* and the Spanish *Cajas* were especially highlighted as potential sources of trouble.

While markets and economists called for transparency, national supervisory authorities procrastinated. Some supervisors may have hoped that providing cheap liquidity would be enough to help their domestic banks rebuild capital, even if this forced the ECB to continue extending liquidity bilaterally. But continued delay was doubtless mainly due to rivalry between European supervisors and national supervisors who were determined to uphold their prerogatives.

The demand for comprehensive and comparable stress tests was effectively ditched. The results of an assessment exercise conducted under the auspices of the CEBS (the Committee of European Banking Supervisors) and released in September 2009 provided scant information. Few banks were surveyed, there was no common methodology, and individual bank results were not published. So rumours continued and spread following the sovereign debt crises in the second quarter of 2010, as exposure to government default risk compounded pressures already present. This led to comprehensive tests carried out by national supervisors but on the basis of common economic assumptions and a common method (CEBS, 2010). The results published in July 2010 were harmonised so that markets had a first systematic assessment of bank weaknesses. Most supervisors also published comprehensive data on the exposure of banks to sovereign risk. In Germany, where this did not occur, banks released the information themselves using the common publication template. While assumptions were sometimes questioned, the general response of markets to the tests was positive. They indicated that the need for additional capital was limited to a few institutions and involved only trivial further amounts<sup>19</sup>.

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18. IMF estimates are to be found in the Global Financial Stability Reports of April 2009, October 2009 and April 2010. The ECB estimates are to be found in the Financial Stability Reviews of June 2009, December 2009 and June 2010.

## 4. Assessment and key questions

Having described the existing policy architecture and how the EU responded to the two phases of the crisis, we now move to addressing our initial questions. Have the shortcomings identified before the crisis hampered its effective management? How have problems been avoided? And how has the EU policy system performed generally given its shortcomings? To shed light on these matters, we first discuss the role of information asymmetries in the European context and then how the main externalities were managed during the crisis. The role of liquidity support, deposit guarantees, support to individual banks, and the treatment of pan-European banks are all examined in turn. However, the special position of the NMS is not considered, as it calls for a longer discussion beyond our scope here.

### 4.1 Information sharing

The primary responsibility of policymakers in a financial crisis is to determine whether and how to help institutions in distress. To manage a crisis well, the authorities should have the soundest possible information on (a) whether a particular financial institution – and the banking system in general – face liquidity shortages or solvency strains, and (b) the systemic implications of any failure of that institution. Public information is neither sufficient nor accurate enough for this purpose, as market-based asset valuation is impaired by panic and financial institutions end up valuing the same asset differently. Even in a centralised system the information available to policymakers is at best biased. If decision-making is a matter of judgment, it should at least involve information-sharing among policy institutions.

Throughout the period 2007-10 the situation in the EU persistently lacked transparency for market participants, the public and policy institutions:

- Supervisors lacked adequate information. According to the De Larosière (2009) report, they ‘did not seem to share their information properly with their counterparts in other member states’ and there was even ‘an erosion of mutual confidence’ among them.
- Governments planning or negotiating the rescue of cross-border banks could not access the same comprehensive body of information.

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19. Prior to the July 2010 stress tests several member states had already approved new support measures to their banking sector during the third phase amounting to nearly 19 percent of GDP in the UK, nearly 8 percent in Ireland, around 2 percent in Finland, around 1.5 percent in Germany and the Netherlands and 0.4 percent in Austria.

- The ECB had to take real-time decisions about liquidity assistance for individual financial institutions and the financial system as a whole, without having access to assessments by national supervisors of the financial health of banks. Even vis-à-vis the market, central bank officials quite often felt under-informed.
- Following the success of the US stress tests in restoring some comparability between big banks in May 2009, Europeans took over a year to follow suit, and only did so under market pressure. The seemingly similar exercise that supervisors decided to undertake in mid-2009 contained so many limitations that it became almost meaningless. For example, it was stated that the tests did not aim 'to identify individual banks that may need recapitalisation'<sup>20</sup>. And results based on a sample of 22 banks included only aggregate information. Even when harmonised stress tests were eventually conducted and published in July 2010, there were significant discrepancies in the amount of information published by supervisors<sup>21</sup>.

This situation involved significant risks. As already indicated, inaccurate information can lead to faulty decisions at EU, euro-area or national levels. And information may well have been used strategically. For too long, national authorities were given incentives not to recognise the fragility of some home-based institutions in the hope that massive provision of liquidity by the ECB at near-zero interest rates would help rebuild the capital base of banks, effectively using the ECB liquidity assistance as a form of hidden subsidy. They were also encouraged to provide capital and guarantees to healthy institutions to help them proceed with acquisitions, effectively distorting competition. EU authorities lacked the information to find out whether governments actually behaved in such a way.

The information problem may come under fresh scrutiny following the creation of a European Systemic Risk Board (ESRB) charged with macro-prudential supervision, and reform of the committee structure of micro-prudential supervision instigated by the De Larosière report. The new European System of Financial Supervisors (consisting of the three EU-level authorities for banking, insurance and securities) and the ESRB are expected to be put in place by 1 January 2011. However, at the time of writing, final decisions are still pending, as legislation remains under discussion in the European Parliament and the ECOFIN Council. The two main questions here are whether European supervisors will receive helpful

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20. Statement of CEBS of 12 May 2009.

21. Spain published extensive results for all banks. Germany did not publish the banks' exposure to sovereign risk and its tests covered part of the banking sector only.

information on cross-border institutions from national supervisors, and whether the ESRB will receive the aggregate information necessary to assess overall risks to financial stability.

As regards the first question, the September 2009 European Commission proposal for the creation of a European Banking Authority stated that the Authority would have the power to obtain from national supervisory authorities 'all the necessary information to carry out [its] duties' and that it would establish and manage a central database accessible to colleges of supervisors<sup>22</sup>. As to the second question, the Commission proposal for the establishment of the ESRB stated that it should have access to all necessary information 'while preserving the confidentiality of these data'. Where this information was not made available, the ESRB would have the right to 'request data directly from national supervisory authorities, national central banks or other authorities of member states'<sup>23</sup>, a significant step forward. While stronger EU-level authorities are fully supported by the European Parliament, some national governments insist that supervision should remain firmly rooted at national level, since decisions may have budgetary consequences.

#### *4.2 Liquidity support*

Scholars and practitioners were concerned that the Eurosystem would be unable to provide effective liquidity support in times of crisis. It was feared that if the ECB had no strong clear, lender-of-last-resort mandate, information asymmetries would hamper swift and sufficient liquidity provision. Writing in 1999 with reference to the treaty provisions and secondary legislation, Prati and Schinasi found that 'there is uncertainty about whether, in the event of a banking crisis across pan-European markets, there will be a central provider or coordinator of emergency liquidity' and that it is 'unclear how a fast-breaking liquidity crisis will be handled'.

Such fears proved unfounded. The ECB was the first central bank to react to signs of a drying-up of liquidity on the inter-bank market, and there was no evidence of difficulties in coordination between the ECB and the national central banks throughout the crisis. Furthermore, there was close coordination with the big central banks, including above all the Federal Reserve.

It was a significant achievement for the ECB to distribute tasks within the

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22. 'Proposal for a regulation establishing a European Banking Authority (EBA), COM(2009) 501 final, 23 September 2009.

23. 'Proposal for a regulation of the European Parliament and of the Council on Community macro prudential oversight of the financial system and establishing a European Systemic Risk Board' COM(2009) 499 final, 23 September 2009.

Eurosystem with little guidance from the treaty and to coordinate action across currency zones, despite the absence of prior formal agreements<sup>24</sup>.

#### *4.3 Deposit guarantees*

As mentioned in section 2, deposit guarantee schemes are national in scope and only loosely harmonised. This lack of coordination involved the risk of deposit flows towards countries offering better guarantees, and of intra-country flows from banks headquartered in countries with weak guarantee schemes to those based in countries with better ones.

The Irish government's unilateral decision in September 2008 to guarantee all deposits to the country's main banks was perfectly legal, as EU legislation provided for minimum guarantees only. Yet the move was still regarded as unfair. The risk of deposit outflows was considered significant enough for other governments to hint at similar moves, which resulted in the swift adoption of a new, higher guarantee threshold across the EU. Predictably, there was a competitive drive to raise guarantees before they were harmonised more closely at the higher level. Less predictable was that only three working days elapsed between the Irish decision and the ECOFIN Council response. The previous failure of coordination was remedied fast enough to prevent a run on banks in countries with weaker protection.

#### *4.4 Bank rescue and restructuring*

Prior to the crisis, there were no advance provisions for coordinating the rescue and restructuring of banks, other than general competition policy provisions for state aid to individual companies, which were not designed specifically with financial stability in mind. Financial stability was regarded as a national competence. The lack of any common framework to guide government action even loosely involved two significant risks:

- First, that uncoordinated and therefore inadequate national action would compound financial instability. The piecemeal introduction of separate guarantee or rescue schemes could have created confusion in times of panic and could definitely have aggravated it. Market reactions to the failure to coordinate activity effectively in the first week of October 2008 suggest that this was a real threat.

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24. The only caveat concerns the handling of cross-border externalities vis-à-vis the new member states. As already indicated we do not address the issue in this paper, but it deserves to be mentioned.

- Second, that legitimate national action to safeguard stability would result in a drive to subsidise, severely distorting competition and perhaps fragmenting the single market.

As the EU had no legal power to devise a coordinated response, action was initially based on *ad hoc* coordination. The October 2008 Paris Declaration was a declaration of intent that could do no more than encourage market confidence until it was followed up by national action plans. Even the ECB recommendation on the pricing of guarantees was purely *ad hoc* advice by its governing council, with no firm legal basis. This was a triumph for discretion over rules.

At the implementation stage, national actions, mainly in the form of state aid, could be monitored in accordance with a provision in the EU treaty. This stated that aid to 'remedy a serious disturbance in the economy of a Member State' could be considered compatible with the common market (Art 87-3(b)). The provision gave legal support to a temporary weakening of state aid rules and the monitoring of national aid by the European Commission under competition policy regulations. In the Banking Communication of 13 October, the Commission indicated that EU countries would 'have to show that the State aid measures notified to the Commission under this framework are necessary, appropriate and proportionate to remedy a serious disturbance in the economy of a Member State' and set precise criteria for assessing various forms of assistance to banks. This was the revenge of rules over discretion.

Coordination thus relied on a combination of *ad hoc* plans which were politically but not legally binding, and on treaty-based monitoring by the Commission.

The effectiveness of this monitoring mechanism has been evaluated several times. A self-assessment by the Commission Directorate-General for Competition (DG Competition) published in August 2009<sup>25</sup> indicated that its objectives had generally been met. However, it echoed concerns over cross-country differences in the pricing of guarantees (in spite of common principles) and the fact that national support was (plainly or implicitly) conditional on extending credit to domestic customers, thereby leading to single market fragmentation. An independent evaluation agreed that 'DG Competition has acted expeditiously and in a way that has proved sensitive to the urgency and the importance of the challenges posed by the financial crisis' (Beck *et al*, 2010 p. 64).

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25. DG Competition's review of guarantee and recapitalisation schemes in the financial sector in the current crisis, 7 August 2009, available at [http://ec.europa.eu/competition/state\\_aid/legislation/review\\_of\\_schemes\\_en.pdf](http://ec.europa.eu/competition/state_aid/legislation/review_of_schemes_en.pdf).

DG Competition's chief economist Damien Neven believes that, in assessing national state aid to the financial sector, the Commission draws 'a distinction among distressed banks between those that are in distress because of a defective business model and those that happened to be distressed because of the systemic effects, while pursuing a fundamentally sound business model. Mandatory restructuring is imposed on the former, and the restructuring plans can potentially be designed in such a way as to address problems of moral hazard and distortions in the incentives to compete for competitors' (Neven and de la Mano, 2009, pp 345-346). Initially, the Commission decided not to object to any national state aid to the financial sector, which was probably wise during the crisis. However, decisions by the Commission are usually reviewable after six months. This means that the first set of reviews for cases initiated under the October 2008 Banking Communication started in April 2009. Reviews can lead to either a prolongation or a formal investigation of the state case, whose eventual outcome is prolongation, termination or prolongation conditional on mandatory restructuring.

On 29 June 2010, the Commission ordered restructuring in four cases begun since October 2008, concerning state aid to Dexia in Belgium, France and Luxembourg, KBC in Belgium, Landesbank Baden Württemberg in Germany, and ING in the Netherlands. It was also investigating nine other cases<sup>26</sup>. Banks have been told to adopt remedies aimed at restoring their long-term viability, which typically involve reducing the scope of their activities and focusing on their core activities.

Dewatripont *et al* (2010) propose building on the successful intervention by DG Competition during the banking crisis to improve bank resolution in the EU. While calling for the creation of a European banking resolution authority, they recognise that this will probably be a long process. In the meantime, DG Competition could promote the coordination of national efforts to achieve resolution wherever cross-border banks are involved. If so, its role would be that of avoiding not just distortions in the level playing field of the single market but inadequate resolution of banks operating within it.

#### *4.5 The treatment of pan-European banks*

As indicated in section 1, the EU architecture before the crisis was weak because it included no framework to deal with the possible failure of a cross-border institution. Concerns were raised about the lack of incentives to share information and the lack

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26. In 2008 and 2009 the Commission had already imposed mandatory restructuring on four of the five banks cited in footnote 5. The fifth (Roskilde Bank) was liquidated.

of provision for anticipatory burden-sharing [Freixas, 2003, and Véron, 2007]. When the crisis developed, there were widespread demands or suggestions for concerted action to devise a European solution to the crisis of pan-European institutions [Alesina *et al*, 2008, and Gros and Micossi, 2008].

Yet calls for burden-sharing in advance were consistently rejected by EU countries. Even the suggestion that they might all contribute to a compartmentalised fund without exercising joint responsibility fell on deaf ears. Despite the severity of the crisis and the high risks involved in the failure of a large cross-border financial institution, governments insisted that there was no European taxpayer and that all support to the banking sector had to be national.

This did not prevent the bail-out of two big institutions with significant cross-border operations, Fortis and Dexia. True, Fortis was broken up along national lines at a cost to its (private) shareholders, but no systemic cost, while Dexia was jointly rescued by three EU countries. Both cases were also fairly simple, as each involved only three member states.

#### *4.6 Financial protectionism and the preservation of the single market*

Conditions were attached to national government intervention in support of national banks. Purely anecdotal evidence suggests that banks receiving government support were often encouraged to continue lending to their domestic clientele, so that foreign customers would bear the brunt of any balance-sheet adjustments. Although, politically and economically, this was the logical consequence of banks being able to rely on the public purse, rather than of an explicitly protectionist attitude, it could have triggered a move towards financial fragmentation. However, there have been no real signs of any firm retreat behind national borders.

A more serious threat came from the Landsbanki episode which ‘revealed that the present regulatory approach to the European single market in retail banking is unsafe and untenable’ (Turner, 2009). A bank headquartered in Iceland, Landsbanki had passporting rights to operate as a branch in the European Union, and so was primarily supervised by its Icelandic home supervisor<sup>27</sup>. Thus when the bank collapsed in October 2008, the protection of depositors in EU branches (in the Netherlands and the United Kingdom) was dependent on the fiscal capacity of Iceland and the resources of its deposit insurance scheme, both of which were inadequate. In the words of Lord Turner, chairman of the British Financial Services

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27. This is because EU single market rules cover Iceland as a member of the European Economic Area (EEA).



Authority, 'faced with that reality we either need more European coordination or more national powers – more Europe or less Europe – we can't stay where we are'. Either the EU can adopt Europe-wide measures to assess how effectively home countries supervise banks wanting to conduct retail business through branches in other EU countries, or those banks will have to operate abroad through subsidiaries fully supervised by host countries, which would mean the end of the EU single market in retail banking.

## 5. Conclusions

The purpose of this paper was to assess the management of the banking crisis in the EU against the backdrop of pre-crisis institutional arrangements that were found to be clearly sub-optimal. Three conclusions emerge from our assessment.

First, the crisis has been managed in accordance with the allocation of responsibilities within the EU. The ECB and national central banks outside the euro area have acted as liquidity providers, national governments have dealt with financial stability, and the European Commission has enforced competition disciplines. Although some of these players, notably the ECB, have not followed every prior regulation to the letter, none has gone beyond its original remit. In particular, there has been no EU financial bail-out of ailing transnational institutions, or even a genuine stress test of European banks. Neither has management of the crisis prompted any meaningful move towards federal solutions, moderate or otherwise. Decisions taken to strengthen the pan-European supervisory agencies have all been more recent.

Second, coordination problems have been dealt with by combining *ad hoc* discretionary cooperation with reliance on existing instruments, especially those of competition policy. It is remarkable that coordination has not been seriously impeded by the location of the main financial centre, London, outside the euro area. However, it is hard to assess whether the EU has managed to deal with the foregoing problems because *ad hoc* coordination was all that was needed, or because the problems themselves were fairly simple. Fortis, the most complex case of cross-border failure, involved only three countries each of which had a long tradition of cooperation.

Finally, the better-than-expected performance of the EU is no cause for complacency. The fairly positive assessment of it here relates to a context which is indeed 'suboptimal'. Scope for further improvement remains huge.

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## Comments on 'The European Union and the management of the banking crisis' by Jean Pisani-Ferry and André Sapir

THOMAS GLAESSNER<sup>1</sup>

What makes any study of crisis containment and resolution, and the related options, more complex in Europe is the diverse and complex set of countries that make up the European Union, each of different size and existing in a different fiscal space. The fiscal resources to devote to a banking crisis in Ireland, Austria and Germany clearly varied *ex-ante*. This point was not lost on investors in the capital structures of either pan-European or non-pan-European banks. In essence, the organisation of a currency union where capital is mobile, yet fiscal policy is independent, will always be tested in a moment of crisis. The balance sheets of banks, households and corporates all came under stress and often were impacted across borders.

In effect, European countries have not had an explicit system of fiscal transfers and associated coordination of policies when addressing financial stability issues. In my comments, I suggest that the crisis should prompt the establishment of a much more rapidly acting and coordinated response infrastructure for facing the next financial crisis. After quickly summarising the paper by Pisani-Ferry and Sapir (2009), I discuss seven key areas for reform that I think both Europe and the United States will have to address if they are to promote greater safety and soundness across the Atlantic. In all these areas, coordination and sequencing of the exit will not be a completely smooth process. In some areas special care will be needed.

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1. Citigroup. The author's remarks are strictly his own and do not reflect the views of Citigroup.

## Institutional constraints going into the crisis:

Pisani-Ferry and Sapir (2009) correctly identify the challenges that coordination failure could have caused both for addressing the crisis and for the post-crisis situation. The authors list, correctly in my view, six specific areas where institutional arrangements for crisis management in Europe were found wanting:

- 1) **Information asymmetries** between financial institutions (FIs) in Europe and the investor community and general public, which the authors argue have not been adequately addressed. This is a transatlantic issue: even in the US after the stress tests this same issue is prevalent. I return to discuss this issue in some detail in my discussion of the road ahead, below.
- 2) **Disparate national deposit-insurance regimes** characterised the EU both with regard to the extent of coverage and value/extent of the guarantee, as well as pricing.
- 3) **Unspecified lender-of-last-resort (LOLR) role of the European Central Bank:** I agree with the authors that this was one factor that did not help in achieving a fast response. However, once the ECB and US Federal Reserve better coordinated their approaches to foreign exchange swaps and LOLR more generally, actions were taken speedily and involving many central banks around the world, and these actions exceeded market expectations.
- 4) **Potential disparity in liquidity provision across currency areas.**
- 5) **Clashes between state support to financial entities and competition policy and/or burden-sharing in the EU.** I will argue that, as European countries come out of the crisis, this continues to be an issue in terms of degree of intervention by the state in the operation of certain banks, particularly those receiving government support. In saying this, I am not suggesting regulatory forbearance is warranted, but rather that care is needed because these interventions are designed not to create increased uncertainty for holders of the capital structure and liabilities of banks at a very sensitive and fragile time in the course of the recapitalisation of these entities.
- 6) **No common war chest for recapitalisation operations of pan-European FIs.** This issue remains open. At the time of writing, no pre-agreed fiscal transfer arrangements and funding, or responsibility for oversight and implementation, were in place. In my view, Pisani-Ferry and Sapir are correct to identify this as a very important action to be taken up front in order to signal that future recapitalisations of pan-European entities can be done speedily. However, this

pot of resources must be linked to the real possibility of aggressive failure resolution for any pan-European bank.

- 7) The authors do not say enough about the fact that there was and still is no over-arching prompt corrective action (PCA) framework providing extra-judicial authority for resolution of systemic FIs in Europe. Moreover, whatever regime is developed, it needs to be consistent across countries. The political economy within each country to effect such change is complex and country-specific. In practical terms, complexities across the legal systems of countries in the region regarding the form legislation would have to take and the issues that surround empowering an agency to circumvent bankruptcy law (civil versus common law) are a barrier to achieving this in practice.

### Performance during the crisis

On the other side of the Atlantic, investor expectations were not high regarding the European response because the political economy of coordination seemed to many to be difficult. Initially, investor confidence was shaken by early developments, such as delay in setting up the swap lines in dollars; the collapse of the Icelandic banks; unilateral action by Ireland to implement blanket guarantees without adequate consultation with other countries in the region; the Fortis crisis or perceived problems with other pan-European banks; and slow official response. Pisani-Ferry and Sapir in my view are correct to assert that the authorities in many European countries and the ECB did in the end respond massively and in a far more coordinated manner than the market expected.

The only omission I feel the authors make in describing the crisis-management performance was the very great importance of the International Monetary Fund as a stabilising force for the entire European region (including the EU) in the cases of Iceland, the Baltics, Hungary and even Poland via the Flexible Credit Line. The crisis-management role played by the IMF on behalf of European countries, that did not want to have to place conditions on their neighbours inside or outside the EU, has been and will continue to be highly significant and is likely worthy of some mention.

The authors might do more to document in detail the exact way in which the facilities run by the ECB work, and provide one detailed table showing collateral requirements, haircut criteria and financing arrangements relating to liquidity provision to banks. Their approach could be contrasted with the detail provided by Krozner *et al* (2009), who describe in great detail all the arrangements the Fed employed. More detail would make the very different approaches of the two

institutions very apparent, with the duration of the loans made by the ECB being shorter, but the types of collateral taken and its quality much broader than the Fed's facilities. In addition, the ECB's intervention, with loans made at one percent, helped to overcome the fiscal transfer problem, as this is an implicit way to allow banks to recapitalise themselves with greater speed without explicitly agreeing and making public the fiscal transfers needed between countries to address the fiscal stress caused by banks in some countries that are very large (such as UBS in Switzerland). The forms of intervention used by the ECB will make exit to some degree less onerous than for the Fed.

### **The road ahead: learning from the crisis in Europe and the US**

Pisani-Ferry and Sapir identify four areas in which work is needed: i) information asymmetries and will European stress tests have any bearing on this issue? ii) is the division of responsibilities adequate for addressing the next crisis, and should the ECB or Financial Stability Board (FSB) take on a new role looking at systemic stability in the region, with powers to act? iii) is the risk of zombie banks real and is the ECB trapped in cheap liquidity support? iv) how will supervision of pan-European markets be coordinated? I consider all these areas to require better and more effective and timely institutional arrangements and agree with the authors. However I think that in common with the US, before tackling these important issues, there are seven fundamental areas that this paper might try to address or weave into the arguments relating to European arrangements for financial-crisis management – and where the links are weakest in terms of building a forward-looking agenda.

#### *1) Sequencing and exit:*

In Europe the currency union and integrated capital account and financial markets make it very complex to take 'independent approaches' to withdrawal of a) liquidity support; b) capital support; c) liability support (guarantees of liabilities); d) changes in deposit insurance coverage and/or pricing; and e) micro-prudential regulatory changes (leverage/capital and provisioning changes that allow for building of a buffer in good times, and liquidity restrictions). When capital is highly mobile, changes undertaken unilaterally in any of the above policy areas can create potentially significant cross-border flows of capital, even if growth is improving across the region. In fact, in emerging-market crises one has a laboratory for examination of many of these exit and sequencing issues. For example, in the 1995



Mexican financial crisis the authorities sought to only unwind the blanket guarantee of liabilities once they had very carefully strengthened and restructured the balance sheets of their banks. Also, sequencing and timing do not need to be coordinated everywhere in all areas.

However sequencing and timing do matter a lot, because of the particulars of different countries' financial institutions and whether they are in the process of strengthening their capital bases or improving their funding and liability structure. In this regard authorities have to keep it simple and not overly micro-manage banks or financial service entities, and not impose measures now that will hinder incentives to lend at the margin at this stage in the cycle.

Central banks face formidable challenges in communicating in a balanced manner when they see the need to take action to retract liquidity or to undertake macro-prudential action. Presently, many central banks are trying to establish valuation and other models to try and measure and establish when markets are becoming 'irrational' and when 'bubbles' are forming. The ECB and the Fed are experimenting with ways to see how excessive compression in credit spreads impacts the actual process of credit origination and leads to increased prospects of stress and deterioration in credit quality. Even if these links can be established, there is the additional challenge of deciding what actions should be taken at a micro-prudential level versus more macro interventions that can entail outright removal of liquidity or a change from an accommodative to restrictive stance in monetary policy. Research in this area, and into micro-market structure, will be important in the months and years ahead, but central banks must be extremely cautious about the speed at which liquidity is removed.

## *2) Asymmetric information, write-downs and European stress tests:*

The inability from a macro-fiscal political economy vantage point for European nations to make public ongoing stress tests is understandable for several reasons. First, there is no pre-agreed fiscal agreement setting out a formula for burden-sharing and establishment of a related capitalisation fund *ex-ante* (as noted by the authors) to deal with pan-European banks. Second, the political economy of disclosing these losses and the process of recapitalisation are made more complex because law in many EU countries makes dilution of existing shareholders via new equity issuance much more complex than in the US, implying that the response to any public disclosure of capital needs would be more uncertain. However reasonable such considerations for not disclosing more information about the condition of portfolios might be, the relatively less aggressive approach to write-

downs and capital raising, coupled with the lack of information in Europe, leads to concern for many investors that there is some 'papering over the cracks'.

There is (as the authors suggest) concern over zombie banks. Despite the ECB's massive liquidity/solvency-enhancing operations via its special liquidity facility that has been a *de-facto* aid in recapitalisation, one has to wonder how quickly European banks compared to US banks will make new loans as demand resumes. The lesser write-downs in Europe can act as a drag on new lending. It is important to note that development of a system of cross-border resolution will be as important in Europe as it will be in the US (see point 5 below) as it can allow authorities to impose holding actions (elimination of payment of dividends, share buybacks, restrictions on forms of lending or other asset operations and limiting compensation) far earlier than was the case in the current crisis. A credible threat of a wind-down and actual resolution will, along with other actions noted below, bring more into question the relative advantage of large size.

### *3) Burden-sharing in official support and competition policy:*

Regulatory and other burden-sharing or competition-policy intervention in banks that are getting meaningful government support (eg Royal Bank of Scotland) has to be handled with care. Recent interference in the pricing of loans (Northern Rock), or actions to force banks to cease payment of interest or dividends to certain claim holders, could set off a new round of uncertainty for holders of different classes of claims in the capital structure. The current environment is still one of repair for the banks. Recent speeches by Bank of England governor Mervyn King and others have suggested that banks as we know them will have to change and become smaller. Many are asking if adequate competition is held up by the concentration and size of financial conglomerates or Too-big-too-fail (TBTF) banks. Others argue (Volcker *et al*) that certain services should not be part of the banks (eg proprietary trading operations). Yet market-making does require by definition some position taking.

What seems likely, however, is that US entities that are still receiving official support may find it naturally attractive to consider voluntary divestiture of certain business lines as a means of optimising shareholder value, if the marginal benefits of sheer size become less clear. A number of factors could act to lessen incentives to be 'large or TBTF', including higher liquidity and capital requirements for systemically important FIs; tougher supervision; more aggressive competition policy thresholds; a more credible threat that being large will not allow an implicit extension of the safety net; and greater interference in compensation.

#### *4) Capital, leverage and liquidity buffers:*

The capital, leverage, and liquidity buffers for European and US banks are going to be a very important area worldwide. However, to what degree is it appropriate to launch new initiatives in these essential areas now, when banks are already tending to hoard cash? Despite the best efforts of policymakers to phase in these changes as financial institutions continue to de-lever and recapitalise, the time to implement is in the midst of the crisis because this is the point when consensus can be obtained to improve the quality of capital. However, these actions will reduce the return on assets, delay normalisation in credit markets and make overall growth less robust, everything else being equal.

As well as the level of capital and the precise definition and level of the liquidity buffer, and the ability or not to include required or excess reserves, there is the issue of the precise definition of leverage. For example as has been shown by Matt King *et al* (2009), a leverage criterion based on total assets versus risk-weighted assets will tend to force larger adjustments and capital needs on European banks compared to US banks, along with differential extent of write-downs. Table 1 illustrates the substantial difference.

#### *5) Fiscal transfer arrangements, prompt corrective action (PCA) and prompt resolution (PR):*

*Ex-ante* fiscal transfer arrangements need to be put in place in Europe. This area is not discussed in sufficient depth in Pisani-Ferry and Sapir (2009). The large number of EU countries, and their different sizes and fiscal positions, were key impediments to coordination of support to be provided to pan-European banks. Furthermore, I would agree with the authors' desire to develop an *ex-ante* recapitalisation fund that likely presumes some form of background cross-country fiscal arrangement. These arrangements and the relationships, roles and responsibilities of the ECB, EU, IMF and home-country regulators in the event of a banking crisis within or across borders, needs to be better organised. The authors may want to provide a clearer vision of how this could be done.

The G20 initiative that all banks should have contingency plans, and should have developed a form of 'living will' with sufficient detail so that it can actually be executed rapidly, can help authorities in their own contingency planning in the event of another crisis. However is this entire concept realistic and what is needed to make it a reality? I think a very long road lies ahead, but I think it is better to attempt to come up with a decent PCA and PR regime, even for very large banks, than to ignore the problem. For example, designing a PCA and PR regime across

Table 1: Some indicative calculations for capital needs under different asset concepts

| US\$, bn                                                                     | United States | Euro area | United Kingdom | Other mature europe |
|------------------------------------------------------------------------------|---------------|-----------|----------------|---------------------|
| Estimated capital positions at end-2008                                      |               |           |                |                     |
| Total reported writedowns to end-2008                                        | 510           | 154       | 110            | 70                  |
| Capital raised to end-2008                                                   | 391           | 243       | 110            | 48                  |
| Tier 1/RWA ratios at end-2008                                                | 10.48%        | 7.30%     | 9.20%          | 7.30%               |
| TCE/TAend-2008                                                               | 3.70%         | 2.50%     | 2.10%          | 2.30%               |
| Scenario bringing forward writedowns                                         |               |           |                |                     |
| Expected Writedowns 2009-10 (1)                                              | 550           | 750       | 200            | 128                 |
| Writedown-adjusted Tier 1/RWA ratio                                          | 6.70%         | 1.10%     | 4.70%          | 1.70%               |
| Writedown-adjusted TCE/TA                                                    | 0.10%         | -0.20%    | 0.40%          | 0.50%               |
| Allowance for expected earnings                                              |               |           |                |                     |
| Expected net retained earnings 2009 and 2010 (after taxes and dividends) (2) | 300           | 600       | 175            | 100                 |
| Net drain on equity (retained earnings) 2009 and 2010 (3) = (1) - (2)        | 250           | 150       | 25             | 25                  |
| Equity requirements                                                          |               |           |                |                     |
| Equity needed to reduce leverage to 25 times                                 | 275           | 375       | 125            | 100                 |
| Equity needed to reduce leverage to 17 times                                 | 600           | 725       | 260            | 225                 |

Europe will require that certain agencies (home-country regulators or maybe some multinational entity in case of pan-European entities) be given extrajudicial authority to take action quickly to pre-empt crises.

PCA would include the right to limit dividends, control salaries, eliminate share buybacks and control the nature and timing of asset operations (so called holding actions). There would need to be some clear indicators for taking such regulatory supervisory actions, which could be monitored in a credible manner by supervisors. The process of identifying when to take action will not be independent of the quality and timeliness of information on asset values and inter-connectedness, given reforms in such areas as OTC derivatives, which I discuss below.

#### *6) Treatment of inter-connectedness or intermediation chains:*

Pisani-Ferry and Sapir (2009) are strangely quiet on an issue that lies at the heart of the recent crisis: the inability of authorities (and market participants) to understand well the true extent of counterparty exposures and the distribution and size of losses. This is what Krozner *et al* (2009) correctly call intermediation chains, and what the IMF has referred to as inter-connectedness. FIs throughout the world undertake complex derivative operations in areas such as commodities, equities, rates, foreign exchange and credit contracts. Several very concrete actions deserve to be mentioned.

First, all systemically important FIs have been asked by regulators to provide very detailed information on all forms of OTC derivatives into a data warehouse. This information is also being required of the FIs in Europe that have been deemed systemically important. This information, when combined with that which depositories and clearing corporations already have, will allow regulators (if the data is properly analysed, which is easier said than done) to have a much better picture of inter-connectedness.

Second, there is a strong push by regulators to encourage most banks and other dealers that are non-banks to increasingly clear and settle all OTC derivatives via 'well capitalised' CCPs. This is being asked even for many forms of contracts that did not present challenges at the height of the crisis. Specifically, in the case of both CLS and Swap Clear (of LCH) that apply to foreign exchange and rate derivatives respectively, the stress of the financial crisis was handled relatively well. The efforts in the US and elsewhere to ensure that CDS and other credit contracts are also cleared and settled properly, and are subject to multilateral netting via CCPs, will be an improvement. These actions will make it easier for regulators to have a much more complete picture of net exposures between FIs.

Third, the relationship and adequacy of capital, and related efforts to assure proper risk management across what appears to be many CCPs, will not be trivial. Many exchange and clearing and custody depository entities have become for-profit corporations (rather than utilities). They issue shares and try to maximise shareholder returns. These CCPs not only concentrate risk into a single point of failure, but, given the new organisational and governance structures in place, there is some scope for abuse across and within countries. Specifically, FIs could gravitate to use of CCPs that do not have adequate risk safeguards (or even adequate capital). Hence very strong supervision will be needed. In my view central banks have to play a major role in the supervision of such systemically important entities as CCPs.

Fourth, there is the issue of whether and when a derivative contract is sufficiently standardised so that it should somehow be exchange traded as well as cleared and settled via a CCP. This could even apply to so-called end-users of derivatives rather than only dealers. Authorities, especially in the US, are seeking to force this issue by charging differential capital requirements to create incentives for dealers to bring as many contracts onto exchanges as possible. Needless to say many companies, that use all kinds of forms of derivatives to hedge, will argue that they will have to pass these costs on to final consumers in the prices of the products they sell. These changes will impact their competitiveness.

Fifth, there are many contracts that will not warrant use of a CCP and trading on an exchange because they cannot be seen as standardised even if they may appear so. An example would be FX options (FXOs). There will be non-trivial challenges if they are to be put into a CCP versus a more sophisticated trade-matching system like CLS 2. Specifically, for FX option contracts to be placed on an exchange and cleared and settled, it will require that virtually all large dealing banks agree on the precise mathematical surface to be used to price these contracts (where today this is proprietary for each dealer). A massive number of OTC FX options would have to be re-valued intra-day and daily. Agreement on initial and variation margining would also have to be sought where there is an infinite array of currency pairs, strikes, expiration dates and expiration times specified in such FXOs. Many industry participants will wonder why such actions are needed when the crisis showed that the CLS system performed very well.

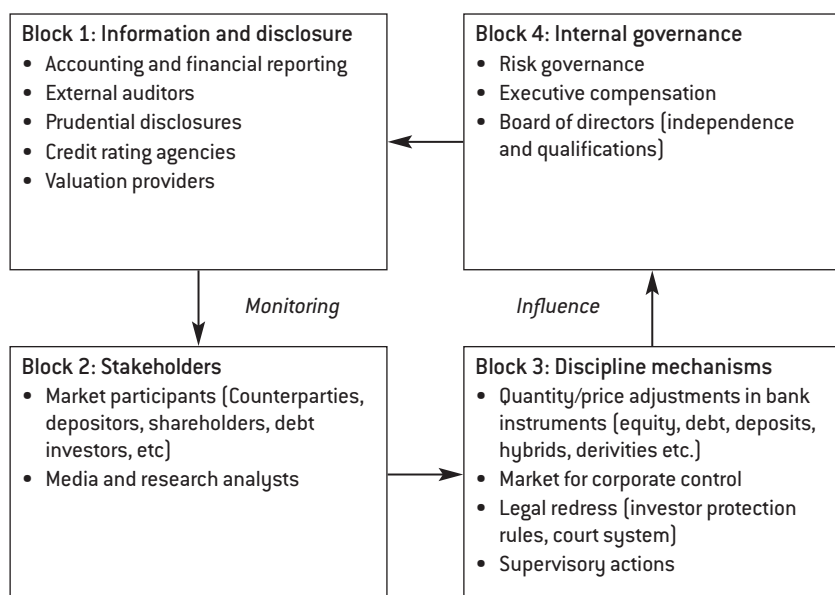
## Revisiting the market discipline model to make it more effective

Valuation metrics, quality of information and risk governance all deserve far more attention than has been typically reported in the press. Figure 1, taken from a recent

World Bank publication (see Constantinos Stephanos, 2009), does a good job of schematically presenting how market discipline can interact with the regulatory framework to create marginally more effective incentives to discipline FIs. The crisis illustrated that there were certain self-reinforcing incentives (collateral calls in CDS contracts linked to rating downgrades) that likely deserve critical review. In addition, the issue of how to value assets is absolutely fundamental. Across the Atlantic, the approach to fair-value accounting will condition how binding or not the many planned G20 reforms will be. Here, the extent to which views on fair-value accounting and principles for valuation are different across the Atlantic will be fundamental to any progress. In addition, any quick look at the Federal Financial Institutions Examination Council data on banks and 10-Ks that analysts are forced to use shows that information and disclosure processes for complex FIs deserve far more attention. Many analysts properly point out that much of the data that is provided by FIs lacks the granularity that is needed to verify the statements of accounts provided.

One example from the mortgage loan sector vividly illustrates the challenges. Today there is not even enough information about the specific vintages of different mortgage loans to permit better analysis of the extent of asset quality deterioration for mortgage loans by vintage. Finally, the increasing complexity of presentation of accounts and footnotes only adds to the extent of asymmetric information about

Figure 1: The elements of market discipline



FIs, making market discipline less effective as a disciplining device.

A second critical area that will need to be improved on a transatlantic basis concerns the function of risk governance. Too often, the risk manager was captured by the traders in many FIs. Often, risk managers were not paid enough and were not independent enough or skilled enough to spot and deal with the abuses. At the level of bank boards, too many board members were not chosen on the basis of their excellence in understanding more sophisticated contracts and risks, such as those associated with complex derivative and correlation trading. There is already some evidence that in many FIs the function of Chief Risk Officer (CRO) is getting more stature, and the procedures within trading for crossing-referencing information between many trading-product heads is becoming far more effective.



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# US and EU reform efforts to improve the management of systemic financial risk

GARRY SCHINASI<sup>1</sup>

## I. Introduction and road map

Against the background of US and EU proposals for financial sector reforms, this paper addresses four questions:

- What was the framework for safeguarding financial stability in which the global crisis occurred and systemic weaknesses revealed by the crisis?
- What are the key broad-brush lessons to guide reform efforts?
- What reforms have been proposed to deal with weaknesses and are they likely to be sufficient?
- What are the key unaddressed areas that require re-thinking before genuine sustainable reform can be achieved?

Before addressing these questions I am obliged to identify some personal intellectual biases.

First, with the benefit of hindsight, and without suggesting it could have been otherwise in real time, it is not difficult to make the case that the global systemic

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1. IMF and Visiting Fellow at Bruegel. Some of the material in the paper reflects ongoing work with Vitor Gaspar, to whom I am grateful, including for commenting on an earlier draft. I am also grateful to Axel Bertuch-Samuels and Peter Garber for their insights, many of which are incorporated in this published version. The views expressed in the paper are entirely personal; they do not represent the views of the IMF or its staff, management, executive board, or governing board; and they do not represent the views of Vitor Gaspar or the European Commission.

crisis was preventable. The crisis was in no small part the result of many self-inflicted wounds, which together increased systemic fragility and ultimately led to systemic events. Some of these problems initially emanated from both private incentives and official policies and decisions and later were the result of mis-assessments of systemic risk and the mis-handling of some aspects of crisis management.

Second, although asked to write a paper focusing on macro-prudential issues, in thinking and writing about these issues I found it difficult to avoid thinking about micro-prudential issues. Why? In a global financial system that will remain vulnerable to weaknesses in large and complex systemically important financial institutions (SIFIs), it is not practical from an operational standpoint to neatly distinguish between micro- and macro-prudential aspects of finance and financial policies. It is a macro-prudential risk that an individual SIFIs will not be adequately supervised. Because of this, my preference is to see the reform challenge as trying to improve our ability to identify and manage systemic financial risk, which is a broader challenge requiring in many instances oversight activities that entail what are traditional micro- and macro-prudential efforts.

Third, in crafting reforms for safeguarding financial stability in the future, the redesign and realignment of incentives is fundamental. The paper does not dwell on this subject, however. Suffice it to say that the incentives that drive the behaviour of both private actors in finance and officials in their oversight responsibilities must each be altered in significant ways if financial-system resilience is to be improved and if supervision and regulation are to be effective in preventing and resolving systemic crises. Accountability is another area requiring fundamental reform efforts.

Fourth, perhaps because I worked in a central bank for a decade, it is my judgment that monetary and financial stability go hand in hand. In the absence of one, the other is at risk. As the past two years demonstrated, central banks that conduct monetary policy in fast-paced modern financial markets dominated by a relatively small number of large, highly complex financial institutions cannot properly maintain monetary stability without also having the capability to help manage financial stability if and when necessary. Despite their different mandates and architectures, the admirable policy efforts of both the Federal Reserve System and the European Central Bank in restoring stability to financial markets is evidence to me that my bias leans in the right direction.

The paper proceeds as follows. Section II describes the pre-crisis framework for preventing systemic problems and crises and for managing and resolving them when prevention fails. It also discusses the weaknesses in the framework revealed

by the global crisis. Section III provides some broad reflections or lessons from the crisis for the reform efforts that are now in train. Section IV briefly describes and evaluates the reforms under consideration in the United States and being proposed by the European Commission for pan-European consideration. Section V concludes the paper by discussing some unaddressed challenges.

## II. The existing policy framework and its systemic weaknesses

Existing policy frameworks for safeguarding financial stability have evolved through time based in part on the realisations that finance is subject to market imperfections and that financial stability is a public good. Frameworks differ across countries, but there are important common features among them. These common features can be portrayed as a series of lines of defence against financial imbalances that could arise, and have arisen often enough, from underlying structural market imperfections and unexpected shocks. The lines of defence have been designed to prevent imbalances from becoming systemic and to resolve systemic difficulties should one or more of the defences be breached. This section briefly summarises the existing framework within the context of cross-border finance although the framework presented is also a reasonable characterisation of existing national and regional frameworks in advanced countries and the major international financial centres.

### *A. The policy challenges and framework*

At many levels national, continental, transatlantic, and global the channels through which financial instability can be transmitted to the real economy or across borders can usefully be classified into the three broad components of financial systems: institutions, markets, and infrastructures. Financial systems also comprise the official monetary system with its official understandings, agreements, conventions, and organisations<sup>2</sup>.

Cross-border linkages of components of this triad can be seen as constituting the main channels through which problems in one national financial system get transmitted to another one. In addition to these financial channels, the global economy is probably the most basic and prevalent cross-border transmitter of economic or financial weaknesses, but this is the purview of macroeconomists and

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2. This characterisation of a financial system is an adaptation of the definition of the 'international financial system' in Truman (2003). Also see Schinasi (2006).

macroeconomic policymakers and not this paper.

To provide a specific context, Table 1 summarises some financial-sector public-policy issues and concerns around which the existing policy framework has evolved. Roughly speaking, the issues involve one or more market imperfections (or market failures).

More specifically, three broad global policy challenges arise to varying degrees from three potential channels of systemic concern<sup>3</sup>. The policy challenges, which make up the rows of Table 1, are protecting investors and market integrity; dealing with the consequences of safety nets and moral hazard; and assessing and mitigating cross-border and systemic risk. The three channels of systemic risk, which make up the columns of the table, are global financial institutions, FX and other global markets, and unregulated activities and entities, such as the activities of hedge funds and other institutional investors (such as insurance and re-insurance companies and pension funds), SIVs, and other special purpose vehicles.

All three policy challenges are relevant for banks generally and cross-border banks in particular. They are all also important for global markets. Investor protection and safety net issues are seen widely as not being relevant for unregulated entities, while the most recent crisis clearly indicates that unregulated entities can pose systemic risk.

Taking this classification as given, to what extent have the tools of financial policies been designed to address these risks and public policy concerns? Table 2 is one, perhaps exaggerated, way of answering this question. The columns of the table represent three important sources of global systemic financial risk: global financial institutions – primarily large, international banks/groups; global financial markets – FX, bond, and over-the-counter derivatives markets; and unregulated financial activities – including those of institutional investors (insurance, pensions, hedge funds).

Financial infrastructures – such as clearance, settlement, and payments systems – are also a source of systemic risk, but they are not discussed in this paper, in part because they performed well during the crisis. The large global banks typically are major participants in domestic and international clearance, settlement, and payments infrastructures – both public and private – as well as the major trading exchanges. Many of them co-own parts of the national and international infrastructures and have a natural interest in their performance and viability. Incentives are to some extent aligned to achieve both private and collective net

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3. Minimisation of the social costs of safeguarding financial stability and restoring it through crisis resolutions when it is lost is an additional important policy concern that is excluded from this lexicon.

Table 1: Public policy issues and concerns

| Policy Domain of Cross-Border Systemic Concern |                                          |                                                  |                                                                |
|------------------------------------------------|------------------------------------------|--------------------------------------------------|----------------------------------------------------------------|
| Policy issues and concerns                     | Cross-Border Institutions                | Global (FX) markets                              | Unregulated activities                                         |
| Investor protection/<br>market integrity       | Investor protection                      | Market integrity                                 | No; possibly for retail Investors (of funds)                   |
| Moral hazard from safety net?                  | Yes; and home/host burden sharing issues | Possibly from G3 central bank liquidity          | No                                                             |
| Cross-border and systemic risks?               | Maybe; depends on size, complexity, etc. | Yes, via OTC markets and infrastructure linkages | Yes?, via opacity, complexity, and w/ institutions and markets |

Table 2: Oversight framework

| Sources of global financial systemic risk |                               |                                           |                          |
|-------------------------------------------|-------------------------------|-------------------------------------------|--------------------------|
| Lines of defence                          | Global financial institutions | Global money and OTC derivatives markets  | Unregulated activities   |
| Market discipline                         | Partial                       | Primarily                                 | Exclusively              |
| Financial regulation                      | National with cooperation     | Not really, over-the-counter transactions | Nc                       |
| Prudential supervision                    | National and home/host issues | n.a.                                      | Nc                       |
| Market surveillance                       | Indirect, as participant      | Direct, national and international        | Indirect, as participant |

Source: Adapted from tables in Schinasi (2007), 'Remarks on causes and conditions for cross-border threats to financial stability', chapter in FRB Chicago Conference Volume.

benefits. Increasingly, however, internationally active banks have been more heavily involved in over-the-counter (OTC) transactions, which do not pass through these infrastructures. As is discussed, this poses systemic risk challenges many of which have surfaced dramatically in the ongoing global financial crisis. In addition, and as discussed more extensively by Peter Garber in his remarks on this paper, there are broader aspects of finance that can also be considered as part of the infrastructure that did pose systemic risks – such as the frameworks for risk management, the very notion of risk diversification, and segments of markets that provide ‘utility’ services to the broader market place, such as the repo market<sup>4</sup>.

The rows of Table 2 represent what can be characterised as lines of defence against systemic problems: market discipline – including private risk management and governance, along with adequate disclosure via financial reporting and market transparency; financial regulations – which define the rules of the game for transactions and relationships; prudential supervision of financial institutions and markets; market surveillance.

As indicated in the first column of Table 2 labelled ‘Global Financial Institutions’, large cross-border banking groups are within the perimeter of all four lines of defence. As such, these financial institutions are the most closely regulated and supervised commercial organisations on the planet, and for good reasons. These institutions pose financial risks for depositors, investors, markets, and even unrelated financial stakeholders because of their size, scope, complexity, and of course their risk-taking. Some of them are intermediaries, investors, brokers, dealers, insurers, reinsurers, infrastructure owners and participants, and in some cases many of these in a single complex institution. They are systemically important: all of them nationally, many of them regionally, and about twenty or so of them globally. Protection, safety net, and systemic risks issues are key public policy challenges. Oversight occurs at the national level, through both market discipline and official involvement, and at the international level through committees and groups.

At the other extreme of regulation and supervision are unregulated financial activities (and entities), as can be seen in the right-most column of Table 2. These financial activities and entities are neither regulated nor supervised. Many of the financial instruments – OTC derivatives for example – these unregulated entities used strategically and tactically are not subject to securities regulation. Moreover, the markets in which they transact are by and large the least regulated and supervised. This lack of supervision and regulation is often the basis for their investment strategies

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4. See the comments by Peter Garber in this volume.

and it defines the scope of profit-making. Unregulated entities (such as hedge funds and certain kinds of SIVs) are forbidden in some national jurisdictions. In jurisdictions where they are partially regulated, this is tantamount to being forbidden – given the global nature and fungibility of the hedge-fund business model. Some market activities of unregulated entities are subject to market surveillance just like other institutions, but this does not make transparent who is doing what, how they are doing it, and with whom they are doing it. Investor protection is not an issue for most individual unregulated entities, as they restrict their investor base to institutions (pension funds, insurance companies, hedge funds) and wealthy individuals willing to invest in relatively high minimum amounts. Probably beginning with the Asian crisis and then Long Term Capital Management (LTCM), and intensifying with the their tremendous growth over the past several years, hedge funds are increasingly being seen as potentially giving rise to systemic risk concerns.

Global financial markets – the third source of systemic risk identified in the middle column of Table 2 – fall in between being and not being regulated and supervised. What is meant by global markets? Examples are, the FX markets and their associated derivatives markets (both exchange-traded and over-the-counter) and the G3 fixed-income markets as well as others associated with international financial centres (pound, Swiss franc, etc) as well as their associated derivatives markets. Dollar, euro, and yen government bonds are traded more or less in a continuous global market, and the associated derivatives activities are also global.

Global markets are only indirectly regulated. They are subject to surveillance through private international networks and business-cooperation agreements, through information-sharing by central banks and supervisory and regulatory authorities, and through official channels, committees, and working groups. Parts of these markets are linked to national clearance, settlement, and payments infrastructures, so they are also subject to surveillance through these channels. The risks they potentially pose are less of a concern to the extent that the major players in them – the large internationally active banks – are supervised and market-disciplined by financial stakeholders. If there is poor oversight of the major institutions, then these global markets are subject to considerable risks, including a greater likelihood of systemic risk. One obvious example would be the global over-the-counter derivatives markets, which are unregulated and where there is little oversight except through the regulation and supervision of the institutions that engage in the bulk of these markets' activities. Both investor protection and systemic risk are challenging public-policy issues for these markets.

Table 2 goes as far as to summarise the policy framework in place for

preventing financial problems from becoming systemic. An additional aspect of the policy framework is crisis management and resolution of financial problems once they become systemic. This part of the policy framework entails the following key components: deposit insurance protection to prevent bank runs; appropriate liquidity provision by central banks to keep markets smoothly functioning; lender of last resort operations to prevent market dysfunctioning and illiquid but viable financial institutions from failing; and recapitalisation, restructuring, and resolution mechanisms (private preferred to public) to maintain orderly transitions for institutions that are not viable. This paper does not dwell on these important aspects of the lines of defence against systemic problems. One missing element is an effective framework for resolving potential systemic problems experienced by systemically important financial institutions – which is briefly discussed in the concluding section of the paper.

### *B. In the breach – what went wrong and why?*

Although the crisis is often characterised as being caused by the US subprime mortgage crisis, the US problem can be seen as symptomatic of an economic and financial environment that encouraged excessive leverage and risk-taking and a worldwide credit boom. As has been widely discussed, including in the press, many factors contributed to the crisis, so there is no need to repeat the long list here.

The main features of the crisis can be briefly summarised as follows:

- Dysfunctional markets for liquidity and their supporting derivatives markets, reflecting an underlying breakdown of trust in systemically important counterparty relationships among the large global active financial institutions.
- Dysfunctional credit markets and their surrounding derivatives markets, which create further pressures in markets for liquidity, which further increase the intensity of underlying creditworthiness issues.
- Growing perceptions of increasing risks of a prolonged and possibly deep US and global economic recession.
- Loss of control of monetary and financial conditions by key central banks in the major international financial centres, thereby reducing their ability to exercise their policy instruments to safeguard both monetary and financial stability.
- Innovative policy changes including the use of existing facilities in new ways (extended terms and access), extended facilities to nonbank financial intermediaries, and other innovations.



- Coordinated actions by advanced country central banks.
- Official financial support to both bank and nonbank financial institutions in the United States and Europe.
- US Treasury-led legislative initiatives to remove toxic assets and recapitalise weak systemically important institutions; many details unresolved.

What this list reveals is that the existing policy framework described – roughly comprised of reliance on a balance of market discipline and official oversight – and whose aim is to prevent systemic threats to financial and economic instability, failed to prevent and adequately resolve the kind of imbalances from arising that created systemic risk and systemic events. Moreover, the frameworks for crisis management and resolution proved to be inadequate. In short, the lines of defence against threats to systemic stability proved to be inadequate and were breached:

- Private risk management and market discipline failed and markets dysfunctioned, the result of a combination of imperfect information, opaque instruments and exposures, poor incentive structures, excessive leverage, inadequate governance/control by top management, insufficient *ex-ante* market discipline, and loss of trust.
- Official supervision failed to promote safety and soundness of major institutions.
- Market surveillance failed to identify the build-up of imbalances.
- Central bank and treasury tools proved to be too limited to address liquidity/solvency issues in restoring market trust and confidence.

There are several reasons why lines of defence were breached and why the policy framework and architecture failed, especially in its cross-border dimensions. These systemic weaknesses raise important questions.

First, the ‘perimeter’ covered by the various lines of defence was in many cases not wide enough. This is a multi-dimensional issue, but the most obvious sources of ‘perimeter’ failures were (1) off-balance sheet activities of the SIFIs, conducted through over-the-counter derivatives markets and embodied in unregulated special purpose vehicles; (2) the national orientation of prudential oversight; and (3) the bank (functional) orientation of oversight to the exclusion of other systemically important financial institutions (SIFIs). Key unresolved questions are: can the existing national frameworks be reformed to anticipate or to prevent problems in cross-border institutions or are new mechanisms necessary? In the transatlantic

or global spheres, for example, can international groupings and committee structures be reformed to provide sufficient early warnings?

A second source of breaches in the lines of defence is that the central banks in the major centres did not have all of the tools they needed to address the immediacy of liquidity problems in the modern financial system. Central banks fell behind the curve in understanding the liquidity-hungry nature of securitised markets and more importantly the changed nature and greater market orientation of systemic risk. Even if central banks had all of the necessary liquidity tools at their disposal, in this crisis, the underlying problems were excessive and badly managed credit/counterparty exposures which proved to be unsustainable. There are many economic and financial policy issues that need to be addressed in this area, but in the area of prudential oversight, two issues stand out:

- Central bank mandates for prudential supervision in all of the transatlantic financial centres fell short of what was required to prevent financial problems from becoming systemic and for dealing with the crisis once it was systemic. In the United States, the Federal Reserve does not have supervisory authority for all of the SIFIs operating in US markets as some of them were investment banks and insurance companies. In the United Kingdom, the Bank of England has responsibility for financial market stability but it does not have supervisory authorities and must rely on cooperation with the UK Financial Services Authority, which clearly was not effective. In the euro area, while some national central banks within the European System of Central Banks (ESCB) have supervisory powers the European Central Bank has no formal responsibility for financial supervision.
- Central banks had neither the comprehensive authority to obtain relevant timely information from all SIFIs and other unregulated financial institutions nor the authority to intervene (place in administration, liquidate, resolve) all SIFIs if and when necessary.

A third source of breaches of lines of defence was the absence of regional and global financing mechanisms to recapitalise systemic cross-border institutions when deemed appropriate and necessary.

A fourth related source of failure was that coordinated government efforts to recapitalise cross-border institutions (for example, Lehman Brothers) reverted immediately to national ring-fencing and solutions. Even in the case of Fortis in Europe, for which it can be argued that excellent pre-conditions for coordinating a

rescue existed between Belgium, Luxembourg, and the Netherlands, the financial resolution ultimately entailed each country individually ring-fencing and recapitalising the domestic pieces of the pan-European institution.

In summary, all lines of defence failed to identify early enough the build-up of overwhelming and unsustainable imbalances in SIFIs and in credit markets, including massive, opaque, highly-leveraged, and essentially unregulated financial structures and securities.

### III. Broad-brush lessons for prevention and resolution of systemic problems

Before moving on to a brief description and assessment of reform proposals, this section provides some broad reflections or lessons from the supervisory and regulatory failures described above. They pertain very broadly to the failures observed in crisis prevention and crisis resolution.

#### *A. Prevention*

In the United States, the Federal Reserve System was broadly conceived and has had since its inception the responsibility for maintaining both monetary and financial-market stability. It is the quintessential broadly-mandated central bank with multiple objectives – as opposed to the ECB, which is a narrowly-mandated central bank with a single objective<sup>5</sup>. The US framework or ‘architecture’ for identifying, monitoring, and assessing the potential for systemic problems has been in place for some time. Although other US agencies have regulatory, supervisory and surveillance responsibilities, system-wide risks fall within the responsibilities of the Federal Reserve System.

In the period 2004-05, it was reasonable to assume that the Federal Reserve was in a good position, with the mandate, tools, and able staff to make reasonably reliable assessments of systemic risk. And, given its explicit mandate, expertise, and resources, there was at least the possibility prior to the crisis for the Fed to monitor the activities of some of the most relevant financial institutions (both on- and off-balance sheet activities, and their market activities) and the build-up of credit and counterparty exposures that ultimately unravelled and which are still being de-leveraged<sup>6</sup>.

From this perspective, the US financial crisis can not reasonably be seen as

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5. See Folkerts-Landau and Garber (1992) on this comparison.

occurring primarily because it did not have a crisis-prevention framework. We now know it is deeply flawed and needs to be reformed. It is also safe to assume that even with a perfect architecture it would have been difficult to make accurate assessments in real time of the extent of systemic risks and vulnerabilities. At least some causes of the US crisis occurred because of inadequate execution of existing responsibilities for oversight of financial institutions and their financial activities in the key US and global money and short-term credit markets. These activities importantly include those in the US and global over-the-counter derivatives markets. Neither the Federal Reserve nor any other regulatory authority had oversight responsibility for over-the-counter derivative markets. These activities are unregulated.

However, the Federal Reserve does have oversight responsibility for some of the largest participants in these markets that were at the centre of the current global crisis. In addition, through its supervision of the major US participants, the Fed also has a window on many of the other major institutions and their activities, such as the investment banks and other institutional investors such as insurance, pension, and hedge funds. Moreover, the collapse of the hedge fund LTCM in 1998 was a wake-up call that over-the-counter derivatives markets embodied the possibility of systemic risks. Although the wake-up call led to many private and official groups to write reports recommending reforms of counterparty risk management and other reforms, the crisis passed without systemic consequences and few reforms were adequately encouraged and implemented.

The main conclusion from these observations is that prior to the crisis, US authorities (as well as the relevant authorities in all of the major financial centres) had supervisory and market oversight tools (via the market intelligence it gathers through its monetary policy operations and its relationships with primary dealers, etc) to assess systemic risks and vulnerabilities. They also had relevant experience in learning lessons from previous episodes of turbulence, and in particular the LTCM crisis, that modern financial markets are subject to systemic risk.

Yet, and in retrospect not surprisingly, safeguarders of financial stability in all of the major financial centres did not know how to achieve their mandates and carry out their responsibilities effectively. This stems in part from the lack of technical

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6. There are many Fed speeches and congressional testimonies in which the Fed's responsibilities for maintaining financial stability are acknowledged. A recent one is as follows: "Maintaining the stability of the financial system and containing the systemic risk that may arise in financial markets has been central to the Federal Reserve's mission for as long as there has been a Federal Reserve. Indeed, Congress passed the Federal Reserve Act in 1913 to provide the nation with a safe and more stable monetary and financial system." See Kohn [2006].

know-how about how to process all of the available market intelligence and in part from the lack of information about exposures in key institutions and markets, notably the over-the-counter derivatives markets. In effect, financial authorities around the world, including in meetings in international forums and committees, utilised the information available to them to the best of their abilities in 2007 and again in early 2008 and simply under-estimated the extent of systemic risk. Part of this mis-estimate, no doubt, is that there is only limited know-how in usefully integrating micro- and macro-prudential sources of information and in processing this information into accurate assessments of systemic risks<sup>7</sup>. More fundamentally, crises will occur even with the most effective early-warning systems and prevention frameworks, so reforms must try to increase the resilience of financial systems to reduce the probability of systemic breakdowns. Reform efforts must tackle all of these formidable challenges.

In Europe, the lesson is a bit different. As in the United States, the frameworks for crisis prevention and resolution are oriented primarily at the national level. To the extent that national frameworks could not see and prevent the build-up of European cross-border exposures, the economic and financial crisis in Europe is in part a failure of implementing the existing architecture – just as it is in the United States.

The same can be said about the resolution of failed banks in Europe, where there is not a European architecture for recapitalising banks, although the European Commission's DG-Competition has the mandate to ensure national approaches to recapitalisation do not produce an unlevel playing field of competition among financial institutions in Europe. To the extent that individual European countries where there are failed banks did not see the build-up of life-threatening credit exposures, the financial crisis in these countries is also the result of not adequately executing appropriate oversight of the institutions in question.

But Europe has the additional problem of having decentralised financial system policy making alongside pan-European markets and pan-European financial institutions. There is no formal framework for safeguarding stability of the markets and only unenforceable agreements to safeguard the safety and soundness of individual SIFIs with substantial cross-border exposures both within Europe and across the Atlantic.

Regarding the United Kingdom, there are divided opinions that date back to the creation of the existing tri-partite approach to safeguarding financial stability.

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7. Some have claimed for that the Greenspan Fed contributed to the build-up of financial imbalances by executing a regulatory policy of passivity – as part of an overall philosophy that placed excessive reliance on allowing markets to discipline themselves.

At the time the Labour party created the UK FSA and moved responsibility for banking supervision from the Bank of England to the FSA, some hailed this new architecture of a single financial regulator and supervisor as the wave of the future. Others hailed this as a mistake, because central banks have a natural interest and competency in supervising its counterparties in monetary operations – typically the largest banks operating in domestic markets and the greatest threats to financial market stability.

There is room for debate, but it is not unreasonable to conjecture that the specific manner in which the UK's financial crisis began – with a bank run – and then evolved into a market run was the result of fundamental flaws in the UK tripartite framework for safeguarding stability. There were also acknowledged inadequacies in implementing the framework – both the supervision of individual institutions by the UK FSA as well as shortcomings in the Bank of England's approach to monitoring activities in the UK domestic markets. Only time will tell whether the UK chooses to fine-tune this architecture or reverts back to giving the Bank of England supervisory responsibilities over SIFIs that operate in UK domestic money markets.

### *B. Lessons for crisis resolution*

Regarding the resolution of financial crisis, it is clear that in all of the major financial centres, the architecture for resolving large, complex financial institutions – SIFIs, universal banks, or whatever you call them – is incapable today of an orderly liquidation. No country has the legislation and apparatus in place to resolve solvency problems in an orderly manner without taking ownership of a large complex financial conglomerate. Until this is addressed, it is likely that moral hazard will continue to encourage excessive risk-taking by the institutions that are too big to liquidate in an orderly fashion.

There is good reason to be optimistic that reform efforts will be successful, however. In the United States, the FDIC is experienced in resolving small and medium-sized financial institutions that are part of the deposit insurance scheme. The policy of prompt corrective action is an early intervention mechanism that helps some banks get back on their feet. But when this fails, the FDIC temporarily takes over the institution and facilitates an orderly liquidation. For most of its resolutions, the process is so orderly that depositors hardly notice that their bank has been closed.

Despite the success of its previous efforts, during this crisis the FDIC saw itself as having neither the expertise nor the financial resources (balance sheet) capable

of resolving through its usual methods the large financial conglomerates that were perceived – at least by the markets – as nearing a threshold where they might become insolvent (such as Citicorp, Wachovia, and at some points in time even Bank of America). Add to this the fact that the FDIC-type resolution architecture was not legally – and may not be generically – applicable to the resolution of systemically important investment banks (like Bear Stearns or Lehman Brothers), insurance companies (such as AIG), and hybrid firms (such as GMAC, GE and others). It is possible, if not likely, that the FDIC will be given a broader mandate to resolve larger and more complex institutions than it has heretofore resolved, but how far its mandate will be broadened and its balance sheet expanded remains to be seen.

In Europe, each country has its own resolution regime and has the strong incentive to design its resolution strategies to satisfy national objectives. For example, in the case of the resolution of Fortis, although a cooperative and coordinated resolution was initially sought by all parties, it did not take long for negotiations for a coordinated solution to break down and devolve into national solutions in which each country resolved the domestic parts of Fortis independently as the nations saw fit. It is clear from this one example that the existing architecture for coordinated resolutions of European cross-border institutions is ineffective. The de Larosière report recommends that a transparent and clear framework for managing crises should be developed; that all relevant authorities in the EU should be equipped with appropriate and equivalent crisis prevention and crisis intervention tools; and that legal obstacles which stand in the way of using these tools in a cross-border context should be removed, with adequate measures to be adopted at EU level<sup>8</sup>.

#### IV. Brief description and assessment of reform proposals

From the previous discussion, the most obvious lesson, and the one that will be the focus of the remainder of this paper, is that the existing national, regional, transatlantic, and global frameworks for safeguarding financial system stability proved to be ineffective. Financial regulation, supervision, and surveillance need to be more effective in the future if systemic crises are to be avoided and better managed when avoidance is not possible. This is easy to observe but difficult to address, especially in the cross-border dimensions of the breaches.

Fortunately, common ground can be found in the reform proposals tabled and being discussed on both sides of the Atlantic. The European Union and the United

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8. See de Larosière (2009), recommendation 13.

States are in the process of considering reforms of their frameworks for safeguarding financial stability. Anticipating what will be concluded later, my reading of these proposals is that, provided they are fully implemented and executed as intended, both sets of recommendations for reform are comprehensive enough to potentially address important weaknesses in the existing frameworks revealed by the crisis and discussed in previous sections<sup>9</sup>. However, there is great uncertainty about the final reform packages and how they are formulated into legislation and regulations and how they are implemented over time. Moreover, the reform proposals do not address all of the important weaknesses revealed by the global crisis.

The remainder of this section will provide outlines of proposals and then offer a preliminary assessment of their likely effectiveness in addressing the concerns raised earlier if fully implemented as they now stand. The section will start out with the reforms proposed in the United States and then proceed to EU proposals.

### *A. US proposed reforms*

The reforms proposed by the US Treasury can be described succinctly as comprising the following five main areas<sup>10</sup>:

- *Systemic risk regulation*, with the Federal Reserve assuming responsibility for supervision and regulation of all systemic firms, tighter prudential standards for large and interconnected firms, registration of hedge funds, and the creation of a Financial Services Oversight Council chaired by the Treasury to identify emerging systemic risks and coordinate agencies<sup>11</sup>.
- *Market regulation*, including enhanced transparency and strengthened incentives for securitisers ('skin in the game'), as well as better regulation of credit rating agencies and over-the-counter derivatives markets<sup>12</sup>.
- *Consumer and investor protection*, with the creation of a Consumer Financial

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9. Although many EU countries are formulating and implementing national reforms – including those that are international financial centres – it is beyond the scope of this paper to describe and assess them. From a substantive point of view, however, the broad outline of US proposed reforms is similar in many regards to reforms being considered in other EU countries, for example, in the United Kingdom.

10. See the US Treasury's paper, 'Financial Regulatory Reform: A New Foundation,' available on the Internet at: <http://www.financialstability.gov/roadtostability/regulatoryreform.html>. For a more detailed summary of these proposals see IMF (2009), the IMF's published documents for the most recent Article IV Consultation for the United States.

11. For details on the Federal Reserve's thinking on the supervision of SIFIs see Tarullo (2009a, 2009b, and 2009c).

12. See Box 1 for a description of the US Treasury proposal to regulate over-the-counter derivatives markets.



Protection Agency, and stronger and more uniform rules.

- *Crisis-management tools*, namely for non-bank resolution and revised emergency lending powers for the Federal Reserve (requiring written approval from the Treasury Secretary).
- *Raise international standards*, including through stronger and better-coordinated capital and liquidity standards and crisis management arrangements.

The US Treasury has submitted detailed legislation proposals for many items in this outline, including for over-the-counter derivatives markets, a consumer protection agency, and other parts. The appropriate US Congressional committees are working on these proposals with the objective of completing much of the legislation by the end of the year.

The Obama Administration and the US Congress have many other priority items they are dealing with – not the least of which is the controversial health-care reform. As a result, there is considerable uncertainty about both the shape of reform and the timing of its completion.

The various US regulatory and supervisory agencies have offered their views to the Administration and Congress on the US Treasury proposals and each of them have offered their own reform agendas. Notably, the Federal Reserve has in recent months been quite transparent about what it sees as the priority items in its reform agenda for revamping its role as regulator and supervisor. In particular, the Federal Reserve sees the following key elements as part of a comprehensive reform effort to make financial supervision and regulation more effective<sup>13</sup>:

- A prudential approach that focuses on the stability of the financial system as a whole, not just the safety and soundness of individual institutions, and that includes formal mechanisms for identifying and dealing with emerging systemic risks;
- Stronger capital and liquidity standards for financial firms, with more stringent standards for large, complex, and financially interconnected firms;
- The extension and enhancement of supervisory oversight, including effective consolidated supervision, to all financial organisations that could pose a significant risk to the overall financial system;
- An enhanced bankruptcy or resolution regime, modeled on the current system

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13. See Bernanke (2009c). Many of the key elements can also be found in the reform proposals of the US Treasury, the UK FSA, the de Larosière Group Report, and in the European Commissions efforts.

for depository institutions, that would allow financially troubled, systemically important nonbank financial institutions to be wound down without broad disruption to the financial system and the economy;

- Enhanced protections for consumers and investors in their financial dealings;
- Measures to ensure that critical payment, clearing, and settlement arrangements are resilient to financial shocks, and that practices related to the trading and clearing of derivatives and other financial instruments do not pose risks to the financial system as a whole; and
- Improved coordination across countries in the development of regulations and in the supervision of internationally active firms.

While Congress is deliberating, much can be accomplished by the Fed on its agenda to improve its oversight of the large complex financial holding companies it already supervises – including now the investment banks that converted to holding companies. But new legislation is required to extend the perimeter of the Fed's authority to all SIFIs.

As the Federal Reserve's list of key elements of reform reveals, much of what it sees as important for improving supervision and regulation matches the outlined reforms of the US Treasury as well as the reforms being considered by countries in Europe and the European Commission (see below). There are two major differences between the Fed's and the US Treasuries proposals: the treasury is proposing to create a new consumer protection agency and relieve the Fed of its existing duties in this area; and the treasury is proposing to limit the Fed's systemic risk powers by requiring it to obtain approval for taking extraordinary systemic measures from the US Treasury Secretary. Neither of these differences are likely to be resolved until Congress completes its work. There are also other areas where members of the US Congress would like to limit the powers of the Fed.

While it is too early to make a comprehensive and final judgment about effectiveness – not least because the exact reforms are yet to be legislated – it is possible to render a preliminary conditional assessment. If all or the US Treasury's proposed reform is properly shaped into legislation, implemented as designed, and executed as intended, the US reform effort could lead to a substantial improvement in the resilience of the US financial system and an improvement in the effectiveness of supervision of the SIFIs and the multitude of smaller financial institutions. Much depends on the ability of the supervisory authority for SIFIs – probably the Federal Reserve – to improve the ability to supervise large, highly complex, multi-business financial institutions. Notably, many of the financial holding companies

that the Fed already supervises were at the core of the crisis – they played major roles in creating the credit exposures and were causes of, and severely affected by, the market dysfunctioning that shook global markets in 2008-09. This suggests that it will be a difficult, uphill battle for the global supervisory community and not just the Federal Reserve to determine how to exercise effective oversight of SIFIs. They may simply be too big and complex to supervise effectively. If so, then what should be done? Should serious consideration be given to reducing the size and scope of existing SIFIs?

The creation of a broader US financial-institutions resolution regime – for example, modeled after the FDIC's prompt corrective action framework, with adjustments to accommodate the resolution of nonbank SIFIs – could lead to an improvement in the ability to effectively resolve SIFIs without threatening market stability (as did the bankruptcy of Lehman Brothers and the threat of insolvency of AIG) and without the government having to take major ownership stakes in them. This too will be an uphill battle with different political pressures in the US Congress about how to revamp bankruptcy laws and possibly even US anti-trust legislation – not the least of which is emanating from the still very powerful lobbying efforts of the US financial industry.

In short, the US reform proposals and process could lead to significant improvements in financial resilience and the oversight framework and thereby improve the ability of authorities to exercise effective systemic risk management and resolution. Having said this, even if perfectly designed and implemented, the oversight architecture that would emerge from a full implementation of the US Treasury's plan would still, in my view, not address all of the concerns revealed by the crisis, including some of the weaknesses in the pre-crisis architecture. There are several unresolved areas and issues that need significant re-thinking before reform efforts have a high probability of success; these are discussed in Section V.

## *B. EU reform proposals*

To deal with pan-European systemic risk, the European Commission has formulated proposals aimed at addressing the weaknesses revealed in Europe by the crisis. The Commission's initiatives are presently being transformed into specific regulations and legislation. The Commission is scheduled to present important legislative proposals on September 23, 2009.

The broad outlines of the Commission's reform agenda can be summarised in the following points:

- *EU macro-prudential surveillance*, through the creation of the European Systemic Risk Board (ESRB) – comprised of EU central bank governors and possibly chaired by the ECB president – with a mandate to assess systemic risks, to issue financial stability risk warnings, and to recommend and monitor implementation of macro-prudential actions by national supervisory authorities.
- *EU micro-prudential supervision*, through the creation of the European System of Financial Supervisors, comprised of three new authorities – European Banking Authority, European Insurance Authority, and European Securities Authority – to ensure consistency of national supervision and strengthened oversight of cross-border entities through supervisory colleges and the establishment of “a European single rule book applicable to all financial institutions in the single market.”
- *Reform of over-the-counter derivatives* – require standardisation and trading on platforms/clearing houses to make them more robust and transparent.
- *Other EU initiatives*, including regulation of alternative investment managers<sup>14</sup>; amendments to capital requirements for trading book exposures and highly complex re-securitisations<sup>15</sup>; enhanced disclosure of complex securitisation exposures; and bank remuneration policies.

The Commission’s systemic-risk oriented reform efforts outlined in the first two bullets are the recommendations of the de Larosière Group. The group was commissioned in 2008 by President Barroso to facilitate the formulation of an approach to safeguard European financial stability. Some of the other Commission reforms being proposed – such as regarding derivatives markets and hedge funds – were underway before the group was commissioned.

The report and recommendations of the de Larosière Group are comprehensive and consistent with addressing weaknesses revealed by the financial crisis in Europe. It is reasonable to conclude from a close reading of the report that if the European Union agreed to implement fully the recommendations as described by the Group in the report, that Europe would thereby establish a new European framework for financial stability that could – if properly executed – constitute an effective pan-European framework for safeguarding financial stability. Figure 1

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14. Masters B and Tait, N (2009) ‘Dodging the draft,’ Financial Times July 13.

15. Available at: [http://ec.europa.eu/internal\\_market/bank/regcapital/index\\_en.htm](http://ec.europa.eu/internal_market/bank/regcapital/index_en.htm). See also Financial Times Leader, “Capital Proposals,” July 14, 2009.

reproduces the de Larosière report's graphic representation of the new framework.

As with the U.S. reform proposals and process, in Europe, the devil is in the details of the ultimate resulting legislation and regulations that come out of the European reform process. That is, it remains to be seen how far the de Larosière Group's recommendations will be agreed collectively by EU member states. Thus as regards reform efforts in the United States, the reforms actually implemented could fall well short of what is required to provide Europe with the kind of financial stability framework in which both systemic risk assessment and supervision of SIFIs would take place at the European level rather than primarily at the national level along side committee structures with perhaps stronger but still informal peer pressure to implement national policies to help manage European systemic risk.

Even if the EU financial-stability reform effort falls short of what is required, it is possible that the Euro area would come up with a framework for safeguarding stability across the Euro area. The ECB has the statutory authority under its monetary policy mandate (Article 5.1 of the Statute of the ESCB and of the ECB) to act decisively to facilitate the smooth functioning of the pan-European money markets, as it demonstrated quite effectively in August 2008 when it was the first to intervene to stabilise markets. In addition, according to some interpretations of the statute, the ECB also has the necessary authorities to obtain whatever statistical information it deems necessary for conducting its monetary policy directly from the large 'European' banks and SIFIs that are its main counterparties in its monetary policy operations – in particular in the money markets in which it operates. However, such a possibility is limited because obligations imposed directly on natural or legal persons would require a decision by the Council of Ministers covering the definition of the natural and legal persons subject to reporting requirements, the confidentiality regime, and the appropriate provisions for enforcement<sup>17, 18</sup>.

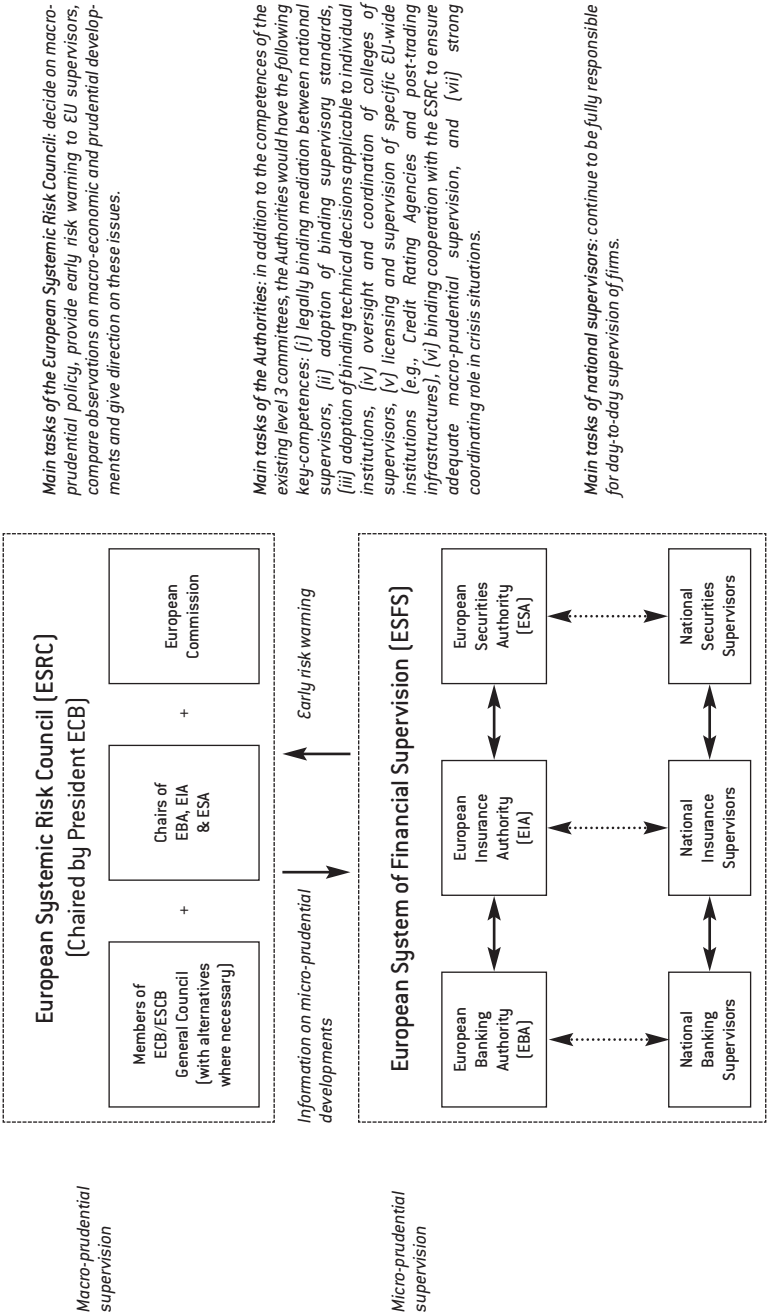
Thus, in principle if not in practice, through its statutory mandate to conduct monetary policy and safeguard the pan-European payments system, it might be possible for the ECB to obtain the kind of information required to not only to execute its monetary policy and payments system mandates but also to engage in the kind of systemic risk assessments required to identify and manage systemic risk in pan-

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16. On these matters the Council of Ministers decides by qualified majority; see Article 5.4 of the Statute of the ESCB and of the ECB.

17. Article 105(6) of the Maastricht Treaty states that "the Council [of Ministers] may, acting unanimously on a proposal from the Commission and after consulting the ECB and after receiving the assent of the European Parliament, confer upon the ECB specific tasks concerning policies relating to the prudential supervision of credit institutions and other financial institutions with the exception of insurance undertakings."

Figure 1 A new European Framework for Safeguarding Financial Stability



European financial markets. What is required is sufficient support inside the Governing Council. This issue is covered in the de Larosière report where it is argued that access to information is crucial to the proper exercise of the functions of the European Systemic Risk Board. However, it is possible that political obstacles will lead to a less-than-full implementation of the de Larosière Group recommendations.

## V. Concluding thoughts

As discussed in the paper, the proposals being considered on both sides of the Atlantic represent potentially comprehensive reforms to the existing frameworks for safeguarding financial stability, managing systemic risk, and resolving systemic crises. If these proposals are properly and entirely translated into specific legislation and regulations, fully implemented as translated, and effectively executed, the reformed frameworks could provide greater resilience to the global financial system and could create the kind of oversight and resolution regimes for safeguarding global stability.

But the devil is in the details of translating these proposals into legislation and regulations. This translation process is by its very nature a political one subject to many interests and influences. Moreover, even if reform proposals were to be fully reflected in outcomes, it would be a formidable challenge for regulators and supervisors around the world to implement the new frameworks to safeguard stability in the future.

An additional multi-faceted qualification is warranted. The reform proposals themselves do not address all of the fundamental weaknesses revealed by the crisis. There are unaddressed and unresolved issues, five of which are discussed below as concluding thoughts.

### *1. Crises will occur again, so effective resolution frameworks are necessary.*

Much of the reform agenda has focused on crisis prevention. In particular, the creation of a US systemic risk council and a European systemic risk boards are necessary and worthwhile efforts aimed at improving the ability to assess the potential for systemic risk early on in its development. Early detection of financial imbalances is the only chance there is for heading off systemic problems through the implementation of risk-mitigating measures that could reduce the potential for financial imbalances becoming systemic and threatening financial stability. Authorities on both sides of the Atlantic should devote considerable resources and

political capital to improving early warning systems to the point where they become more reliable.

Having said this, authorities should have realistic expectation about how effective these early warning systems will be. The reality is that crises will occur again, and it can not be ruled out that the next systemic crisis is just around the corner. The costly and at times chaotic resolution of the current crisis provides clear evidence that no country has an effective mechanism for closing or liquidating systemically important financial institutions with significant cross border exposures. The objective ought to be to put in place a legal framework that allows for the orderly resolution of systemically important financial institutions in a timely manner and with the multiple objectives of minimizing both the systemic consequences and taxpayer costs of resolution. This is a formidable challenge that should be pursued without delay on both sides of the Atlantic.

## *2. Realign balance between market discipline and official oversight.*

Greater reflection is warranted on what constitutes an effective balance between relying on market discipline and relying on official oversight. The balance prior to the crisis relied too heavily on *ex-ante* private market discipline to prevent the buildup of systemically threatening imbalances and not heavily enough on official oversight. Presently, it could be argued that the balance is relying too heavily on official intervention and not heavily enough on market discipline. In crafting reforms for the future, a key challenge is the realignment of the private incentives that drive business decisions and the incentives that determine the actions or inertia of regulators and supervisors. In effect, the incentives and rules of the game that guide private finance and official oversight need to be realigned so that they are compatible with and naturally react to prevent the kind of self-inflicted weaknesses and imbalances that arose in the years prior to the crisis. This is a difficult set of challenges and may take considerable time to craft, but it is essential to achieve an effective balance of these lines of defence against systemic risk and crises.

## *3. Reconsider the inter-temporal benefits and costs of too-big-to-fail SIFIs.*

It is widely acknowledged that some financial institutions were deemed too big to fail, and the crisis has revealed some were too big to manage and too difficult to save without massive injections of taxpayer monies. Reform efforts are aiming to address these issues by creating regulatory and supervisory frameworks more



capable of overseeing SIFIs and resolution regimes capable of orderly liquidations and closures. This is one possible approach and only time will tell if reform proposals lead in the right direction.

Before such an approach is engraved in stone, greater reflection is warranted on alternative approaches. Over the years, authorities in all of the major financial centres have through explicit policies or inaction either promoted, encouraged, or acquiesced to the emergence of these very large global institutions often on the grounds of claims of economies of scale and scope. However, the extensive economics and finance literatures are inconclusive about the actual gains of economic efficiency from economies of scale and scope alleged and sought by universal banks, financial holding companies, global financial conglomerates, and other SIFIs. It may well be the case that economies of scale – for example, having a global platform for foreign-exchange trading – can be mostly, if not entirely captured by more specialised institutions that are large and global but that would be more transparent, easier to manage, and less difficult to regulate and supervise. In light of the empirical evidence and the recent crisis, surprisingly very little serious discussion has been heard on the optimal or appropriate size, scope, complexity, management, and governance of private financial institutions.

Accordingly, leaders and policy makers should be asking: What exactly are the inter-temporal efficiency gains to their societies of combining M&A, asset management, securities origination and underwriting, foreign exchange trading, commercial banking, and other financial services all under one roof in relation to the inter-temporal social costs now being experienced? Can the alleged gains be captured by more specialised institutions that are less likely to generate the social costs? It would seem entirely appropriate for these and other important related subjects to receive as much analytical and policy attention as the efforts now being expended on formulating reforms of the surveillance, regulation, supervision, and governance framework for overseeing these SIFIs.

#### *4. Consider global regulation and surveillance of the global over-the-counter derivatives markets.*

Although authorities in all of the major financial centres agree that the over-the-counter derivatives markets need to be effectively regulated, creating an effective regulatory framework is likely to pose significant operational and politically contentious challenges. Over-the-counter derivatives markets constitute a global network of counterparty relationships among and between primarily SIFIs – a

network in which these institutions act as dealers and market makers, manage financial risks, and trade on their own account (capital). In effect, this network is the global interbank money market. It is at the core of the global financial system, and it provides 'utility' financial services that affect indirectly many aspects of company and household finance. As the global crisis demonstrated, a single credit event or weak link in this network can quickly lead to a systemic problem as SIFIs rebalance and re-price their portfolios to minimise and exposures and preserve their own liquidity. When this happens, the network shrinks, becomes fragile, and as we saw in the autumn 2008 it ultimately can dysfunction.

The autumn of 2008 was not the first time this network threatened to meltdown. Ten years before this, in September 1998, the market turbulence surrounding the collapse of Long-Term Capital Management occurred in this same network; it was a wake up call that this market was subject to considerable systemic risk<sup>18</sup>. In the event, few reforms were implemented even though the official community gathered many times and wrote many reports about what needed to be reformed.

Genuine reform efforts in this area will require changes on many fronts: legal, process, architecture, cross-border cooperation, and leadership. There are differences in reform proposals across the Atlantic and fierce competition between the major financial centres; but there is also much common ground. These markets are truly global and systemic. Uncoordinated solutions will not work. Anything short of a global solution could lead to the persistence of regulatory arbitrage, complexity, opacity, and systemically threatening counterparty relationships. For these reasons, leadership at the head-of-state level may be required to forge a consensus that a global regulatory framework and platform is necessary to regulate the activities in these markets and conduct continuous effective surveillance over them.

#### *5. Ensure central banks have tools to co-manage monetary and financial stability.*

As the global crisis convincingly demonstrated, monetary and financial stability are inextricably intertwined. The necessarily unconventional central bank policy responses to systemic events have provided dramatic illustrations of the natural role and inherent competencies of central banks in crisis prevention and management, and crisis resolution. In fast-paced modern financial markets dominated by a relatively small number of large, highly complex financial institutions central banks cannot properly maintain monetary control and stability without also having

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18. For an extensive discussion of the potential for systemic risk in over-the-counter derivative markets see Schinas<sup>1</sup>, Craig, Drees, and Kramer (2000).

## US PROPOSAL FOR REFORMING OVER-THE-COUNTER DERIVATIVES MARKETS\*

The US Administration's proposed reform of the over-the-counter (OTC) derivatives markets has four broad objectives:

- Prevent activities in the OTC derivative markets from posing risks to the stability of the financial system;
- Promote efficiency and transparency of the OTC derivative markets;
- Prevent market manipulation, fraud, and other abuses; and
- Protect consumers and investors by ensuring that OTC derivatives are not marketed inappropriately to unsophisticated parties.

The proposal includes the following broad measures:

- Require all standardised derivative contracts to be cleared through well-regulated central counterparties and executed either on regulated exchanges or regulated electronic trade execution systems;
- Encourage through capital requirements and other measures substantially greater use of standardized OTC derivatives (to facilitate substantial migration of OTC derivatives onto central clearinghouses and exchanges);
- Require all OTC derivative dealers, and all other major OTC derivative market participants, to be subject to substantial supervision and regulation, including conservative capital requirements; conservative margin requirements; and strong business conduct standards;
- Make the OTC derivative markets fully transparent by requiring the SEC and CFTC to impose recordkeeping and reporting requirements (including an audit trail) on all OTC derivatives and by requiring OTC derivatives that are not centrally cleared be reported to a regulated trade repository on a timely basis. (The objective would be to provide relevant regulators with access on a confidential basis to the transactions and open positions of individual market participants; and the public with access to aggregated data on open positions and trading volumes);
- Provide the SEC and CFTC with clear authority for civil enforcement and regulation of fraud, market manipulation, and other abuses in the OTC derivative markets;
- Work with the SEC and CFTC to tighten the standards that govern who can participate in the OTC derivative markets (to zealously guard against the use of inappropriate marketing practices to sell derivatives to unsophisticated individuals, companies, and other parties);
- Continue to work with our international counterparts to help ensure that our strict and comprehensive regulatory regime for OTC derivatives is matched by a similarly effective regime in other countries.

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\* See Secretary Geithner's testimony to the House Financial Services and Agriculture Committees Joint Hearing on Regulation of OTC Derivatives July 10, 2009.

the capability to restore financial market stability if and when necessary. In crafting financial-system and central-banking reforms, decision makers should strive to ensure that central banks retain the independence required to conduct successful monetary policies and obtain the necessary authorities, discretionary instruments, and policy mandates required to ensure the smooth functioning of financial markets and the stability of financial systems more generally<sup>19</sup>. Central banks are likely to face serious challenges in these dimensions. Likewise, they are also likely to continue to face political pressures that could impinge on their independence and their operational abilities to deal effectively with future systemic crises.

#### *6. Meet other challenges of greater global financial governance.*

There are important unmet challenges in the global governance of finance – that is, in safeguarding global financial stability. The major countries have reshaped governance mechanisms by initiating a G20 process at the head-of-state level. This process has already been successful in bolstering and reforming the multilateral institutions to help safeguard systemic stability in countries and across borders. There have also been successful efforts in coordinating macroeconomic and monetary responses to mitigate the adverse consequences of the global systemic crisis.

Despite these successes, there are remaining areas that require close cooperation if global financial stability is to be restored and maintained. As already mentioned, the regulation of the global over-the-counter markets requires a globally coordinated effort if it is to be effective in reshaping these markets so that embody significant less systemic risk. Likewise, many of the SIFIs are truly global enterprises operating in many legal and regulatory environments. It would improve resilience of the global financial system if a global agreement could be reached about how to supervise these institutions effectively and how to resolve them in an orderly fashion without requiring massive injections of taxpayer monies.

An additional unmet global governance challenge is that of objective surveillance of global financial markets free from national and political influences. Although existing international financial institutions such as the IMF or the FSB might be able to fulfill this role, institutional reforms would be necessary to free the

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19. See Schinasi (2003) for a discussion of the natural role of central banks in financial stability. Also see Padoa-Schioppa (2003) who states, “The role of central banks in financial stability was thus part of their genetic code. It was – and, I would be inclined to say, still is – an integral part or an inseparable component of the central bank as a bank, of its monopoly on ultimate liquidity, of its role as the bankers’ bank, and of commercial banks as creators of money themselves.”

process from political influences. An alternative is to create a new independent organisation with a fully professional staff whose only remit is to identify sources of systemic risk and vulnerabilities, including emanating from specific countries or financial systems. Effective objective surveillance would require that this organisation be politically independent and capable of holding countries to account for the negative externalities created by their financial systems and policies without consequences for their budget or mandate. The organisation must be free to communicate its assessments and recommend actions without being subject to political or national pressures to nuance or change its analysis and judgment<sup>20</sup>.

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20. A different kind of reform is proposed by Adams and Sadun (2009). They call for the creation of a global economic council (Gleco), a ministerial body with decision-making powers overseeing the proper functioning of the global economy and the stability of the international financial system by providing close political support and strategic guidance to all IFIs.

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# Comments on 'US and EU reform efforts to improve the management of systemic financial risk' by Garry Schinasi

PETER GARBER<sup>1</sup>

I have few quarrels with the substance of Garry Schinasi's paper – the existing policy structure, what went wrong during the crisis, the lessons that we should learn, and the various reform proposals. But there is a list of small items that I would add to his descriptive sections and some ideas that I would put a little differently. Also, there is now a concrete proposal from the US administration to reform the derivatives markets. I will discuss this in some detail, including the results that I expect it to have if it passes as proposed.

1. This paper examines a crisis emanating from the financial system and spreading into the real economy, with the public sector putting into the field its defensive weapons to prevent or control the crisis. Indeed, the 2007-8 crisis partly arose in the private financial system. But since central banks and treasuries are part of the global financial system, disruption of the real economy has in the past been caused by them as well. Most macro-crisis models worry in particular about this causal direction. Many financial crises have been the *private sector's* response to government moral hazard or policy inconsistency. So I would add a column in Schinasi's schematic table that indicates the roles of central banks and treasuries. For example, market discipline has been one of the weapons launched by the *private sector* against governments in many crises of the past via financial crisis or even just rising

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1. Deutsche Bank.



- government interest rates. Crisis itself – speculative attacks – has traditionally been one of the private sector's lines of defence against government bad policy.
2. In some crises, for example, the crash of 1987, financial infrastructure failed and either directly caused the crisis or contributed to its severity. Garry Schinasi recognises this as a potential source of problems but leaves it out of the discussion on the basis that infrastructure such as payment mechanisms did not fail in 2007-8. However, the Lehman collapse caused a serious failure in the infrastructure of collateral management. It directly froze the tri-party repo market because parties to a deal could not get back the collateral that Lehman was managing. This in turn led to a scramble for liquidity. Garry Schinasi might explain why he limits the definition of infrastructure to only the few items that he mentions.
  3. Just to expand on that, I also count the basic theories of finance and all the arbitrage concepts and correlation-based hedging and trading strategies, and the computer based methods that back these up as part of the market's infrastructure. All of these failed, effectively creating a negative and long-lasting technological disturbance that took this infrastructure offline, and perhaps permanently reduced the productivity in our capital-allocation industry.
  4. Although hedge funds are a target for regulation, it should be said that they were not at the heart of this crisis. Their effect was indirect due to the fact that their shareholders created a run on them via redemptions.
  5. In the section on what went wrong this time, I would add a bullet point that a feature of the crisis was the revelation of the danger of excessively large financial centres relative to the country's supporting tax base.
  6. Even government-sponsored financial institutions collapsed and were part of the dynamic leading up to the crisis – for example, the US government-sponsored enterprises or the Landesbanks. This indicates, at least in the case of the US, that their supervisors were effectively captured by them and working in tune with, and possibly being the major drivers of, the speculation. This was done clearly to support a higher-priority social policy ordained by the political authorities.
  7. To the list of reforms in the US and EU, I would add the remarkably concerted drive to bring to heel offshore financial centres. This is being done according to the rationale of controlling tax evasion, but forcing offshore centres into the new regulatory system to close an avenue of escape from the coming reforms in US and EU domestic regulatory systems cannot be far behind.
  8. Garry Schinasi's 'lines of defence' categorisation creates an adversarial vision

of 'us vs. them'. However, we have the old story of regulatory capture here as well. The regulatory troops often abandon their trenches and fraternise with the enemy. For example, in the UK, it has been argued that the Financial Services Authority was engaged in an industrial policy to protect and grow its financial industry.

Indeed, we see some potential for industrial policy now in the race in the US and EU to push derivatives onto exchanges. Of course, the drive to regulate these products stems, among other things, from the failure to observe the position built up in some entities like AIG and the difficulty in settling and netting the gross positions of a large failed institution like Lehman, although this reform was in the air before the crisis.

At the end of August 2009, the US Treasury delivered to Congress its proposed 'Over-the Counter Derivatives Markets Act of 2009'. This requires that 'standardised' OTC products clear with a central counterparty (CCP). The definition of 'standardised' is a bit circular. Any contract accepted for clearing by a CCP is defined as standardised. The requirement applies to all dealers and 'major swap participants', such as corporates. It does not include structured notes, but any of the derivatives used to hedge such notes would be included.

More contentiously, the Act requires that all standardised OTC derivatives have to be traded on an exchange or 'alternative swap exchange facility' – electronic trade execution platform. Margin requirements on centrally-cleared derivatives will be set by regulators and positions will carry a capital requirement. All non-centrally cleared derivatives will have an even higher capital requirement.

The Commodity Futures Trading Commission and Securities and Exchange Commission (who will split the regulatory responsibility by underlying product type) can impose position limits in the aggregate and on individual participants. These regulations cover all US domiciled or regulated entities wherever they transact their business. But they are limited only to transactions where one of the counterparties is US domiciled. A foreign counterparty to a US domiciled entity would be subject to the same regulation.

It remains to be seen what will be the final outcome of this proposal after Congress gets done with it. The expectation is that these changes, especially requiring exchange trading, will be destructive of revenue at the dealer banks by bringing in spreads and so will lead to opposing lobbying efforts. These banks will also race to set up alternative trading platforms. It is also expected that the establishment of position limits will be a competitive disadvantage for US-based

markets and US-regulated or domiciled participants because it will limit their ability to undertake operations to hedge or make markets. The European Commission is the second mover in this and will deliver its proposals later this year and is expected to produce a less radical set of proposals. Clearly, the desire of both the US and EU to have a clearinghouse on their own territories can lead to an outcome of competitive industrial policies to capture this industry. I will close on this happy thought.

# Pro-cyclicality of capital regulation: Is it a problem? How to fix it?

PAOLO ANGELINI, ANDREA ENRIA, STEFANO NERI,  
FABIO PANETTA AND MARIO QUAGLIARIELLO<sup>1</sup>

## 1. Introduction

Since the end of the 1980s, following the implementation of the Basel rules, G10 countries have introduced bank capital requirements based on risk-weighted assets. At the microeconomic level, the reasons for capital regulation include potentially excessive risk-taking by bank managers induced by flat-premium deposit insurance schemes<sup>2</sup> and insufficient monitoring of lending policies by small, dispersed depositors<sup>3</sup>. From a macroeconomic perspective, risk-based capital requirements are one of the tools available for reducing the externalities associated with bank failures (in terms, for example, of public funds needed in case of systemic crises or contagion across intermediaries)<sup>4</sup>.

While there is strong rationale for their adoption, a potential drawback of risk-based capital requirements is that they could amplify the cyclical fluctuations of the economy (ie they may generate pro-cyclicality). In theory, in a frictionless economy they should not, but imperfections in capital markets do exist, and an accelerator mechanism may generate feedback from bank capital to the real

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1. Bank of Italy. The views expressed in the paper do not necessarily reflect those of the Bank of Italy. We wish to thank F. Saccomanni for providing us with the incentive to work on the paper, as well as K. Regling and H. H. Kotz (the discussants), E. Gaiotti and A. Gerali for useful comments on a previous draft. All remaining errors are our own.
  2. See Kohen and Santomero (1980), Kim and Santomero (1988), Rochet (1992).
  3. See Dewatripont and Tirole (1994).
  4. See Kashyap and Stein (2004).

economy (Adrian and Shin 2008). Therefore, risk-based capital requirements could generate pro-cyclicality, because risk itself is cyclical both in quantity and in value<sup>5</sup>. The debate on the additional pro-cyclicality generated by capital regulation, however, is still open. To conclude that capital regulation has pro-cyclical effects one should check, first of all, that it induces cyclicity in the minimum regulatory capital requirement under Pillar I, and that such cyclicity survives the supervisory review process under Pillar II (in principle, the regulator could take steps to dampen it). Second, it should be ascertained that the banks' response to the regulatory changes does not offset the additional pro-cyclicality (eg via voluntary accumulation of countercyclical capital buffers). Finally, one should check that any resulting additional cyclicity in bank lending affects real activity<sup>6</sup>.

Although our knowledge about each of these conditions is very limited, as we argue below, in the aftermath of the current financial crisis a consensus has emerged that the Basel II capital rules should be amended. Widely discussed proposals, to be implemented once the crisis is over and allowing for a gradual phasing-in, focus on the level and the dynamics of bank capital. They include: strengthening the capital base of banks; implementing mechanisms for building capital buffers and forward-looking provisions in periods of buoyant growth for use in downturns; harmonising the definition of eligible capital and improving its quality; complementing Basel II rules with non-risk based limits to leverage; introducing liquidity requirements (G20, 2009; FSF, 2009). The challenge is not reaching an agreement on general principles, but translating principles into concrete measures, which can be applied consistently across jurisdictions.

The current state of the debate prompts the following considerations. First, the above mentioned proposals for reform are generally analysed on a piecemeal basis in the absence of a consistent framework, which would allow a more structured approach to the issue of capital regulation. Moreover, the proposals pursue the twofold objective of increasing the resilience of the financial system and of mitigating the pro-cyclical effects of capital regulation, at times without clearly distinguishing between these two objectives. Finally, in our view, the recent contributions by regulators (Basel Committee, 2010b, Macroeconomic Assessment Group, 2010) and by the private sector (Institute of International Finance, 2010) on the macroeconomic impact of the regulatory reform can be enriched with further

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5. The quantity of risk tends to rise during contractions, partly reflecting the process of accumulation during expansions (Borio *et al*, 2001). Similarly, the price of risk – that is, investors' risk aversion – decreases during upswings and increases during downswings (Lowe, 2002).

6. These conditions have been pointed out by several authors. See Taylor and Goodhart (2004), for example.

cost-benefit analyses.

Moving from these considerations, the present paper represents a first attempt to address these issues in a systematic way. We believe that a comprehensive framework should address the following fundamental questions: (i) does the new Basel II regime really increase the pro-cyclicality of the banking system, and if so, by how much? (ii) higher capital requirements would clearly strengthen the resilience of the financial system; could they also help dampen the cyclical effects of credit on GDP, consumption and investment? (iii) what room is there for the management of countercyclical capital requirements? (iv) what is the macroeconomic cost (eg in terms of GDP growth) of policies aiming at mitigating pro-cyclicality?<sup>7</sup>

To address these questions we cast the regulator problem within a macroeconomic model. Specifically, we build on the DSGE model developed by Gerali *et al* (2009) to examine the functioning and possible shortcomings of risk-based capital regulation, and potential policy measures aiming to mitigate pro-cyclicality. This model features a simplified banking sector with capital, capturing the basic elements of banks' balance sheets: on the assets side there are loans to firms and households; on the liabilities side there are deposits held by households and capital. We support this model by introducing heterogeneity in the creditworthiness of the various economic operators. We also introduce risk-sensitive capital requirements and quantify the extent to which they induce excessive lending and excessive GDP growth in booms, and vice-versa in downturns. We assess the effectiveness of stylised countercyclical tools on the basis of the model. In particular, we look at the response of the key macroeconomic variables to higher capital requirements and to passive and active countercyclical capital policies.

A final section is devoted to the practical aspects of the implementation of countercyclical capital rules. In particular, we focus on two tools: (i) the accumulation of Basel II capital buffers calibrated on downturn conditions (eg adopting simple correction factors based, for instance, on the ratio between downturn and current PDs); (ii) dynamic provisioning based on through-the-cycle expected losses. We argue that these tools may complement each other and are an essential building block of any countercyclical toolkit.

This chapter makes two main contributions to the existing literature. First, the role of capital regulation is studied in the context of a macroeconomic model, which allows us to examine the general equilibrium effects of changes in bank capital

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7. A fifth crucial issue, which we do not address here, concerns the systemic nature of certain risks: risk-based capital regulation that only refers to individual banks underestimates systemic risk by neglecting the macro impact of banks reacting in unison to a shock (Brunnermeier *et al*, 2009).

regulation. The DSGE model employed throughout the paper belongs to a new class, which explicitly comprises a (simplified) financial sector and features a meaningful interaction between this sector and the real economy. However, a caveat is needed. Our model is still far too simplified to be able to capture several essential elements of the financial sector, some of which arguably played an important role during the current financial crisis – eg maturity mismatches, derivative products, liquidity issues, heterogeneity across financial institutions. Regarding these clear weaknesses, it is worth recalling that the financial sector was entirely absent in DSGE models of the previous generation. The financial accelerator mechanism of Bernanke, Gertler and Gilchrist (1999) has been only recently reconsidered in standard medium scale DSGE models. One possible reason why the empirical literature, in particular, has typically not considered this mechanism is that it does not significantly amplify the effects of monetary policy shocks.

Second, we try to integrate this simplified but rigorous framework with a discussion of the main policy proposals. This approach stands in sharp contrast, on the one hand, with existing literature on financial stability issues, typically based on reduced-form, partial equilibrium models, and on the other hand, with the theoretical macroeconomic literature, typically not concerned with the practical implementation of policy proposals. We are aware of one paper only that studies the additional pro-cyclicality introduced by Basel II relative to Basel I in a similar macroeconomic framework: Aguiar and Drumond (2009). They find that the amplification of monetary policy shocks induced by capital requirement becomes stronger under Basel II regulation.

## 2. The macro framework

Until recently, the financial sector was largely overlooked in macroeconomic modelling. Seminal contributions, starting from Bernanke, Gertler and Gilchrist (1999), have started to fill the gap by introducing credit and collateral requirements in quantitative general equilibrium models. More recently, models have begun to study the role of financial intermediaries in general and banks in particular (Christiano, Motto and Rostagno, 2007, and Goodfriend and McCallum, 2007). These models, however, mainly emphasise the demand side of credit. The credit spread that arises in equilibrium (called the external finance premium) is a function of the riskiness of entrepreneurs' investment projects and/or their net wealth. Banks, operating under perfect competition, simply accommodate the changing conditions from the demand side.

Gerali *et al* (2009) instead build on the idea that conditions from the supply side of the credit markets are key to shaping business-cycle dynamics. Starting from a standard model, featuring credit frictions and borrowing constraints as in Iacoviello (2005) and a set of real and nominal frictions as in Christiano *et al* (2005) or Smets and Wouters (2003), they add a stylised banking sector with three distinctive features. First, banks enjoy some degree of market power when setting rates on loans to households and firms. Second, the rates chosen by these monopolistically competitive banks are adjusted only infrequently – ie they are sticky. Third, banks accumulate capital (out of retained earnings), as they try to maintain their capital/assets ratio as close as possible to an (exogenously given) optimal level. This optimal level might derive from banks because of a mandatory capital requirement (like those explicitly set forth in the Basel accords). In a deeper structural model, the optimum level might relate to the equilibrium outcome from balancing the cost of funding with the benefits of having more ‘skin in the game’ to mitigate typical agency problems in credit markets. The model is estimated with Bayesian techniques using data for the euro area from 1998 to 2009.

Banks make optimal decisions subject to a balance-sheet identity, which forces assets (loans) to be equal to deposits plus capital. Hence, factors affecting bank-capital impact on the capital/assets ratio, forcing banks to modify leverage. Thus, the model captures the basic mechanism described by Adrian and Shin (2008), which has arguably played a major role during the current crisis.

In this chapter we modify the model by Gerali *et al* (2009) to study the role of capital regulation. More specifically, we assume that credit risk differs across categories of borrowers and introduce risk sensitive capital requirements. We then show how optimal lending decisions of banks, and hence the macro environment, are affected by different regulations. We refer the interested reader to the original paper for a more thorough description of the basic features of the model.

## *2.1 Main features of the model*

The model describes an economy populated by entrepreneurs, households and banks. Households consume, work and accumulate housing wealth, while entrepreneurs produce goods for consumption and investment using capital bought from capital-good producers and labour supplied by households.

There are two types of households, which differ in their degree of impatience, ie in the discount factor they apply to the stream of future utility. This heterogeneity



gives rise to borrowing and lending in equilibrium. Two types of one-period financial instruments, supplied by banks, are available to agents: saving assets (deposits) and loans. Borrowers face a collateral constraint that is tied to the value of collateral holdings: the stock of housing in the case of households and physical capital for entrepreneurs.

As mentioned above, the banking sector operates in a regime of monopolistic competition: banks set interest rates on deposits and on loans in order to maximise profits. The balance sheet is simplified but captures the basic elements of banks' activity. On the assets side are loans to firms and households. On the liabilities side are deposits held by households and capital. Banks face a quadratic cost of deviating from an 'optimal' capital to assets ratio  $\nu$ <sup>8</sup>.

$$(1) \quad \kappa_b \left( \frac{K_{b,t}}{L_t} - \nu \right)^2 K_{b,t}$$

where  $K_{b,t}$  is bank capital,  $L_t$  are total loans and  $\kappa_b$  is a parameter measuring the cost of deviating from  $\nu$ . The latter can be thought of as a minimum capital ratio established by the regulator, plus a discretionary buffer. When the capital ratio falls below  $\nu$ , costs increase are transferred by banks onto loan rates:

$$(2) \quad R_t^i = R_t - \kappa_b \left( \frac{K_{b,t}}{L_t} - \nu \right) \left( \frac{K_{b,t}}{L_t} \right) + markup_t, \quad i=H, F$$

where  $R_t$  is the monetary policy rate and the term '*markup*' captures the effects of monopolistic power of banks on interest rate setting<sup>9</sup>. Equation 2 highlights the role of bank capital in determining loan supply conditions. On the one hand the bank would like to extend as many loans as possible, increasing leverage and thus profits per unit of capital. On the other hand, when leverage increases, the capital/assets ratio falls below  $\nu$  and banks pay a cost, which they transfer on the interest rates paid by borrowers. This, in turn, may reduce credit demand and hence bank profits.

8. The adjustment cost adopted in equation 1 is quadratic, and hence symmetric. An alternative, more realistic version should be asymmetric – the cost of falling below a regulatory minimum is arguably higher than the cost of excess capital. However, the first order approximation of the model which we use throughout the current version of the paper would make such alternative adjustment cost immaterial for the results. In future work we plan to introduce an asymmetric adjustment cost (see Fahr and Smets, 2008, for an application of downward nominal wage rigidities) and look at a second order approximation of the model, or simulate the nonlinear model.

9. In practice, a dynamic version of equation 2, in which bank rates are sticky, is employed in the model (see Gerali *et al*, 2009). It is assumed that banks, at any point in time, can obtain financing from a lending facility at the central bank at a rate equal to the policy rate  $R_t$ . A no-arbitrage condition between borrowing from the central bank and from households by issuing deposits implies that in equilibrium a dynamic version of equation 2 must hold.

The optimal choice for banks is to choose a level of loans (and thus of leverage) such that the marginal cost of reducing the capital/assets ratio exactly equals the spread between  $R_t^i$  and  $R_t$ . The presence of stickiness in bank rates implies that the costs related to the bank capital position are transferred gradually to the interest rate on loans to households and firms. Bank capital is accumulated out of retained profits  $\pi$ , according to the following equation:

$$[3] \quad K_{b,t} = (1 - \delta_b)K_{b,t-1} + \Pi_{b,t-1}$$

where the term  $\delta_b K_{b,t-1}$  measures the cost associated with managing bank capital and conducting the overall banking intermediation activity.

Monetary policy is modelled via a Taylor rule with the following specification:

$$[4] \quad R_t = (1 - \phi_R)\bar{R} + (1 - \phi_R)\phi_\pi(\pi_t - \bar{\pi}) + \phi_y(y_t - y_{t-1}) + \phi_R R_{t-1}$$

The values of the parameters of the model are reported in Gerali *et al* (2009).

## 2.2 Key changes to the analytical framework

We've introduced a few changes in the basic framework of Gerali *et al* (2009) in order to adapt it to our purposes. Specifically, we assume that loans to firms and to households are characterised by different degrees of riskiness captured, in a reduced form, by weights,  $w_t^F$  and  $w_t^H$ , which we use to compute a measure of risk-weighted assets<sup>10</sup>. The capital adjustment cost (1) is modified as follows:

$$[5] \quad \kappa_b \left( \frac{K_{b,t}}{w_t^F L_t^F + w_t^H L_t^H} - \nu \right)^2 K_{b,t},$$

where total loans  $L_t$  have been replaced by the sum of risk-weighted loans to firms  $[L_t^F]$  and households  $[L_t^H]$ .

Note that by setting  $w_t^F = w_t^H = 1$  expression 5 simulates the Basel I regime for loans to the private sector, whereas allowing the weights to vary over time captures the essence of the risk-sensitive Basel II mechanism. Under the latter mechanism, the inputs of the capital function can change through the cycle, reflecting either the rating issued by rating agencies or banks' own internal risk assessment models

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10. The model does not feature defaults, as they are ruled out as equilibrium outcomes (see Kyiotaki and Moore, 1997, and Iacoviello, 2005). However, the device we adopt mimics well the effect of capital requirements based on risk weighted assets.

(the so-called internal ratings based, or IRB, approach). Under this second interpretation, we model the weights so as to roughly mimic their real-world setting by banks. We assume simple laws of motion of the form:

$$[6] \quad w_t^i = (1 - \rho_i) \bar{w}^i + (1 - \rho_i) \chi_i (\log Y_t - \log Y_{t-4}) + \rho_i w_{t-1}^i \quad i = F, H$$

where the lagged term  $w_{t-1}^i$  models the inertia in the adjustment of the risk-weights and the parameter  $\chi_i < 0$  measures the sensitivity of the weights to cyclical conditions proxied by the year-on-year growth rate of output<sup>11</sup>.

It is important to note that appropriate choices for the parameters in equation 6 also allow us to study the system dynamics under the two main rating systems allowed by the regulation: ‘point in time’ (PIT) v ‘through the cycle’ (TTC). In a nutshell, to assess borrowers’ creditworthiness under Basel II, banks can either use ratings supplied by external rating agencies, or produce their own internal ratings. Regardless of the source, ratings can be attained via either a PIT or a TTC approach. PIT ratings represent an assessment of the borrower’s ability to discharge his obligations over a relatively short horizon (eg a year), and so can vary considerably over the cycle. The TTC approach focuses on a longer horizon, abstracting in principle from current cyclical conditions. TTC ratings are therefore inherently more stable than PIT ratings, although their predictive power for default rates is lower<sup>12</sup>. Within our framework, the TTC approach could be approximated by choosing a large value for  $\rho$  and a small one for  $\chi$  in (6). In the limit, in this simplified setting a pure TTC system coincides with the Basel I framework.

Summing up, the results in the following sections can be interpreted as a comparison between the Basel I and Basel II frameworks, but also as a comparison between the PIT and the TTC approaches of the Basel II framework. While in our comments we shall mainly refer to the first interpretation for brevity, the second should also be kept in mind.

A final remark concerns the interpretation of  $v$ , the ‘optimal’ capital/assets ratio appearing in equations 2 and 5. As mentioned above,  $v$  can be thought as a minimum capital ratio established by the regulator – eg the 8 percent benchmark imposed by the Basel regulation, plus a buffer. The buffer captures the idea that banks tend to voluntarily keep their capital above the regulatory minimum, to avoid extra costs related to market discipline and supervisory intervention, or to meet

11. The results illustrated below remain broadly unchanged if the business cycle is measured using the deviation of output from its steady state level.

12. For a comparison of PIT and TTC components of default risk, see Löffler (2008).

market expectations (eg to maintain a given rating)<sup>13</sup>. This twofold interpretation of  $\nu$ , as a regulatory instrument and as a capital buffer held by banks, has a key role in the present paper and must be kept in mind for the interpretation of our results. We shall come back to it in the following sections.

### 3. The pro-cyclicity of the Basel II framework: is it a problem?

Whereas there is a relatively broad consensus that Basel I – as any capital regulation – increased the pro-cyclicity of the financial system, the issue of how much additional pro-cyclicity Basel II generates relative to Basel I is still open to debate<sup>14</sup>. This issue is difficult to address empirically, in view of the extremely recent application of Basel II (in Europe most banks deferred it to 2008). The scant available evidence derives from counterfactual and simulation exercises, or from comparisons with similar past experiences of regulatory change. Many authors argue that this extra pro-cyclicity may be substantial. However, the result often depends on the credit-risk estimation techniques chosen. In addition, other authors observe that banks hold capital buffers in excess of the regulatory minimum, and that this could enable them to smooth out or even eliminate the impact of the new regulation on lending patterns<sup>15</sup>. Overall, a tentative summary of the available literature is that Basel II may increase the pro-cyclicity of bank lending, but that this conclusion must be treated with caution. Furthermore, as we argued in the introduction, little if any evidence is yet available on the impact of the new regulation on the real economy – ie on GDP and its components, and lending – which is what ultimately matters to assess pro-cyclicity.

This section develops such analysis. Specifically, we use the model augmented with the estimated versions of (6) to compare the model dynamics under Basel I and Basel II, and assess whether Basel II induces extra swings in both bank variables and the key macro variables, and the size of these swings. To this end, we compute impulse response functions to various shocks. We focus on technology shocks, which are arguably the main drivers of the business cycle, but we also consider monetary policy and demand shocks.

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13. See Furfine (2001).

14. The Basel Committee was well aware of the potential pro-cyclical effects of the new regulations. The ‘through the cycle’ philosophy that permeates the accord, and several explicit provisions therein, were meant to contain pro-cyclicity. However, the evidence suggests that the implementation did not fully conform to the regulation’s spirit. See Cannata and Quagliariello (2009).

15. See Panetta *et al* (2009), and Drumond (2008) for reviews of the literature on the pro-cyclicity of capital regulation, and for a summary of the debate on the pro-cyclicity induced by Basel I and Basel II.

We use the parameterisation of the model reported in Gerali *et al* (2009). To make the model operational we need to estimate the parameters of (6). Applying this equation to the data presents several challenges, due to the fact that no historical time series for the weights, or the risk-weighted assets, is yet available. To obtain estimates of the parameters of (6) we proceed as follows. We use data on delinquency rates on loans to households and non-financial companies in the US as proxies for the probabilities of default on these loans (similar data for the euro area were not available to us). We input these time series into the Basel II capital requirements formula, and using a series of assumptions concerning the other key variables of the formula (loss given default, firms' size, the maturity of loans) we are able to back out time series for the weights  $w_t^F$ ,  $w_t^H$ . Next, we estimate equation 6 using these series. The regressions suggest that the sensitivity of the risk weights to the cycle (the parameter  $\chi$ ) is relatively large for commercial and industrial enterprises while it is not statistically different for residential mortgages. The methodology used to obtain the weights is reported in the Appendix 1.

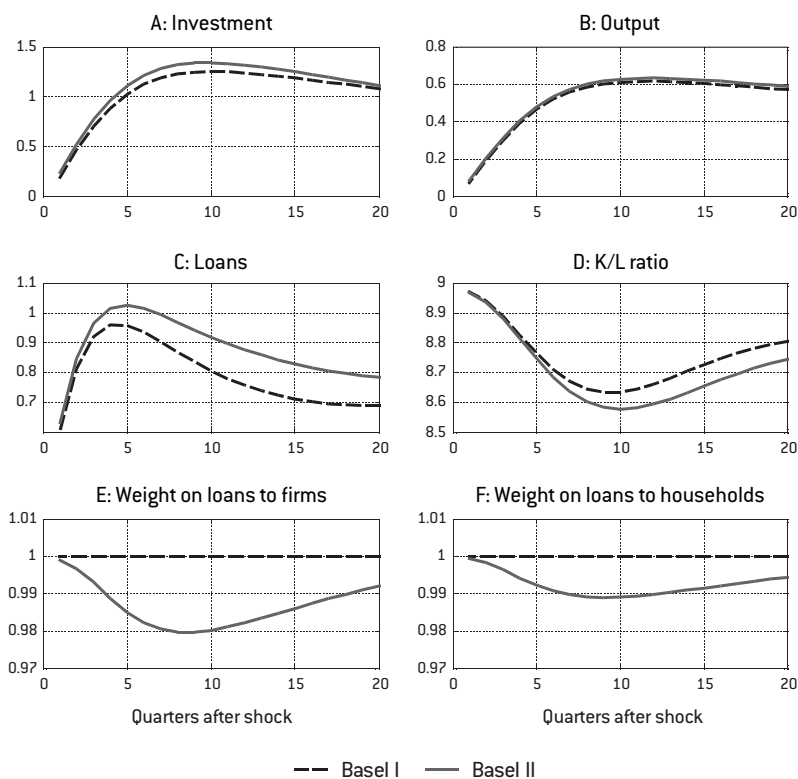
### 3.1 Baseline results

Figure 1 shows the results for the technology shock, modelled as an unexpected increase in the total factor productivity (TFP). Consider the results under Basel I first (represented in the figure by the dashed lines).

The two top panels report the response of the key macroeconomic variables. The main effect works through investment: firms react to the positive technology shock by increasing investment by about one percent above its steady state level in the first year (panel A). The expansion of output is relatively more muted and delayed (panel B), reflecting a more gradual pick-up in consumption. The increase in investment drives up the demand for loans, so that one year after the shock loan growth is about 0.9-1.0 percent above steady state (panel C).

The ratio between bank capital and assets declines over the first two-three years. The minimum value, close to 0.4 percentage points below the nine percent steady state value, is reached after 10 quarters (panel D). The decline reflects the increase in loans in the denominator (panel C), as well as a contraction of bank profits, which affects the numerator via the bank capital accumulation equation (3). The decline in profits is related to the decrease of the policy rate by the central bank in response to the decline in inflation, and to the presence of a mark-up on the loan rates and a markdown on deposit rates. The mark-up and the markdown are sticky. Hence, as the policy rate is reduced by the central bank, the interest rate margin

Figure 1: Impulse responses to a positive technology shock: Basel I v Basel II



Note: the impulse responses are measured as percentage deviations from steady state, except for the K/L ratio (measured in percentage points) and the weights  $w^i$  (normalised to one and measured in levels).

falls and, since the price effect dominates the quantity effect, so do profits<sup>16</sup>. Notice that by construction the weights  $w_t^i$  in panels E and F do not move, as under Basel I they are fixed at 1.

Consider next the same exercise under Basel II (represented by the solid lines). In a nutshell, the system's responses are qualitatively similar, but slightly more pronounced than in the Basel I scenario. The reduction in the risk weights  $w_t^i$  is the key driver of the system's enhanced response. Both weights decline in the two years after the shock, reflecting improved macroeconomic conditions and the related decline in the riskiness of the loans. The sharper decline of  $w_t^F$  is due to its higher sensitivity to cyclical conditions (a higher  $\chi_i$  in (6)). This drives the ratio between banks' capital and risk-weighted assets away from the desired value  $\bar{v}$ . To boost loans and reduce this gap, banks reduce interest rates on loans more aggressively than under Basel I.

The response of bank credit is always above the corresponding curve under the Basel I framework. The effect is relatively small, however. A similar reaction emerges for banks' capital/assets ratio<sup>17</sup>. The expansion in bank credit boosts investment growth: the deviation from steady state peaks about two years after the shock, at about 1.4 percent, compared with about 1.3 under Basel I. The effect on output is also magnified but muted.

Figure 2 shows the results for an expansionary monetary policy shock. The effects on the macroeconomic variables are qualitatively analogous to those in Figure 1: in the first 8-10 quarters the curves for Basel I are systematically below those for Basel II. However, the difference is negligible, as the curves virtually overlap. The limited impact of Basel II reflects the behaviour of the time varying weights  $w_t^i$ : whereas the technology shock described in figure 1 induced a large and persistent decline in the weights, the monetary policy shock causes a reduction of the risk weights that is too small and short-lived to alter significantly the dynamics of the bank and macro variables. In turn, this is due to the small and short-lived reaction of output to a monetary policy shock (a relatively common finding in the DSGE literature). The small additional pro-cyclicality induced by Basel II according to the exercises in Figure 2 echoes several findings in the literature, according to which financial frictions do not significantly amplify the transmission of monetary policy shocks (see, among others, De Fiore and Tristani, 2009, De Graeve, 2008, and Iacoviello, 2005). At the same time, our result is in contrast with

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16. Empirically, the differential between loan and deposit rates is countercyclical. See eg Aliaga-Diaz and Olivero (2008) for evidence on the US.

17. This decline is also due to the fall of bank profits, which is sharper under Basel II.

Aguiar and Drumond (2009), the only other paper which focuses on the Basel I v Basel II issue within a DSGE framework. They find that, in the case of a monetary policy shock, the impact of Basel on the model dynamics in general and on output in particular is larger than in our case (both for the effect of Basel I, and for the Basel II v Basel I differential)<sup>18</sup>.

As a third experiment, we examined a positive demand shock, modelled as a decrease in the intertemporal discount factor which induces both types of households to anticipate consumption and reduce savings. This type of disturbance, which affects directly households' inter-temporal first-order conditions, is commonly considered in estimated medium-scale models (see Primiceri *et al*, 2006, and Smets and Wouters, 2007). A feature of this type of shock is that it typically generates opposite movements in consumption and investment. This does not match the pattern observed in reality, as the correlation, along the business cycle, between consumption and investment is strongly positive in most economies. Thus, the quantitative importance of these shocks for the business cycle tend to be relatively modest, and the positive correlation between consumption and investment may reflect other, more important drivers of the business cycle (eg technology shocks, which push consumption and investment in the same direction).

The debate on this issue clearly lies outside the scope of the present paper. For our purposes, it is important to remark that after this type of demand shock investment falls, and so do bank loans; these movements are dampened (ie the contraction is more modest) under Basel II. Overall, output growth is (slightly) stronger under Basel II, as the growth in consumption offsets the fall in investment<sup>19</sup>. Thus, using a strict GDP-based interpretation of the definition of pro-cyclicality proposed in the introduction (an arrangement is pro-cyclical if it amplifies the cyclical fluctuations of the economy), we can still conclude that adoption of Basel II produces a (modest) increase in pro-cyclicality. However, the muted contraction of bank loans (and investment) under Basel II makes one

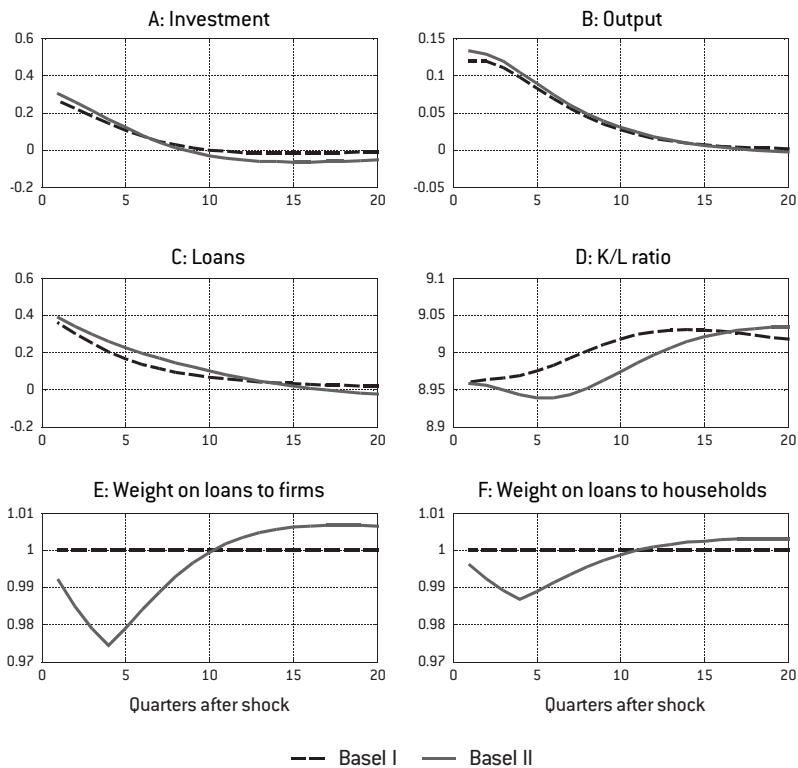
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18. This difference may be due to alternative modelling choices. Aguiar and Drumond (2009) build on the Bernanke, Gertler and Gilchrist (1999) framework, whereas our model is based on the financial accelerator mechanism of Kyjotaki and Moore (1997).

19. The decrease in the households' discount factor makes them more impatient and causes an increase in consumption and output, and a reduction in savings [deposits fall by around 0.6percent]. The fall in deposits forces banks to reduce lending to firms (who cut investment spending) and to households. The initial increase in spending on capital goods reflects the large increase in the price of firms' installed capital stock. The fall in risk-weighted loans and the slow increase in bank capital, resulting from higher profits, raises the capital/asset ratio above the desired value  $\bar{v}$ . As for the technology shock, both weights decline in response to the demand shock. Profits increase under Basel I while they fall under Basel II. This difference reflects the response of loan rates, which increase more under Basel I than under Basel II.



Figure 2: Impulse responses to a positive monetary policy shock: Basel I v Basel II



Note: the impulse responses are measured as percentage deviations from steady state, except for the K/L (measured in percentage points) and the weights  $w^i$  (normalised to one and measured in levels).

wonder whether simply looking at the behaviour of output is the proper thing to do.

Summing up, our findings suggest that the transition from Basel I to Basel II can amplify the dynamics of bank loans and capital/asset ratio and, ultimately, the fluctuations of the real economy. Furthermore, recalling that our exercises in figures 1 and 2 can also be interpreted as a comparison between the ‘point in time’ (PIT) v ‘through the cycle’ (TTC) rating approaches under Basel II, our evidence also suggests that the PIT approach introduces extra pro-cyclicality relative to the TTC. Our key finding, however, is that the magnitude of this amplification effect appears to be relatively small<sup>20</sup>.

This assessment must be qualified with the following two caveats. First, there are at least two reasons why, *ceteris paribus*, the above exercises may overestimate the extra pro-cyclicality induced by Basel II. One is that they only partially incorporate banks’ optimal response to shocks and regulatory changes. As we discuss below, several authors contend that forward-looking banks will react to Basel II by holding voluntary countercyclical buffers. By contrast, we have assumed so far that  $v$  [the parameter pinning down the steady state value of banks’ capital/assets ratio] doesn’t vary with time. We shall address the issue of a time varying  $v$  in section 5.1. Another potential source of overestimation is that our estimates of equation 6 are based on quarterly delinquency rates, and should therefore approximate a pure PIT approach.

Second, several shortcomings of the model may have an ambiguous impact on the magnitude of the Basel II v Basel I effect, thereby increasing the confidence interval around our assessment. Other features not yet discussed are likely to generate an underestimation of this effect. We discuss them in section 5.

### 3.2 Robustness

Our results are sensitive, *inter alia*, to the estimated values of  $\rho$  and  $\chi$ , whose point estimates are subjected to particular uncertainty, for the reasons just mentioned. Therefore, we will now assess the sensitivity of our findings to alternative values for  $\rho^i$  and  $\chi^i$ , the key parameters in equation 6. We gauge the impact of modifying these parameters on output and bank loans, the key variables that characterise the results of figures 1 and 2. We replicate the exercise underlying the figures under different values of for  $\rho^i$  and  $\chi^i$ . These figures are judgmental – ie they are not

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20. Our assessment of the pro-cyclicality of capital regulation may be affected by the parameter measuring the costs of adjusting the capital/assets ratio,  $\kappa_b$ , in equation 1. We analyse the issue in section 3.2.

estimated – and their only aim is to test the robustness of our results. In Table 1 we only report the results for the technology shock, as those for the monetary policy shock remain virtually unchanged.

For ease of comparison, the intersections of the row and columns labelled ‘baseline’ report results from Figure 1, Basel II scenario. For instance, consider the effect of the technology shock on output (left-hand side of the table). Using the baseline estimates of  $\rho^i$  and  $\chi^i$  one obtains a maximum deviation of investment from its steady state value of 0.6 percent. This value is the maximum of the impulse response curve of output under the Basel II regime, reached after about seven to eight quarters (Figure 1B). Likewise, the maximum effect on loans, 1 percent of the steady state value, reached after 5 quarters, can be read off Figure 1C.

The other cells of the table report the results of three exercises. First, we keep the autoregressive parameters  $\rho^i$  fixed at their estimated baseline levels, and increase the sensitivity  $\chi^i$  of the weights to the business cycle. Second, we move the autoregressive parameters  $\rho^i$  above or below their estimated baseline levels while keeping the  $\chi^i$  at their baseline values. Finally, we allow both parameters to differ from the baseline. Note that the low  $\rho^i$ , high  $\chi^i$  cells can also be interpreted as corresponding to a version of the PIT rating approach more extreme than that under our Basel II baseline scenario in Figures 1 and 2. Vice versa, the high  $\rho^i$ , low  $\chi^i$  cells could be viewed as capturing a TTC less extreme than under our Basel I scenario in Figures 1 and 2.

Overall, this robustness check confirms the results of Figures 1 and 2. Consider first the effect on output (left-hand side of the table). In all cases the introduction of Basel II increases the pro-cyclicality relative to Basel I. Pro-cyclicality is also increased when moving from less to more PIT rating systems, ie moving from the

Table 1: Sensitivity of results to parameterisation of equation (6): technology shock  
(Maximum effect; percent deviations from steady state)

|          |              | Effect on output<br>(0.6 under Basel I) |          |      | Effect on loans<br>(1.0 under Basel I) |          |      |
|----------|--------------|-----------------------------------------|----------|------|----------------------------------------|----------|------|
|          |              | $\rho^i$                                |          |      | $\rho^i$                               |          |      |
|          |              | 0.70                                    | Baseline | 0.97 | 0.70                                   | Baseline | 0.97 |
| $\chi^i$ | Baseline     | 0.6                                     | 0.6      | 0.6  | 1.1                                    | 1.0      | 1.0  |
|          | Baseline * 5 | 0.7                                     | 0.7      | 0.7  | 1.9                                    | 1.4      | 1.1  |
|          | Baseline* 10 | 0.8                                     | 0.9      | 0.7  | 3.1                                    | 2.4      | 1.5  |

Note: the baseline values for  $i$  and  $i$  ( $i=F, H$ ) are those reported in the appendix, and used in Figures 1 and 2. The estimated is in the range 0.90-0.93 (ie larger than 0.7 and smaller than 0.97) for both households and firms.

upper right corner to the lower left corner of the table (although a slight non-monotonicity appears in the figures: the effect under  $\rho^i=0.7$  is slightly larger than under the baseline value, which is above 0.9). The magnitude of the effects induced by the Basel II regulation is almost insensitive to the autoregressive parameter  $\rho^i$ , relatively more sensitive to the  $\chi^H, \chi^F$  parameters: assuming that the true values of these parameters are 10 times larger than the estimated baseline, the pro-cyclical effect on output increases from 0.6 to 0.9 in terms of maximum deviation from the steady state value. Overall, the effects would remain modest even if we were to admit that our baseline was significantly underestimated.

Next, look at the effect on loans, on the right-hand side of the table. The above effects are confirmed from a qualitative viewpoint, but become more sensitive to the choice of  $\rho^i$  and  $\chi^i$ . In reaction to the technology shock, loans increase to a maximum of 2.3 percent of their steady state value when  $\chi^i$  are 10 times larger than the estimated baseline, compared with 1 percent when the baseline values are used.

We also check the sensitivity of the results to the estimated value of  $\kappa_b$ , the parameter measuring the cost of deviating from the optimal capital/assets ratio  $\nu$  in (1). To this end, we increase this parameter up to 10 times its baseline value, and compute the impulse responses for technology, monetary policy and demand shocks. These simulations reveal that the effect of this parameter is relatively large if one focuses on the Basel I scenario (following a technology shock, the expansion of loans and investment is smaller if  $\kappa_b$  is larger); however, it is marginal if one looks at the Basel II/Basel I difference.

### 3.3 Summary

In this section we have shown that the shift from Basel I to Basel II increases the procyclicality of bank lending – ie that the reaction of macroeconomic variables such as output and investment to shocks is relatively larger under the Basel II regime compared with Basel I. However, our results indicate that the magnitude of this amplification effect depends on the type of shock considered, and appears contained.

This conclusion is subject to a series of caveats. To begin with, the magnitude of this impact depends on a number of model features (discussed in section 5), which make our estimate particularly uncertain at this stage. In addition, admitting that the extra pro-cyclicality induced by Basel II is small does not entail that one should do nothing about it: if the cost of eliminating it were likewise small, then it would be optimal to address the problem. Finally, Aguiar and Drumond (2009), who employ a similar DSGE framework to address the issue, find that the amplification

effect induced by Basel II is larger than suggested by our estimates.

Therefore, in the rest of the paper we consider possible remedies to the pro-cyclicality induced by the Basel II regulation, assessing their benefits and cost.

#### 4. Assessing costs and benefits of countercyclical measures

In the current policy debate several proposals to reduce the pro-cyclicality induced by Basel II have been advanced. Section 6 reviews and discusses these proposals in some detail. In short, they can be grouped under the following headings: (i) smoothing the inputs of the capital function (for instance, banks could be required to mitigate the cyclicity of their PIT estimates of the PDs, or to move to TTC estimation methods); (ii) adjusting the capital function (for instance, some parameters such as the confidence level or the asset correlations could be appropriately changed over the cycle); (iii) smoothing the output of the capital function (ie, allow capital requirements to move in an autoregressive or countercyclical fashion); (iv) adopting countercyclical capital buffers; (v) adopting countercyclical provisions.

For the purposes of this section, it is enough to remark that the model with which we work does not allow us to distinguish among these proposals (as it makes no distinction between capital and loss provisions, say). However, it does allow us to assess their macroeconomic effects if one is willing to overlook the (important) technical differences among these suggestions, and concentrate instead on their common denominator. In our view, the common denominator is the idea that capital (or provisions) should be adjusted in a countercyclical fashion.

In the next subsection we gauge the effects of implementing countercyclical (regulatory or voluntary) capital buffers on pro-cyclicality. In section 4.2 we assess the impact of higher capital requirements on pro-cyclicality.

##### *4.1 Implementing a countercyclical capital*

So far, we have worked under the assumption that the key parameter  $\nu$  is time invariant. This is in keeping with the current policy framework, under both Basel I and II, and with the idea that banks like to keep voluntary capital buffers constant at the minimum possible value. However, a natural extension is to consider a time-varying  $\nu$ . Within our framework, this represents the most straightforward way to assess the effect of countercyclical capital requirements. Consider the following equation:

$$[7] \quad v_t = (1 - \rho_v) \bar{v} + (1 - \rho_v) \chi_v (\log y_t - \log y_{t-4}) + \rho_v v_{t-1}$$

where the parameter  $\bar{v}$  measures the steady state level of  $v$ . In [7], we assume that  $v_t$  adjusts to year-on-year output growth, our measure of the business cycle, with a sensitivity equal to the parameter  $\chi_v$ . Assuming that the latter is positive amounts to imposing a countercyclical regulatory policy: capital requirements increase in good times (banks hold more capital for the amount of loans they provide to the economy), and vice versa.

Note that adding [7] to the model affects the cyclical pattern of the main variables but not their steady state levels, and is therefore neutral in this sense. The reason is that the steady state of the model is affected only by the value of  $\bar{v}$  and not by the dynamics of  $v$ , which are influenced by the sensitivity of capital requirements to output. Therefore, in what follows we focus on the effects of adopting [7] on the dynamics of the economy.

Recall from section 2 that  $v$  has a twofold interpretation: as a capital requirement and as a buffer voluntarily held by banks. This interpretation carries over to  $v_t$  and to equation [7]: the regulator might decide to implement a countercyclical capital requirements policy; alternatively, banks might voluntarily choose to hold countercyclical capital buffers. In the following section, we look at these two interpretations.

#### 4.1.1 Countercyclical management of capital requirements policy

Is there room for countercyclical capital requirements? The answer seems to be no, within our model as well as in general: the Taylor rule which closes the model is the natural countercyclical tool, and it would seem that any new instrument with such a target would at best be co-linear with monetary policy, and at worst conflict with it (eg if the responsibility for the new instrument were assigned to another authority and co-ordination between the two authorities was limited). However, models, including ours, feature several frictions, some of which are related to the presence of nominal rigidities (prices and wages) and others to the presence of borrowing constraints on households and firms. Therefore, an additional instrument might improve on the result attainable when only monetary policy is available<sup>21</sup>.

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21. Woodford [2003] shows that in a simple economy with one friction, optimal monetary policy is capable of restoring the first best allocation. However, Erceg, Henderson and Levin [2000] show that in an economy with staggered wage and price setting, strict inflation targeting can induce substantial welfare costs. This result suggests that when more than one friction is present, policymakers may want to resort to multiple instruments to maximise society's welfare.

The literature has only very recently started studying optimal monetary policy in the context of models with financial frictions. Cúrdia and Woodford (2009) find that in the simple new Keynesian (NK) model with time-varying credit (arising because of financial frictions), the optimal target criterion (ie the optimal monetary policy) remains exactly the same as in the basic NK model: the central bank should seek to stabilise a weighted average gap between inflation and output. In the context of a similar small-scale model, De Fiore and Tristani (2009) show that in the presence of a credit channel, near-full inflation stabilisation remains optimal in response to specific shocks.

In this section we interpret equation (7) as a simple capital requirement reaction function, where the parameter  $\bar{v}$  measures the steady state level of capital requirements  $v_t$  and  $\chi_v > 0$  measures its sensitivity to the business cycle. As in section 3, we look at the effects of the introduction of (7) on the dynamics of the model by examining the responses to various shocks. For comparison, the figures report the curves from figures 1 and 2 obtained under Basel I, a useful baseline since we have seen that its pro-cyclicality is a lower bound.

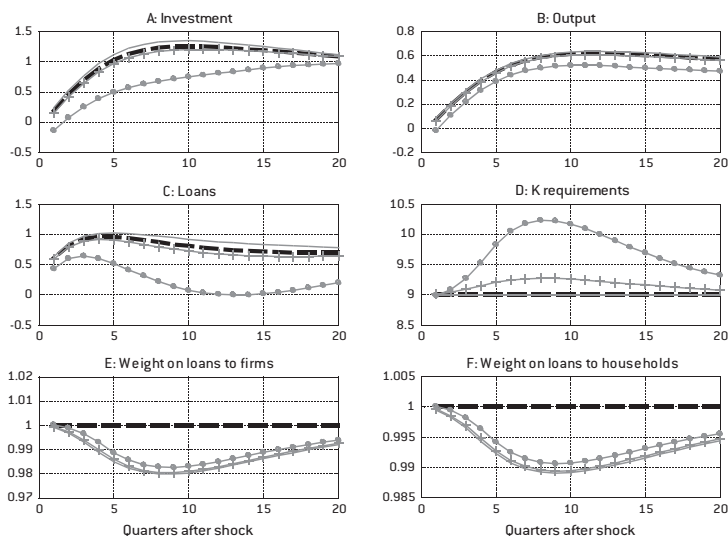
The results are shown in Figure 3. As usual, we start with a positive technology shock. Consider the responses of investment, in panel 3.1A. The two top lines in the figure illustrate the reaction under Basel I and Basel II. They are exactly those reported in figure 1, for ease of comparison. The two new lines are obtained with a countercyclical management of the capital requirement – ie simulating the model augmented with equation (7). Specifically, the curve labelled ‘Basel II: countercyclical K requirement’ is obtained by setting  $\rho_v = 0.90$  and  $\chi_v = 20$  in (7). The figure clearly shows that this policy can undo the extra pro-cyclicality induced by Basel II relative to Basel I, and indeed, to improve upon Basel I. How is this stabilisation achieved? The basic mechanism is the same as illustrated in section 3. The stabilisation policy dampens loans growth (panel C). In turn, this is due to the fact that the expansion of output drives up the capital requirement  $v_t$ . The above parameterisation for  $\rho_v$  and  $\chi_v$  in (7) causes  $v_t$  to gradually increase from its steady state of nine percent to a maximum of 9.3 percent after about 8 quarters (panel D).

The response of output, in panel B, confirms this message from a qualitative viewpoint, although the small dimension of the effects, documented in section 3, causes the curves to be very similar. Notice that in this case, the risk weights in panels (E, F) are hardly affected, and consequently play a minor role.

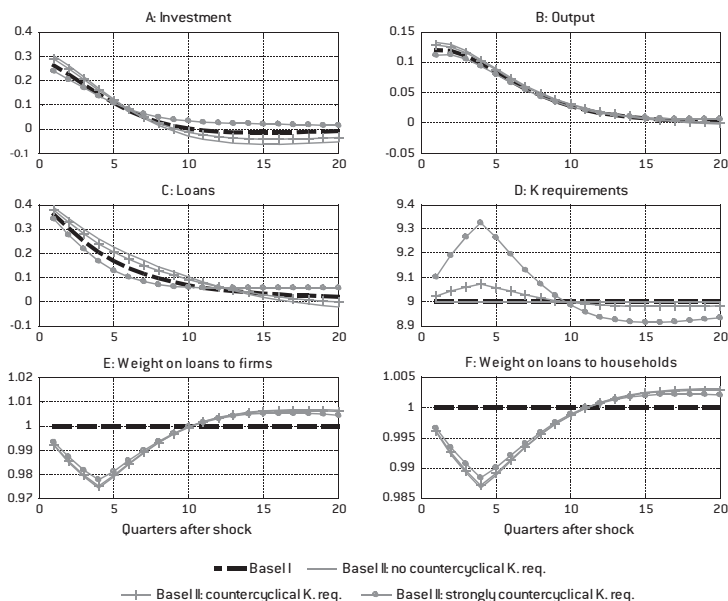
To assess the sensitivity of the results we simulated the model setting  $\chi_v = 100$ . The resulting responses are labelled ‘Basel II: strongly countercyclical K

Figure 3: Impulse responses with passive v countercyclical capital requirements

### 3.1 Positive technology shock



### 3.2 Expansionary monetary policy shock



Note: the impulse responses are measured as percentage deviations from steady state, except for the capital requirement [measured in percentage points]; the responses of weights  $w'$  are normalised to one and measured in levels. To ease the interpretation, in panel 2 the curves have been computed using a value of  $\chi'$  in [5] five times larger than the baseline.



requirement'. A look at the usual sequence of panels in Figure 5.1 reveals significant changes. The responses of investment and output are now well below the Basel I benchmark, pointing out that the dampening effect on pro-cyclicality is now relatively marked. This effect is obtained with a 1.2 percentage point increase of the capital ratio, from the steady state value of nine percent to a peak of 10.2 after about two years. The order of magnitude of this increase does not look unreasonable.

According to the interpretation which we adopt in this section, equation 7 is a policy reaction function. Hence its parameters could be chosen optimally, so as to minimise pro-cyclicality, say, or maximise welfare. We leave this task for future research. The point of the simple exercise just described is to show that a countercyclical capital requirement policy can achieve relatively powerful results.

Panel 2 of Figure 3 replicates the exercise for a monetary policy shock. Overall, the results of panel 1 are qualitatively confirmed. As in previous sections, the difference across the different regulatory regimes turns out to be small when this type of shock is considered. In this case, the 'countercyclical K requirement' policy manages to improve on the passive policy, but still leaves more pro-cyclicality than under the Basel I framework. To improve on the latter, the 'strongly countercyclical K requirement' policy should be adopted<sup>22</sup>.

Overall, our results suggest that introducing policy tools that allow building up and using buffers of resources in a countercyclical fashion may yield benefits, relative to an environment in which only the interest rate instrument is available to the policymaker. The practical implementation of this countercyclical capital requirements policy is the subject of section 6. As we shall see, such policy need not be discretionary – ie its implementation need not require periodic meetings of a board, as it could be based on rules.

#### *4.1.2 Would banks voluntarily adopt a countercyclical capital policy rule?*

In our simplified framework,  $\nu_t$  can be thought of as comprising a buffer voluntarily held by banks (eg to face unexpected losses) because the current version of the model does not distinguish between capital and provisions. Therefore, one may view equation 7 as an admittedly rough way to let banks – not the regulator –

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22. As with previous cases, we also consider a demand shock. The results (not reported) confirm the analysis of the previous sections. Conditioning on this type of shocks, the success of the countercyclical K requirement policy is clear cut if one sticks to a strict definition of pro-cyclicality (output increases, and the increase is dampened under the countercyclical policy); it is ambiguous if one considers the entire economy (loans and investment decline, and the decline is enhanced under the countercyclical policy).

choose a (possibly countercyclical) capital buffer. Indeed, as mentioned above, various authors (Repullo and Suarez, 2008, and Tarullo, 2008) argue that forward-looking banks will find it optimal to manage their excess capital buffers in a countercyclical fashion, and that this endogenous response has the potential to offset to a significant extent the extra pro-cyclicality induced by the new regulation<sup>23</sup>. If this were the case, regulatory intervention on capital requirements could prove to be largely redundant.

A straightforward way to check whether this may be the case within our framework is to look at bank profits (the interest rate margin, more precisely) under Basel II, with and without the countercyclical capital policy (?). Clearly, if banks can increase profits by voluntarily adopting countercyclical capital buffers, they will not wait for the regulator to intervene before implementing such a policy.

Figure 4 reports the impulse response of bank gross profits (ie before capital depreciation) to the usual technology and monetary policy shocks under the four regimes discussed in the previous section: the Basel I and Basel II regimes underlying Figures 1 and 2; the Basel II regime with the countercyclical and 'strongly' countercyclical policy (?) underlying Figure 3.

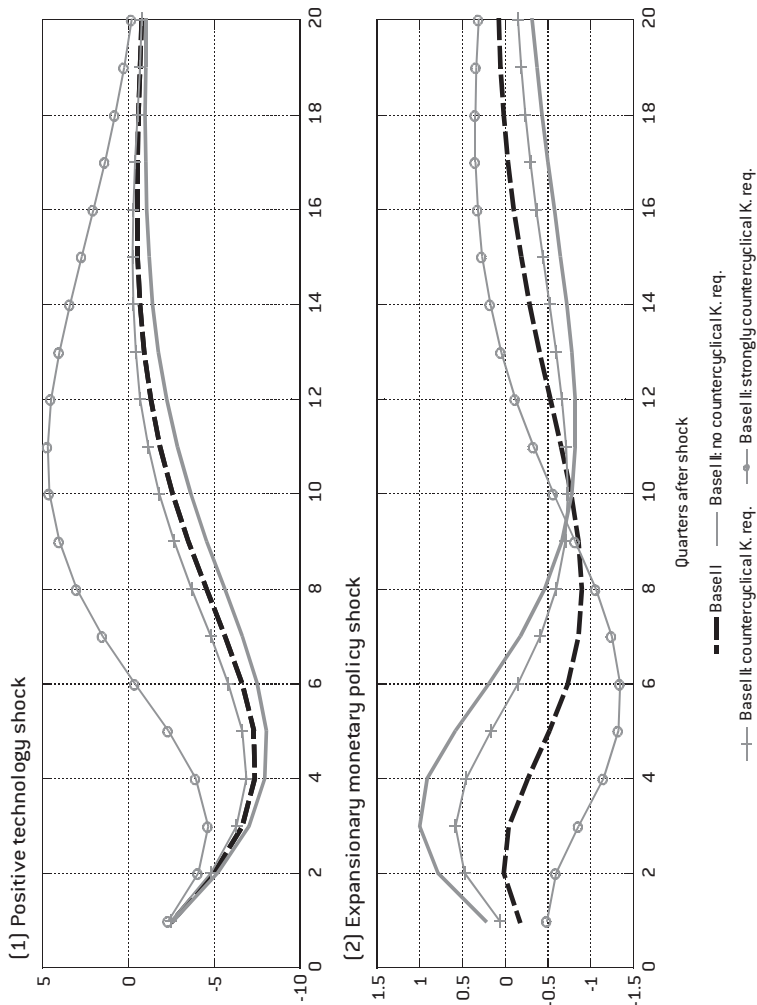
Look at the first panel, reporting the response of bank profits to a technology shock. Gauged with the yardstick of bank profits, the worst regime is Basel II with fixed capital buffers; next comes the Basel I regime; then, the Basel II with time-varying, countercyclical capital buffers (countercyclical K requirement). The best is the Basel II with strongly countercyclical K requirement. Thus, it seems that a countercyclical accumulation of voluntary capital buffers would be in the banks' own interest.

Next, consider panel 2, reporting the response of profits to the expansionary monetary policy shock. Here the results become ambiguous. Specifically, the ordering of the curves depends on the time horizon: a policy of countercyclical capital buffers accumulation would initially harm profits. When a countercyclical policy is implemented, capital requirements are increased exactly when the capital/assets ratio falls because of the expansion in lending. As a consequence, the fall in bank loan rates induced by the expansionary monetary policy is partly offset by the increase in costs related to the bank capital position (see equation 2) and, consequently, profits fall by a larger amount. Overall, the figure suggests that banks would shy away from such a policy. As usual, we also considered a positive demand shock. The message emerging from the related figure (not reported) is in

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23. Repullo and Suarez (2008) suggest that these buffers would range from about 2 percent of total assets in recessions to about 5 percent in expansions.

Figure 4: Impulse responses of bank profits under alternative regulatory regimes



Note: the impulse responses are measured as percentage deviations from steady state. To ease the interpretation, in panel 2 the curves have been computed using a value of  $\chi'$  in [5] five times larger than the baseline.

line with that of panel 1.

Summing up, several authors argue that, faced with the Basel II regulatory change, banks will find it optimal to (partly) offset the additional pro-cyclicality by choosing appropriate voluntary capital buffers. Our analysis provides only partial support for this argument. As is often the case in the context of analyses conducted with DSGE models, the effectiveness of certain economic actions is not uniquely determined but conditional on the type of shock affecting the economy. As such, our results lend support to the view that a policy of countercyclical management of capital requirement, enforced by a regulator, would not be redundant.

#### 4.2 Increasing banks' regulatory capital

Because of the current crisis, proposals to raise the regulatory minimum capital above 8 percent and to improve capital quality have recently returned to the fore. It is widely acknowledged that excessively low capital levels of financial institutions were a propagating factor of the crisis. Relatively small losses, concentrated in time and affecting many intermediaries at once, triggered a deleveraging with far-reaching consequences. Clearly, the adjustment could have been much less dramatic if the capital base had been larger – ie if the leverage of the system had been lower. However, in the current policy debate proposals to increase banks' regulatory capital are seldom explicitly motivated with the need to reduce pro-cyclicality (see FSF, 2008 and 2009, for example). This is probably due to the fact that the link between pro-cyclicality and the level of capital is not obvious. Intuitively, one could think that, as long as the cost borne for deviating from the minimum requirement is unchanged, it is immaterial whether the minimum is set at eight or at a much higher level<sup>24</sup>.

Within our model an increase in  $\nu$  does have an effect on the dynamics of the key macroeconomic variables<sup>25</sup>. In more intuitive terms, the effect of  $\nu$  on the system dynamics may be seen as working through bank leverage: raising  $\nu$

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24. This point is well summarised by Brunnermeier *et al.* (2009): "requirements based on minimum capital ratios do not provide resilience, since they cannot be breached. They represent a tax, not a source of strength". They thus suggest to introduce higher target levels of capital, with a specific, rule-based ladder of increasing sanctions.

25. There are two indirect (and technical) effects. First, the depreciation parameter  $\delta_b$  in equation (3) is determined by the parameter  $\nu$  (via a series of conditions discussed in Gerali *et al.*, 2009, which we have omitted from section 2). Thus, increasing  $\nu$  causes a decline in  $\delta_b$  which affects the dynamics of capital accumulation via (3). Second, looking at the log-linear approximation to equation 2 used to derive the impulse response functions presented throughout the paper, one can see that a higher  $\nu$  implies that a given deviation of the capital/assets ratio has a greater effect on the interest rates set by banks.

increases the steady state value of the capital/assets ratio, reducing leverage. While this should univocally dampen the accelerator effect and therefore reduce pro-cyclicality, in practice we will see that the result is ambiguous. Thus, we have first assessed whether higher capital requirements increase or decrease pro-cyclicality. Next, we look at the macroeconomic costs of higher capital requirements.

For the first task, we use the baseline parameterisation of our model to compute impulse response functions of bank variables and key macroeconomic variables to different shocks, adopting several different, plausible values for  $\nu$ . Figure 5.1, the counterpart of Figure 1, reports the reaction to a positive technology shock. The curves labelled  $\nu=0.09$  are those of the baseline exercises in Figure 1, reported for ease of comparison. The figure suggests that higher capital requirements dampen the reaction of the key bank variables: the curves for loans and the capital/assets ratio corresponding to higher  $\nu$  are relatively closer to zero (panels C, D)<sup>26</sup>. In turn, the dynamics of loans affect investment (panels B, C) and ultimately output.

Figure 5.2 replicates the same exercise for an expansionary monetary policy shock. Since under the baseline parameterisation the curves virtually overlap in all the panels, we plot the responses obtained setting  $\chi_i$  five times larger than the baseline; this magnifies the differences without altering their sign. The results appear now to be reversed, although they are not clear cut. The rate of growth of bank loans is higher in the first six to seven quarters after the shock, but becomes lower afterwards. Increasing the capital requirement seems to have a pro-cyclical impact on investment and output, although the effects are negligible and short lived.

As in section 3.1, we also considered a positive demand shock (figure not reported). The results obtained with the baseline parameterisation of the model are somewhat ambiguous: the response of output is positive and increasing in  $\nu$ . Loans decline, reflecting the fall in investment. However, the fall is dampened for higher values of  $\nu$ . Overall, the difficulties of interpreting the outcome of this exercise mirrors those discussed in section 3.1.

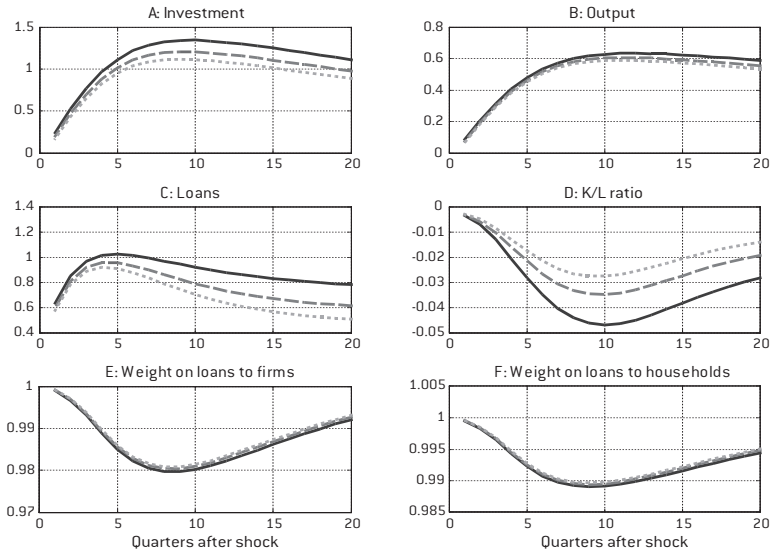
Finally, we analysed the robustness of these results compared with alternative choices of the key parameters in equation 6. For values of  $\chi_i$  five or ten times larger than the baseline, the result of Figure 3.1 vanishes: it is no longer true that higher values of  $\nu$  yield lower pro-cyclicality – indeed, they tend heighten pro-cyclicality. Figure 5.2 is already drawn under the assumption of  $\chi_i$  five times larger than the baseline. Setting it to 10 times the baseline magnifies the pattern: higher values of

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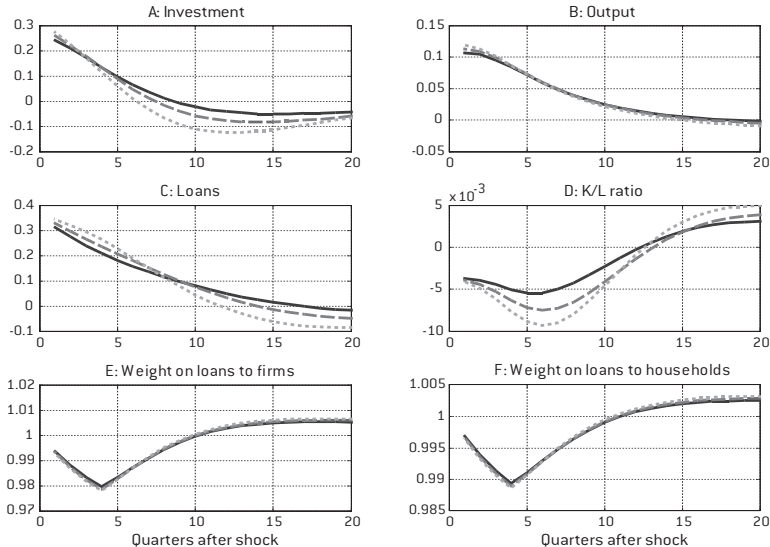
26. The curves in Figure 3 are derived from models with different steady states. They are comparable because they are expressed in terms of percentage deviation from the steady state.

Figure 5: Impulse responses under different levels of capital requirements

(1) positive technology shock



(2) Expansionary monetary policy shock



— Basel II:  $\nu = 0.09$     - - - Basel II:  $\nu = 0.12$     ..... Basel II:  $\nu = 0.15$

Note: the impulse responses are measured as percentage deviations from steady state, except for the capital requirement [measured in percentage points]; the responses of weights  $w$  are normalised to one and measured in levels. To ease the interpretation, in panel (2) the curves have been computed using a value of  $\chi'$  in (5) five times larger than the baseline.

$\nu$  yield higher pro-cyclicality. The same holds true for the demand shock experiment: when  $\chi^i$  is increased, higher  $\nu$  is associated with a larger response of output to the shock.

Summing up, the impact of higher capital requirements on pro-cyclicality is virtuous under the baseline parameterisation of our model. However, it depends on the type of shock considered, and it is also somewhat sensitive to the model parameterisation. More work is needed on this issue.

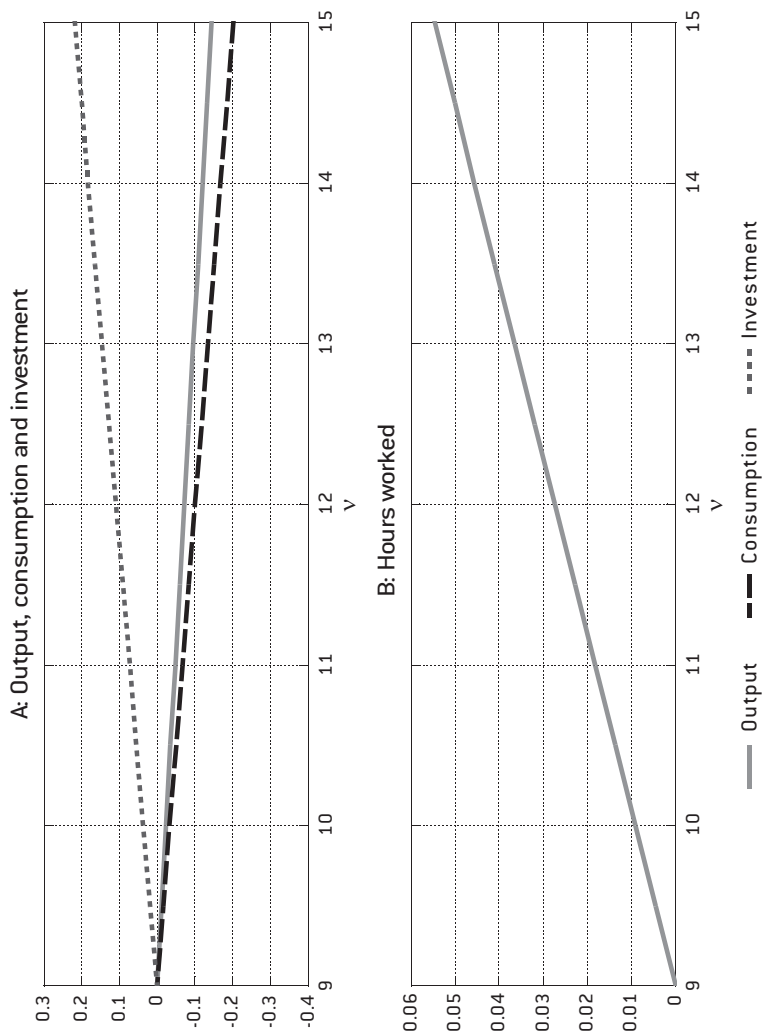
Next, we assess the effect of higher capital requirements on the steady state values of the main economic variables. Figure 6 reports some key results from this exercise. In each panel, values of  $\nu$  ranging between 9 and 15 percent are measured on the horizontal axis. The figure offers several interesting insights.

First, output monotonically decreases as  $\nu$  is increased (panel A). This result appears intuitive: higher capital requirements should make the economy more stable, but at a cost, along an ideal efficiency/stability trade-off. Second, the decline in output is modest: the steady state level of output under  $\nu=15$  percent would be only 0.2 percent lower than under the baseline  $\nu=7$  percent. However, this effect must be qualified. To begin with, the decline in output takes place in concomitance with an increase in the equilibrium amount of hours worked: to prevent consumption from falling, workers choose to work more (panel B). This implies that a broader measure of welfare would signal that the cost of higher capital requirements are larger than suggested by simply looking at traditional measures, such as GDP and its components. In addition, the decline in output reflects diverging patterns for its components. Specifically, the steady state level of consumption decreases monotonically with  $\nu$ , while investment increases. In turn the increase in investment is driven by an increase in loans, which could be model specific and not preferable to alternative modelling choices available to the banking sector. Third, in the version of the model used here the higher steady state  $\nu$  translates into a decline of the depreciation rate of bank capital,  $\delta_b$ . This amounts to assuming that banks make up for the extra cost by increasing efficiency. However, in practice banks might also react by shifting part of the cost to their clients, eg by increasing loan rates, or by reducing dividends. In this case the output loss due to higher requirements will be larger. Preliminary estimates conducted with a version of the model in which these alternative channels are allowed to operate confirm that the steady state output loss may be larger, but still relatively modest on average<sup>27</sup>. Summing up, output, as well as the aggregate

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27. See Angelini and Gerali (2010). See also Macroeconomic Assessment Group (2010) and Basel Committee (2010).

Figure 6: Increasing  $\nu$ : effect on the steady state levels of key economic variables



Note: the graphs reports the percentage deviation from the steady state of the variables as  $\nu$  is gradually increased from the initial value of nine percent.  $\nu$  is measured on the horizontal axis. For output, consumption and investment, the deviations are expressed in annualised terms.



welfare of households and entrepreneurs, fall monotonically as  $\nu$  is increased; the estimated decline is modest, but the given caveats suggest that the effect could be underestimated<sup>28</sup>.

These results suggest some policy implications concerning proposals to increase capital requirements. On the pro side, higher capital requirements increase the ability of the banking system to withstand shocks<sup>29</sup>. However, their effectiveness in terms of dampening pro-cyclicality is dubious: they may dampen or enhance the sensitivity of bank variables and the key macro variables to the business cycle, depending on the nature of the shock. On the down side, higher requirements could reduce aggregate welfare. Overall, with the usual caveats, these results suggest that policy options other than higher capital requirements may be better suited to limit pro-cyclicality.

## 5. Technical discussion

The results derived thus far are relatively clear cut and reasonably robust to a series of alternative assumptions about certain model features and parameters. However, the amount of uncertainty surrounding our estimates is certainly much higher than for many other macroeconometric works. Below is a list of technical issues that warrant this statement or that could lead us to suspect a bias of some sort in our baseline estimates, and, in particular, in one of our key results (that the extra pro-cyclicality injected by Basel II is small).

- i) The model used in the present paper belongs to a family which rules out firm and bank defaults in equilibrium. Models in this family include Kyiotaki and Moore (1997), and more recently Iacoviello (2005), Iacoviello and Neri (2009). Alternative models, in which defaults can and do happen are Bernanke, Gertler and Gilchrist (1999), Christiano, Motto and Rostagno (2007). It remains to be seen if a different macroeconomic environment could alter our conclusions.
- ii) The model does not differentiate between required capital and buffers voluntarily held by banks. As discussed in sections 3.2 and 4.1.1, there are

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28. The lower welfare caused by higher capital requirements at the aggregate level stems from opposite effects on savers and borrowers. In terms of consumption equivalents (a measure which is used in the literature when comparing welfare across different steady states), savers should be compensated when increasing capital requirements while borrowers (both households and entrepreneurs) would be willing to pay to move to a steady state with a higher capital requirement.

29. It must be remarked that in our framework banks and firms never default in equilibrium. Thus, we overlook the fact that higher capital requirements reduce banks' probability of failure, an important factor of stabilisation.

reasons to believe that banks would at least in part offset the extra pro-cyclicality induced by Basel II via such buffers.

- iii) In Section 4.2 we saw that as  $\nu$  is increased, so do investment and loans. This effect could be model-specific and not robust to alternative modelling choices of the banking sector.
- iv) Banks' lending rates incorporate changes in the capital requirement via equation 2. However, they do not take into account potential changes in the idiosyncratic riskiness of households and firms. In principle, rates on loans to firms, say, should increase in reaction to an increase in the riskiness of firms (measured by  $w^F$ ).
- v) In the current version of our estimated model, the steady state ratio between investment and output (defined as the sum of consumption and investment) is around 13 percent. This compares to 26 percent on average using euro area data. This is likely to induce an underestimate of true effects because in our environment Basel II works primarily through its effect on investment.
- vi) In our model bank capital has an implicit cost, given by the depreciation rate, but no explicit cost. Under alternative modeling choices, capital can be made a choice variable for banks and be assigned an explicit cost, possibly varying through the cycle.

Other things being equal, features under (iii) to (vi) point to a potential downward bias in our estimate of the pro-cyclical effect of Basel II, whereas (ii) points in the opposite direction. The sign of the net effect is hard to tell.

## 6. The policy debate on countercyclical tools

The results of the previous sections may help financial regulators to give operational content to the recommendations of the G20 leaders, published in April 2009. First, our analysis confirms that the transition to Basel II has to some extent enhanced the effects of banks' capital on the dynamics of loans and, ultimately, on the real economy. Our results suggest that the magnitude of this effect may have been overemphasised so far. However, they are consistent with the view that some correction to the current prudential framework is warranted, and that policymakers should eliminate potential pro-cyclical effects of capital regulation. Our analysis also suggests that this additional safeguard is better obtained through countercyclical buffers than by a simple, final increase in capital requirements.

Our model cannot distinguish among the various proposals since they are too

complex and detailed to be shaped in our simplified framework. Hence, in this section we first review the main proposals for introducing countercyclical devices within and alongside the Basel II framework, commenting on their pros and cons. We conclude with a discussion of the countercyclical toolkit proposed by the BCBS [2009].

## *6.1 Review of the main proposals*

### *6.1.1 Smoothing the inputs of the capital function*

Specification of more binding rules on how banks should estimate risk parameters. Generally, in most rating systems, the PDs are assigned in a two-stage process. First, a rating grade is assigned to a counterparty; next, a PD is assigned to an individual rating grade. Cyclicalities can result from (i) migrations (ie individual counterparties are assigned better or worse ratings as the cycle improves or deteriorates), and (ii) from recalibration of the mapping from rating grade to PDs (ie counterparties in a given rating grade will be assigned a different PD) or from a combination of the two.

In 'point in time' (PiT) rating systems the role of factor (ii) above will typically be negligible, whereas factor (i) will be important: in a downturn a large number of borrowers will migrate to worse grades, resulting in higher capital requirements (and vice versa in an expansion). By contrast, in through the cycle (TTC) rating systems migrations to different rating grades are rare and their role as a driver of pro-cyclicality tends to be negligible. In TTC systems some volatility of capital requirements can still derive from factor (ii). Therefore, compulsory adoption of TTC systems can be seen as a straightforward way to reduce pro-cyclicality induced by capital regulation<sup>30</sup>.

### *6.1.2 Strengthening stress tests*

Another option, which can go together with more TTC ratings, is to strengthen Pillar II provisions under Basel II, and particularly stress tests. Bank supervisors are already responsible for assessing capital adequacy in the light of cyclical conditions and macro-prudential concerns. In particular, Pillar II gives supervisors the discretion to require banks to increase capital resources above the Pillar I

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30. Basel II expresses a preference for TTC systems, but it does not force banks to adopt them. Indeed, in Europe, most banks implemented hybrid solutions, including both PiT and TTC components.

minimum. While not limited to this purpose<sup>31</sup>, Pillar II rules have also been designed for reducing cyclicalities (this is the reason why stress tests should at least consider the impact of a recession on capital adequacy). Banks can be required, for instance, to run stress tests based on common recessionary scenarios set by supervisors and adjust their capital buffers according to the results of such simulations.

### *6.1.3 Adjusting the capital function*

Time-varying confidence levels: Kashyap and Stein (2004) note that the new prudential discipline aims to ensure that the probability of default of a single bank stays below a given threshold, regardless of economic conditions. The time invariance of the threshold implies that in recession the objective of reducing the probability that banks will default is over-weighted and that keeping sufficient credit flows to the economy is under-weighted (and vice versa during expansions). Kashyap and Stein (2004) conclude that a policymaker who cares about both objectives could adopt confidence intervals that change over the business cycle. This conclusion is supported by Repullo and Suarez (2008), who show that simple cyclical adjustments in the confidence level used to compute Basel II capital requirements could significantly reduce pro-cyclicality.

Time-varying asset correlation: Another option is the adjustment of the asset correlation parameter, which is either constant or dependent on PD levels for different asset classes. The correlation would be adjusted downwards in bad times and upwards in boom times. This approach appears consistent with the conceptual framework behind Basel II, where co-movements in credit risk are driven by a single systematic risk (ie the business cycle), which is captured in the model through asset correlation.

### *6.1.4 Smoothing the output of the capital function*

Adjustments based on autoregressive mechanisms: Gordy and Howells (2006) propose to smooth the output of the capital requirements formula, arguing that this will reduce pro-cyclicality while preserving the informative value of PIT ratings. They discuss an autoregressive filter to be applied to capital requirements of each

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31. The role of the supervisory authorities in Pillar II is to ensure that banks have adequate capital to sustain all the risks of their business, also in crisis times, and to push the banks to develop and use better risk monitoring and management techniques. The purpose of Pillar III (market discipline) is to complement the minimum capital requirements (Pillar I) and the supervisory review process (Pillar II).

individual bank, so that shocks are absorbed into the regulatory minimum over several years rather than all at once.

Adjustments based on time-varying multipliers: A second group of proposals envisages applying a non bank-specific, time-varying multiplier to the output of the regulatory formulae. The multiplier would be higher than one in good times and lower than one in bad times. Gordy and Howells (2006) mention, as an example, a multiplier tied to a moving average of the aggregate default rate for commercial bank borrowers. Repullo and Suarez (2008) propose a multiplier based on the deviation of GDP growth from trend. Goodhart and Persaud (2008) propose to use credit growth. Himino (2009) proposes equity prices.

#### *6.1.5 Buffers based on risk-sensitive conditioning variables*

An alternative approach for dealing with cyclicity is to rely directly on risk-sensitive variables. CEBS (2009), for instance, proposes a mechanism for measuring the gap between banks' capital needs in recession and in normal times. Since the probabilities of default are the most relevant source of cyclicity in banks' rating models, CEBS proposes to rescale the PDs estimated by banks in order to incorporate recessionary conditions. In practice, the proposal puts forth a scaling factor, which decreases in a recession and increases in expansionary phases. This scaling factor would be used to multiply the current PD in the regulatory capital formula. The approach can be applied at the portfolio-level (ie at the level of each asset class in the banking book). First, the PD of the portfolio at time (t) is calculated as the average of grade PDs weighted by the number of counterparties in each grade. The PD of the portfolio would obviously change over the cycle as the result of two different factors:

- Transition of borrowers across grades (which is more pronounced in more PIT rating systems);
- Change of grade PD (which is more pronounced in more TTC rating systems).

Then, a scaling factor can be computed as the ratio of the downturn PD and the current PD, which is close to one in a recession and assumes values higher than one in expansionary phases. The final step is to adjust grade-PDs using the scaling factor and compute the buffer as the difference between the regulatory capital requirements based on the adjusted PDs and those based on the unadjusted PDs.

The key element of the CEBS proposal is that the requirement obtained in this

fashion should be used as a benchmark for supervisors when assessing the adequacy of Pillar II buffers. In other words, the adjusted PDs would serve as a transparent way for identifying worst-case capital needs and, thus, for defining the adequate level of buffers.

#### *6.1.6 Countercyclical provisioning*

The proposals reviewed so far focus only on mechanisms to build up capital buffers. However, another possible way to accumulate resources in good times, for use when the recession hits, is by changing loan-loss provisions.

The choice of the mechanism used for countercyclical provisioning is affected by accounting issues. In fact, current accounting standards allow banks to provision only at the very moment when losses are actually incurred. This can have a pro-cyclical effect, as losses accumulate in good times but emerge in bad times.

A mechanism for correcting this pro-cyclical effect would be to align provisions with long-term expected losses. This proposal has been sketched by IASB (2009), which states that provisions should reflect the losses that banks estimate will be produced by a portfolio of loans over its entire life.

Another proposal has been put forward in the Turner Review (see FSA, 2009a, 2009b). The proposal links provisions to the stock of outstanding loans. The proportion of provisions to total loans is extrapolated from historical experience and aims to capture latent losses in the overall loan portfolio. In order to avoid over-provisioning, a cap would be imposed to total provisioning.

So far, though, the only practical example of countercyclical provisions is the Spanish system of dynamic (or 'statistical') provisioning. This approach links provisions to banks' historical loan-loss experience. Each year, Spanish banks are required to charge their income statement specific provisions for incurred losses, and generic provisions, based on historical credit losses. Generic provisions are an increasing function of the flow of new credit, as well as of the stock of outstanding loans (the parameters of this function are set by the regulator). In good years, credit losses are typically low, and generic provisions are larger than specific provisions; thus, the difference between the two is added to the stock of provisions accumulated in previous years through the same mechanism. In recession years generic provisions will tend to be smaller than specific provisions, and the difference is covered by drawing on the accumulated stock of provisions. The rules include upper and lower limits to the stock of general provisions, set by the Banco de España taking into account the impact of past severe recessions.

## 6.2 Critical assessment of the proposals

The model used in this paper does not help select an ideal system. However, we believe that an analysis of the pros and cons of the proposals just described provides arguments for ruling out some of the approaches.

Requiring banks to use TTC rating systems does not seem either feasible or desirable. As Gordy and Howells (2006) point out: i) TTC ratings would impair the comparability across time of the capital requirement and would make it difficult to infer changes in portfolio risk from changes in a banks' capital ratios; ii) they are poorly suited for internal pricing and risk-management purposes and may thus fail the 'use test' provided for by the Basel II framework, which envisages that risk estimates used for the calculation of capital requirements are effectively employed for internal risk management purposes.

Reinforcing stress tests is certainly a promising avenue, but it may pose challenge in terms of international convergence of methods and approaches under Pillar II.

Conversely, the revision of the capital functions would be impractical. The current calibration of the regulatory formulae is the result of a long process aiming to ensure a consistent risk assessment across asset classes, so that changing it would likely require new, lengthy quantitative analyses<sup>32</sup>. We also note that the proposals for time-varying capital functions, while appealing in principle, are hardly workable in practice since they rely on supervisory authorities identifying the correct phase of the business cycle. In addition, as cycles differ across countries, a common recalibration would be probably inappropriate, and country-specific adjustments would need to be applied. This might reduce the meaningfulness of cross-country comparisons of banks' solvency positions and increase the degree of discretion left to national authorities. Furthermore, implementation problems could be significant for large cross-border players: it would not be obvious how the conditioning variable (credit expansion, equity prices, etc) should be defined, especially if host and home supervisors have different views<sup>33</sup> (Borio *et al*, 2001).

Similar criticisms apply to the proposal for adjusting the capital requirements based on time-varying multipliers. In turn, each variant for the definition of the multiplier has its own advantages and problems. First of all, market variables such

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32. On the process that eventually led to the calibration of Basel II, see Cannata (2007).

33. For instance, the former may wish to impose higher capital ratios on banks operating domestically because of local concerns; however, the latter may find it unjustified to impose a higher capital ratio at the consolidated level if local developments have only a small effect on the bank's overall risk profile.

as stock prices or CDS spreads are not necessarily robust indicators of credit cycles, especially for banks that are mainly involved in retail segments and loans to small- and medium-size enterprises. Moreover, establishing a link between capital requirements and forward-looking measures of economic conditions, such as equity prices, would make capital requirement heavily dependent on the volatility of market conditions<sup>34</sup>. Using macroeconomic indicators (GDP growth) would have drawbacks due to publication delays and revisions.

Smoothing the output of the capital function through autoregressive mechanisms may create perverse incentives. A weak bank may be encouraged to increase portfolio risk rapidly (gambling for resurrection) because required capital would adjust only slowly. Moreover, the calibration of adjustment speed would pose practical challenges. In fact, the timing of capital restoration after a crisis would largely depend on the choice of this parameter, which may be difficult to estimate.

More importantly, most of the variants discussed so far share a main drawback: as they define aggregate, system-wide adjustments, they do not capture the specific features of individual banks and may thus introduce distortions and raise concerns about an unlevel playing field. A bank with declining loans should not be required to increase capital due to the application of a rule linking capital requirements to aggregate credit growth. Furthermore, the proposed adjustments would fail to discriminate between banks with TTC and PIT approaches. Reliance on TTC estimates would thus be discouraged, as TTC banks would in any case be required to build up buffers just like banks using PIT measures of credit risk.

The proposal put forward by CEBS does not suffer from this shortcoming: it is bank-specific; it is based on risk-sensitive conditioning variables and meets therefore the incentive structure provided for by Basel II (TTC banks systems should be required to hold lower buffers than those adopting PIT systems, which have more pronounced cyclical fluctuations of capital requirements). These features reduce the risk of regulatory arbitrage, which is likely to arise if non-risk sensitive adjustments are applied. In addition, there is no need for supervisors to define recessions/expansions, since PD fluctuations and, thus, the dynamics of the scaling factor approximate the evolution of the business cycle. More generally, the approach does not require any calibration of the buffer; in fact, each bank would be required to hold buffers that are consistent with the cyclicity of its capital requirements: if cyclicity is a small problem, the solution would be small and vice versa.

While we find the proposal sensible, there are some issues that should be

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34. Other financial variables (eg spreads on credit default swaps) are likely to suffer from similar problems.



pointed out. First, this approach addresses the pro-cyclicality of capital regulation, but does not lead to truly counter-cyclical capital buffers. In fact, the buffers will move through the cycle to compensate for the fluctuations of risk-sensitive capital requirements, bringing the Basel II framework close to Basel I. If counter-cyclicality were deemed desirable other tools should be introduced, that allow freeing capital in recessions. Second, the proposal might lead to wrong outcomes for banks that experienced significant structural changes in portfolio composition – eg through M&As – and would face requirements based on past measures of risk that are not significant anymore. This could be amended by leaving some flexibility in application, allowing banks to discuss with supervisors possible structural breaks in their time-series and, thus, the need to change the value of the downturn-PDs, if deemed appropriate. Third, CEBS suggests applying the mechanism under Pillar II, the supervisory review process. This means that supervisors would enjoy some degree of freedom in deciding if and how to take corrective actions in case the buffers are below required levels. Admittedly, cross-country differences in applying Basel II are significant and may lead to concerns about an uneven playing field. But if it does not look feasible to enforce the mechanism in a consistent manner under Pillar II, it could always be considered as a true capital requirement under Pillar I. In this case, banks would continue to use their internal estimates for borrowers' selection and pricing purposes, but they would be required to use the scaling factor mechanism for calculating the regulatory capital charge. This may weaken the use-test, but would preserve the informative value of PIT rating systems.

As to countercyclical provisioning, it does not directly amend the pro-cyclicality of capital requirements, but it contributes to the build up of buffers in good times that can be used during recessions. The technical specification of the instrument is crucial, though. For instance, the proposal put forward in the IASB staff paper would be based on banks' internal estimates of expected losses. Such specification might be pro-cyclical, as it would generate more frequent changes in provisioning for banks relying on PIT estimates of credit risk: for those banks, provisions would indeed increase during downturns, thus restraining banks' lending capacity, while their low levels during upswings would contribute to sustained profits and lending booms.

The Spanish dynamic provisioning mechanism does not seem to suffer from these drawbacks, as it is based on statistical measures of loan losses and does not depend on the cyclical sensitivity of banks' internal models. One potential problem with this system is that it blurs the distinction between expected and unexpected losses, which could clash with accounting rules (Burroni *et al*, 2009).

### *6.3 The proposals of the Basel Committee*

Where does the preceding discussion leave us? As we have seen most proposals have pros and cons, which may help explain why no clear ‘winner’ has emerged so far. It is thus not surprising that the Basel Committee (2009, 2010a) opted for a set of tools which should ideally complement each other. More specifically, the proposal put forward includes measures for: 1) dampening the cyclicity of the minimum capital requirement; 2) promoting more forward looking provisions; 3) inducing banks to conserve capital; 4) achieving the macroprudential goal of protecting the banking sector from periods of excess credit growth.

For smoothing the volatility of minimum required capital, the Committee aims at developing a set of supervisory tools – including PD adjustments à la CEBS – to assess the adequacy of banks’ capital buffers in relation to the differing ratings methodologies used by banks. Stronger provisioning practices would result from revised accounting rules that allow an expected loss approach to be followed and that are not limited to incurred losses. The Basel Committee then proposes a capital conservation buffer, based on mechanisms that constrain dividend distribution (or bonus payments) in order to meet a pre-defined solvency target. The farther the actual solvency level from the target, the tougher the limits to payout ratios. Finally, the building up of a macroprudential buffer is pursued through a regime which would adjust the capital buffer range when there are signs that the economy is overheating, for example when aggregate credit has grown to excessive levels with respect to the long-term trend. This will ensure that all banks build up countercyclical capital buffers in time of excessive euphoria, which can be released when authorities – using their discretion – announce that bad times are approaching and bring the capital buffer back to normal levels.

All proposals are still under development, but they seem to go in the right direction. There are however some important issues that, in our view, should be properly addressed in order to make the countercyclical package effective and avoid unworked consequences.

First, the identification of the supervisory tools for dealing with the cyclicity of the minimum capital requirement should be a top priority. We believe that the capital conservation buffer and the macroprudential buffer – ‘one-size-fits-all’ measures – may have perverse effects if not properly complemented by a tool for smoothing the fluctuations of the regulatory minimum. With no smoothing the minimum device, in good times, banks using TTC ratings would be required to hold

higher buffers than those using PIT methods, endangering the functioning of the whole countercyclical toolkit.

We are also concerned that the capital conservation buffer – as currently designed – is primarily a tool for defining supervisory prompt corrective actions and does not seem to deliver any countercyclical benefit. In that respect, the countercyclical and the capital conservation buffers might be probably packed into a single tool, with a time-dynamics linked to the evolution of aggregate credit, penalties in terms of dividend restrictions and clear mechanisms for allowing the buffers to be (almost) entirely depleted when necessary.

Finally, concerning provisions, we believe that it is important to recognise that the concept of expected losses used thus far is probably too narrow, and that provisions should be accumulated vis-à-vis a broader concept. The Spanish system proved effective in the current crisis – an important advantage relative to other similar proposals, which have not been implemented and tested yet – and would be a valuable option. However, in the light of accounting standard setters' concerns, the Basel Committee developed an approach that leverages their proposals. This sounds a pragmatic way forward, but attention needs to be paid to the technical specification of the instrument.

## 7. Conclusions

In the aftermath of the current financial crisis, a consensus has emerged that the Basel II capital rules should be amended. Widely discussed proposals, which are to be implemented once the crisis is over, focus on the level and dynamics of bank capital. Much emphasis is placed on the need to reduce the pro-cyclical effects of the new regulation, although there is still much uncertainty as to the practical importance of this effect.

This chapter has moved from the consideration that the current policy debate lacks a consistent way of measuring the benefits of the proposed amendments and their costs. We've addressed the problem of regulation using a macroeconomic model, which allows us to examine the functioning and possible shortcomings of risk-based capital regulation, and potential policy measures aiming at mitigating pro-cyclicality. Our results are relatively clear cut and reasonably robust when set against a series of alternative assumptions about certain model features and parameters. At the same time, it must be openly acknowledged that the amount of uncertainty surrounding our estimates is certainly higher than for most other macroeconometric work, partly due to the limitations of our DSGE framework, which

models the financial sector in a very simplified fashion. Therefore, the following answers to the four questions raised in the introduction must be read in the light of this important caveat.

First, our results confirm that Basel II can increase the pro-cyclicality of the banking system, relative to Basel I. Our simulations suggest that, following a technology shock (a key driver of macroeconomic fluctuations within our model), the maximum deviation of output from steady state is 0.64 percentage points under the Basel II framework, against 0.62 under Basel I – a negligible difference. The effect mainly works through investment, where the difference is more pronounced but still small. A monetary policy shock yields an even smaller differential effect. The robustness of this result was assessed by changing key model parameters within reasonable ranges. This may increase the difference somewhat, to a maximum of 0.3 percentage points in terms of maximum output response. Overall, these results suggest that the extra effect induced by Basel II v Basel I is modest, although this conclusion is subject to the caveats discussed in Section 5. The same conclusion, and the same caveats, apply to the comparison between the PIT v TTC approaches established by Basel II.

Second, we find that higher capital requirements (often advocated in the recent debate, although seldom motivated on grounds of reducing pro-cyclicality) may dampen the pro-cyclical effects of capital regulation. However, their effect depends on the type of shock affecting the economy: in a Basel II regime, the reaction of output to a technology shock or a demand shock is dampened by higher capital requirements, but the result vanishes under a monetary policy shock. Overall, our results provide only weak support in favour of adopting this measure to counteract pro-cyclicality.

Third, there does seem to exist room for a countercyclical regulatory policy. Simulation conducted with the model augmented with a simple regulatory reaction function, which increases capital requirements during periods of buoyant growth, and vice versa, can easily offset the pro-cyclicality induced by the move to Basel II, and even reduce it below the Basel I benchmark.

Would such a policy of countercyclical capital (or provisions) be spontaneously implemented by banks via voluntary accumulation/depletion during periods of boom/recessions? As above, our results suggest that the answer to this question depends on the type of shock affecting the economy: in a Basel II regime, a policy of countercyclical buffering is beneficial for banks (ie it increases profits) if it takes place in reaction to a technology or a demand shock; it reduces profits under a monetary policy shock. Thus, our analysis provides only partial support for the

argument that, faced with the Basel II regulatory change, banks will find it optimal to offset the additional pro-cyclicality by appropriately choosing voluntary capital buffers. Our results suggest that a policy of countercyclical management of capital requirement enforced by a regulator could be beneficial in some cases. The practical implementation of this policy need not be discretionary. That is, its implementation could be rule-based and not require regular board meetings.

Fourth, we address the issue of the macroeconomic cost (eg in terms of GDP growth) of policies aiming at mitigating pro-cyclicality. Our findings suggest that a permanent increase of the capital requirement would have negative consequences on welfare. The negative effect on steady state output would be accompanied by an increase in the number of hours worked, so that, in terms of welfare, the loss could be larger than suggested by simply looking at output. By contrast, the adoption of a countercyclical capital policy would have no effect on the steady state of the model, and hence it would have no macroeconomic cost (at least, no cost measured in terms of steady-state levels of the variables). This conclusion provides further support to the view that pro-cyclicality should be dampened via a countercyclical capital policy.

Indeed, the idea that capital (or provisions) should be adjusted in a countercyclical fashion represents the common denominator of many proposals currently being debated. Our model is unable to provide guidance on the practical implementation of this policy, as it cannot discriminate among the various important technical differences characterising these proposals. However, it helps set the stage for our critical review of the available proposals, and provides some guidance as to the strength of the measures.

In summary, our review of the debate prompts the following considerations. The Basel II framework has desirable features that should not be discarded. The risk of pro-cyclicality should be contained by means of a package including countercyclical capital buffers and dynamic provisions. In our view, the proposals recently advanced by the Basel Committee represent a reasonable option for addressing pro-cyclicality, but they may require some amendments to avoid unintended consequences.

First, greater focus should be given to the tools for reducing the cyclicity of PIT rating systems, the first and essential building block of any countercyclical package. Second, all buffers should be genuinely countercyclical, that is banks should be allowed to release them in bad times. In that respect, the time-dynamics of the capital conservation buffer is still undefined, which may be interpreted by market participants as an attempt by regulators to introduce a new (albeit softer)

minimum requirement. It is also crucial to finalise the work on dynamic provisions, developing methods that ensure that provisions are aligned to truly TTC expected losses.

A final comment on the trade-off between rules and discretion. We pointed out that automatic mechanisms may be difficult to calibrate and could be negatively affected by the difficulty of getting precise macroeconomic forecasts; in addition their rigidity may turn out to be unsuitable for specific contingencies. On the other hand, discretionary judgement could put supervisors under strong political pressure, making any countercyclical tool inter-temporally inconsistent and, therefore, not credible. The Basel Committee opted for measures that leave to national authorities a constrained discretion. This is probably reasonable, but it should be accompanied by rigorous peer reviews that assess and remove unwarranted implementation differences across jurisdictions.

## Appendix 1: The calibration of risk-weighted assets

The potential pro-cyclicality of Basel II depends on the cyclical behaviour of the risk parameters, particularly the probability of default (PD) and the loss-given-default (LGD), which affect the risk-weights via the regulatory formulae.

In the setting of the model used in the paper, the parameter  $\chi$  in equation 6 represents the sensitivity of the Basel II risk weights to macroeconomic conditions (ie the degree of cyclicity of the Basel II capital requirements). Ideally, the calibration of  $\chi$  should be based on the time-series of the risk-weights calculated according to the Basel II rules. Unfortunately, in most countries the new prudential framework was implemented only in 2008 – if at all – so that no historical time series is yet available.

In principle, in order to analyse pro-cyclicality we could simulate our model for different values of  $\chi$  and check the feedback effect from the financial sector to the real economy in each case. However, this methodology would not solve the issue of the *actual* degree of pro-cyclicality of the Basel II framework.

Without claiming to provide the final answer, to examine the *true* pro-cyclicality of Basel II, we estimate  $\chi$  starting from available proxies and exploiting the set of regulatory formulae provided for by the accord<sup>35</sup>. In particular, we've proceeded as follows. First, we've used US data on the delinquency rates of loans to households and firms as proxies for the probability of default of these loans<sup>36</sup>. Second, we've

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35. See Basel Committee, 'An Explanatory Note on the Basel II IRB Risk Weight Functions', 2004.

inputted these time series into the Basel II capital requirements formulae, and using realistic assumptions concerning the other key parameters of the formula (the LGD, firm size, and the maturity of the loans) we've estimated the time-series of the risk-weights  $w_i^F$ ,  $w_i^H$ . This allows us to simulate the dynamics of risk weights for advanced IRB (AIRB) banks, under the hypothesis that the PD is the only source of cyclicity of the risk-weights. This is obviously an approximation, but a realistic one since AIRB banks are required to estimate downturn LGDs. Finally, we've estimated equation 6 in the paper using the time-series for risk-weighted assets.

The second step is obviously the most difficult since it requires some judgment on the most appropriate figures for the key risk parameters. As mentioned, for the PDs we've employed the delinquency rates for US loans. In other words, we've assumed that the behaviour of PDs goes hand in hand with that of credit losses. This is clearly an approximation – as forward-looking PDs do not necessarily exactly match backward-looking historical losses – but a reasonable one, as one would expect the PDs to be closely correlated with actual credit losses in the long term.

Since we have separate time-series for firms and households' delinquency rates, we've apply the method described above to each of these two categories.

For non-financial firms we've used the corporate regulatory function with no size-adjustment. This is equivalent to assuming that firms have sales of at least €50 million. This also means that we've assumed higher asset correlation and, thus, greater cyclicity than in a SME portfolio to some extent we are overestimating cyclicity. The loss-given-default is set at 40 percent, consistently with the figures reported in the '5th Quantitative Impact Studies for G10 firms' (the most recent publicly available information on the risk parameters of the Basel II framework)<sup>37</sup>. The maturity of the loans was set at 2.5 years, as in the standardised approach.

For households, since data refer to mortgages, we've used the residential mortgage function, with a LGD equal to 20 percent, following the QIS5. Both functions include the 1.06 scaling factor. Using the regulatory formulae we've obtained the capital requirements (as a percentage of the exposure at default), that are subsequently multiplied by 12.5 in order to obtain risk-weights .

The results of the regression estimated using these data are reported in the table below. The regression estimates the log-linear version of equation 6, since it

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36. Delinquency rates are provided by the Federal Reserve Board over the period 1991-2007 on a quarterly basis; they are annualised and seasonally adjusted. For households we used delinquency rates on single-family residential mortgages from banks ranked 1st to 100th largest in size (by assets). For firms we used delinquency rates on business loans from banks ranked first to 100th largest in size (by assets). To the best of our knowledge similar data is not available either for the EU or the euro area.

37. Basel Committee (2006), Results of the fifth quantitative impact study (QIS 5).

is exactly in this form that it enters the model:

$$\hat{w}_t^i = (1 - \rho) \chi_i (\log \hat{Y}_t - \log \hat{Y}_{t-4}) + \rho_i \hat{w}_{t-1}^i$$

where a hat denotes percentage deviations from steady state and the term in brackets measures output growth.

Table A1: Sensitivity of weights to cyclical conditions

| Dependent variable    | $\rho$      | $\chi$    | $R^2$ |
|-----------------------|-------------|-----------|-------|
| Business loans        | 0.92 [0.03] | -14 (4.6) | 0.97  |
| Residential mortgages | 0.94 [0.04] | -10 (8)   | 0.89  |

Note: Nonlinear least squares. In the case of households standard errors are corrected for heteroscedasticity and autocorrelation of residuals of order 2. Sample period: 1991:Q1 To 2007:Q4. For households we used delinquency rates on single-family residential mortgages from banks ranked 1st to 100th largest in size (by assets). For firms we used delinquency rates on business loans from the 100 largest banks (by assets). Data are taken from the Federal Reserve Board (<http://www.federalreserve.gov/releases/chargeoff/deltop100sa.htm>). Cyclical conditions are measured by year-on-year changes in real GDP (<http://research.stlouisfed.org/fred2/series/GDPC96?cid=106>). All data are seasonally adjusted.

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## Comments on ‘Pro-cyclicality of capital regulation: is it a problem? How to fix it?’ by Paolo Angelini, Andrea Enria, Stefano Neri, Fabio Panetta and Mario Quaghiraniello

HANS-HELMUT KOTZ<sup>1</sup>

In response to the deepest financial crisis in the western world for more than 60 years, which led to an unprecedented loss of output (and, most plausibly, of potential growth also), the search for preventive remedies is high on the agenda. This search begins with rules and regulations as well as regulatory institutions (their design), which evidently did not prevent the crisis from developing. Even worse, some hold that the regulatory set-up, in particular capital requirements, being by construction pro-cyclical, contributed to the boom and ultimately the bust. While it took a while to acknowledge that we were facing a serious crisis, highly dysfunctional financial markets have – in particular after the Lehman shock – vividly captured the level of prevailing uncertainty. In particular, interbank money markets showed a dire but truthful picture of the fundamental stress in the system. Ultimately, a systemic implosion could only be prevented by forceful public sector interventions – central bank liquidity support on an unprecedented scale, extraordinary countercyclical fiscal policies and exceptional underwriting of the functioning of banking sectors.

While the worst of the crisis appears to be over, all the extraordinary measures taken come at price: they have to be reined in as otherwise they are likely to sow the seeds of further unsustainable developments. This is an awe-inspiring balancing act. Exit has to be contingent on the economy’s capacity to stand on its own again. But waiting too long would come at a prohibitive price.

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1. Bundesbank.

Over the medium-term it is paramount to create institutions that minimise the probability that such a crisis, with all its attendant social costs, happens again. Re-thinking risk-sensitive capital requirements for banks is one of the topics high on the to-do list of international regulators. That's why it is so laudable that Angelini *et al* have put this issue within the consistency-enforcing framework of a DSGE (dynamic stochastic general equilibrium) model.

The main features of the model are, as concerns the behaviour of consumers and entrepreneurs, standard DSGE fare (including New Keynesian frictions in borrowing – collateral restrictions – and lending as well as real and nominal stickiness). What is new is the integration of a banking sector where banks are interest-rate setters, respond only sluggishly to demand-supply disequilibria and accumulate capital out of retained earnings. The latter they do in order to achieve a target capital-to-asset ratio. The costs of deviating from this optimal level  $v$  – which captures regulatory requirements as well as, possibly, a buffer – are quadratic. Via a mark-up to loan rates they are shifted on to consumers. In equilibrium, banks balance the cost of reducing  $v$  (which is evidently the inverse of the leverage ratio) with the spread between loan rates and funding costs, largely influenced by monetary policy via a Taylor rule. By introducing differing degrees of risk for households and firms into the cost of capital adjustment function, a risk-weighting of asset scheme as in Basel (I or II) emerges. This leads in a straightforward way to an equation [6]. Here two parameters are of interest: (1) the adjustment of risk-weights over time, captured by  $\rho$ . A large  $\rho$ -coefficient would amount to a through-the-cycle (in lieu of point-in-time) rating scheme. (2) the coefficient  $\chi$  denotes the response to cyclical conditions (in the paper proxied by year on year output growth).

This bare-bones description gives the gist of Angelini *et al*'s model. They use it to address in various simulation exercises if Basel II's purported pro-cyclicality indeed exists. (The model – via setting the risk weights appropriately – can also accommodate a Basel I set-up.) To do this, they compute impulse-response trajectories after disturbing the system with technology and monetary policy shocks. They focus on the former since “technology shocks (are) arguably the main drivers of the business cycle” (Angelini *et al*, 2009). This betrays the real-business cycle legacy of this approach, which does not leave much room for endogenously created financial market shocks. (One is at least entitled to ponder this premise).

In their first simulation run they use the historical US default experience (for households and non-financial firms), plus a number of assumptions, to compute risk weights as required for their equation explaining the risk weights' trajectory

over time [equation 6]. Angelini *et al* find that cyclical responsiveness is relatively large for firms but statistically not different from zero for residential mortgages. Over all the simulation runs, Basel II shows a more pronounced cyclical sensitivity – with the reduction of risk weights being the main drivers. Monetary policy shocks generate qualitatively similar results but are economically unsubstantial.

A general financial irrelevance result comes into being at this point – which is of course, given the recent (but also the not so recent) experience (Kindleberger 1996) we have had, somehow puzzling. Finance, being introduced – as a consequence of the G in DSGE – mainly as a friction only, does not significantly impact the dynamics of the system. It is barely more than a temporary veil, to be cut through rapidly. This almost-irrelevance proposition however might also be a trait of this model since it excludes bank defaults, hence cost of distress which, bearing in mind Lehman, AIG and others, can be awesome indeed.

Nonetheless, making apparent its attack plan, the model can be used to generate very attractive propositions. First, it is of course helpful to go beyond partial equilibrium analysis reasoning, that is, to take account of interdependences and repercussions. Here, the DSGE approach, by forcing consistency on an argument, is very useful. At the same time, there is probably too much smoothing/optimising going on in these systems. As impulse-responses show, models are too robust. One has to introduce very implausible parameter values to produce even some mode of crisis only. Such models – which actually do not speak to derivatives, not to mention CDOs, etc – might appear to practitioners to show too much complacency.

Still, as the discussion on the costs and benefits of countercyclical measures shows, Angelini *et al*'s model lends itself convincingly to policy evaluation. This holds at least true from a qualitative angle. While we don't see that banks – given the competitive environment they are in and hence the return on equity requirements they have to obey – can significantly deviate from a conventional capital buffer (which is defined by regulators as well as by the market), the model straightforwardly shows – confirms our prejudices – that equity capital was much too low for comfort. Or leverage too high, for that matter. At the same time, Angelini *et al* also show that higher capital requirements do not necessarily reduce procyclicality. But they do increase stability, ie individual banks' capacity to absorb shocks. And if one accepts the model, they do it – in terms of efficiency losses – at rather low costs. Admittedly, the social opportunity cost which we currently face makes us rather conservative with regard to any emphasis put on Harberger triangles.

We have to admit to two things: we are not particular fans of the DSGE approach, in particular if it is not pragmatically attended. At the same time Angelini *et al*'s model is clearly useful in a number of policy-relevant contexts for dealing with the pro-cyclicality of capital requirements argument. (Incidentally, it is remarkable that this topic, which has been raised since the mid-1990s by Martin Hellwig, Thomas Gehrig, Jürg Baum or Charles Goodhart, has been so long under-acknowledged in policy circles). This is most impressively shown in the concluding part of the paper – which uses the model only in a very qualitative way, as sort of a benchmark. Here the case is made convincingly that a package of counter-cyclical capital buffers, as well as Spanish-style dynamic (or statistical) provisioning, should be applied.

A number of questions obviously remain. The most daunting is whether and how the model can deal with maturity mismatches. An approach mainly looking at risk-weighted assets does not address the issue of endogeneity of (funding, market) liquidity crises. This however has been a main driver of the self-reinforcing downward spiral that we saw in wholesale funding markets. Systemic illiquidity does arise out of interaction (see Brunnermeier *et al*, 2009). This leads to the question of the importance of liability side (*versus* asset side) perspective. It encompasses questions about limits on the composition of the liability side or maturity transformation.

Quite obviously, there are additional, powerful sources of pro-cyclicality: the margining behaviour (haircuts), leverage or fire-sale and inter-connectedness externalities which do have a systemic dimension. In other words, reality is a bit too messy for DSGE's comfort. Consequently, in conceiving regulations, practitioners cannot but rely on some significant dose of eclecticism.

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## Comments on 'US and EU reform efforts to improve the management of systemic financial risk' by Garry Schinasi, and on 'Pro-cyclicality of capital regulation: is it a problem? How to fix it?' by Paolo Angelini, Andrea Enria, Stefano Neri, Fabio Panetta and Mario Quagliniello

KLAUS REGLING<sup>1</sup>

The paper presented by Garry Schinasi deals with macro-prudential supervision, but Garry also spoke about the many failures that contributed to the crisis. All those failures need to be addressed if the policy system is to be improved.

The paper presented by Paolo Angelini deals with the issue of pro-cyclicality of capital requirements, which has been a major problem during the crisis.

However, these two papers say nothing about macro-economic policies which, I believe, should also be addressed in a session that is called '*How the crisis will impact the policy system*'. The discussion on fiscal and monetary policies should be linked to the issues of pro-cyclicality and a better policy system.

### Comments on Schinasi (2009) and Angelini *et al* (2009)

Pro-cyclicality has been widely recognised as one of several problems in our regulatory and supervisory system that contributed to the extent of the crisis. Pro-cyclicality was not at the origin of the crisis but it has made the crisis worse.

Financial markets are inherently pro-cyclical. Human nature is pro-cyclical. Periods of excessive optimism are normally followed by over-pessimism. Boom and bust cycles will always happen. It is therefore important that the regulatory, accounting and policy frameworks do not add unnecessarily to the already pro-cyclical nature of the system.

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1. KR Economics.

The G20 has recognised the problem of pro-cyclicality. There is a reference to it in every G20 communiqué. The meeting of G20 finance ministers in early September 2009 called for counter-cyclical capital buffers. Earlier G20 summits asked the Financial Stability Board, the Basel Committee and the accounting standard setters to find ways to 'mitigate pro-cyclicality' and 'to work on approaches to address any excessive cyclicality of minimum capital requirements'.

The paper by Paolo Angelini and his colleagues is very useful as it tries to quantify in a rigorous way how much pro-cyclicality was added to the system through Basel II, compared to Basel I. This is useful because not many models incorporated a financial sector until recently – perhaps another reason for the crisis?

The paper argues that Basel II added some but not much additional pro-cyclicality. Other studies have concluded that the effect might be somewhat larger. In any case, there are ways to deal with the pro-cyclical effects of higher capital requirements of Basel II and also to address the pro-cyclicality of Basel I.

Angelini *et al*'s main recommendation is a good one, and increasingly accepted in the supervisory community and by policy makers. It is to build up capital buffers and to use them in a counter-cyclical way. However, efficient implementation globally will not be easy. In my view, enforcement by regulators will be required. To rely solely on the self-interest of industry seems too risky after the experience we have had with 'self-interest' during the last decade.

Even if there is a growing consensus to move to a system with higher capital requirements and counter-cyclical capital buffers, a number of unanswered questions remain:

- Will such a new system be implemented in a discretionary way, based on judgement (eg in the context of macro-prudential supervision) or should it be rules-based?
- If based on judgement and discretion, who would decide when 'good times' begin and 'bad times' end? (The EU has some experience with this kind of problem; and it will have to be faced on a worldwide scale when deciding on the appropriate timing of exit strategies).
- If rules-based, would it be politically acceptable to have quasi-automatic policy-responses when variables like credit growth, equity markets, profits or real GDP deviate from their long-term trend?

Answers to these questions will probably differ from country to country because institutional situations, transmission mechanisms and time-lags differ.

The authors show a lot of sympathy for the Spanish system of 'dynamic provisioning', which I share, even though the Spanish approach blurs the distinction between provisions (expected losses) and capital requirements (unexpected losses) which can lead to new problems in the accounting framework. Nevertheless, the Spanish approach has the big advantage that it is the only example of counter-cyclical capital requirements that has been in force for several years; it meant the Spanish banks were relatively well prepared for this crisis. It is a rules-based system and thus avoids implementation problems based on discretion. But could the Spanish system be copied in all major economies? If not, how much national differentiation is acceptable for an integrated global financial market in which the possibility for regulatory arbitrage should be minimised?

### Other ways to reduce pro-cyclicality

These are difficult issues and the paper correctly highlights these problems. It is therefore important to look also at other ways and tools – not just capital requirements – that could reduce pro-cyclicality. Accounting rules could be examined, for example, as fair-value accounting probably added more pro-cyclicality to the system during the last few years than Basel II. The paper does not do that because it focuses on capital requirements.

Last but not least, one should look at macro-economic policies in this context. The ocean between the United States and continental Europe in this area seems to be wider than ever.

Fiscal policies and monetary policies were clearly pro-cyclical in most countries in the years up to the crisis, and thus contributed substantially to the pro-cyclicality of markets and the economy, probably more than the capital requirements of Basel II.

In the US and the United Kingdom, fiscal policy was particularly pro-cyclical before the crisis, as indicated by fiscal deficits of close to three percent of GDP in 2007, even after five years of relatively strong growth. The economic boom, in particular asset bubbles, led to substantial windfall revenue (and we are not very good at calculating cyclically adjusted fiscal balances). In 2007, most advanced economies, certainly the US, the UK and the euro area, should have been in surplus. It is likely in my view, that the positive output gap in these countries in 2006-07 was quite large (unfortunately, this will only be confirmed in a few years time), which would imply that structural fiscal deficits in those years were substantial.

Monetary policy, globally, was too loose for too long after the bursting of the equity bubble in 2001. I consider that to be one of the root causes of this crisis. We

have seen the limits of narrow inflation targeting and the problems associated with the so-called 'risk management approach' of monetary policy. We understand better today what the costs are of ignoring asset price developments.

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## An ocean apart? Comparing transatlantic responses to the financial crisis: panel session.

### Taking stock: global implications of transatlantic differences

CHAIR: JEAN PISANI-FERRY (BRUEGEL)

PANELISTS: CAROLINE ATKINSON (IMF), LORENZO BINI-SMAGHI (ECB), MARCO BUTI (DG ECFIN), EDWIN TRUMAN (PIIE), DAVE RAMSDEN (UK TREASURY)

Caroline Atkinson

This panel's topic, the importance of transatlantic differences, is an interesting one. But it also ignores one key lesson from this crisis— that the international financial system is now truly global. In previous decades, crises have erupted in individual countries, or in some cases regions. They have often been restricted to one type of economy only—for example emerging markets. But contrary to the expectations of many at the start of this crisis, the financial and economic fallout from a problem triggered in the US housing market reverberated around the world.

Earlier sessions and papers, perhaps taking inspiration from the title of the conference, have tended to imply that if only the US and Europe had addressed their financial sector weaknesses, the global problem would have been solved. This may have been true in the past, but it is no longer the case. Just as the crisis has shown the integration of the global economy and financial system, it has indicated that analyses of the lessons for future policy must take into account the rest of the world. The widening of the Financial Stability Board, to include all G20 countries, is a recognition of this. When we are analysing the crisis, and thinking about future crises and policy implications, we should remember this.

I shall return to this soon. But before that I would like to make two other main points. The first is that the most striking feature of this crisis has been not the differences but the similarities across the Atlantic.

Why do I say that?

Before the crisis, there was unwarranted complacency on both sides of the Atlantic about the dangers lurking in the financial system. The complacency certainly had different forms. In the US, a common view among policy makers, academics and market participants was that the US financial system was very robust and efficient, that markets were deep and liquid, and that much of the credit for this was due to the relatively free play of market forces. This permissive environment led to rapid financial innovation and an impressive parcelling and spreading of risk to those who could afford and bear to take it. On this side of the Atlantic, in Europe, there was more skepticism about markets and new financial products, as well as some concern about the impact on risk-taking of a relatively 'easy' US monetary policy that allowed a long period of low interest rates. To caricature: the US viewed its financial market participants as masters of financial innovation and rapid growth, while Europe saw itself as masters of stability and common sense. The crisis showed both to be wrong.

Again, during the early and middle phases of the crisis there were similarities in approach on both sides of the Atlantic. Policy makers in the US and Europe were late in understanding the depth of the problem and the fragility of the system. Muddling, piecemeal approaches staved off disaster for a while but ultimately made it worse.

Finally, and most importantly, the eventual policy response on both sides of the Atlantic was strikingly similar. A big, comprehensive, politically supported, and effective response involved—both in the US and Europe—financial policies with extensive guarantees, government capital, nationalisation in some cases, monetary policies with unprecedented use of traditional and nontraditional tools to support the system and ease policy, and fiscal policies that were deliberately counter-cyclical and coordinated to provide a global stimulus. A remarkable feature of the crisis response, in contrast to 60 years earlier, was global cooperation to support the global economy and financial system. One thing that at least economists can feel good about is that economic policy prescriptions based on careful analysis and research have indeed helped to avoid a second Great Depression.

Secondly, there have also been major differences in policy frameworks and tools. What is interesting is that there is not yet analytical clarity about the lessons from those differences and, in particular, if they made a real difference to outcomes. To run through them quickly:

On monetary policy, the initial framework for policy-making was quite different in the US, the euro area and the United Kingdom. In the US, policy explicitly considered output as well as inflation, although not asset prices. In the European

Central Bank, there was the two-pillar approach. And in the UK, perhaps the most rigid inflation targeter, the attempt at the purest type of monetary policy.

The tools that central banks were able to use in crisis were also very different, although the differences were perhaps unexpected. It turned out that the ECB was more modern and able to be more flexible in its approach than the US. The Fed found itself with a rather old-fashioned toolkit that it had to use clever legal reasoning to adapt to. Indeed, chairman Bernanke has blamed the lack of legal instruments for the inability to stop the Lehman failure that precipitated the worst of the crisis.

On fiscal policy, governments on both sides of the Atlantic ran procyclical policies during the run up to crisis, with budget deficits expanding in many countries during the boom years when economic prudence would have argued for more savings. For some countries this limited the scope for countercyclical policies afterwards. Most of them of course joined in the global stimulus. But the tools used for this, the speed with which policy could react and its effectiveness differed depending on the magnitude of automatic stabilisers, the fiscal rules in place, and the budgetary system, including the concentration of budget power in the central executive. In Europe, automatic stabilisers played a large role, for example, compared to the US.

Finally on financial policies, there were very different systems for approaching regulation and crisis resolution. This governed the kind of approach taken by central banks and others to resolve the crisis, especially in the early days. But a key feature of all these systems was a fragmentation that certainly complicated crisis management and had probably contributed to its buildup. In the US, the fragmentation was, of course, internal with the plethora of regulators and supervisors. Within Europe, the lack of a pan-European financial regulator and European-level oversight was a weakness. And of course, in the UK, what looked like an analytically pure and simple division between the Financial Services Authority and the Bank of England turned out to be a fatal splintering that led to an ineffective response to one of the earliest signs of the troubles to come, when Northern Rock faced a run in the autumn of 2007.

Returning to the global picture, which is the common frame at the International Monetary Fund, what are the global lessons that countries can learn from the crisis for policy?

I would like to highlight six points, for emerging market countries, but also industrialised countries.

First, the workings of the global system are complicated. It is important to take preventive measures against crisis. But don't believe anybody, whether they are

an academic or a policymaker, who predicts that instability will be banished. Business cycles, volatility, and even crises will happen again. And the next crisis will be different, by definition.

Secondly, in this global world it is not feasible or helpful to try to be insulated from other countries and their mistakes. As Gary Schinasi points out, if there is a big macro-economic policy mistake being made in one part of the world, this will spill over. Moreover, this crisis has shown that spillovers may come from trade flows as well as capital flows. For a number of countries, especially in Africa and Asia, the main impact of the crisis has been via its impact on trade and the real economy. So there is not a lesson here about capital account openness.

Third, it is important to be realistic about the limitations of regulation and supervision. Some have argued that the financial collapse was just a failure of financial supervision, with the implication that better supervision would have saved the day. But financial activities and innovation will always move faster than regulation and supervisory practice. I was working in the Bank of England when Barings collapsed. As we investigated the reasons, I discovered that each wave of change in the Bank of England's supervision had come in response to a particular crisis. And it was fashioned inevitably to address the features of that crisis. We have also seen that institutions being supervised under many different regulatory systems before the current crisis had severe weaknesses that had not been dealt with.

This means, fourth, that policymakers must focus on steps to build resilience. There has been a debate about whether early warning systems that aim to detect crisis are an alternative to stronger systems. I see them as working in tandem. The IMF's developing early-warning exercise aims to identify potential systemic vulnerabilities so that these may be addressed. Resilience to economic crises include building buffers in good times that can help cushion shocks. The relatively good performance of many Latin American countries in this crisis reflects the shift towards stronger reserves positions, lower debt levels and stronger fiscal policies that allowed countercyclical policies in some cases. Flexible exchange-rate regimes in many countries proved more resilient than earlier fixed exchange-rate pegs. On fiscal policy, one element of resilience comes from automatic stabilisers. Finally, banking resolution mechanisms that allow 'controlled unwinding' of systemic institutions, perhaps with living wills, will strengthen resilience to economic stress.

Fifth, if crises are going to happen, it means that adopting policies as problems unfold is really important. In my view, the biggest mistakes in this crisis were made during the initial period of financial stress. For policymakers to get ahead of a



financial collapse, they need to anticipate the worst. But understandably, political and financial decision makers often find this hard. In this crisis, as in many others, the failure to get ahead of the curve left fewer, and worse, policy options as the crisis deepened. The comprehensive and large-scale eventual response turned the corner. But it has left a lot of extraordinary and difficult complications for an exit strategy.

Finally, and this is an optimistic note, we've learned that global cooperation does actually matter. For those of us who have been going to global meetings, of various Gs, for years now it is good to have an answer to the perennial question of what do they achieve. As one of those who helped set up the G22, the precursor of the G20, I am glad to see that the decade of discussions and cooperation at this broader level was hugely important.

This became clear at the G20 Summit in London in April 2009. Political leaders were able to send a coordinated message that really helped to support confidence. Now all of the technicians need to cooperate carefully so that we move forward in a sustainable way.

**Lorenzo Bini Smaghi**

This conference has examined in detail how policy authorities on both sides of the Atlantic have reacted to the financial crisis. I won't consider in depth the events of the past two years. Let me just say that central banks on both sides of the Atlantic responded swiftly and decisively, especially since September 2008, working very closely together, even to the point of coordinating some of their actions. Indeed, you remember that the first interest rate reduction in the easing cycle, on 8 October 2008, was a coordinated move by a number of major central banks.

Market interest rates are now at very similar levels. For instance, the money market interest rates at the twelve-month horizon both in the US and the euro area are currently just below 1.3 percent (as at September 2009).

Central banks on both sides of the Atlantic have also resorted to a number of non-standard measures to provide additional support and stimulus to their respective economies. The choice and design of those measures reflects the structural characteristics of those economies. The non-standard measures implemented by the European Central Bank have focused primarily on banks, as banks are the main source of funding in the euro area economy. In the US, however, market-based financing plays a more important role.

The ECB's framework for non-conventional measures comprises five main

building blocks: meeting in full the banks' liquidity requests at a fixed rate, expanding the list of assets eligible as collateral, lengthening the maturities of long-term refinancing operations, providing liquidity in foreign currencies and, since July 2009, supporting the financial market by making outright purchases of covered bonds.

These measures are by now well known. We consider that they have achieved the desired objectives, in particular by reducing the spreads in the money market, flattening the yield curve over the short-term horizon and restarting the market for covered bonds – an important instrument through which banks finance themselves.

So much for recent measures. Today, though, I would like to look ahead and talk about a topic which has been widely discussed at recent international meetings, the exit strategy. This strategy sets a course for progressively reversing the policy measures that were implemented in recent months, ie the interest rate levels and non-standard instruments.

Let me make it quite clear: this is not yet the time to implement the exit strategy. We clearly stated our view last week that the level of interest rate is appropriate, and we decided to conduct another one-year refinancing operation at the main refinancing operations rate (1 percent) with full allotment.

But it is critical to have a well thought-out exit strategy because markets have to realise that the current policy is temporary and will be reversed when it is no longer appropriate, in particular when risks to price stability re-emerge and conditions in financial markets have improved. As far as the euro area is concerned, the primary goal of monetary policy remains price stability, and the ECB will do whatever is needed to carry out its mandate. Inflation expectations over the medium term have to remain well anchored. This is essential to ensure that long-term interest rates remain low, thereby supporting the economic recovery.

Having an exit strategy is thus an act of responsibility for a central bank.

Drawing up an exit strategy entails two questions above all: how? and when? I won't touch upon the how – the instruments – as both chairman Bernanke and president Trichet have examined this particular question recently<sup>1</sup>.

Instead, I will address the issue of the when from an analytical point of view. The concrete implementation will depend on many imponderables, not least the prospects for economic recovery and for the stabilisation of financial markets – and

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1. See the speech by ECB President Jean-Claude Trichet, 'The ECB's exit strategy', Frankfurt, 4 September 2009, and testimony by Federal Reserve Chairman Ben Bernanke before the Committee on Financial Services, US House of Representatives, Washington DC, 21 July 2009

those prospects are fraught with uncertainty. I intend to discuss a few issues that – in my view – central banks will have to consider when taking the decision to exit. This will show how complex and difficult that decision is going to be.

My analysis does not pretend to be exhaustive, but in my view the following five issues demand our full attention.

One issue is reversibility. Once the decision has been taken, we can't easily go back on it. This seems pretty obvious, but it has some deeper implications. Let me explain.

If the decision to exit is taken too late and monetary expansion continues for too long, fresh seeds of instability in the financial sector are sown. On the other hand, if the decision is taken too early, the economic recovery might be undermined. Mistakes in the timing, both premature and tardy (what I would call type I and type II errors), have been made in the past.

The solution is to do it right, obviously.

Some might think that these errors are not so worrying because they can be remedied while the exit policy is being implemented. If the decision to exit is taken too early, for instance, the central bank might slow things down. If, however, the decision is taken too late, the exit can be speeded up. It sounds nice, but is a bit too easy.

Why? Because the decision to exit is bound to have an impact on agents' interest rate expectations throughout the whole yield curve, and lead to substantial portfolio reallocations. This is desirable, and inevitable, as the purpose of the exit strategy is indeed to change the behaviour of the private sector. But if the adjustment in expectations is large, it can lead to disruptions that affect financial stability and in turn jeopardise the sustainability of the whole exit strategy. In particular, any late exit which needs to be accelerated could produce unexpected shocks, for instance in the form of losses in the fixed income market which could hamper attempts by financial institutions to progressively regain access to the funding market. The effects of such a delay might lead to a prolongation of the non-standard measures which were supposed to be phased out. Remember the 1994 episode, when a mere 25-basis-point increase in the Fed funds rate gave rise to major losses in the bond market (reflecting the fact that it was probably a bit too late). The losses then constrained the future moves, which had to be relatively more gradualistic.

The second issue relates to the uncertainties surrounding the analytical framework that central banks have at their disposal in order to decide on the optimal interest rate path. Ideally, the stance of monetary policy should be calibrated in such a way as to avoid an implicit easing of monetary conditions as the economy

recovers. This implies that the interest rate should be raised as the economy starts growing above its potential rate and as the output gap starts closing. The problem with this framework is that it is very difficult to estimate potential growth and the size of the output gap, especially after a shock like the one experienced over the last two years. Looking at the past, the major policy mistakes have been made as a result of overestimating potential growth and the size of the output gap, in particular during a recovery. This has led monetary policy to be overly activist and has delayed the tightening phase, thus fuelling financial instability.

The two-pillar strategy of the ECB has helped to reduce this type of risk, as monetary and credit aggregates have been used as indicators of a strengthened economy, while inflationary pressures were still subdued. In the current phase, we might have to take into consideration the fact that the ongoing process of deleveraging in the financial sector, which is likely to take place for some time as a result of the correction of the previous credit bubble, might affect the signalling content of money and credit aggregates.

To be sure, the tightening phase cannot wait until inflation materialises, but will have to precede it. This is even more the case this time around, given the very low level to which interest rates have been reduced, and the distance from the steady state level that will need to be attained. The latter is in itself very difficult to determine, given the uncertainties about some of the longer-term developments in the economy. This will, as usual, present some communication challenges, such as having to answer the question commonly put to central bankers under these circumstances: 'Why are you raising interest rates if there is no inflation?'

The pace of the tightening will obviously depend on the underlying conditions, in particular the speed of the recovery. Given the uncertainties, it would be inappropriate to commit to any specific path *ex-ante*.

Another issue to take into account is the exit strategy from fiscal policy. I will not dwell on this issue, which is undoubtedly a challenging one *per se*. But there is a link with the exit from monetary policy and it will have to be considered. In particular, the more delayed the fiscal exit, *ceteris paribus*, the more the monetary policy exit might have to be brought forward. Indeed, given the level of the debt accumulated in most advanced economies, any delay in the fiscal exit is likely to have an effect on inflation expectations, and may even disanchor them. This is a risk that monetary policy cannot take, as it would undermine its overall strategy.

On the subject of inflation expectations, allow me to digress briefly. Inflation expectations are an important indicator for central banks, as they reflect their credibility in achieving price stability. However, recent experience suggests that

central banks should not be too complacent, even when expectations appear to be anchored, as the private sector might not always be a good predictor of future developments. Over the previous cycle, inflation expectations seemed to be well anchored, but partially concealed the build-up of asset market instability and longer-run threats to price stability. Well-anchored inflation expectations are a necessary condition for an appropriate monetary policy, but not a sufficient one.

Let me touch on a final issue, related to financial stability. The exit strategy for the interest rate policy will be defined on the basis of the primary objective: price stability. In this respect, financial stability can only be a secondary objective. If it were given the same priority as price stability, the latter would obviously be compromised.

The exit from the non-standard measures is likely to be linked to the state of the financial markets, and in this respect can partly be disconnected from the interest rate policy. Given the design of the non-standard instruments implemented by the ECB, the exit from those instruments can take place before or after the interest rate decision, without major effects on it. However, if at the time of the exit a number of financial institutions are still addicted to central bank liquidity, the transmission channel of monetary policy might be impaired.

It is not the central bank's task to continue providing liquidity to financial institutions which are not able to stand on their own feet, once the turmoil is over. It is the responsibility of the supervisory authorities, and ultimately of Treasuries, to address the problems of these addicted banks as soon as possible, through recapitalisation and restructuring, as appropriate, and to ensure that all banks in their jurisdictions can stand on their own feet even without the central bank's facilities.

To conclude, I have tried to identify some of the issues which will have to be considered in implementing the exit strategy on both sides of the Atlantic. My observations have been purely analytical, and do not aim to provide any insight into specific monetary policy decisions over the next few months. My purpose was to explain parts of the analytical framework in which central banks will have to operate, on this and the other side of the Atlantic.

Just like the entry, the exit will also call for close interaction between the monetary authorities. This might not necessarily mean coordinated action or similar measures, given the different situations. However, the challenges ahead are quite similar.

Ultimately, if we want to avoid 'being too late' or 'being too early', the only solution is to 'be right on time'. And this is what we are committed to doing.

Let me say first of all that it is normal but also useful at such events to dwell on identifying differences. It is more exciting to look for divergences than acknowledge convergences. However, when I look at the responses to the crisis, I see dramatic convergence. Less than a year ago I attended the Washington Summit and if you compare Washington, London and what has been prepared for Pittsburgh there is an enormous convergence of views such as on regulation, on macroeconomic policy and on reform of international financial institutions (IFIs) (though we have not discussed this here, it is an important part of the response to the crisis). I think it has to be stressed that to a certain extent the divergences one detects reflect institutional differences rather than differences in purpose or fundamental differences in views. The current economic juncture is also testimony to the fact that there has been an important policy response and a convergent one. Unlike the conclusions at the G20 in Washington, where there was a set of broad orientations, the London meeting was at least followed up with action and not just intentions.

Since we talked about an exit strategy, the question here is what kind of convergence one would want to see in these strategies. On exit strategies, as Lorenzo Bini-Smaghi stressed, there is an issue of design and implementation on the monetary side. On this, I think we have to go beyond what one may call 'the state-contingency mantra', because now everybody agrees that it is a good time to design the policy but not yet to implement it. But, as pointed out during discussions yesterday and this morning, it is important to go beyond this to orientate policies properly.

When is a good time? The assessment of potential output is key to orientate policies. Here there are indeed different views between the two sides of the Atlantic.

It seems wrong, from the view point of policy responses, to wait until growth rates have reverted to their pre-crisis levels (and this may never happen) or to wait for the output gap to close (which means you must have a very accommodative macroeconomic policy with a very buoyant headline growth because you have to re-absorb the output gap). I think that such strategy would be a mistake.

Of course there are difference across policy areas and it seems to me that the state contingency has a different meaning for central banks, where the policy instruments can be activated very quickly and on a discretionary basis, and for fiscal authorities, who have to deal with much more complex instruments and decide on policy, despite extraordinary conditions, once a year while preparing the budget.

On the fiscal policy side the key issue is not the budget 2010. Here we all know

that by and large the budget at the global level will remain expansionary.

Despite different fiscal spaces (unfortunately, some countries, given the complete lack of fiscal space, will have to accept to continue to be pro-cyclical), in 2010 fiscal stances will remain by and large expansionary. The key issue here is 2011. While preparing the budget for 2011, given the extraordinary accumulation of public debt that we are witnessing, fiscal policies will have to turn restrictive. This does not mean that (here we go beyond the mantra of the state contingency) fiscal policy will be completely locked into a restrictive mode. One possibility could be that while starting to adjust structural budget balances we are prepared with expansionary measures that can be quickly activated should cyclical conditions not turn out as bright as expected.

With regard to exit strategies, in particular in the G20 framework, coordination will vary across policy areas. Clearly, very strong coordination on financial support measures will be required. Moving in disparate ways will entail negative spillovers. Realistically, on fiscal policy we should aim at agreeing on a number of principles for exit strategies.

In Europe the degrees of coordination resides in the surveillance implementation of the Stability and Growth Pact.

My final point is on the actual meaning of 'exit'. 'Exit strategy' seems to me almost a misnomer because what we are, or should be, talking about is not only the withdrawal of what has been put in place and spotting the right time to do it in a coordinated way, but also a strategy that tackles the legacy of the crisis (and this is crucial for market expectations and confidence). These two elements must be combined. While considering how to withdraw the stimulus in the short-term we should tackle the legacy issue since we know that this time the long-term effects of the crisis are going to be very strong.

Our assessment with simple partial equilibrium exercises is that on the fiscal side once public debt has been withdrawn, in many countries what is put in place is still on an unstable trajectory. This means that even after withdrawing the fiscal stimulus these countries are on unsustainable path. As part of the exit strategy, you need to go beyond all this and implement a programme of structural reform that will boost potential growth: this is the key to bringing back economies on a sustainable path.

While there are many areas where we can find a convergence of views, the degree of coordination will vary. I think the G20 has been very useful in providing political traction to policy intentions. I hope that Pittsburgh will result in the same momentum as London did on IFI financing.

## Dave Ramsden

My comments today reflect my responsibilities as Chief Economic Advisor to the UK Treasury. I will focus on economic and fiscal policy but I will also touch on financial policy and the challenges ahead.

In terms of the economic backdrop, I want to make three opening remarks:

- Overall, I think there are grounds for being cautiously optimistic: I am optimistic because of both the improvement of global economy relative to earlier in the year and the recent return in confidence. I am cautious because the basis for that improvement is very fragile and significant global challenges remain, including on banks, the labour market and commodity prices.
- On asset prices, I understand from market participants that the markets are getting the message that policy makers mean what they say in securing recovery in the G20 and elsewhere.
- On the real economy, we do seem to have reached the trough, allowing for the margins of error in statistics. But a lot of this is driven by weak imports, the stocks cycle and government intervention.

I think we can have more confidence than a year ago that policy can make a difference and that policy makers have risen, individually and collectively, to the challenges posed by the crisis, although there is much more work to be done on policy implementation. The progress made by the G20 has been particularly encouraging and, in terms of the question posed by the conference title, my view is that the transatlantic similarities have outweighed the differences.

Looking ahead, I want to highlight three areas:

- The importance of analysis for policy assessment;
- Surveillance and the global recovery; and
- Fiscal policy.

### *Importance of analysis for policy assessment*

We all face the challenge of turning a strong analytical base into knowledge that can inform and support policy development. This was the focus of much of yesterday's proceedings.

I agree with Klaus Resling's comments and the Milesi-Ferretti analysis, both of



which focus on the interaction between the economic fundamentals and the public finances. I don't necessarily share Klaus' conclusion that in the years running up to the crisis output gaps were smaller and cyclically adjusted deficits would therefore have been higher. But I do agree that the case for taking more account of asset prices and financial developments in monetary and fiscal policies has strengthened.

Drawing on this kind of analysis, one area where I think there is more of a transatlantic difference is in the importance attached to the supply side and the impact that the crisis has had on potential output. Here I find my sympathies lying with the European type analysis suggesting that there has been a lasting impact on potential supply.

### *Surveillance and the global recovery*

Surveillance has to be improved both bilaterally and multilaterally for macro-economic and structural issues, both taken separately and together.

The EU has a lot of experience in these fields, as indeed do many people in this room. No one should underestimate how challenging it will be in practice to deliver the necessary changes to surveillance to achieve the benefits it can potentially bring, as set out in the analysis by the IMF and others. We have made real strides in just the past year, in G20 and beyond. Closer collaboration could bring real benefits during the recovery phase if it was brought about a more balanced and sustainable growth. But it is a huge challenge for surveillance to get to there.

### *Fiscal policy*

This gets me into the issue of fiscal policy. Over the coming years all countries are going to need to withdraw their various fiscal stimuli. I agree with those that have said that how they do this must be set out transparently, over both the short and medium-term and as part of a credible consolidation plan. Why do I mention the short-term? Because certain policy exits are already being implemented, for example from the German car scrappage scheme, and previously announced tax increases are being implemented, for example the rise in UK fuel duties.

Also, if the optimists are right and growth is quicker than has recently been forecast, then the fiscal adjustment could be faster. In the UK case, as the output gap starts to close, the pace of consolidation increases. I agree with IMF analysis that the majority of fiscal consolidation is an issue beyond 2010, but during 2010 it is important to stay on the right track in line with pre-announced plans.

Finally, we have to recognise the inter-linkages between monetary, fiscal and financial policy. Two examples of this in practice: first, fiscal consolidation at the appropriate time allows monetary policy to do its job. Second, the scale and variety of the financial interventions implemented in the UK, as in many other countries, is great and all these interventions were underwritten by the fiscal authority. So there will need to be a lot of coordination between authorities to ensure the appropriate sequencing of withdrawal of policies and such coordination must be done in a manner that does not undermine central bank independence, which will be critical to ensure credibility in macroeconomic policy is restored.

Edwin M. Truman

This conference was structured to compare and contrast the European and US responses to the global economic and financial crisis of 2007-09. This was principally a device to get at lessons to be learned. Fifty years from now, economists and financial officials will be arguing over those lessons just as today we argue about the lessons to be learned from the Great Depression. In that sense, we were engaged in an early assessment. I think that has been demonstrated by the focus on the future even as we reviewed the immediate past.

In that spirit, my contribution is in two parts: first, I present my *ex-ante* views on the topics considered in the four main sessions of the conference. Second, I describe how those views have been affected by what I have learned at this conference –part of my own evolutionary education.

Prior to this conference, my view was that the economic and financial crisis of 2007-09 was not entirely made in the United States even if its proximate, indirect breakout was in my country – the epicentre. We have had a global crisis with global origins. The crisis was not caused by a single, specific sin of commission but by years and decades of sins of omission by the public and private sectors.

On the public sector side, I am in the minority that places relatively more blame, by a small margin, for the crisis on macroeconomic policies than on financial and regulatory policies. Global macro policies were too easy for too long. But I see no significant causal link between global imbalances and the crisis; both phenomena were jointly determined by macroeconomic policy mistakes though macroeconomic policies were not the entire story. Global imbalances also are not hard-wired to the reserve currency role of the dollar, as I demonstrated in Truman (2009b).

Inattentive macroeconomic policies contributed to benign economic and financial conditions that were too good to be true and to an associated relaxation

of lending, credit, and financing standards. Regulation and supervision in all these dimensions was incomplete, outdated, and inadequate to the challenges of the twenty-first century, leading to excess leverage and distorted incentives. Financial innovation, the absolute size of global institutions, hedge funds, and private equity firms, and tax evasion were, at most, marginal crisis propagators.

Once the crisis broke in August 2007, a process of deleveraging and macro-economic slowdown in the industrial countries took 14 months to reach the full crisis stage in the second phase of the crisis. The Lehman bankruptcy was a key date, but that decision by itself, right or wrong, was not a prime contributor to the second phase of global deleveraging. The collapse of AIG and the run on other US financial institutions were already well under way. I think that there is some recognition of this dynamic in the United States, but much less appreciation of this view in Europe. This difference in perspective tends to colour views about what should be done going forward.

Self insurance, via better policy frameworks and large foreign exchange reserve holdings, provided only partial protection to emerging market countries. Within the United States, within Europe, and across the Atlantic, I saw no agreement prior to this conference on any of these points.

The responses to the crisis differed in its two phases, but they had three basic dimensions: macroeconomic repair, market repair, and structural repair. As always when dealing with a crisis that combines both economic and financial collapse, the issue was what to repair first: the economy or the financial system. In my view, the right answer was both.

Initially there was reluctance to use policy to repair the macro economy in Europe because the perception was, first, that the crisis was not going to affect European economies adversely and, second, that the European economy was in a dilemma situation, facing rising inflation. In the United States, there was less reluctance on both the fiscal and monetary side. However, policymakers on both sides of the Atlantic were prompt to begin to address market issues in ways that were viewed as aggressive at the time. In retrospect those actions were not mistaken, but proved to be too timid.

In the second phase, policies were better aligned and more forceful with respect to macroeconomic repair and market repair, but they continued to be differentiated with respect to structural repair of the financial system, reflecting in large part institutional differences. In all three dimensions, on both sides of the Atlantic, path dependence constrained policies. The policymaking game generally does not permit mulligans or do-overs.

Differences emerged on the policy approaches on the two sides of the Atlantic with respect to the size and force of actions, methods of structural repair, approaches to toxic assets, transparency, resolution strategies, and their importance. Authorities on both sides of the Atlantic failed adequately to take account of the cross-border implications of their actions in the heat of the battle.

Looking ahead before the start of this conference, I was troubled by four concerns.

First, the focus of macro-prudential regulation has been almost entirely on institutions that become too big, complex, or interconnected to fail and, therefore, a threat to macroeconomic stability or on institutions or practices that in combination threaten the macro economy. Too little attention is being paid to the implications of macroeconomic policies creating conditions for lax lending and credit conditions including with respect to international capital flows.

Second, everyone agrees that pro-cyclicality in regulatory policies should be constrained or reversed. There are lots of ideas about how to do it, but there is no consensus on them.

Third, home-host differences and consequences with respect to all aspects of supervision and regulation, not just resolution regimes, are being swept under rugs or into fogbanks.

Fourth, the lack of consensus on the role of macroeconomic policies and global imbalances (including again capital flows) in causing and propagating the crisis impeded appreciation of their potential role in crisis prevention in the future.

### *The conference presentations*

How did what we heard at this conference affect my views of the crisis and transatlantic differences?

With respect to the first session dealing with the underlying forces behind the crisis, I was gratified that Gian Maria Milesi-Ferretti's analysis supported my view that global imbalances shared a common cause with the financial crisis – macroeconomic policies – but they were not the cause. Garry Schinasi disputed this view, thus validating my sense of a lack of consensus.

I was enlightened by, and agreed with, Milesi-Ferretti's emphasis on gross capital flows, in particular the relative importance of those across the Atlantic, in contrast with net capital flows. His analysis implies that there was a single Atlantic financial nexus of the crisis. He was right to differentiate the emerging market countries in this regard, but there were exceptions such as Korea.

I was also gratified that Randall Kroszner, who was on the inside, downplayed the significance of the nature of the Lehman collapse, allowing it to go into bankruptcy. It was not the crucial event, only one of a sequence of events.

Charles Steindel took us in two directions. First, we had to square his analysis of the national accounts and the limited role of the financial sector with perceptions of the 'bonus culture' of the financial institutions and their large pre-crisis profits. We were informed but failed to reach consensus. Second, we began to discuss the future of the financial system and its implications for long-term growth. Here it does appear that Europe and the United States are oceans apart. To over-generalise, what little faith in market discipline that there was in Europe has evaporated and in the United States we retain some faith.

With respect to the two sessions on crisis management, the lesson that I draw from this conference is that there were transatlantic differences in emphasis, but cooperation was relatively easy because all the authorities were essentially on the same page.

However, when it comes to exit strategies, there appears to be less of a consensus. First, we do not agree on the appropriate macroeconomic targets; traditionally US policymakers have thought about potential growth in level terms and European policymakers have thought about potential growth in growth-rate terms, which means in Europe that once the rate of growth reaches potential the brakes need to be applied even if the output gap remains large. None of this really comes through in Joe Gagnon's paper which does not uncover large differences in the stances of monetary policy as of September 2009 on both sides of the Atlantic, with the possible exception of the Bank of England's policies. He found that the Federal Reserve and European Central Bank may still be tighter than they might like to be.

Second, we do not agree on what we mean by 'exit' and this may prove to be a major problem. In my view, the confused thinking on this topic rivals the lack of agreement about the causes of the crisis.

The discussion of exit strategies should cover three broad categories of government policies: monetary policies (conventional and unconventional), fiscal policies (automatic stabilisers and discretionary), and structural policies mostly applied to the financial system and its institutions but also involving non-financial institutions such as major manufacturing firms.

Beyond the question of whether talking about exit strategies is really about whether more stimulus should be applied is the question of what we mean by exit or reducing stimulus and support. Some programmes will wind down automatically,

such as automatic stabilisers and some special central bank programmes like swap arrangements. Of course they could be extended, but then we are talking about not exiting not about the timing of any exit. An exit policy strictly defined, in my view, involves the reversal of a policy: raising interest rates, cutting expenditures and raising taxes, or disposing of ownership stakes in financial institutions. However, in the discussion below, I am less strict.

Two broad considerations also seem to be missing from the discussion. First, the circumstances of individual countries differ in terms of their own economies, financial systems, and longer-term structural problems. To ignore those differences in the name of simultaneous and parallel action or inaction by each country oversimplifies the analysis. Policy responses to the crisis were largely pointed in the same direction. They were not always perfectly coordinated, and they were differentiated. That differentiation contributed to some of the transatlantic disputes, for example about fiscal stimulus programmes, in the run-up to the London G20 summit.

Second and related, what really matters to the global economy and financial system is the positive and negative spillovers (externalities) associated with reversing stimulus and support programmes. Here too, circumstances matter. What Chile does may be important to Chile and its immediate neighbors but not to the system as a whole. What the United States and Germany do matters to the entire global economic and financial system.

Let's use this framework of actions or inactions, circumstances, and spillovers to think, at least preliminarily, about the exit strategies in the three categories of government policies: structural, fiscal, and monetary.

With respect to structural policies, the overriding question for many countries will be the extent to which governments maintain their increased involvement in the financial system and other aspects of the economy. For example, how fast, if at all, do they sell their stakes in financial institutions? On this question, the circumstances of countries will differ in their *ex-ante*, as well as *ex post*, philosophies about direct government involvement in the economy. In the United States, we pledge allegiance to the principle of limited government involvement even though we have many exceptions including in the financial sector – see Fannie Mae and Freddie Mac! However, views on the European side of the Atlantic are, in general, much more tolerant of government intervention in the economy. These differences promise conflicts to be resolved.

When it comes to spillovers, some argue that sales of stakes in financial institutions should be internationally coordinated because the first mover has a

competitive price advantage and will bring pressure on other governments to follow suit even if their institutions are not yet sufficiently strong to be fully privatised. I am inclined to see the problem the other way around, governments that maintain their stakes, in particular stakes that involve substantial influence if not full control, will tend to distort the level playing field, putting private sector institutions at a competitive disadvantage. Thus, I would say the principle should be that governments should sell their stakes – the sooner the better. If getting a higher price is an incentive to do so, that is positive for the system as a whole. There is no international merit in a convoy strategy for privatising financial institutions.

Fiscal policy is more complicated. One reason is that fiscal policy responses to the crisis were differentiated across countries based upon institutional differences and policy preferences. In particular, in continental Europe there was greater reliance on automatic stabilisers and discretionary actions were relatively more frontloaded. The United States placed less reliance on automatic stabilisers and its discretionary policies will have almost as large an effect in 2010 as they did in 2009. Thus, by construction, the timetable for exiting from fiscal stimulus is already largely set by the circumstances of individual countries.

With the prospects for global recovery improved, these differences in the size, timing, and composition of fiscal policies may not matter much in the aggregate, but there are the cross-border spillovers. Continued fiscal stimulus in the United States and diminished fiscal stimulus in, say, Europe means that Europe receives a positive spillover effect from the United States, in effect free riding on US policies, and the United States receives a negative spillover effect from Europe. The most important spillovers involve not so much the nature of the recovery but the nature of the expansion. This is all the more relevant when it comes to questions of reversing fiscal policies via discretionary actions to reduce fiscal deficits. For countries like Germany, China, and Japan that before the crisis relied on growth models emphasising external demand rather than domestic demand, the *a priori* case for withdrawal or reversal of fiscal stimulus is weaker, everything else being equal, because of the global imperative that they boost their domestic demand.

Monetary policy is similarly complex. My biggest worry is not about mopping up central bank liquidity in the form of excess reserves. The technical problems are minor because the process will be largely self-executing. For example, the Federal Reserve's balance sheet already has shrunk by about 10 percent from its peak at the end of 2008. Although marginal negative cross-border spillovers may be felt as various facilities run off or are not extended, for example guarantee facilities, this also is not my biggest worry.

My biggest worry is the timing of central bank actions with respect to conventional monetary policy, in other words raising nominal interest rates. We heard at this conference about the Federal Reserve's ability to pay interest on reserves, but this tool does not come into play until the Federal Open Market Committee (FOMC) begins to raise interest rates and it is an untested policy. On the one hand, such actions could have spillover effects tending to strengthen the currency of the country or area, but one cannot be certain of size or even the sign of this effect. When the Federal Reserve ultimately began to raise interest rates in 1994 (too late in my view) the dollar went into a prolonged decline hitting its low in early 1995 in terms of the Federal Reserve's broad index for the dollar in real terms. That low was not again approached until March of 2008.

However, there are two broader concerns. First, because inflation generally is low, the anti-inflation incentive not to adopt a policy of competitive non-appreciation has been weakened. The incentive to do so, to self-insure, and to follow an export-led growth strategy has been enhanced. This would be to the detriment of the global expansion. All countries cannot devalue their way to prosperity at the same time. If they try, the result will be a collective failure, a weaker global expansion, and rising trade frictions.

Second, the lesson I draw from the crisis is that monetary policies around the world were too easy for too long earlier this decade, feeding the global credit boom and promoting lax lending and credit standards. In the context of the coordination of monetary and fiscal policies within countries and across countries, the greatest concern is that the political authorities who are also the fiscal authorities will pressure central banks to be too easy for too long in the name of sustaining the recovery and holding down the interest costs of government debt. This is my interpretation of what happened in Japan earlier this decade. In this regard, the euro area, but not the rest of the European Union, may be better positioned institutionally than the Federal Reserve.

Reverting to the issues surrounding the crisis itself, I was interested by the discussion at this conference about whether the United States with its crazy quilt of regulators was more challenged than the European Union with its 27 members. In both cases, the crisis will promote change, almost certainly not sufficient change to satisfy some critics, and they will probably be proved to be correct. However, crises force evolution, or to put it another way without a crisis change is more difficult to achieve. A case in point is the locus of responsibility for the supervision and regulation of foreign banks in the United States. Three decades ago the states had principal responsibility, but after several crises involving foreign institutions,



responsibility was transferred in several steps to the Federal Reserve. On the other hand, I would note that this crisis is not likely to produce a change in US supervision of insurance companies, which is at the state level, despite the fact that a huge insurance company was at the centre of one important chapter in the crisis, albeit via its federally chartered thrift institution.

Looking ahead, the paper by Paolo Angelini and his colleagues at the Bank of Italy on the pro-cyclicality of capital regulation reinforced two of my *ex-ante* biases. First, it confirmed that we have a long way to go to reach consensus on these issues, and we may well make mistakes as Klaus Regling reminded us. Second is the fact that higher capital charges or pro-cyclical reserving in the model presented in the paper do not solve all problems, for example those associated with monetary shocks. This reinforces my view that we are in danger of leaving macroeconomic policies out of macro-prudential regulation, as was emphasised by Klaus Regling. We have monetary policy in the model but not in a role that protects the financial system.

I interpret Garry Schinasi's paper as not entirely consistent with these concerns though his oral discussion was more sympathetic. He points to 'systemic risks', but they operate independent of macroeconomic policies. It is the importance of this two-way link that, in my view, argues for placing much of the macro-prudential function in central banks, which I took to be Peter Garber's argument.

On my other two concerns, home-host supervisory differences and global imbalances, we heard little or nothing, which is bad news and good news. Home-host supervision and tensions were mentioned, but largely were swept under the rug as far as Europe itself is concerned and as far as transatlantic cooperation is concerned. [Garry Schinasi did touch on these issues a bit, but they were not highlighted]. This is likely to become a big problem operationally, politically, and for the international financial institutions themselves. On the reemergence of global imbalances, I am thankful that this topic did not dominate this conference, aside from some indirect references in the Milesi-Ferretti's presentation, but it will dominate future conferences.

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Other influential analyses have addressed economic reform in Europe, Japan, the former communist countries, and Latin America (including the Washington Consensus), the economic and social impact of globalisation and policy responses to it, outsourcing, electronic commerce, corruption, foreign direct investment both into and out of the United States, global warming and international environmental policy, and key sectors such as agriculture, financial services, steel, telecommunications, and textiles.

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# An ocean apart?

## Comparing transatlantic responses to the financial crisis

Jean Pisani-Ferry, Adam Posen and Fabrizio Saccomanni, editors

Has the relationship between the European Union and the United States become a sideshow or is it still central to the global economy? Conflicting signals have been sent out since the outbreak of the global crisis. The creation of the G20 suggests that priorities have moved away from the traditional G7 focus on the transatlantic economy. But many of the key policy debates, such as those on bank capital ratios and reform of financial regulation, have retained a characteristically transatlantic flavour.

There are reasons for this. The global financial crisis has been mostly a transatlantic crisis, and in the aftermath of the shock, the EU and US share common problems: deleveraging, unemployment, the need for unconventional policy responses, reduced growth potential, high public debt, and political pressures for protection. Furthermore, the EU and US still constitute a major part of the global economy, and what happens to them matters for all.

The EU and the US however have not responded to the shock in the same way. Their policy space and policy traditions are different and this portends significant divergence across the Atlantic. How far this divergence will go and whether policymakers on the two continents will disagree or agree to disagree are the subjects of this volume, based on a joint Banca d'Italia-Bruegel-Peterson Institute conference, held in Rome in September 2009, with the support of the European Commission.

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