

Europe's Tech Lag: Does It Matter?

di Paul Krugman

Some days I just need a break. This is one of those days. But today's break will allow me to indulge my inner wonk. Specifically, I am going to revert to the international trade theorist that used to be my primary professional identity and write something moderately incomprehensible that isn't tightly tied to today's headlines. Think of it as scratching an intellectual itch.

I tend to spend more time than most American economists thinking about Europe. Comparisons between countries are a good way to understand how policies and events play out in the real world. And, on top of that, I really care about maintaining Europe as a bastion of liberal democracy as we, in America, go badly off the rails. You can listen to or read my recent discussion of issues European with Adam Tooze [here](#), and my primer on why Europe's economy is better than you think [here](#). But today I want to go into a quite specific and somewhat technical question: The significance or lack thereof of the difference between U.S. and European productivity growth.

I've written about this [before](#). But I believe that I've managed to sharpen the analysis and find a clearer way to make my points with data. So here we go.

The conventional wisdom is that Europe's economy has fallen significantly behind the U.S. economy since the late 1990s. Much of this conventional wisdom is based on the undeniable fact that U.S. companies have achieved a sizeable lead over Europe in information technology. In addition, data that seem to show considerably slower productivity growth in Europe than in the US have contributed to Europessimism.

But do the data really show that? In fact, there's a lively argument on that question. Gabriel Zucman — an excellent economist — recently [took issue](#) with insults directed at Europe by ... the U.S. ambassador to the EU. Said ambassador claimed that Europe is as poor as Mississippi and Germany as poor as West Virginia, to which the

immediate answer should be that if that's what your numbers say, your numbers are wrong. Get out of your limo and walk around! But then said ambassador probably fears that he will be mobbed by immigrants from Trump-labeled shithole countries.

Granted, the official numbers show that over the past 25+ years productivity — real output per worker — has risen faster in the U.S. than in Europe. But if we drill down into the data, they also show that this productivity gap is more or less entirely accounted for by higher U.S. growth in the tech sector.

To me, this raises the question of whether Europe's apparent lag in tech is as important an issue as conventional wisdom makes it out to be. In particular, I have two main reasons to be skeptical that it is.

First, should we believe these productivity measures?

Macroeconomists often work with theoretical models in which the economy produces a single good, which we then identify with official measures of real GDP. Any sensible economist knows, however, that the notion of a one-good economy is a sort of Noble Lie. Or, as we tell our students, it's an approximation that can be useful as long as you don't take it too seriously.

However, the question of how to add up apples and oranges is no longer academic when we consider growth in the tech sector. That is, since the tech sector is at the heart of the European-US performance comparison, how should we measure output and productivity in tech? Today's CPUs can execute [thousands of times](#) as many instructions per second as cutting-edge CPUs in the late 1990s. Does that mean that productivity in the computer sector has risen by several hundred thousand percent? Clearly not in any economically meaningful sense: a computer that can process a thousand times as much data as your old computer is better, but not a thousand times better.

Statisticians try to measure productivity in tech with "hedonic" indices that attempt to measure how much the productivity gains are actually worth to people, rather than using physical measures of output. While they do the best they can, hedonic measures leave plenty of room for dispute.

Nor is the problem limited to tech. Brad DeLong [recently argued](#) that we've been badly understating productivity growth outside of tech. Indexes that measure consumer prices of manufactured goods have been falling faster than indexes that measure producer prices, suggesting that productivity in manufacturing has been rising faster than the official numbers indicate. One possible implication of DeLong's argument, as applied to Europe, is that we may be badly understating European productivity growth, given Europe's lag in tech.

I don't know whether that critique of the conventional wisdom on Europe is right or wrong. But it's important to realize that the data underlying pronouncements about Europe's general productivity lag are much softer and less reliable than many imagine. Second, there is a question of how the American tech industry, with its exceptionally rapid productivity growth, actually translates into changes in Americans' living standards.

I originally approached this question with a little mathematical model, but I don't think the math is necessary to investigate the question. A simple thought experiment will suffice. First, assume that there are two countries, America and Europe, and two industries, tech and non-tech. Second, assume that the tech industry is highly localized – that is, once it gets started in a particular area, such as Silicon Valley, it tends to stay in that area. Third, assume that, by its nature, technological progress is much faster in tech than in non-tech. For example, it's much easier to make your computer 100 times faster than it is to enable your hairdresser to cut your hair 100 times faster. Finally, assume that for accidental historical reasons America has a comparative advantage that causes it to produce all the world's tech.

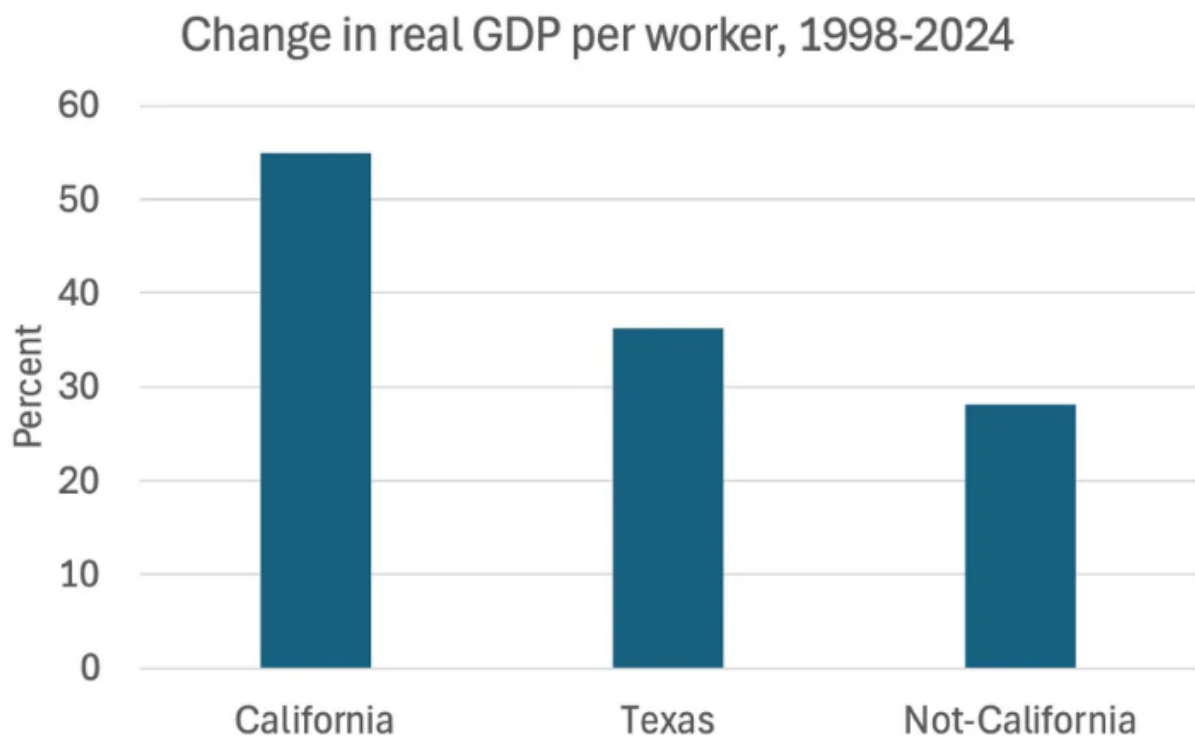
In such a world America's overall measured productivity growth, which includes growth in tech, will be higher than Europe's. But will this translate into a rising standard of living for Americans relative to Europeans?

The answer to this question crucially depends upon whether there is competition among technology companies. If there is, then the answer to the question is no: rising productivity will be passed on to consumers in both countries through lower prices. Even if the competition is imperfect, so that there are big profits for a few firms, many

of the benefits of technological progress will still diffuse worldwide. Also, what is good for Mark Zuckerberg isn't necessarily good for America. Furthermore, Europe can use antitrust policy to limit the excess profits of tech oligopolists and ensure that its own consumers benefit.

If you find it implausible to suggest that high U.S. productivity growth in tech doesn't translate into significantly higher American living standards compared to other developed countries, consider productivity divergences among U.S. states. Much of the U.S. tech sector is located in California. This leads, as we should expect, to high measured productivity growth in California compared with the rest of America.

Below is a bar graph constructed with data from the Bureau of Economic Analysis, showing percentage changes in real GDP per worker over the period 1998-2024 for three "countries": California, Texas, and "not-California," i.e., the United States excluding CA:



Source: [BEA](#)

This is a huge divergence — bigger than the EU/US divergence that has Europeans so worried. Yet we don't see Texans obsessing over why they can't be like California.

Within the U.S., to the extent that people think about this divergence at all, they realize that it's mainly about composition effects.

None of this should be taken to say that everything in Europe is fine. But it is a caution against trash-talking the European economy — and also against American triumphalism.