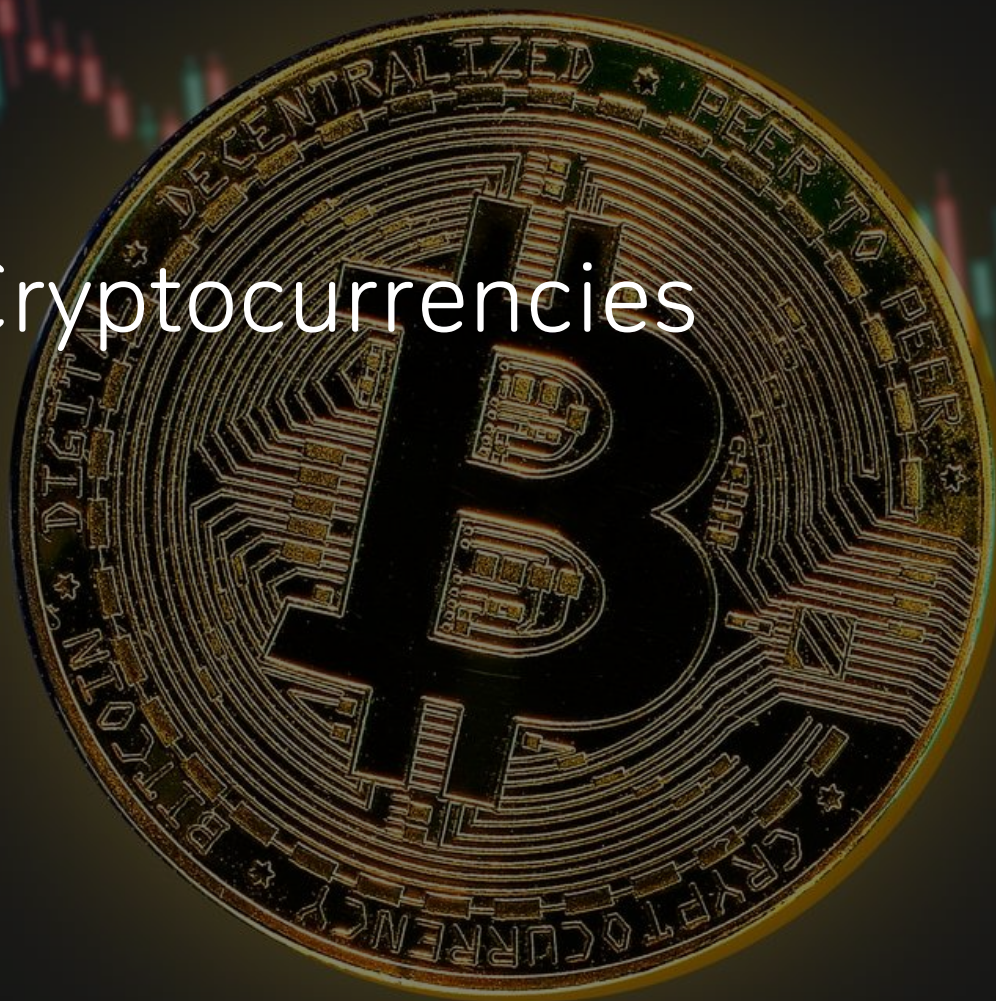




The Future of Cryptocurrencies

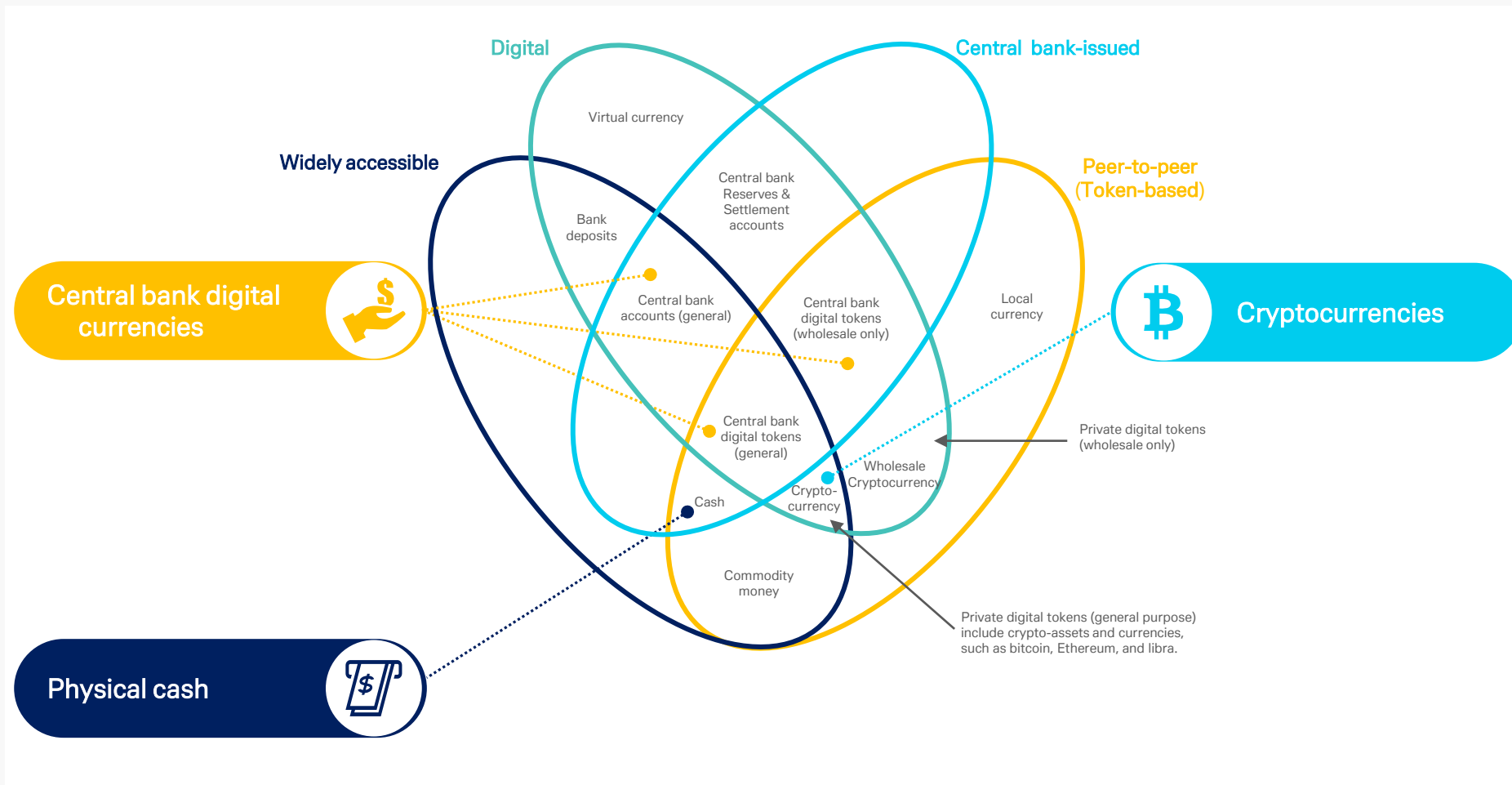
Marion Laboure, Ph.D - Global Research
marion.laboure@db.com



February 2022

Distributed on: 03/02/2022 11:17:07 GMT

What types of money are out there?

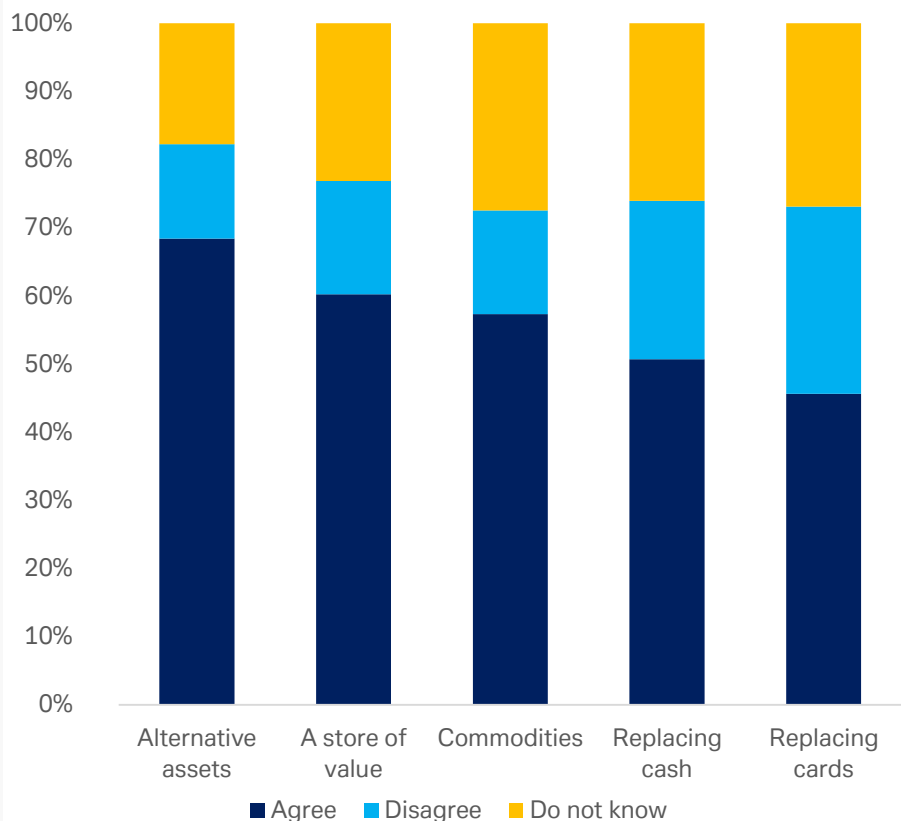


Source: Adaptation from Bank for International Settlements (2017), based on Bech and Garratt (2017); Notes - The Venn-diagram illustrates the four key properties of money: issuer (central bank or not); from (digital or physical); accessibility (wide or restricted); and technology (account-based or token-based). Bank deposits are not widely accessible in all jurisdictions.

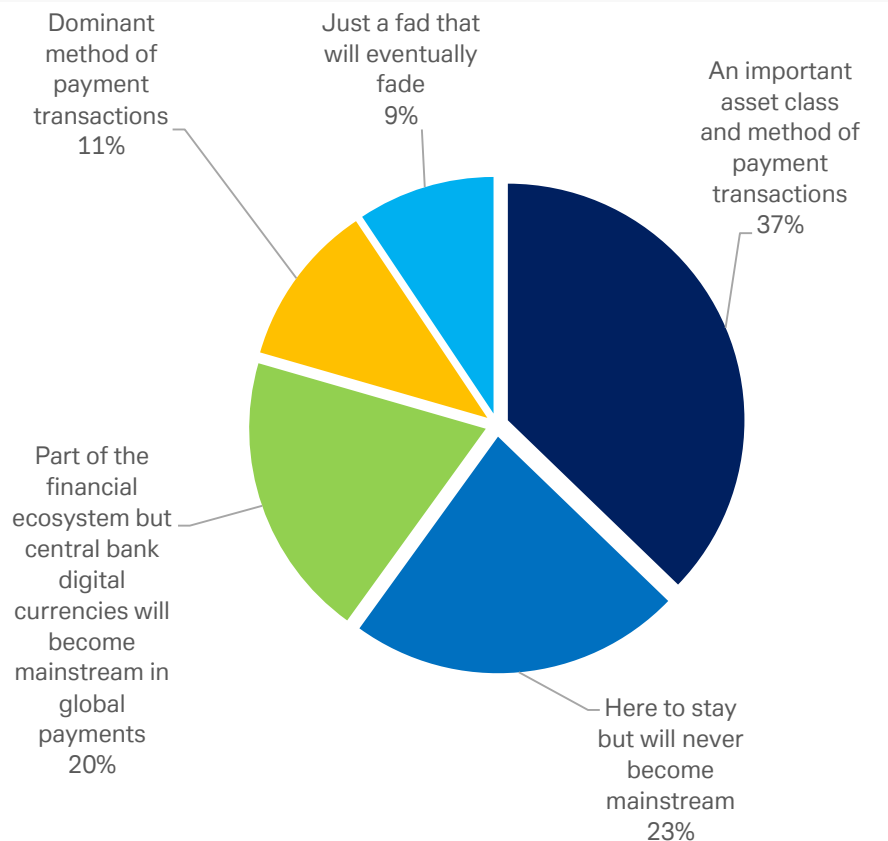


A strong majority of crypto users are fairly die-hard and believe in the importance of cryptocurrencies

Today



In the future



Source: Deutsche Bank dbDIG. Note: The survey was conducted in December 2021 in the United States and include 3,200 people.

1. The landscape

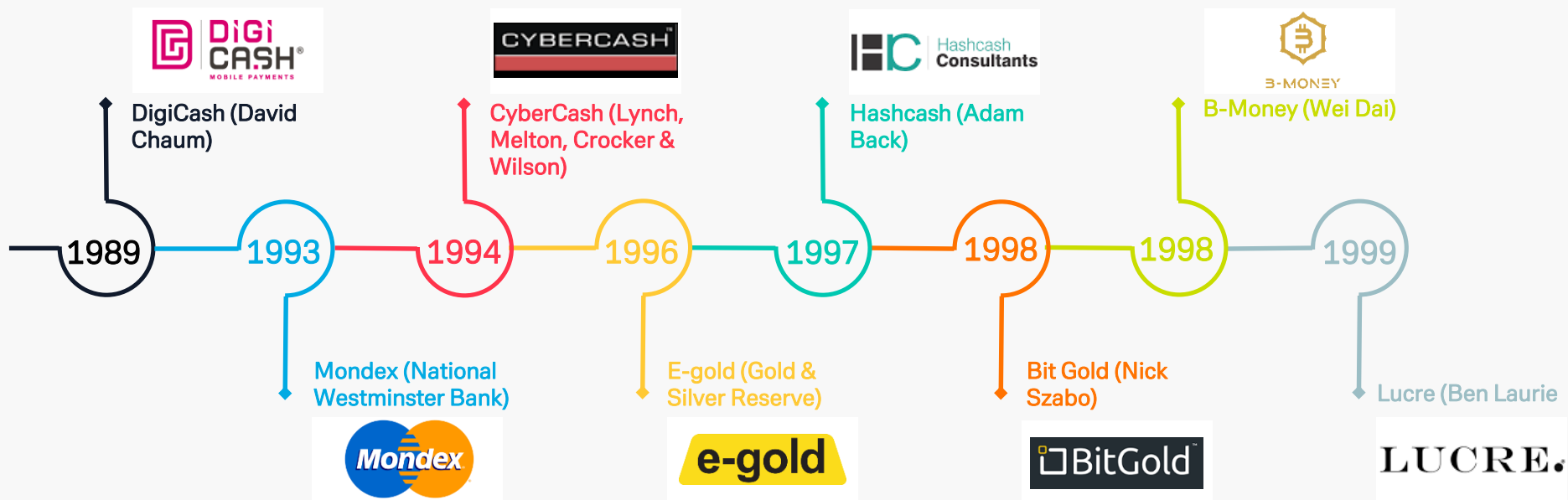


The one thing that's missing, but that will soon be developed, is a reliable e-cash, a method whereby on the Internet you can transfer funds from A to B without A knowing B or B knowing A.

- Professor Milton Friedman (1999).
- Noble Prize winner




Early cryptographic digital currencies... All failed



Why did early digital currencies fail?






- Merchant adoption
- Centralisation
- Double-spending
- Consensus



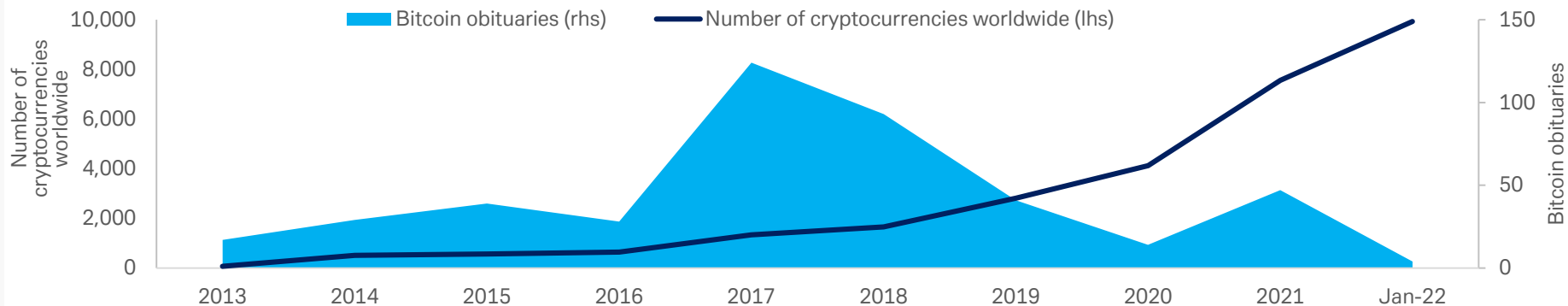
Source: Deutsche Bank.

Bitcoin was the first (successful) cryptoasset and today is the largest (40-50% of the total crypto market)



#	Cryptocurrency	Created	Price	Market cap (\$ bn)	Circulating supply (mn)
1	 Bitcoin	2009	\$37,739	\$715,938	18.9
2	 Ethereum	2015	\$2,619	\$313,249	119
3	 Tether	2014	\$1	\$78,431	78,120
3	 Binance Coin	2017	\$381	\$62,683	165
5	 USD Coin	2018	\$1	\$49,856	49,828

The number of cryptocurrencies keeps increasing while fewer and fewer people believe Bitcoin will die



Source: Deutsche Bank, coinmarketcap, CoinMarketCap.com, <https://99bitcoins.com/> and Statista; as of January 31, 2022.

What could Bitcoin do?



What could Bitcoin do?

- **Rapid and low-cost 24/7 settlement:**
 - On 12 April 2020, someone transferred bitcoin worth more than \$1.1 billion at the time in a single transaction.
 - The transaction settled in ten minutes, and the fee for processing the transaction was \$0.68.
 - In the first half of 2020, fees for bitcoin transactions amounted to just 0.019% of the volume transacted.
- **Digital scarcity and digital property rights:**
 - Bitcoin as 'digital gold'.
 - Nonfungible tokens (NFTs), which the gaming industry is exploring, provide ownership guarantees that were previously nonexistent in the digital world.
- **The many variations of cryptoassets (unlike Bitcoin) that are running on customised blockchains are programmable, like any software, to achieve a certain contractual purpose:**
 - So-called programmable money or smart contracts.
 - Creating transactions with rules and conditions.

Bitcoin vs. Ethereum

- **Bitcoin's blockchain allows for only a narrow set of transactions:**
 - You can program it to send, receive, or hold bitcoin and to set up simple escrow- and trust-style accounts.
 - Bitcoin's simplicity is part of what makes it secure and what gives people confidence to put large sums of money into it - serving as digital gold.
- **Ethereum, the second-largest cryptoasset by market cap, was launched in 2015, with the idea of expanding that list of capabilities:**
 - It has established itself as the platform of choice for 'programmable money'.
 - Ethereum's flexibility entails a level of technical risk that would be unacceptable for bitcoin but that allows other interesting applications to develop.
 - For example, in finance-specific applications, such as blockchain-enabled lending protocols, which has given rise to a new term: decentralised finance.

Source: Deutsche Bank.

El Salvador: A Case Study for Bitcoin Payments



- In September 2021, El Salvador became the first country in the world to accept bitcoin as its official currency.
- This means that citizens can pay their taxes in bitcoin and merchants must be able to accept it alongside the US dollar (which has been the national currency for 20 years).

Three reasons to adopt Bitcoin as legal tender...

- **1. To reduce El Salvador's dependence on the dollar, which is used as the official currency.**
 - If we look closer - and this is probably a more political than economic reason, as the country does not suffer from any monetary turbulence (quite the contrary) - El Salvador has experienced low inflation and economic stability since adopting the US dollar 20 years ago.
- **2. To reduce the cost of Salvadorians' remittances from abroad, which are a significant support and are equivalent to 22% of GDP. Bitcoin can be quickly sent with lower fees and without exchange rates.**
 - In reality, people who send and receive remittances frequently use informal brokers to convert local currency to and from Bitcoin.
 - Prices are extremely volatile, which makes buying and selling Bitcoin a complex process, requiring technical expertise.
- **3. To increase financial inclusion.**
 - 70% of the Salvadorian population does not have a bank account and works in the informal economy.

... in an external and internal context of opposition

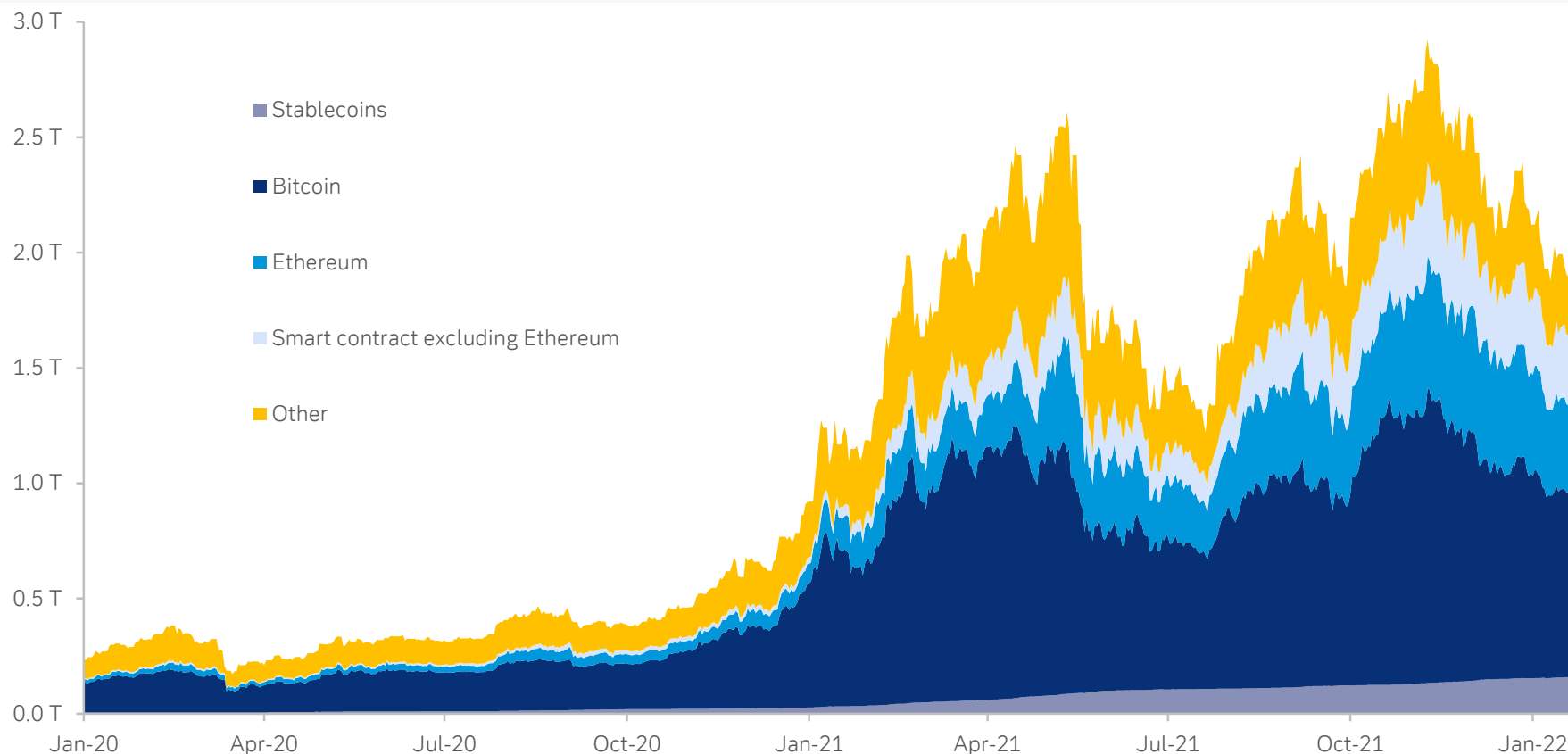
- **The international financial community opposes it.**
 - The IMF has warned against adopting cryptocurrencies as legal tender, citing risks to macroeconomic stability, financial integrity, consumer protection, and the environment. **End of January 2022, the IMF has urged El Salvador to reverse its decision to make Bitcoin legal tender.**
 - The UN has pointed out the risks of money laundering.
 - The World Bank declined a request for help in advising El Salvador on Bitcoin.
 - Last July, Moody's downgraded the country's credit rating further to CAA1, meaning that it has a high risk of default on its loans. According to Bloomberg, El Salvador has an \$800mn bond maturing in January 2023.
- **The public also opposes it.**
 - 70-80% of the population was against the Bitcoin law. Such opposition is a first for President Bukele after two years in power.

Source: Deutsche Bank. For more details, please see [Bitcoin: A Payment Method? Not Yet!](#) And [Bitcoin: The End of the Beginning?](#)

The market value of the ecosystem has increased dramatically beyond Bitcoin



Market capitalisation for crypto assets (USD trn)

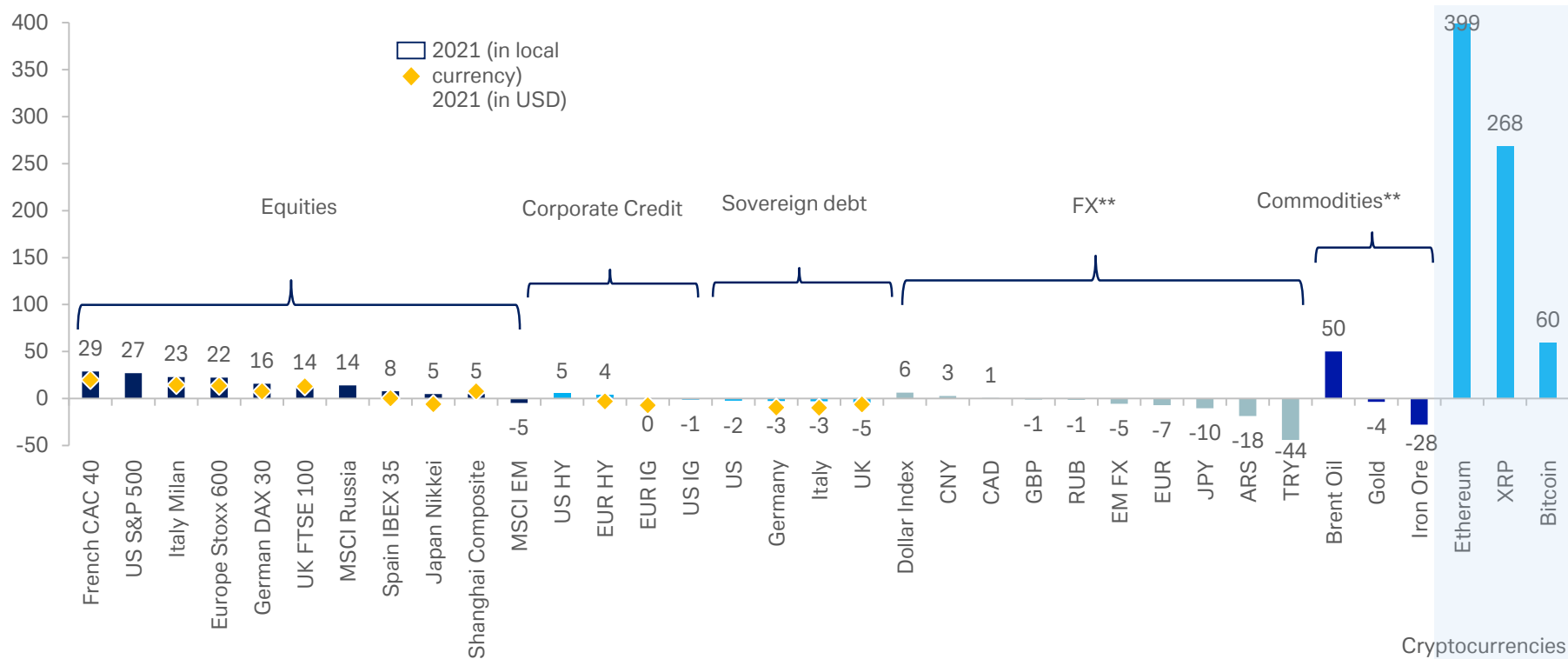


Sources: Bloomberg Finance LP, CoinGecko, and Deutsche Bank calculations.

Cryptocurrencies recorded strong performance in 2021



Returns* per asset class in 2021

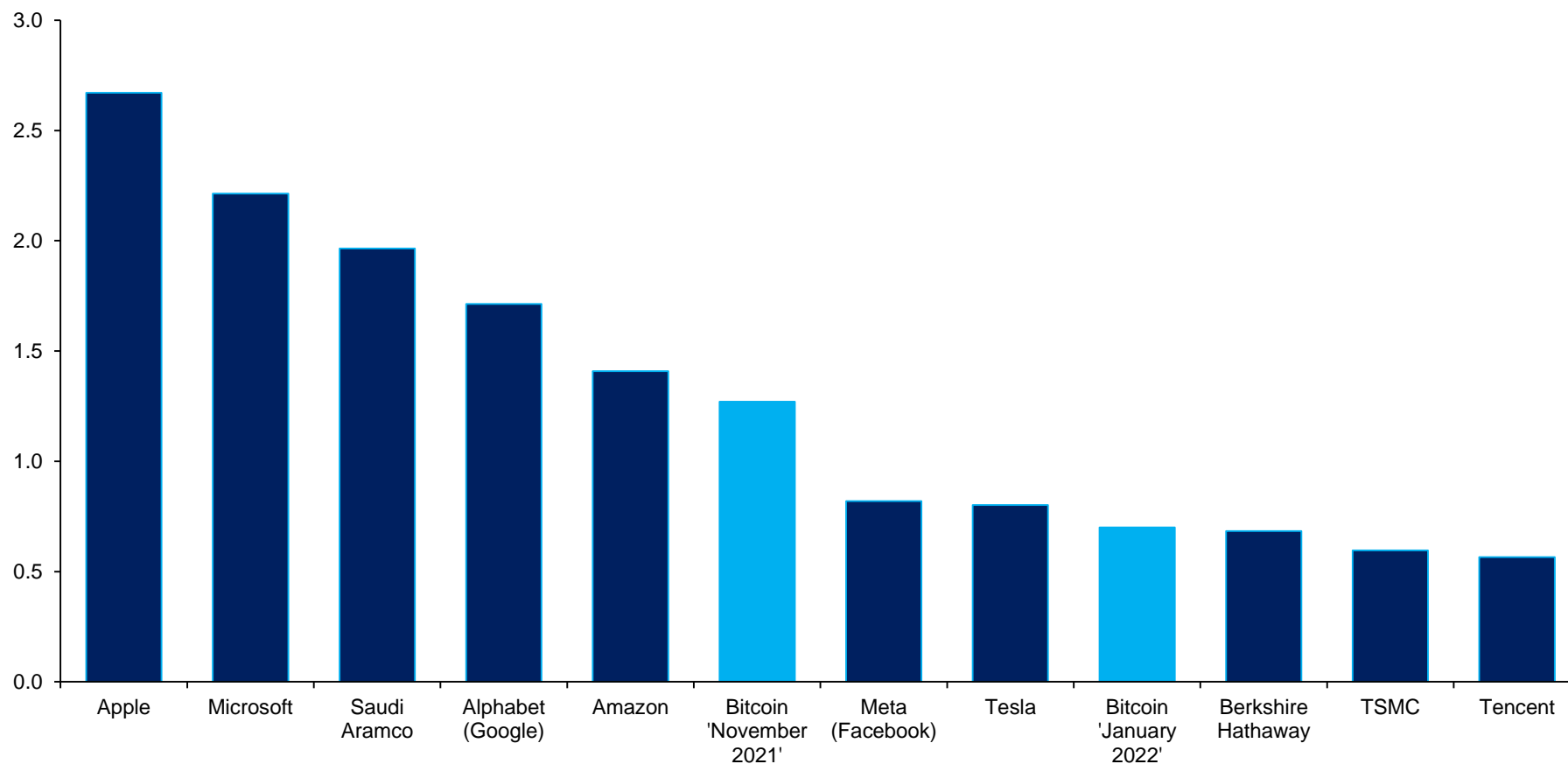


Note: (*) Total return accounts for both income (interest or dividends) and capital appreciation. (**) FX, Commodities are spot returns.
 Source: Bloomberg Finance LP, Deutsche Bank Research.

If Bitcoin were a company, it would be part of the top 10 largest companies by market cap



Market capitalisation for crypto assets (USD trillion)

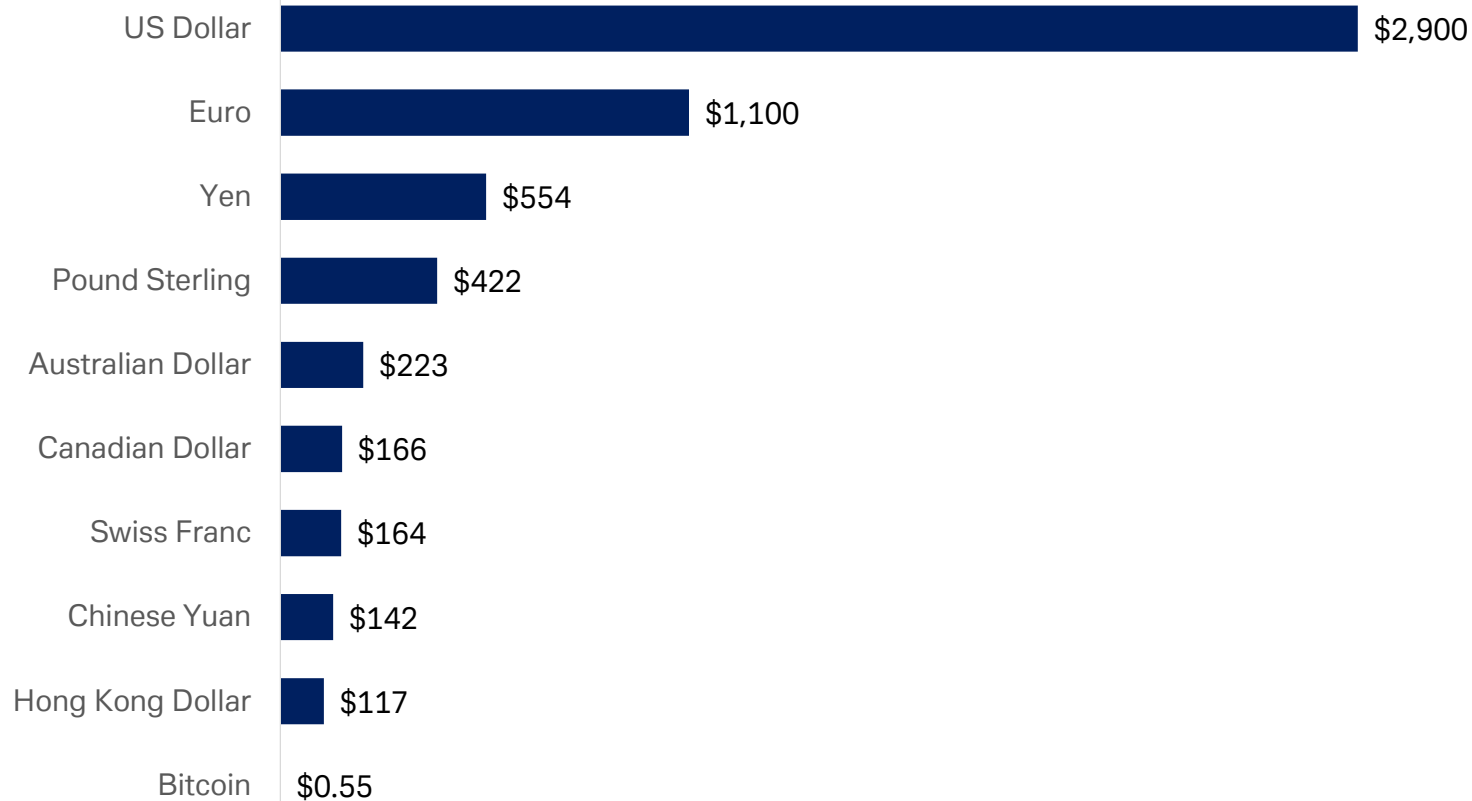


Source: Bloomberg Finance LP, Coinmarketcap, Deutsche Bank.

... but its tradability remains very limited



Average daily trading volume (USDbn)

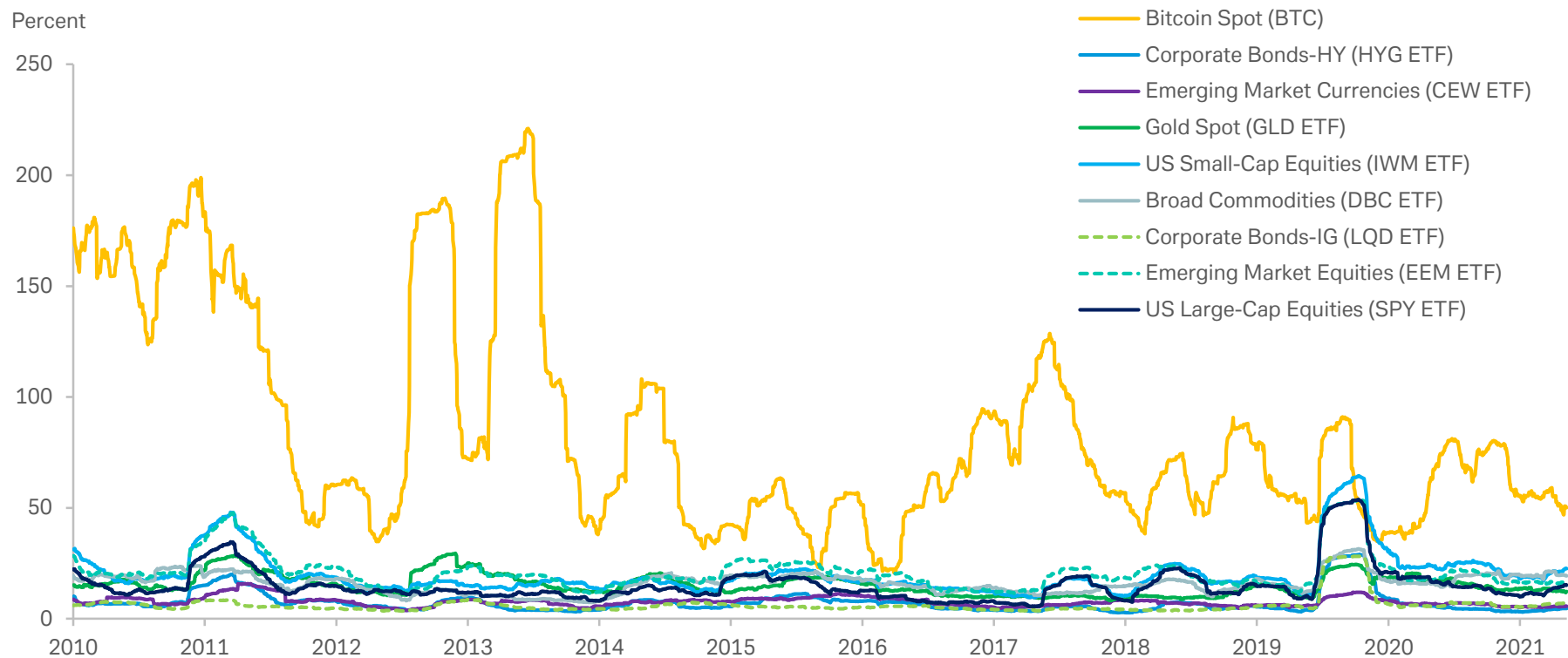


Source: Deutsche Bank, Bank for International Settlements, Blockchain.com. Note: Bitcoin trading volume from 11/2020-11/2021; all others from 2019.

It is not uncommon for Bitcoin to trade within a 10% spread over 24-hour periods



Volatility of Bitcoin vs. selected asset classes



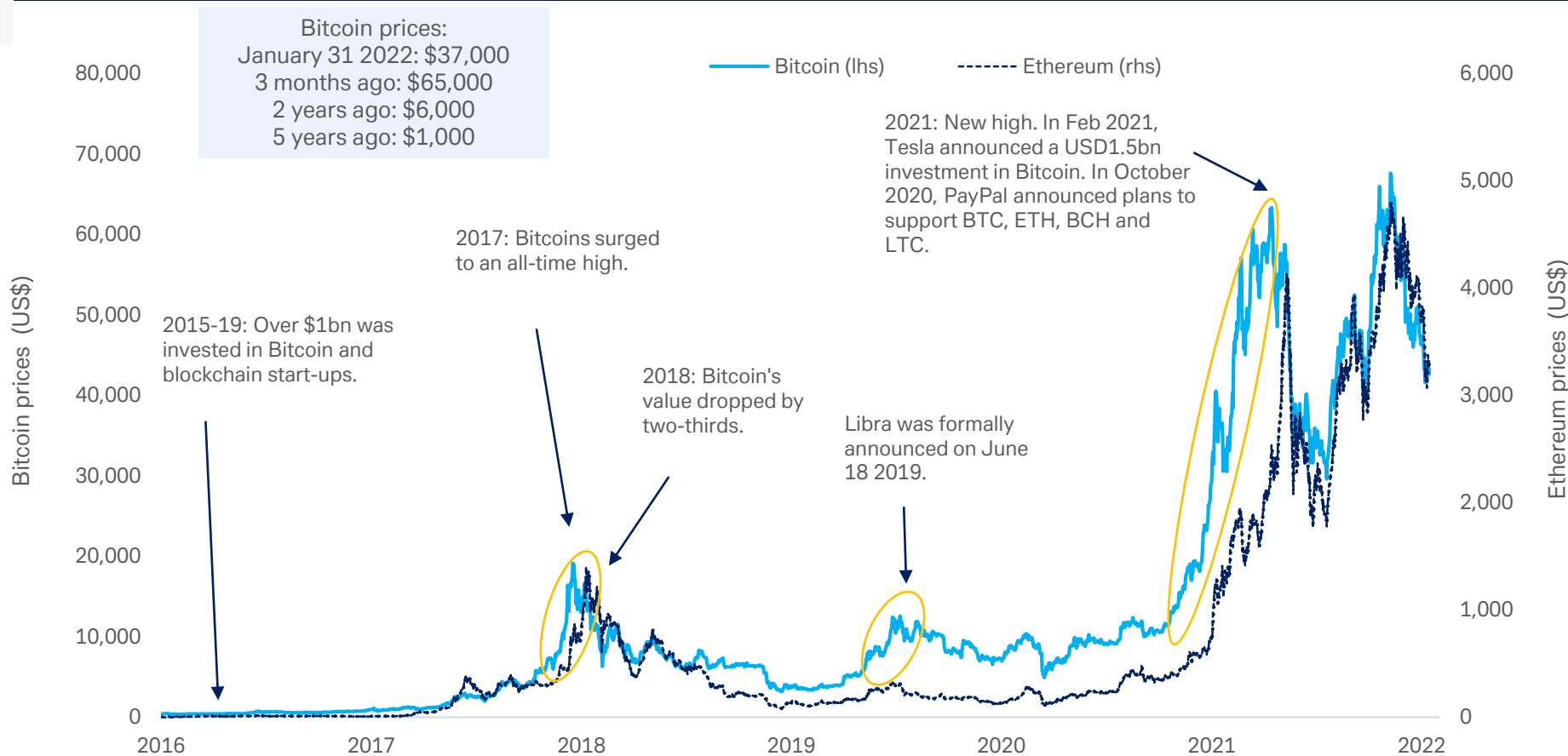
Notes: The price of Bitcoin spot is calculated by Bloomberg using the cross USD/BTC. "Broad Commodities" refers to the Invesco DB Commodity Index Tracking ETF (DBC). "Corporate Bonds-HY" refers to the iShares iBoxx \$ High-Yield Corporate Bond ETF (HYG). "Corporate Bonds-IG" refers to the iShares iBoxx \$ Investment Grade Corporate Bond ETF (LQD). "Emerging Market Currencies" refers to the WisdomTree Emerging Currency Strategy Fund (CEW). "Emerging Market Equities" refers to the iShares MSCI Emerging Markets ETF (EEM). "Gold Spot" refers to the SPDR Gold Trust ETF (GLD). "US Large-Cap Equities" refers to the SPDR S&P 500 Trust ETF (SPY). "US Small-Cap Equities" refers to the iShares Russell 2000 ETF (IWM).

Sources: Deutsche Bank, Bloomberg Finance LP.

Bitcoin is strongly and positively correlated to other cryptocurrencies... especially Ethereum...



Prices fluctuate significantly and in the same direction



Sources: Deutsche Bank, Haver Analytics. Note: as of January 2022.

... but Bitcoin has a low correlation with other major assets classes



From 2015 to 2021 • Local currency

	Bitcoin	US Equities	Dev ex US Equities	EM Equities	Commodities	US Treasuries	IG Corp Bond	HY Bonds	DXY	Gold
Bitcoin	1.0									
US	0.15	1.00								
Dev ex US	0.12	0.63	1.00							
EM		0.50	0.72	1.00						
Commodities	0.08	0.36	0.35	0.35	1.00					
US Treasuries	-0.02	-0.35	-0.35	-0.24	-0.18	1.00				
IG Corp Bonds	0.02	-0.03	0.02	0.08	-0.03	0.78	1.00			
HY Bonds	0.07	0.52	0.63	0.57	0.34	-0.22	0.32	1.00		
DXY	-0.02	0.01	0.08	-0.06	-0.22	-0.19	-0.23	-0.11	1.00	
Gold	0.10	0.03	-0.08	0.03	0.28	0.26	0.27	0.03	-0.34	1.00

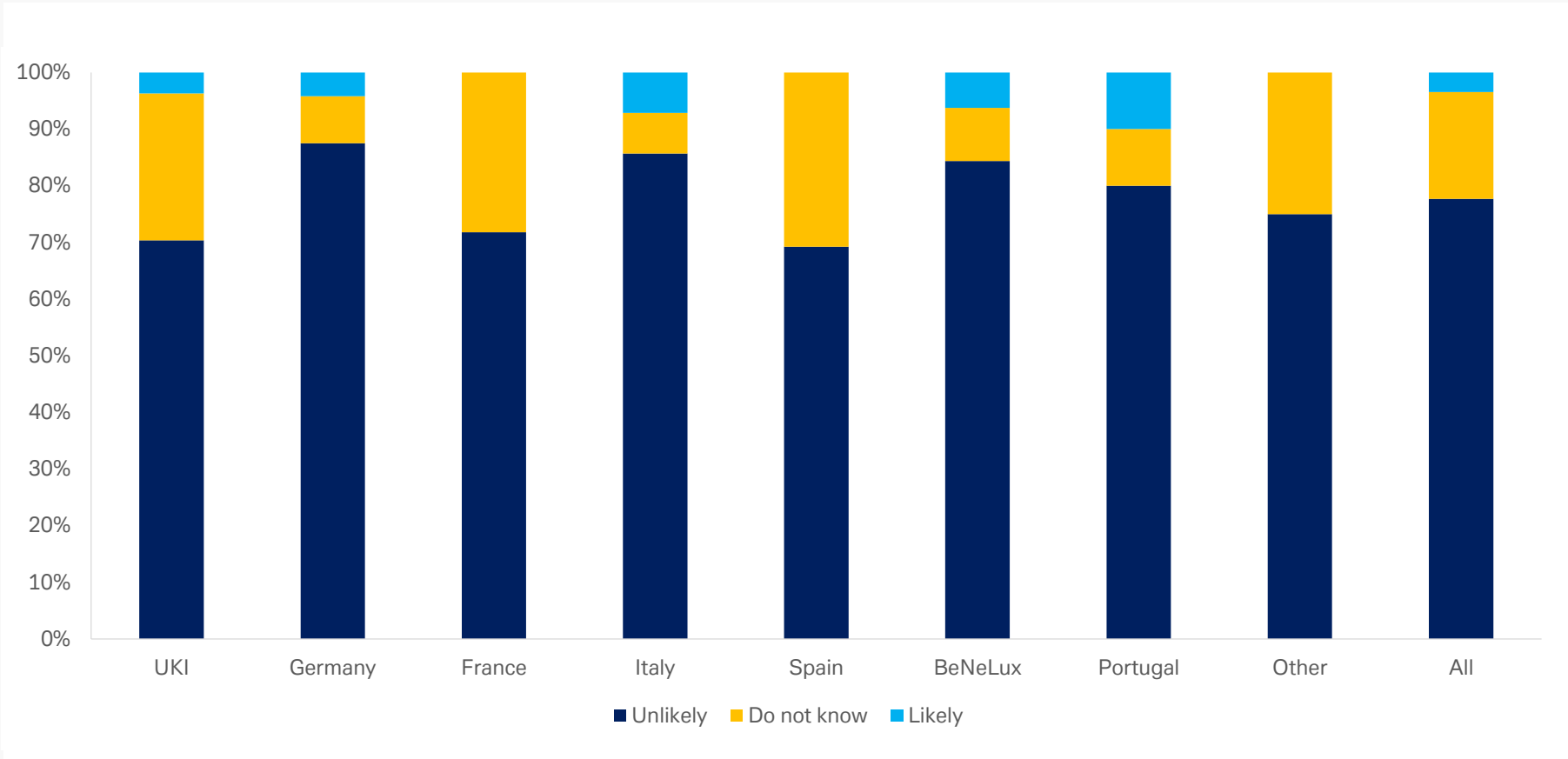
Sources: Bloomberg Index Services Limited, Federal Reserve, MSCI Inc., and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties. Notes: Equity returns are net of dividend taxes. "US" is represented by the MSCI USA Index, "Dev ex US" is represented by the MSCI World ex US Index, "EM" is represented by the MSCI EM Index, "Commodities" is represented by the Bloomberg Commodity Index, "US Treasuries" is represented by the Bloomberg US Treasury Index, "IG Corp Bonds" is represented by the Bloomberg US Corporate Bond Index, "HY Bonds" is represented by the Bloomberg US Corporate High-Yield Index, and "DXY" is represented by the US Dollar Index.



Cryptocurrencies are not yet an accepted means of payment for Treasurers/CFOs...



In the next 18 months, how likely is your company to receive or pay with cryptocurrencies



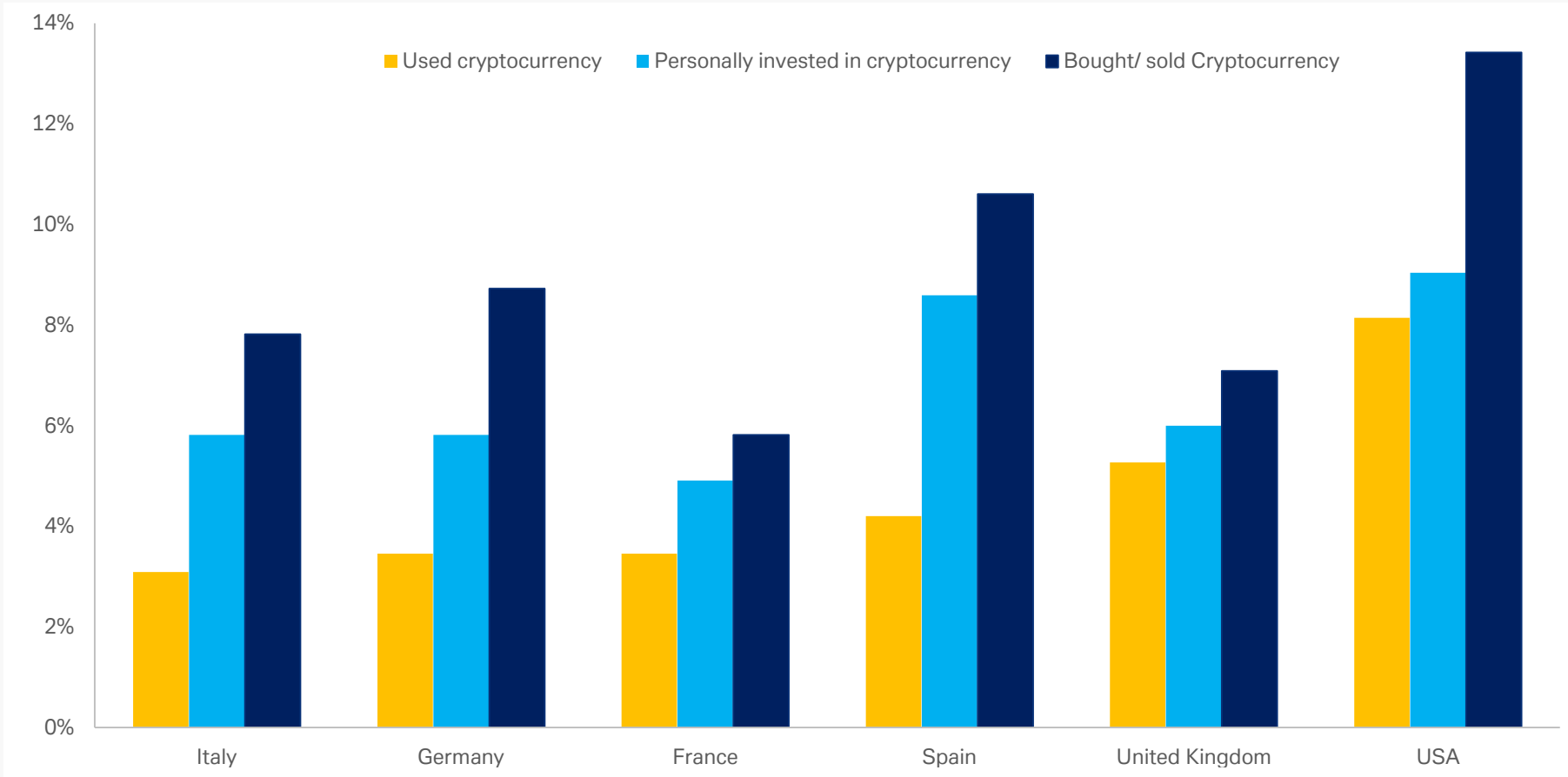
Source: Deutsche Bank dbDIG.



... nor consumers



Consumers who have used cryptocurrencies



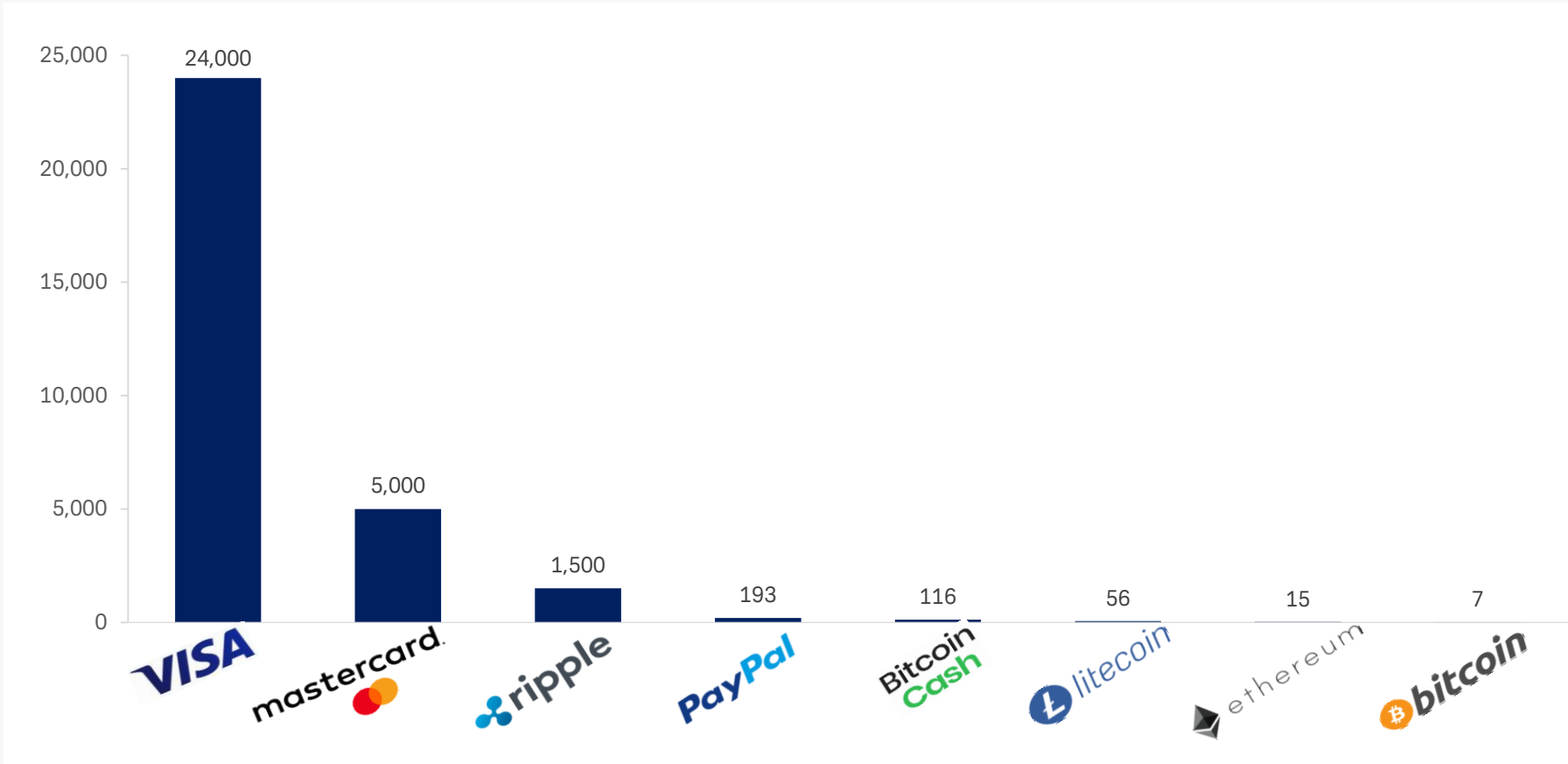
Source: Deutsche Bank dbDIG.



... and transaction capacity per second remains limited - but the Lightning Network is promising



Transaction capacity per second

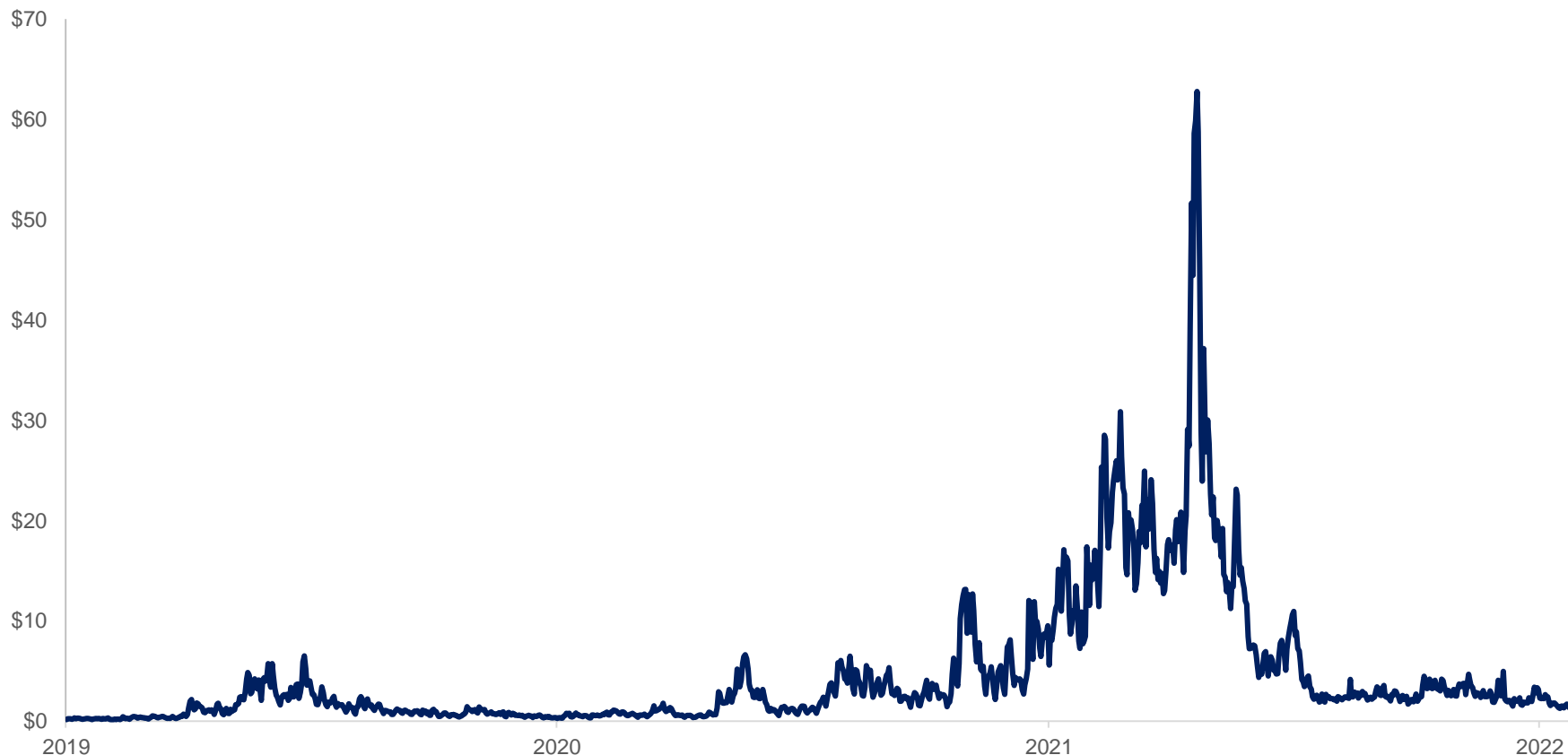


Source: Deutsche Bank, Visa, Mastercard, Ripple, Gemini, Blockchain.com



In January 2022, Bitcoin's average transaction fee was \$1.79

Bitcoin average transaction fee (USD)

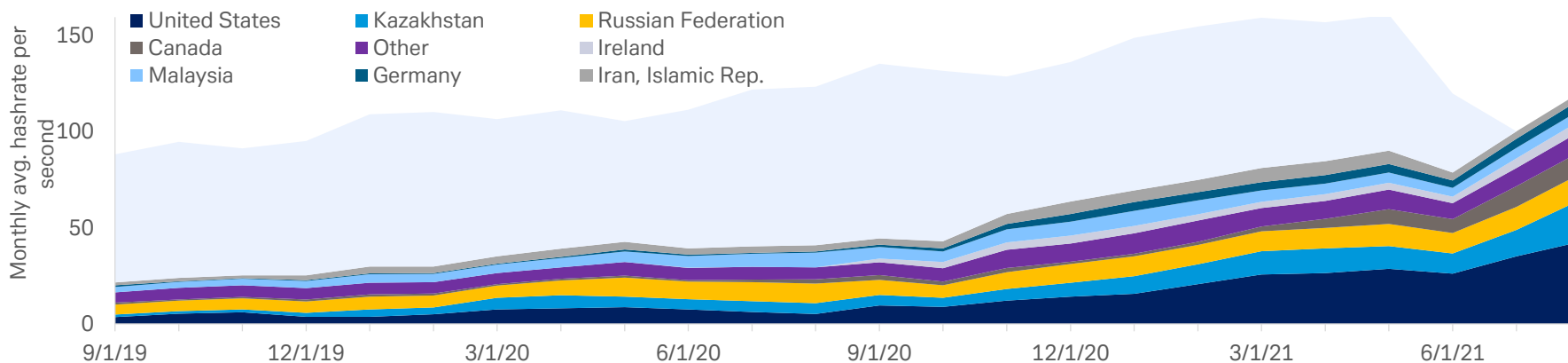


Source: Deutsche Bank, Blockchain.com.

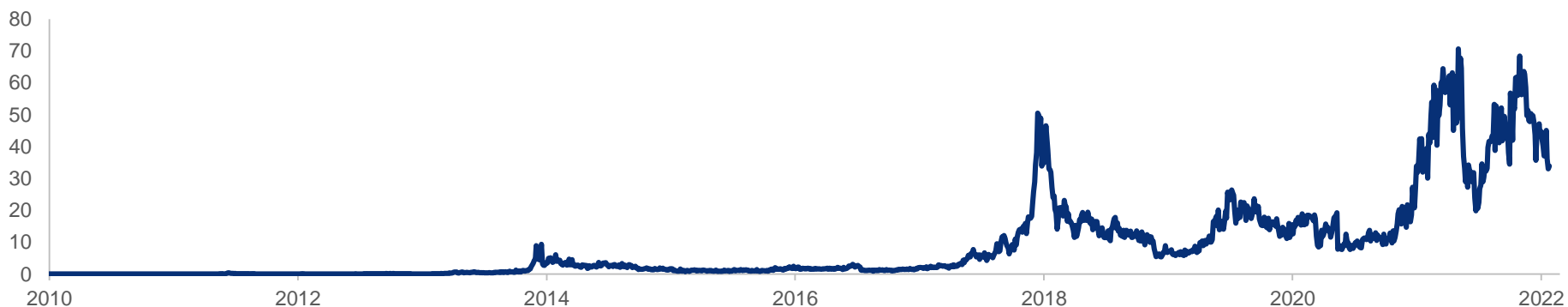
The miners are all in... and mainly incentivised by their own revenue



Global Bitcoin hashrate by country



Bitcoin miners revenue (USDmn)

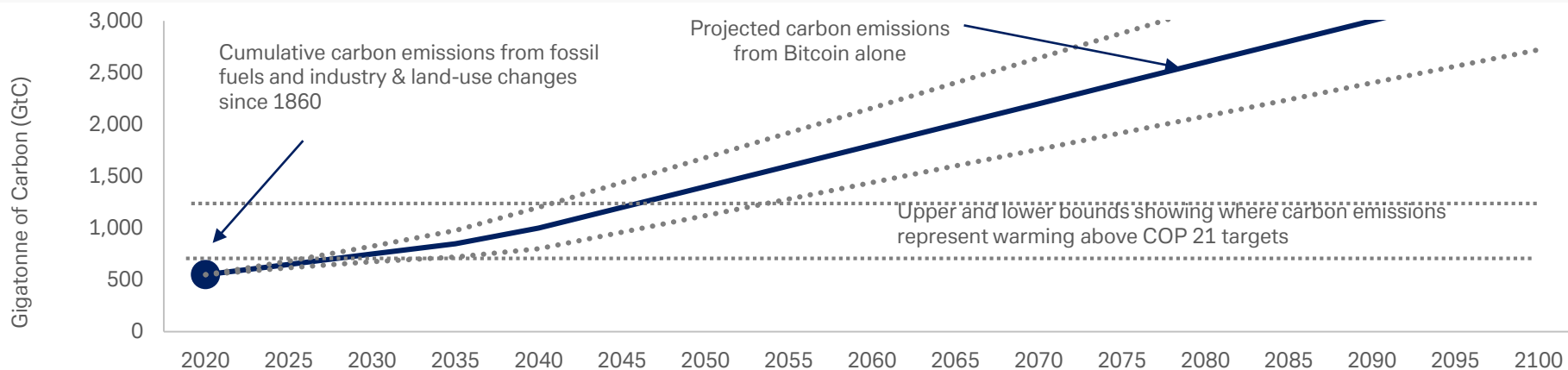


Sources: Cambridge Centre for Alternative Finance, Blockchain.com, and Deutsche Bank calculations.

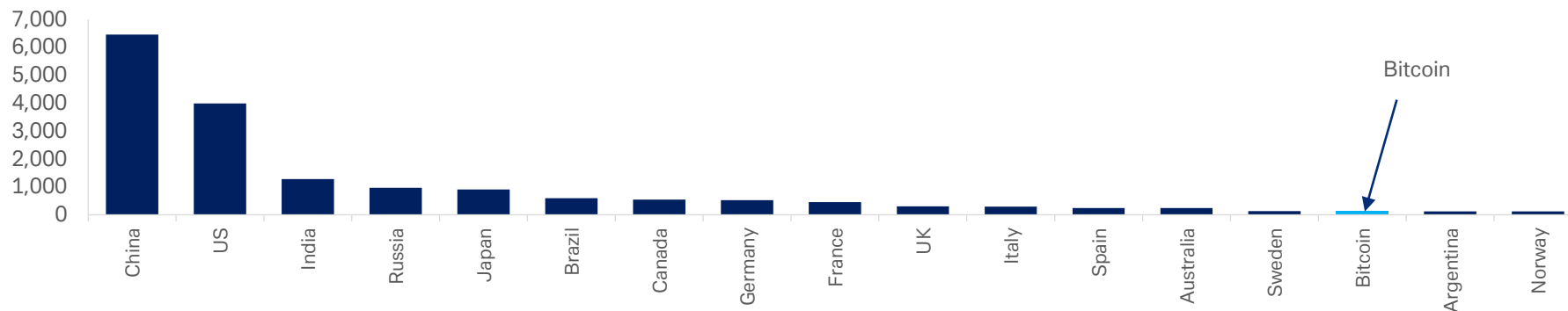
A Nature Climate Change article suggests that Bitcoin alone could increase global temperatures by 2 degrees Celsius within three decades



Projected bitcoin cumulative carbon emissions



Annual electricity consumption (TWh/year)

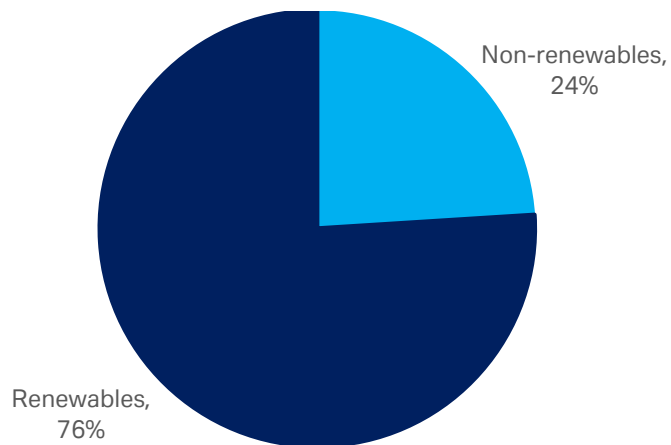


Source: Mora, Rollins, et al. Nature Climate Change. Note: Projections based on average growth rate of other broadly adopted technologies.
 Source: University of Cambridge Bitcoin Electricity Consumption index, Deutsche Bank. Note: National energy use is in TW/h.

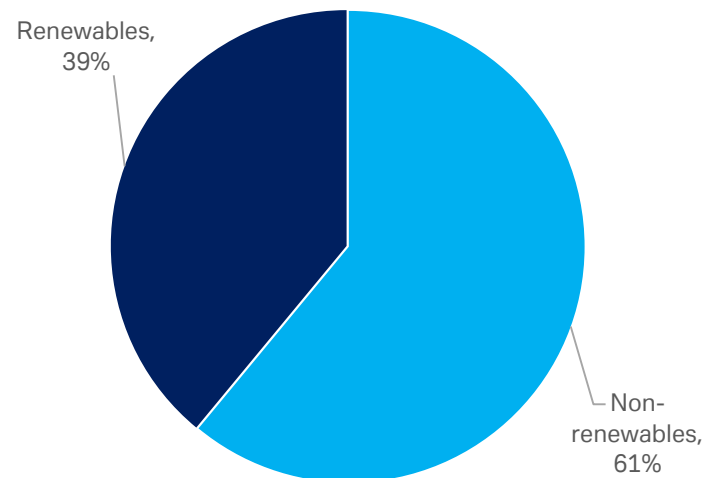
Bitcoin: Share of renewable vs. non-renewable energy



Share of miners



Share of total energy consumption



Possible solutions for decarbonising crypto (for more details, please see [Decarbonising Crypto: In Search of Sustainability](#)):

- A transition to renewable energy sources;
- Imposing taxes in order to disincentivise carbon-fueled crypto mining;
- A switch from proof-of-work to proof-of-stake protocols that verify transactions off the blockchain (e.g., Lightning Network);
- Pre-mining the tokens.

Source: University of Cambridge Bitcoin Electricity Consumption index, Deutsche Bank. Note: National energy use is in TW/h.

Facebook Novi 2022: Not all things have a happy ending



- Initial problems were: (a) to create a competing global currency via pegging libra to a basket; and (b) as a result, risk governments losing control of the money supply and regulatory control.
- Facebook’s strategy has shifted, with more emphasis on lowering the cost of payments, rather than competing with governments.
- In October 2021, Facebook launched the long-awaited pilot of its digital currency wallet, Novi, in the US and Guatemala, but it chose to use the Paxos Dollar stablecoin after its own cryptocurrency, Diem, failed to get backing from regulators.
- Last week, Facebook was reportedly considering selling all assets and intellectual property of The Diem Association, suggesting that it is abandoning its in-house crypto plans.





2. Results from our proprietary dbDIG survey



I've been working on a new electronic cash system that's fully peer-to-peer, with no trusted third party

- Satoshi Nakamoto





Our key findings



- 65% of those surveyed have used cryptocurrencies for the first time over the last 12 months (and over 80% for investing).
- We split our findings into: (i) crypto investors; (ii) crypto traders; and (iii) 'transactors' : consumers who have paid in cryptocurrencies.
- INVESTORS
 - While over half of crypto investors invest because they think they will make money, the next largest motivation is simply curiosity.
 - A majority of investors have only committed relatively small amounts (under \$10K) to their crypto portfolio.
 - Even in an extremely bearish crypto market in which values were to drop 80%, less than half of investors say they would reduce their investments or exit the market.
 - Only a small percentage of investors believe that crypto is a golden ticket.
- TRADERS
 - Traders are more bullish vs. investors, and they believe there are large gains to be had. Yet, curiosity is still a big driver of activity.
 - Very few crypto bears are active in the space.
 - Even in an extremely bearish crypto market, less than half of traders say they would reduce their trading.
- 'TRANSACTORS'
 - The majority of crypto transactions are under \$100.
 - A majority of 'transactors' are using crypto for the same reasons as those of investors and traders.
 - A significant minority believes that crypto will replace national currencies someday.

dbDIG Survey Methodology

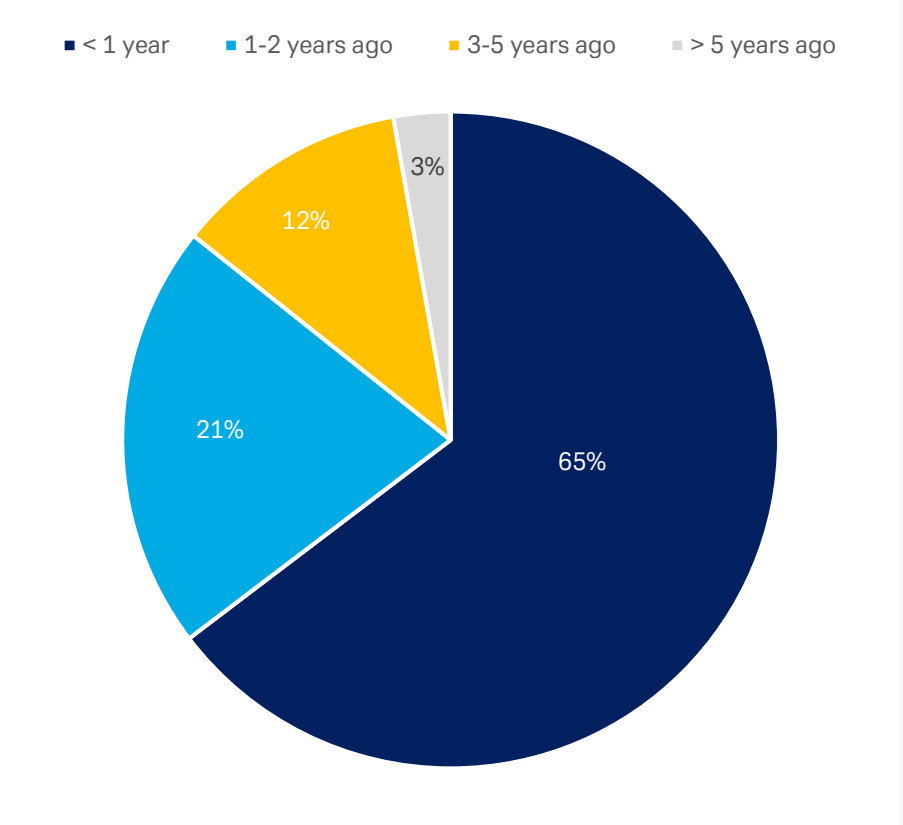
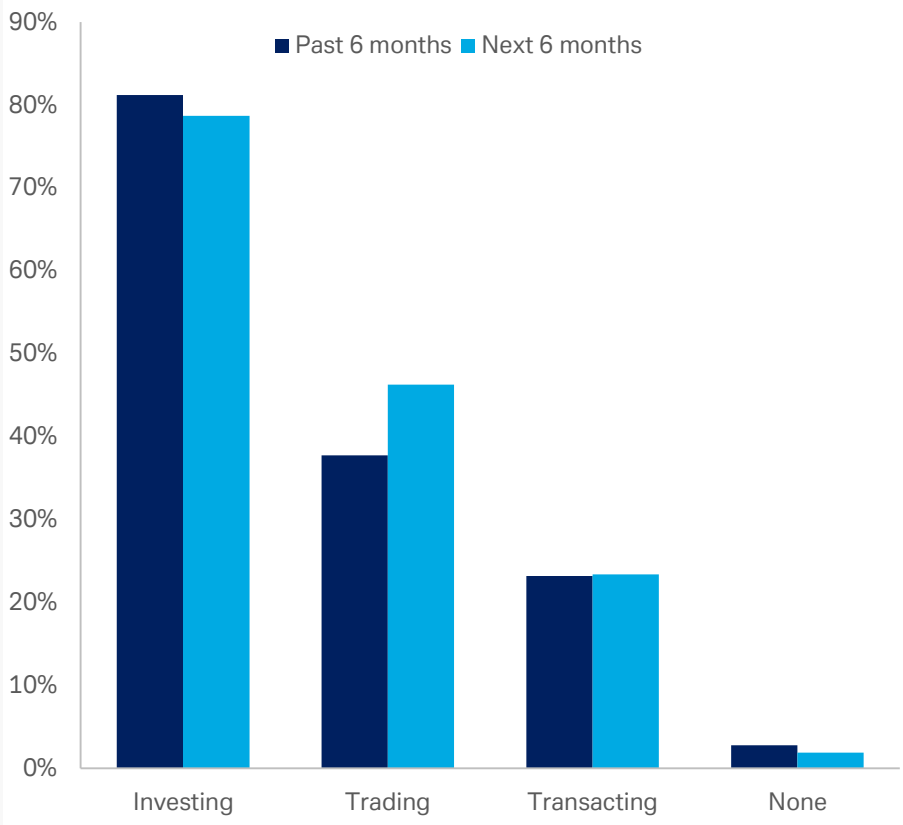
- In conjunction with dbDIG, we conducted an online survey of 3,250 U.S. consumers from 8-12 December 2021. The sample included 680 cryptocurrency users.
- The survey results are broadly representative based on the U.S. Census across gender, age, income, region, and race/ethnicity.
- The margin of error is +/-1.7% for the full consumer sample and +/-3.8% for the crypto user sub-sample.



65% of those surveyed have used cryptocurrencies for the first time over the last 12 months... mainly for investing

Have you used cryptocurrencies for the following activities ?

When did you first start using cryptocurrency?



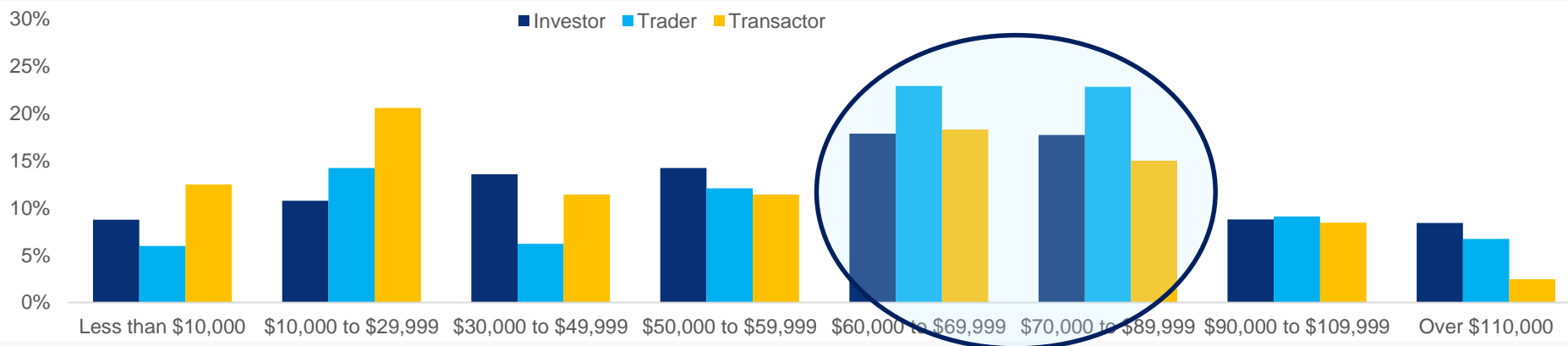
Source: Deutsche Bank dbDIG. Our proprietary survey was conducted in December 2021 in the United States with a sample of 3,200 consumers.



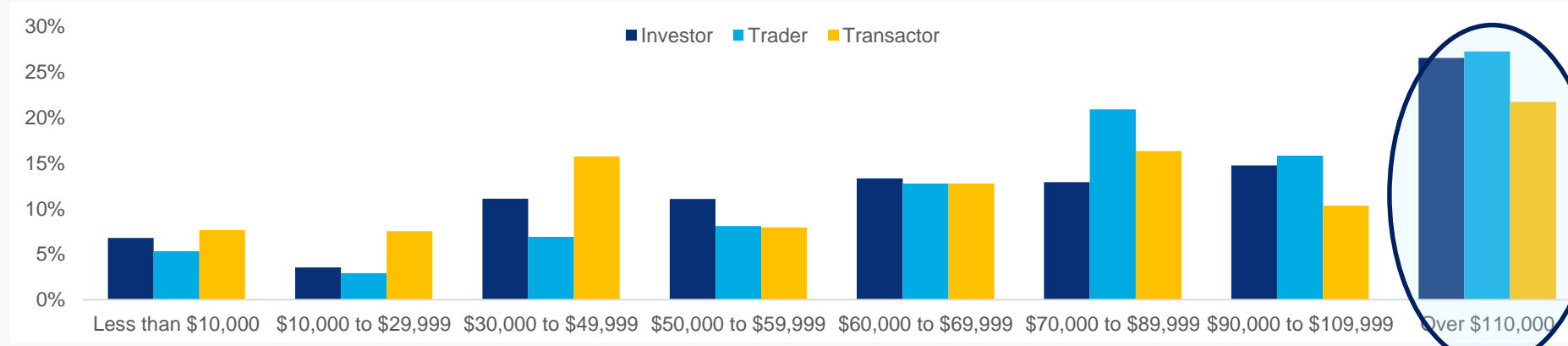
One-fourth of those surveyed believe that Bitcoin prices will be over \$110,000 in five years



The price of Bitcoin one year from now



The price of Bitcoin five years from now

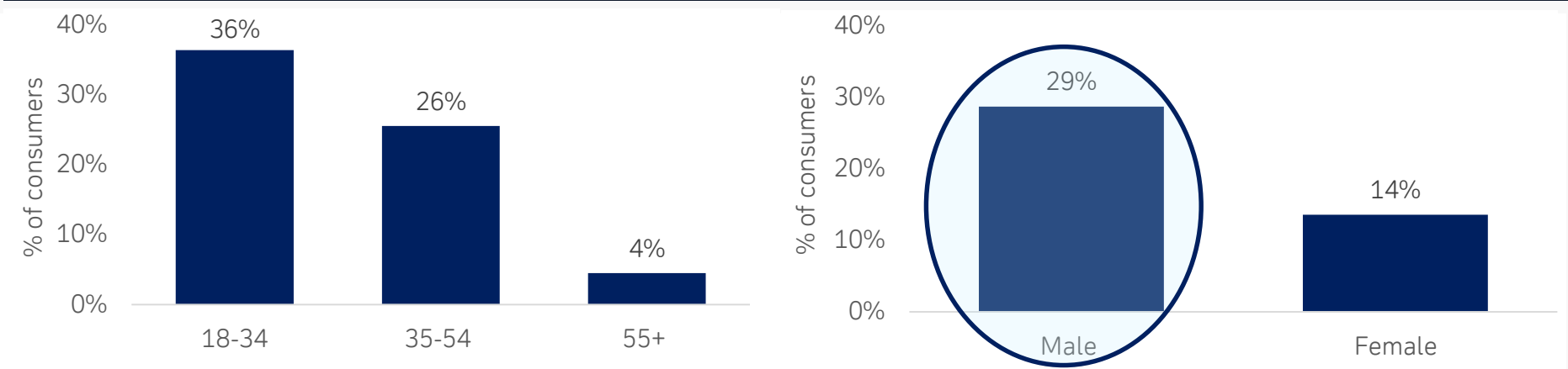


Source: Deutsche Bank dbDIG. Our proprietary survey was conducted in December 2021 in the United States with a sample of 3,200 consumers; as a % of crypto investors and traders.

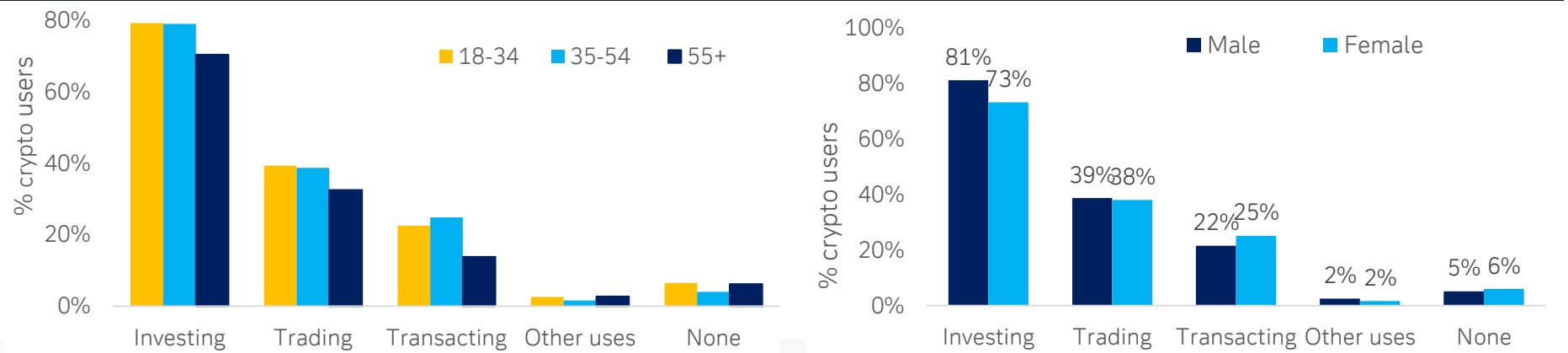


Men are overwhelmingly more active in crypto vs. women, and they are more bullish on it, in general

Consumers who used or invested in cryptocurrency over the past 12 months



Cryptocurrencies used for the following activities in the past six months



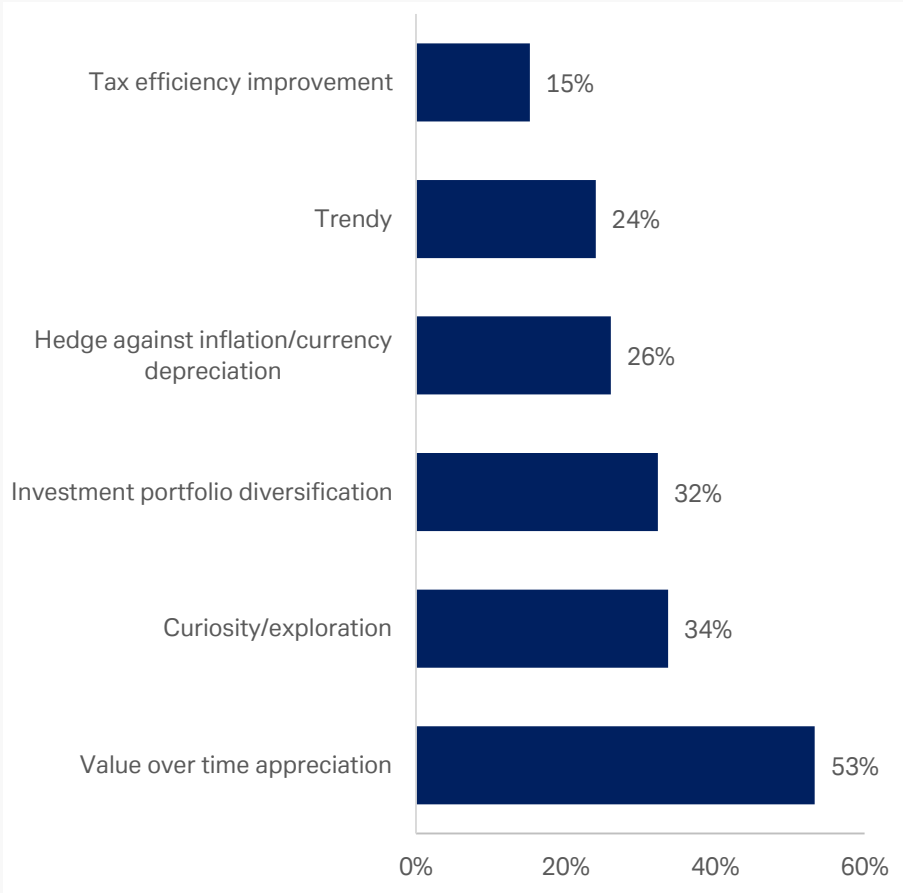
Source: Deutsche Bank dbDIG. Our proprietary survey was conducted in December 2021 in the United States with a sample of 3,200 consumers; as a % of crypto traders.



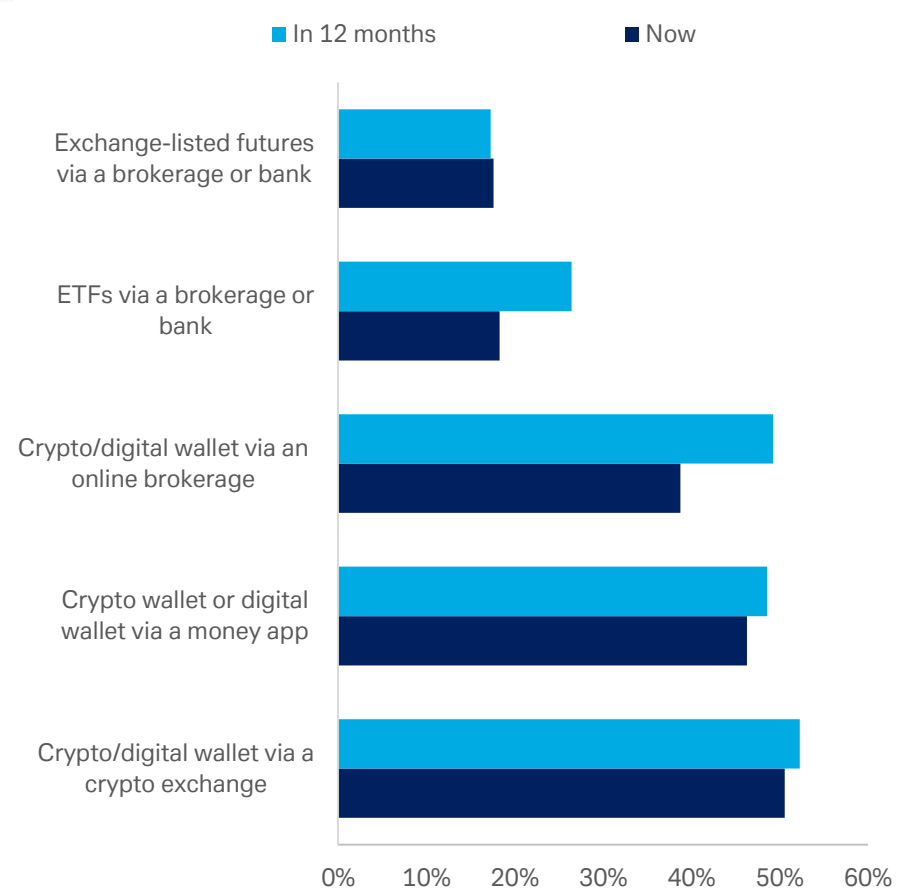
INVESTORS: While >50% of those surveyed invest because they think they will make money; the next largest motivation is curiosity



Primary reasons to invest in cryptocurrencies



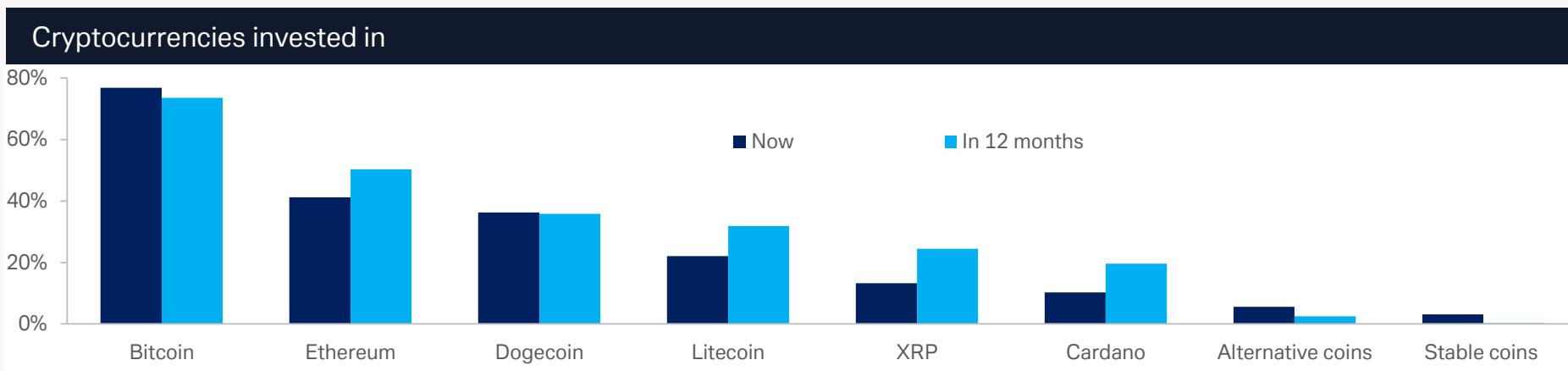
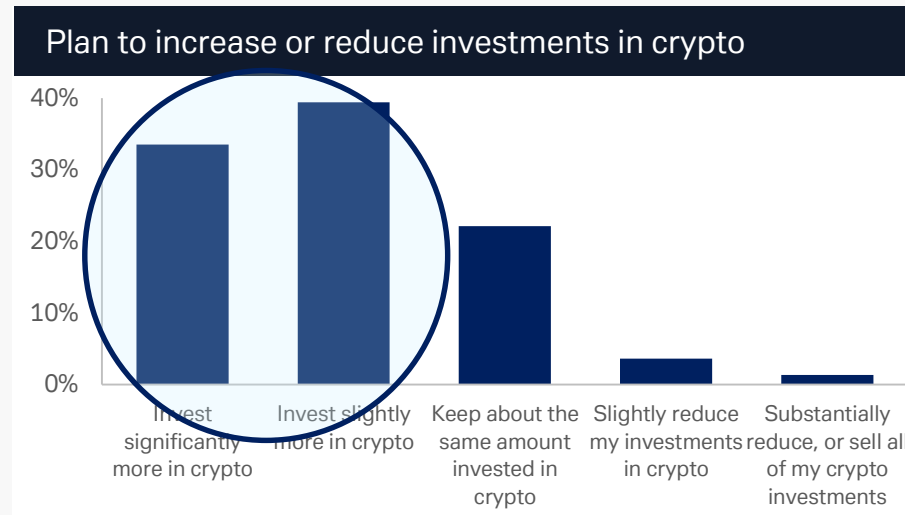
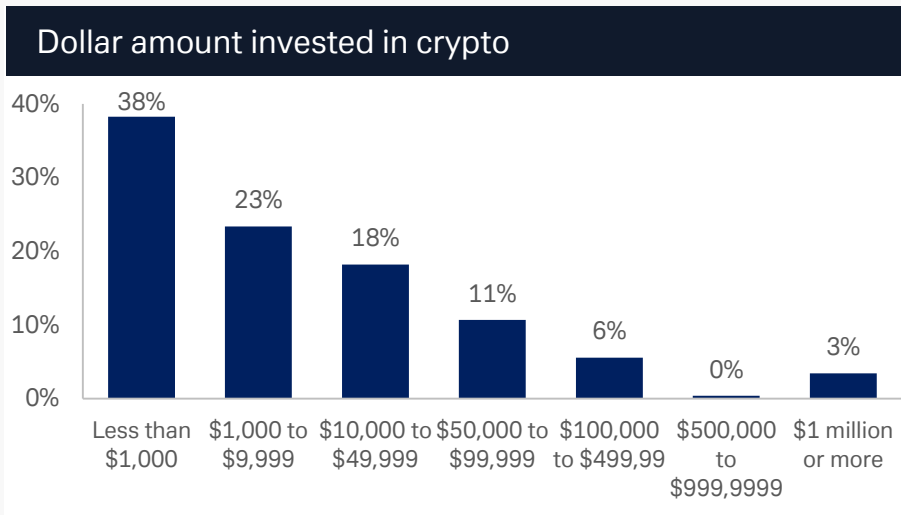
Methods used to invest in crypto



Source: Deutsche Bank dbDIG. Our proprietary survey was conducted in December 2021 in the United States with a sample of 3,200 consumers; as a % of crypto investors.



INVESTORS: Over 70% plan to increase (either significantly or slightly) their crypto activity



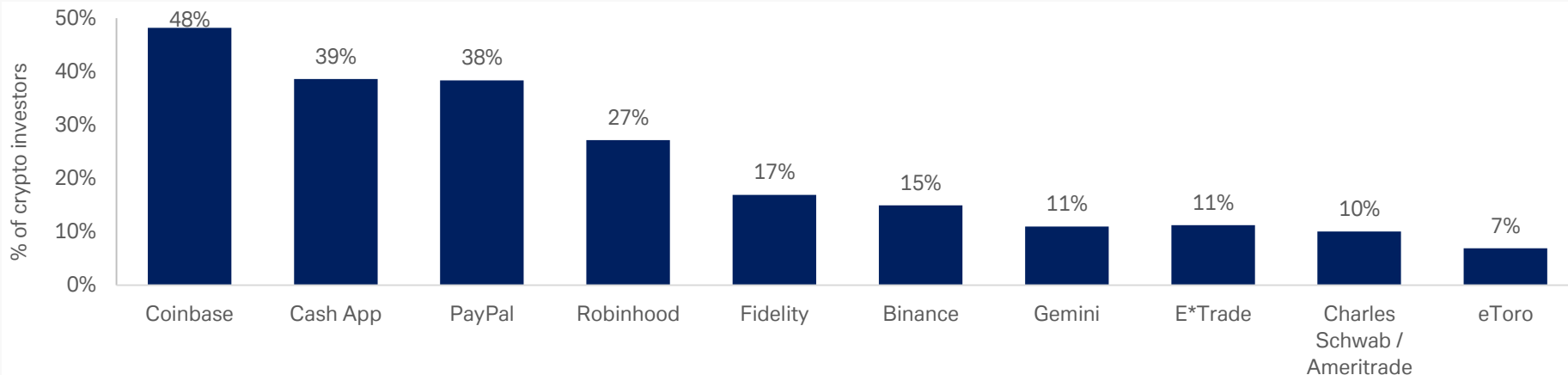
Source: Deutsche Bank dbDIG. Our proprietary survey was conducted in December 2021 in the United States with a sample of 3,200 consumers; as a % of crypto investors.



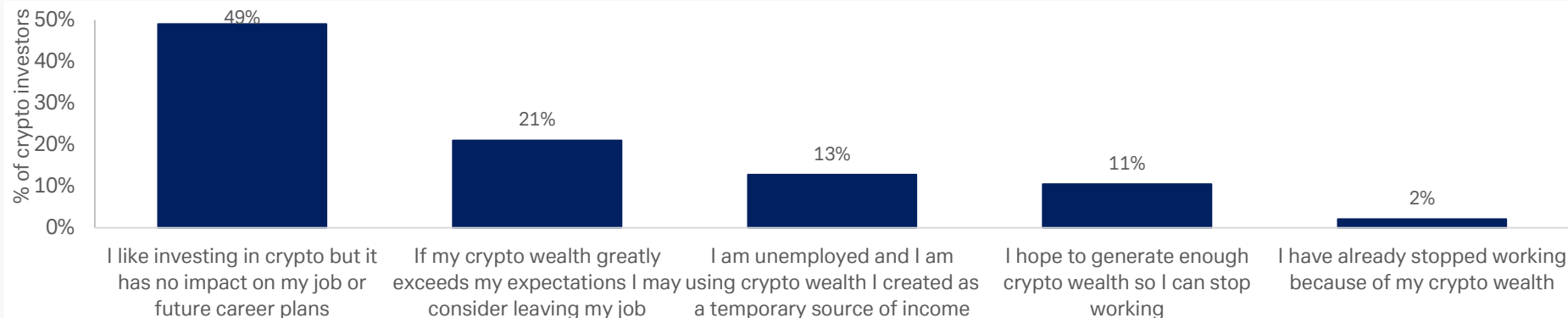
INVESTORS invest/trade crypto as a hobby, although a sizeable percentage of the respondents would consider leaving their jobs if their crypto activities generated sufficient wealth



Platforms used/plan to be used to invest in crypto



Positions on crypto wealth and employment

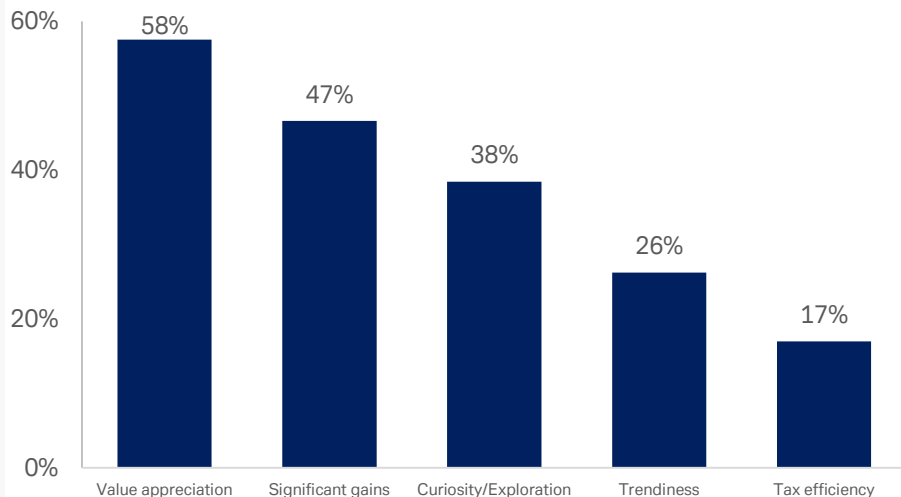


Source: Deutsche Bank dbDIG. Our proprietary survey was conducted in December 2021 in the United States with a sample of 3,200 consumers; as a % of crypto investors.

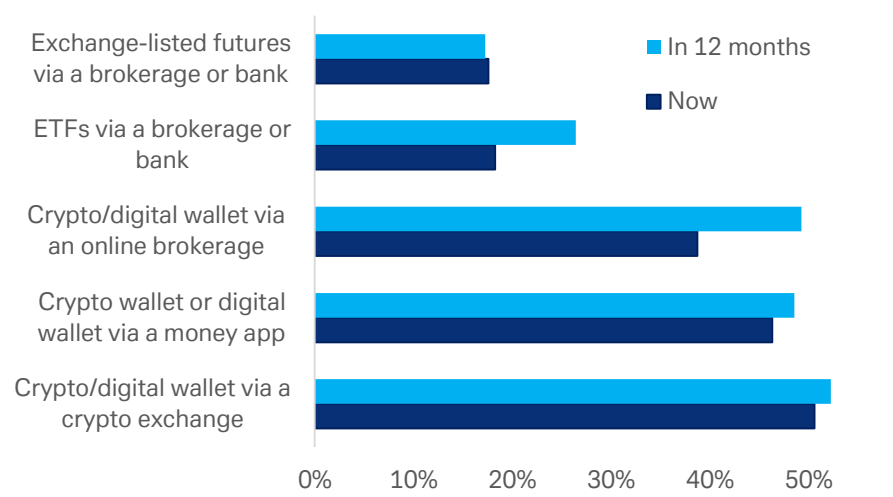


TRADERS: Primarily driven by large gains to be had and secondarily driven by curiosity

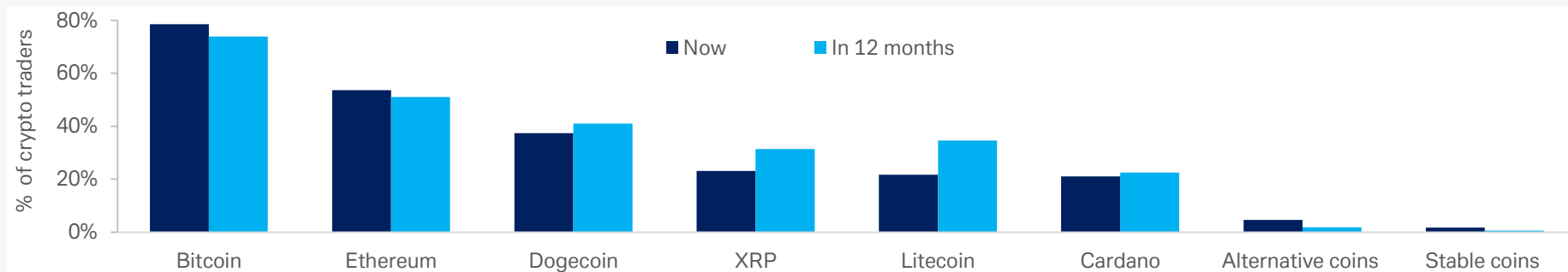
Primary reasons to trade cryptocurrencies



Methods used to trade cryptocurrencies



Cryptocurrencies currently traded

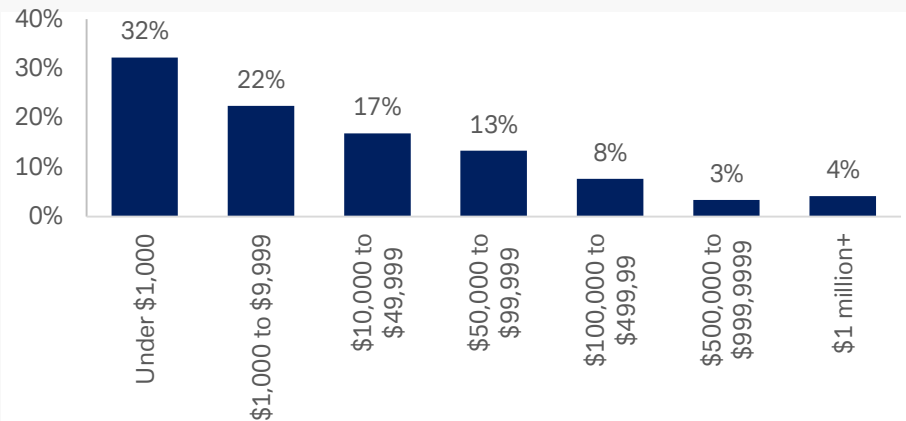


Source: Deutsche Bank dbDIG. Our proprietary survey was conducted in December 2021 in the United States with a sample of 3,200 consumers; as a % of crypto traders.

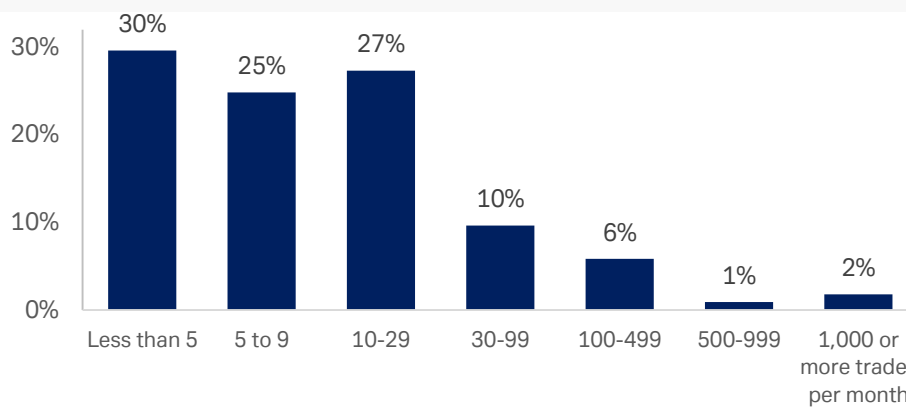


TRADERS: Very few crypto bears are active in the space

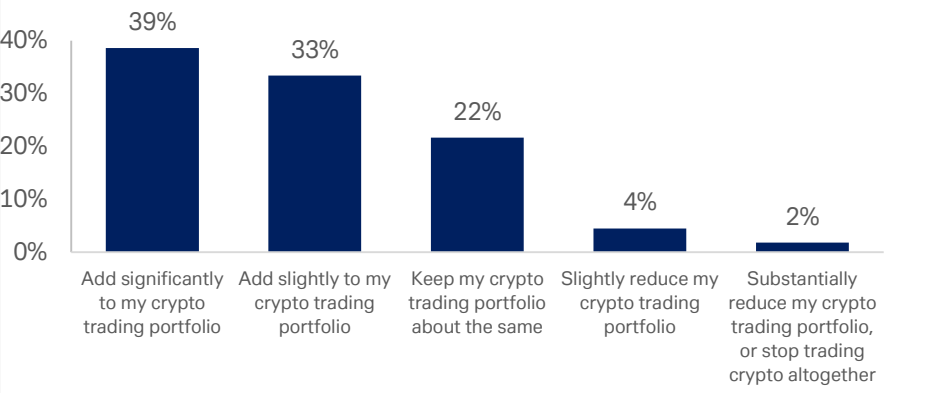
Size of crypto trading portfolio



Number of crypto trades per month



Plan to add to or reduce the size of crypto trading portfolio



Plan to increase or reduce crypto trading activity



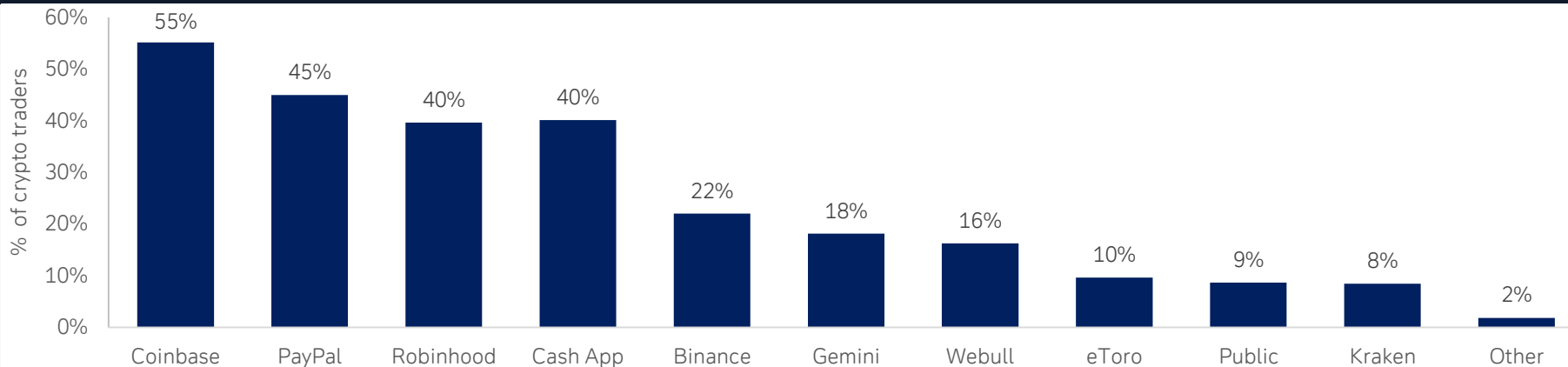
Source: Deutsche Bank dbDIG. Our proprietary survey was conducted in December 2021 in the United States with a sample of 3,200 consumers; as a % of crypto traders.



TRADERS: Only a small percentage believe crypto is a golden ticket



Platforms used/planned to be used to trade crypto



Position on crypto trading and employment



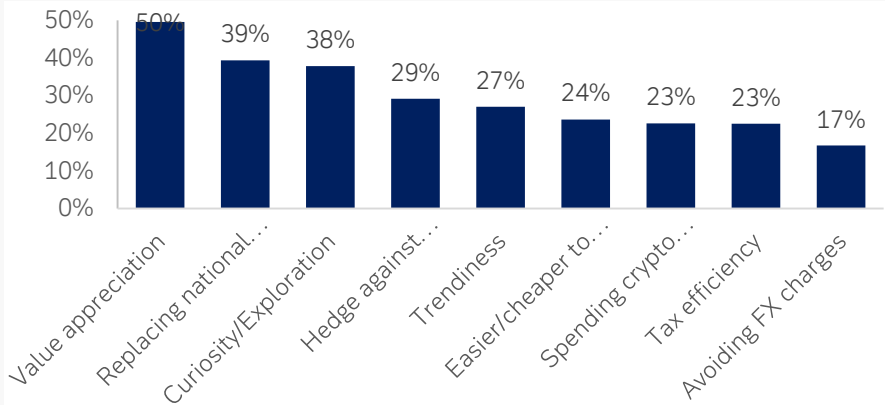
Source: Deutsche Bank dbDIG. Our proprietary survey was conducted in December 2021 in the United States with a sample of 3,200 consumers; as a % of crypto investors.



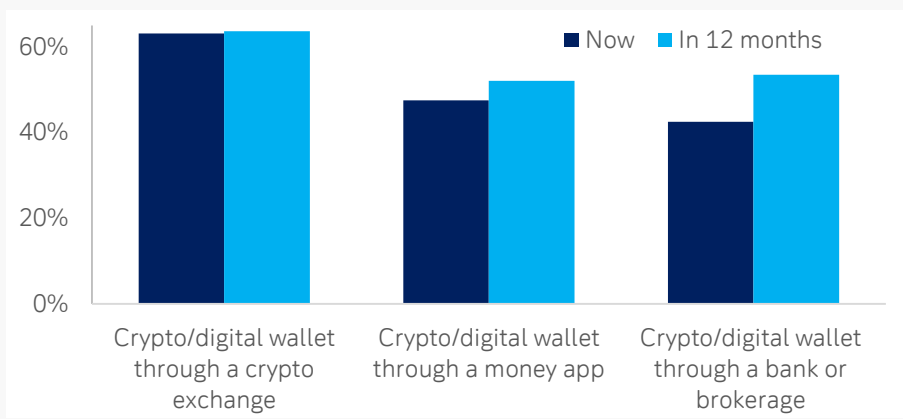
'TRANSACTORS': Most are using crypto for the same reasons as those of investors and traders



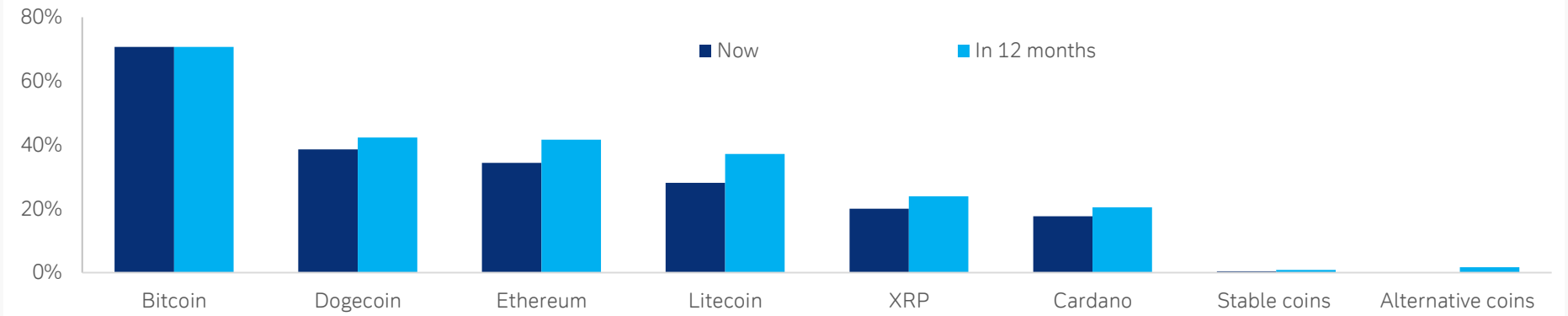
Primary reasons for transacting in cryptocurrencies



Methods currently used for crypto transactions



Cryptocurrencies used for transactions

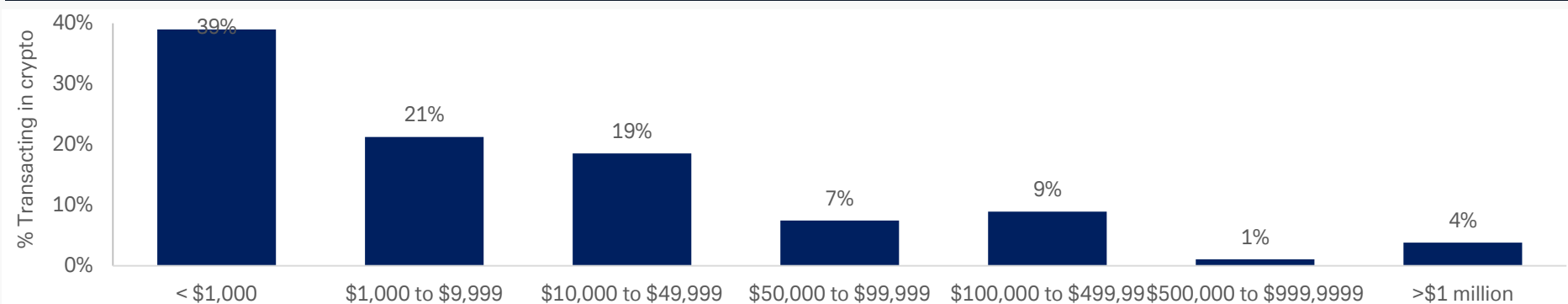


Source: Deutsche Bank dbDIG. Our proprietary survey was conducted in December 2021 in the United States with a sample of 3,200 consumers; as a % of crypto transacting users.

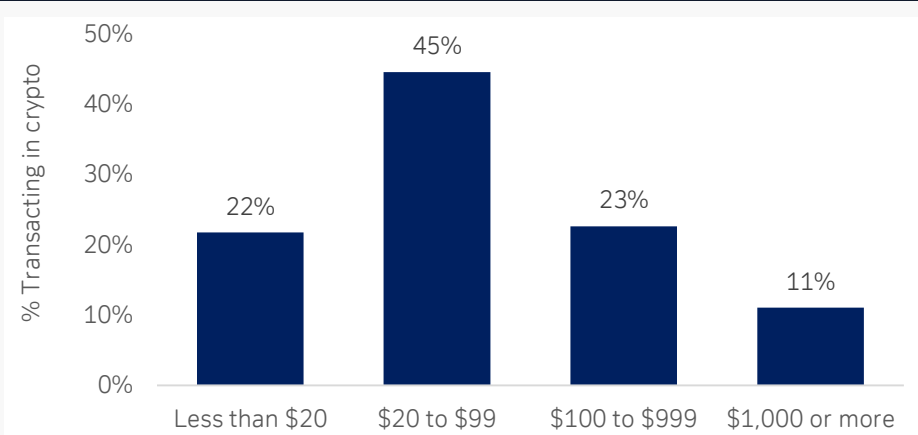


'TRANSACTORS': The number of crypto transactions remains limited, and most of them are under \$100

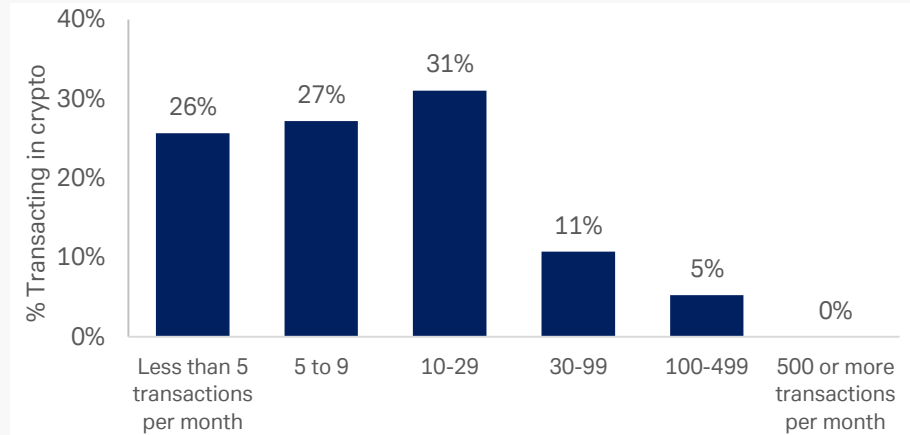
Size of crypto/digital wallet



Average value of each crypto transaction



Number of crypto transactions per month

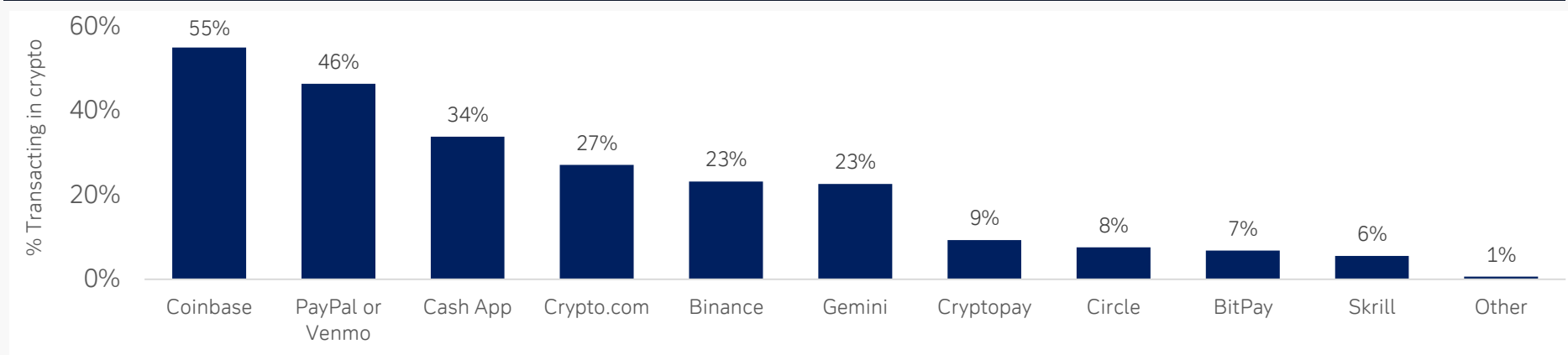


Source: Deutsche Bank dbDIG. Our proprietary survey was conducted in December 2021 in the United States with a sample of 3,200 consumers; as a % of crypto traders.

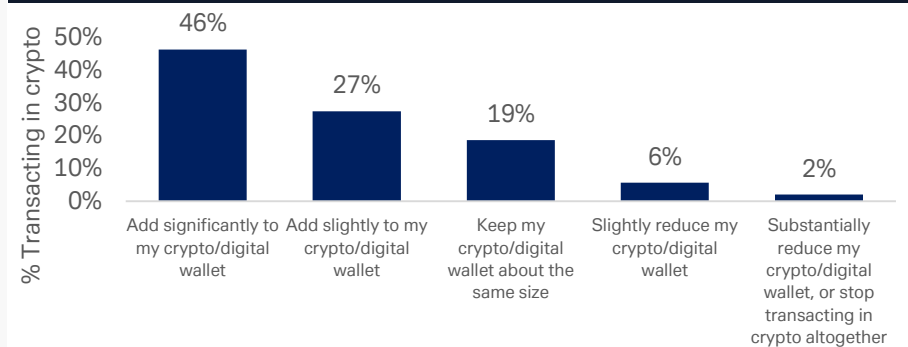


'TRANSACTORS': Over the next year, over 75% of those surveyed plan to increase their crypto transaction activity

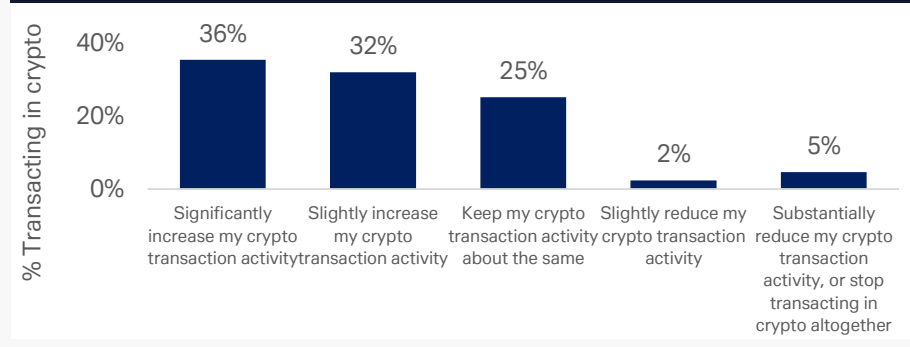
Platforms used to transact in crypto



Plan to increase/decrease the size of digital/crypto wallet during the next year



Plan to increase/decrease crypto transaction activity during the next year

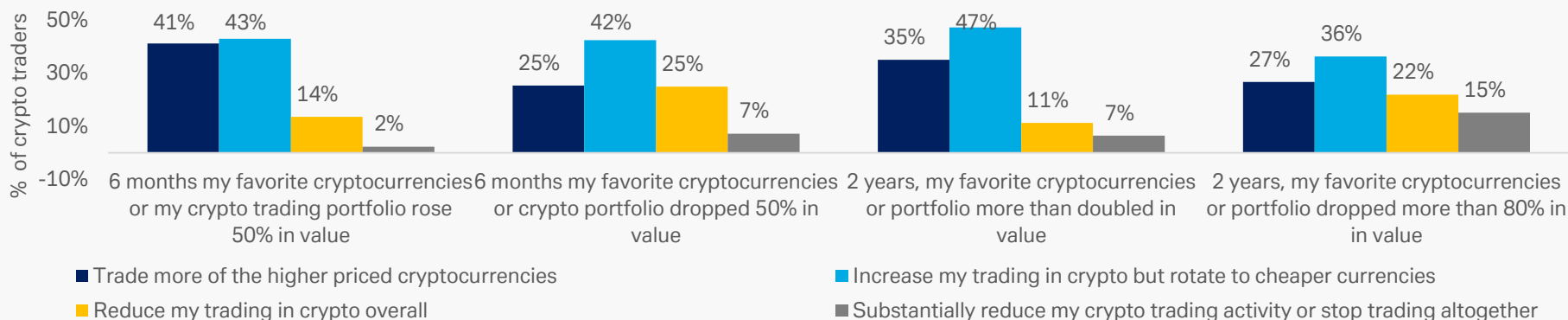


Source: Deutsche Bank dbDIG. Our proprietary survey was conducted in December 2021 in the United States with a sample of 3,200 consumers; as a % of crypto investors.

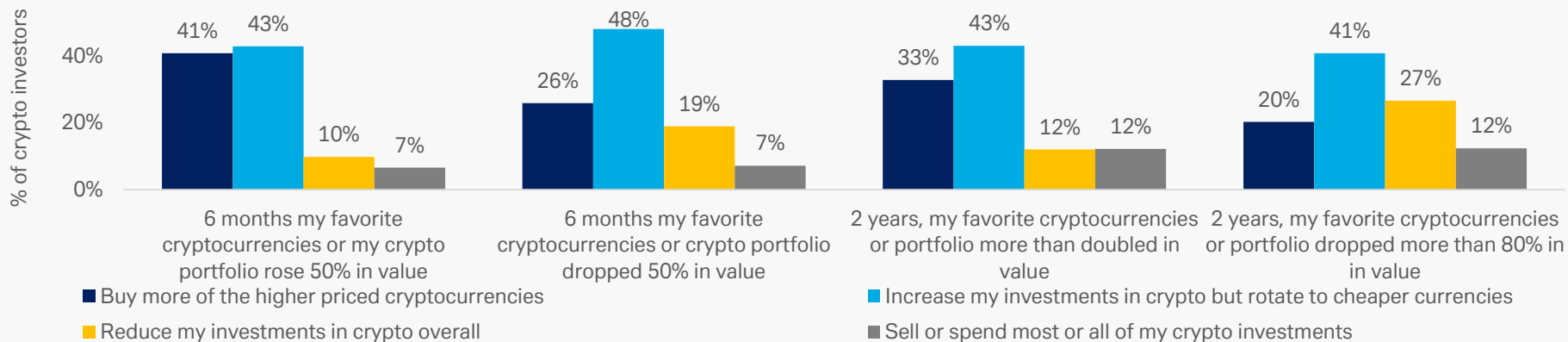


Even in an extremely bearish crypto market in which values were to drop by 80%, less than half of traders and investors would reduce their investment or exit the market

Crypto TRADERS actions taken if...



Crypto INVESTORS actions taken if...



Source: Deutsche Bank dbDIG. Our proprietary survey was conducted in December 2021 in the United States with a sample of 3,200 consumers; as a % of crypto investors and traders.



My personal conviction on the issue of stable coins is that we better be ahead of the curve. There is clearly demand out there that we have to respond to.

- Christine Lagarde, ECB President



3. When regulation becomes mainstream



Regulation is needed to protect consumers, corporates, and governments



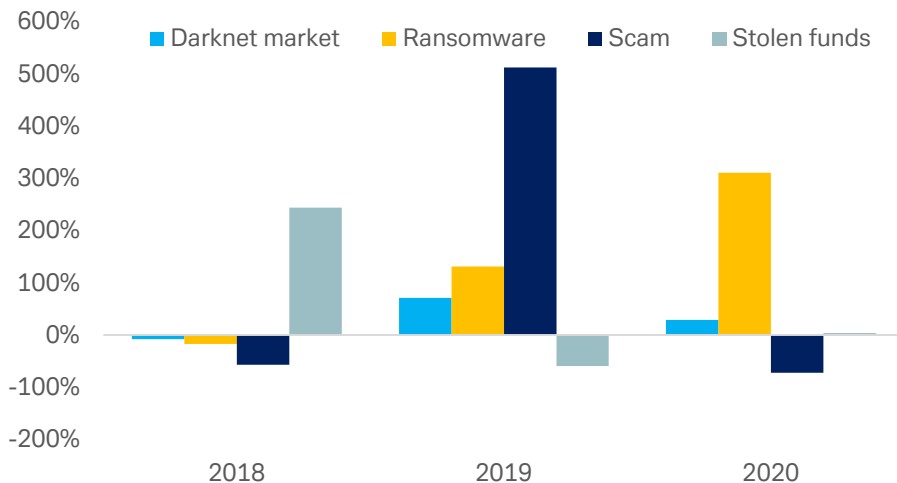
Low levels of financial literacy:

- Only one-fourth of all adults in the 38 countries that comprise the OECD responded correctly to questions about simple and compound interest together.
- Only 53% of surveyed adults achieved the minimum target score (and only 57% of individuals in OECD countries achieved this).

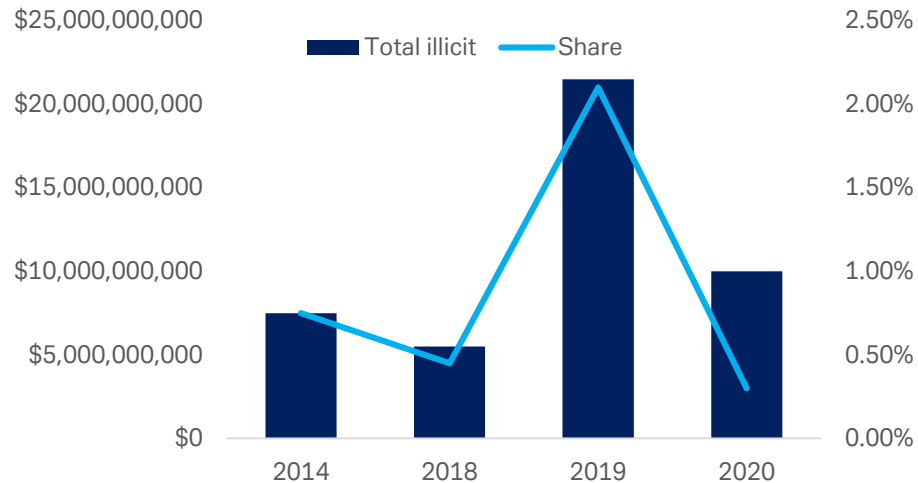
Darknet and ransomware activity has been growing steadily since 2019.

- In 2020, ransomware schemes jumped by more than 30%. Scammers received nearly \$2.5bn in 2020. These scams, which often use cryptocurrencies, remain the largest source of illicit activity in the world.

Crime categories (% increase in cryptocurrency received)









Illicit activity



Source : Chainanalysis, Deutsche Bank.

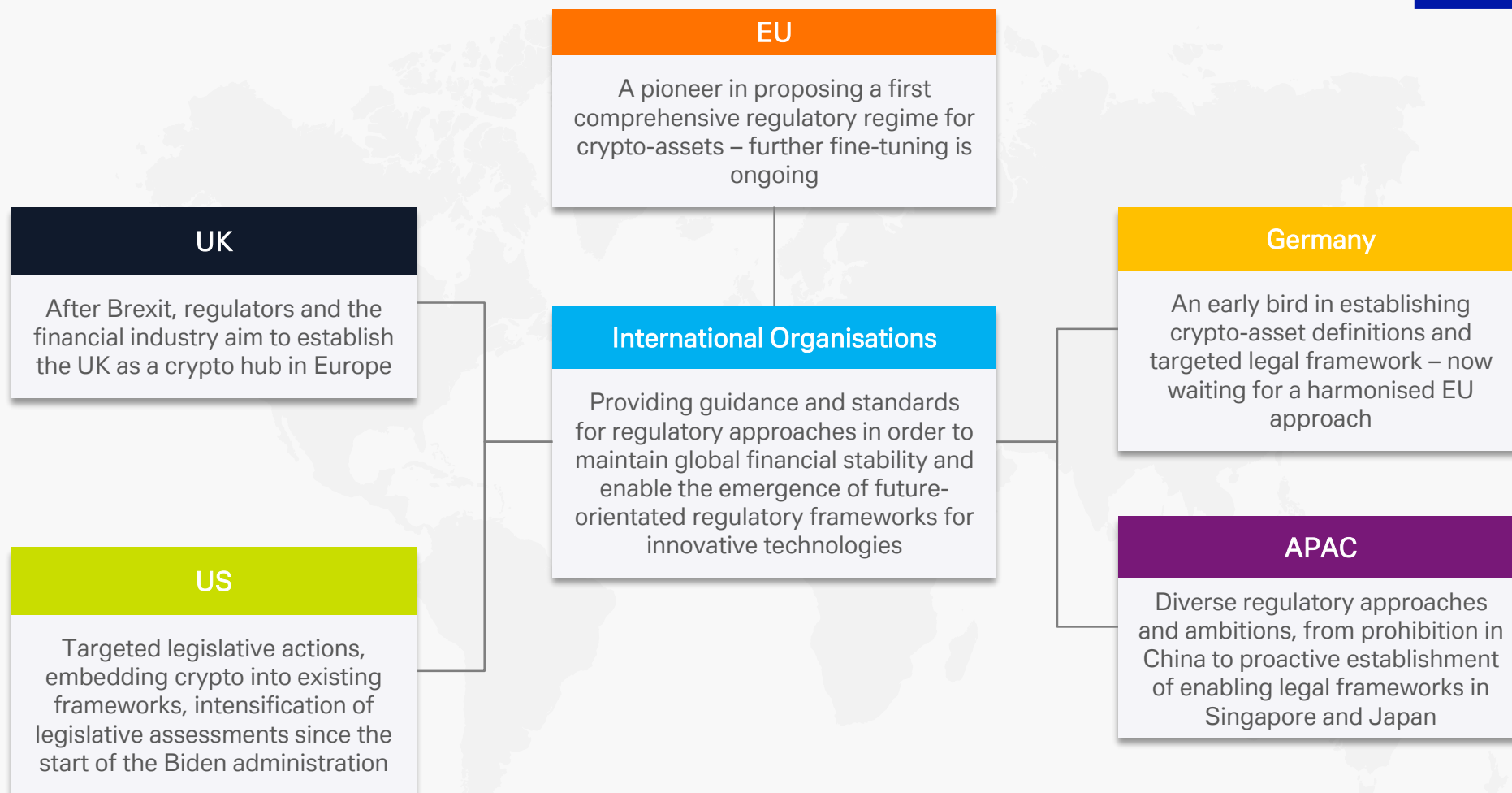
SUMMARY of the approaches, goals, timing, and general market-based criticisms of key current and forthcoming crypto asset regulations



Countries	Approach	Goal	Timing	General market based criticisms
European Union 	Regulation The first holistic regulatory approach needs fine-tuning.	The region seeks a Pan-European framework to support innovation while also promoting financial stability.	Defined as a deliverable of the EU Retail Payment Strategy, which sets out the roadmap for legislative actions until 2024. MiCAR is expected between mid-2022 and early-2023.	The proposed regulatory approach envisages a catch-all regulatory framework that may not properly address specific needs related to each crypto-asset use case. (i.e., a uniform approach is not feasible for a diversified crypto-asset ecosystem).
United Kingdom 	Regulation Regulators aim to establish the UK as a crypto hub in Europe.	UK policymakers will take a staggered approach, initially focussing on stablecoins and collecting evidence about developments that are relevant to the wider crypto ecosystem.	Legislation is expected to be published in spring of 2022.	So far, the work of developing a regulatory framework has been focussed on guidance on the basis of existing regulations, but a more comprehensive assessment can be observed since January 2021.
United States 	Regulation Progress is slow, but an acceleration can be observed under the Biden administration.	The US will initially focus on regulating cryptocurrencies within existing frameworks.	Legislative actions from Congress are still outstanding. In the interim, as part of a Presidential Working Group on Financial Markets, governmental agencies will continuously apply existing legislative powers to address various crypto-asset-related risks.	US governmental agencies follow a targeted assessment approach when defining needed legislative actions for different categories of crypto-assets and related use cases.
Japan 	Regulation	Japanese leaders aim to implement a progressive approach to crypto assets while strengthening regulatory oversight.	Regulations in Japan address the crypto-asset industry since 2017 (e.g., via amendments to the Payment Services Act). Most recently, AML regulations came into effect in early 2021. In April 2022, the travel rule will be enforced, and a proposal for regulations on decentralised finance can be expected in the summer.	So far, Japan's approach to regulation has not prevented security breaches nor financial crime.
China 	A government ban on private cryptocurrencies	The government aims to maintain complete control over the financial system	The People's Bank of China (PBoC) banned cryptocurrencies in September 2021	Due to uniform regulations, there is a lack of flexibility to tailor rules to diverse crypto innovations.
India 	India is moving from strictly banning cryptocurrencies to establishing strict regulations.	The government aims to prohibit all private crypto-currencies but introduce certain exceptions in order to enable use cases based on the underlying technology of crypto-assets.	India's new regulation on crypto-assets should be finalised in late 2021 or early 2022, with further legal initiatives expected to follow.	The government is viewed as over-regulating crypto-assets and being slow to assess the opportunities of cryptocurrencies.

Source: [Future Payments - Cryptocurrencies: When regulation becomes mainstream](#)

Key regulatory developments – Global landscape



Source: Deutsche Bank.

International Standard Setting Bodies (SSB): Providing guidance and standards for regulatory approaches



Note: non-exhaustive, focus on Core Global Regulators as per appendix + key regions

Draft status / Proposal

Final Rule

Organisation	Regulation	Focus / Description	(Expected) Effective Date
BIS / CPMI / IOSCO	Supervisory Standards for stable coins	<u>Focus:</u> stablecoins – value tied to an asset or basket of assets <u>Description:</u> consultation on the application of Principles for Financial Market Infrastructures to novel features of stablecoin arrangements.	H1 2022
BIS / BSBC	Prudential Treatment of Crypto-Assets	<u>Focus:</u> prudential regulatory treatment of crypto-assets in general <u>Description:</u> defining the features/risks of crypto-assets for the design of prudential treatment of crypto-asset exposures, as well as general guiding principles and considerations (incl. capital and liquidity requirements).	H1 2022
FATF	Guidance for Risk-Based Approach to Virtual Assets	<u>Focus:</u> virtual assets and virtual asset service providers <u>Description:</u> guidance for national competent authorities to address money laundering and terrorist financing issues, key definitions of scope and risks resulting from virtual assets, application of existing FATF recommendation on virtual assets, best practices.	November 2021
International Monetary Fund (IMF)	Working Paper – Legal Aspects of CBDC	<u>Focus:</u> central bank digital currencies (CBDC) <u>Description:</u> detailing legal aspects of CBDC for central banks, assessing if legal frameworks allow for CBDC, monetary law considerations.	November 2020
BIS	Working Paper Stablecoins: risks, potential and regulation	<u>Focus:</u> stablecoins – value tied to a fiat currency or other asset <u>Description:</u> regulatory approaches to consider differences between existing stablecoins vs. planned global stablecoins, embedded supervision, efficiencies of stablecoins vs. CBDC and instant payments.	November 2020
BIS / 7 Central Banks	Central Bank Digital Currencies – joint report	<u>Focus:</u> central bank digital currencies (CBDC) <u>Description:</u> a report of a group of seven central banks and the BIS to define foundational principles and core features for the issuance of CBDC (incl. aspects of monetary / financial stability, coexistence with other forms of money, innovation, and efficiency).	October 2020
Financial Stability Board (FSB)	Recommendations on the Regulation, Supervision & Oversight of stablecoins	<u>Focus:</u> stablecoins – value tied to a fiat currency or other asset <u>Description:</u> recommendations addressed to authorities for the regulation, supervision, and oversight of so-called global stablecoin arrangements and stablecoins, in general, that may pose a risk to financial stability.	October 2020 (annual progress report thereafter)

Source: Deutsche Bank, Crypto-Assets – Key Regulatory Developments, January 2022, Katharina Paust-Bokreuz, various national and international websites.

US: Progress acceleration expected under the Biden administration



Note: non-exhaustive, focus on Core Global Regulators as per appendix + key regions

Organisation	Regulation	Focus / Description	Draft status / Proposal	Final Rule
			(Expected) Effective Date	
Securities and Exchange Commission (SEC)	Guidance & Interpretive Letters	<u>Focus:</u> digital assets deemed a “security” and Decentralised Finance (DeFi) <u>Description:</u> little formal action taken; instead various guidances and letters have been issued to help market participants assess whether their asset qualifies as a security. Action this year is expected to focus on investor protections.		On-going
Commodity Futures Trading Commission (CFTC)	Guidance	<u>Focus:</u> digital assets derivatives markets <u>Description:</u> clarification of existing rules for the digital asset ecosystem, such as what constitutes “actual delivery” for digital assets. The primary focus has been on exchanges and novel derivatives contracts that reference digital asset markets.		Since 2017
Financial Crimes Enforcement Network (FinCEN)	Guidance on Bank Secrecy Act (BSA)	<u>Focus:</u> virtual currency exchanges, administrators of a centralised repository of virtual currency <u>Description:</u> under the BSA, it defines these actors as regulated money transmitters, which are obliged to adhere to relevant AML controls and procedures (incl. the FATF travel rule). Continued consultative process to adjust the current regime.		Since March 2013
Office of the Comptroller of the Currency (OCC)	Interpretive Letters & Guidances	<u>Focus:</u> cryptocurrencies and stablecoins for payment purposes <u>Description:</u> clarifications for banks regarding custody of cryptocurrencies and stablecoins and related activities. The most recent interpretive letter permits banks to use new technologies and stablecoins to facility payment transactions.		Since May 2020
Presidency Working Group (Fed, FDIC, OCC, SEC, CFTC)	Report on Stablecoins	<u>Focus:</u> payment stablecoins, which maintain value relative to a fiat currency <u>Description:</u> assessment of risks, identification of key gaps in US authority’s oversight procedures, and recommendation of legislative actions to address the gaps.		November 2021
SEC / CFTC	Enforcement & alert actions	<u>Focus:</u> Initial Coin Offerings (ICOs), unregistered securities, fraudulent activities <u>Description:</u> numerous actions and litigation to enforce existing regulations, typically under antifraud provisions and registrations of broker-dealers, investment advisers, exchanges, and transfer agents.		Since 2019

Source: Deutsche Bank, Crypto-Assets –Key Regulatory Developments, January 2022, Katharina Paust-Bokreziou, various national and international websites.

EU: A first holistic regulatory approach that needs fine-tuning

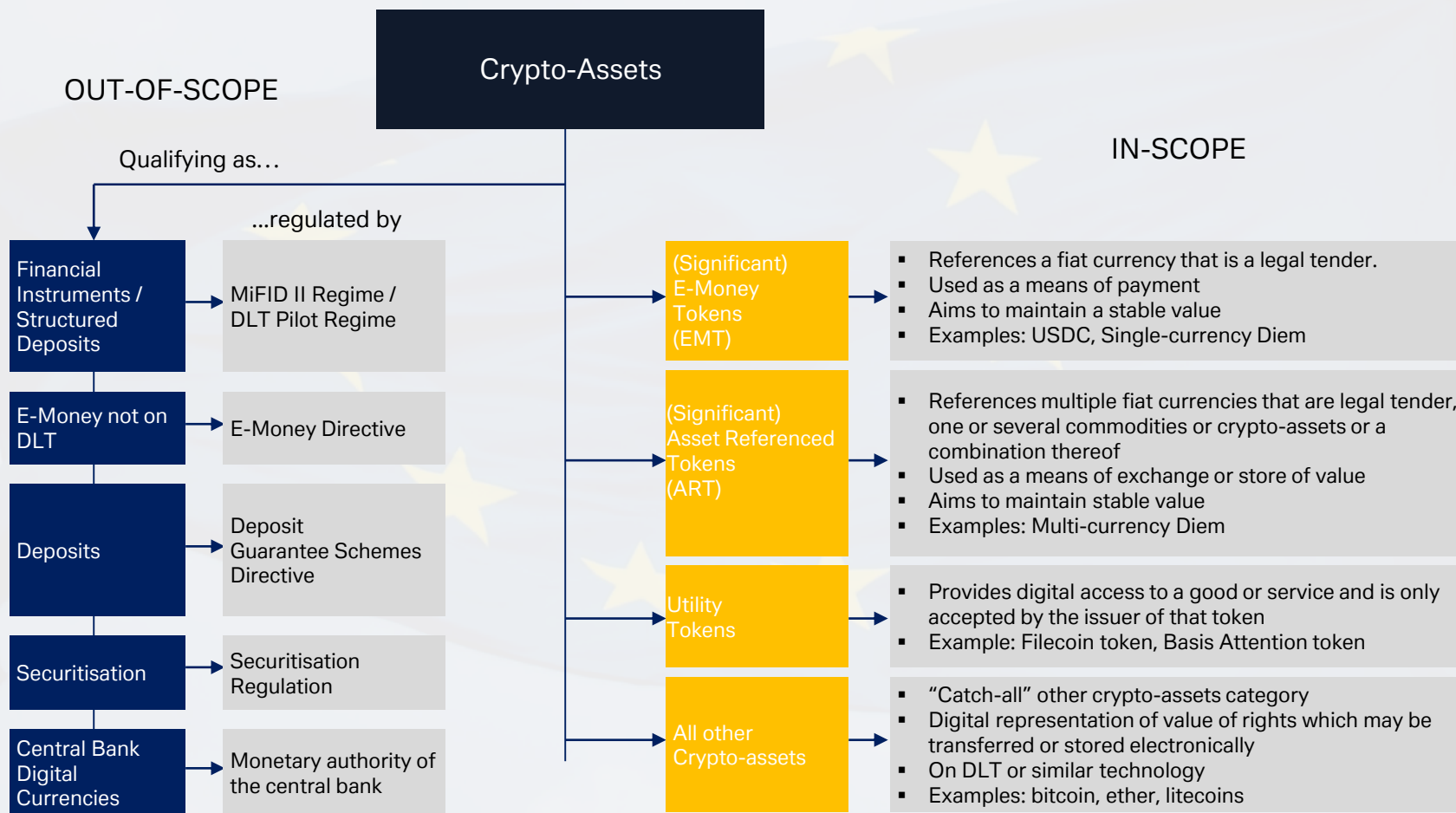


Note: non-exhaustive, focus on Core Global Regulators as per appendix + key regions

Organisation	Regulation	Focus / Description	Draft status / Proposal	Final Rule
				(Expected) Effective Date
EU Commission	DLT Pilot Regime	<u>Focus:</u> crypto-assets that qualify as financial instruments <u>Description:</u> a sandbox-like regulatory regime for DLT-based financial market infrastructures for crypto-assets that qualify as financial instruments. Definition of legal conditions for experimentation of the issuance of DLT-based securities tokens.		Q1 2022 (earliest)
EU Commission	Markets in Crypto-Assets Regulation (MiCAR)	<u>Focus:</u> all crypto-assets that do not qualify as financial instruments <u>Description:</u> comprehensive regulation for crypto-assets not covered by existing EU legislation: harmonising national regulations in EU member states, definition of crypto-assets, definition of issuers and service providers, authorisation and supervisory framework, control and operational resilience obligations, offering and marketing rules, prevention of market abuse.		Mid-2022 (earliest)
EU Commission	EU Travel Rule & AML Package	<u>Focus:</u> crypto-assets as defined in MiCAR <u>Description:</u> proposal for EU-wide adoption of the FATF travel rule on crypto-assets and review of existing AML rules for crypto-assets, full alignment of definitions with MiCAR.		Mid-2022 (for Travel Rule only)
EU Commission	MiFID II Regime - Amendments	<u>Focus:</u> crypto-assets that qualify as Financial Instruments <u>Description:</u> clarifying amendments to the existing MiFIDII regime, including supervisory guidance to provide legal certainty for crypto-assets qualifying as financial instruments (DLT-based securities tokens). Results from the DLT Pilot Regime phase will feed into these amendments.		End of 2022 (earliest)
EU Commission	5th Anti-Money Laundering Directive (AMLD5)	<u>Focus:</u> virtual assets that can be digitally traded or transferred / custodian wallet providers / virtual asset service providers <u>Description:</u> introduced a legal definition of virtual assets and virtual asset service providers (VASPs), VASPs registration required, and VASPs defined as obliged entities for AML/CFT controls.		January 2020
European Supervisory Authorities	Supervisory alerts and guidance	<u>Focus:</u> Initial Coin Offerings (ICOs) and crypto-currencies <u>Description:</u> provides supervisory guidance for investors and service providers within the framework of existing regulatory regimes, advising the EU Commission on developments and concerns in relation to the emergence of the crypto-asset ecosystem.		Since 2013 (frequent publications)

Source: Deutsche Bank, Crypto-Assets – Key Regulatory Developments, January 2022, Katharina Paust-Bokreziou, various national and international websites.

EU: Proposal for “Catch-All” Regulation – bringing all crypto-assets in scope that are not covered by an existing regulatory framework



Source: Deutsche Bank, *Crypto-Assets – Key Regulatory Developments*, November 2021, Katharina Paust-Bokreziun, various national and international websites.

Germany: Early bird – now waiting for a harmonised EU approach



			Draft status / Proposal	Final Rule
Organisation	Regulation	Focus / Description	Status	(Expected) Effective Date
Ministry of Finance	German Travel Rule	<u>Focus:</u> crypto-assets as defined in the KWG §1 (11) <u>Description:</u> national adoption of the FATF travel rule (Recommendation 16) on crypto-assets – to be replaced by EU Regulation (see EU-slide)	Final	Oct 2021
Ministry of Finance	Law on electronic securities (eWpG)	<u>Focus:</u> crypto-assets that qualify as bearer bonds and bearer investment fund units <u>Description:</u> enables the use of innovative technology - e.g., DLT for issuance and trading of electronic securities, adjusts legal framework so that electronic certificates, recording and registration of securities is possible, equates electronic securities with regular securities that are represented by a global certificate.	Final	May 2021
Ministry of Finance	German Banking Act (KWG)	<u>Focus:</u> crypto-assets that qualify as financial instruments <u>Description:</u> transposed the AMLD5, legal definition of crypto-assets (Kryptowerte), registration requirements for crypto-asset custodians	Final	Jan 2020
BaFin	Bulletin / Guidance on crypto-custody	<u>Focus:</u> initially on cryptocurrencies like Bitcoin, later including crypto-assets as defined in the KWG <u>Description:</u> supervisory practice and guidance in response to the emergence of crypto-assets, and complementary to the German Banking Act.	Final	Since 2011 frequent publications
Ministry of Economics / Ministry of Finance	Blockchain Strategy for the German Government	<u>Focus:</u> wider framework for a tokenised economy <u>Description:</u> a comprehensive blockchain strategy that: i) aims to retain stability of the financial sector, ii) enables innovation through sandboxing, iii) establishes legal foundations, iv) explores technology usage in the public sector, and v) enables education of the wider public.	Final	Sept 2019

Note: non-exhaustive, focus on Core Global Regulators as per appendix + key regions

Source: Deutsche Bank, Crypto-Assets – Key Regulatory Developments, January 2022, Katharina Paust-Bokreziou, various national and international websites.

UK: Regulators aim to establish the UK as a crypto-hub in Europe



Note: non-exhaustive, focus on Core Global Regulators as per appendix + key regions

Draft status / Proposal

Final Rule

Organisation	Regulation	Focus / Description	(Expected) Effective Date
HM Treasury	Regulatory Approach to Crypto-Assets	<u>Focus:</u> security tokens, e-money, and unregulated tokens <u>Description:</u> the first stage of a consultative process on the broader regulatory approach to crypto-assets and stablecoins, and a call for evidence on DLT-based financial markets (DeFi).	Q1 2022
HM Treasury	UK Travel Rule	<u>Focus:</u> crypto-asset exchanges and service providers <u>Description:</u> amendments to the 2017 Money Laundering, Terrorist Financing and Transfer of Funds (Information on the Payer) Regulations, in line with FATF Recommendation 16	Mid-2022 (earliest)
HM Treasury / Financial Conduct Authority (FCA)	Crypto-asset promotion	<u>Focus:</u> promotion rules for all types of crypto-assets <u>Description:</u> bring certain crypto-assets which are deemed unregulated in terms of promotion into the scope of financial promotions regulations.	Q3 2022
Financial Conduct Authority (FCA)	Supervisory ban on certain crypto-based products	<u>Focus:</u> crypto-based products for retail investors <u>Description:</u> ban on the sale, marketing, and distribution of certain crypto-based products for retail investors.	January 2021
Financial Conduct Authority (FCA)	AML / CTF regime	<u>Focus:</u> virtual assets that can be digitally traded or transferred / custodian wallet providers / virtual asset service providers <u>Description:</u> transposition of AMLD5, with the FCA as the supervisory authority.	January 2020
Financial Conduct Authority (FCA)	Guidance on Crypto-Assets	<u>Focus:</u> security tokens, e-money, and unregulated tokens <u>Description:</u> clarification of regulatory perimeters for participants of the crypto-asset market engaged in issuance, marketing, buying/selling, advising, and trading.	July 2019

Source: Deutsche Bank, Crypto-Assets – Key Regulatory Developments, January 2022, Katharina Paust-Bokreziou, various national and international websites.

APAC: Drivers, regulatory approaches, & ambitions – key markets



Draft status / Proposal

Final Rule

Organisation	Regulation	Focus / Description	(Expected) Effective Date
Hong Kong Securities and Futures Commission (SFC)	Virtual Assets (VA) Exchanges Regulatory Regime	<u>Focus:</u> virtual assets as per FATF definition <u>Description:</u> expand existing regulatory regime operators of VA exchanges to enhance anti-money laundering and counter-terrorist financing (AML/CTF) regulations, in line with FATF recommendations.	Q1 2022
Hong Kong Monetary Authority (HKMA)	Regulatory Regime for crypto-assets & stablecoins	<u>Focus:</u> crypto-assets and stablecoins for payment purposes <u>Description:</u> on-going assessment in a public discussion paper of the adequacy of existing regulation for payment-related stablecoins which are deemed to have a higher possibility of becoming widely accepted as means of payment.	Q3 2022
Government of China	Tightening prohibition of crypto-asset	<u>Focus:</u> all types of crypto-assets <u>Description:</u> the digital Yuan is intended to be the only digital currency to be used in China. Prohibition of crypto-asset trading and mining activities. All crypto-asset services are illegal activities. Prohibiting mainland citizens from passing overseas exchanges to conduct related transactions. Prohibiting financial institutions and non-bank payment institutions from contracting with and servicing crypto-asset-related businesses.	Since Sept 2021
Monetary Authority of Singapore (MAS)	Payment Services Act (PSA)	<u>Focus:</u> digital payment tokens (DPT) <u>Description:</u> after numerous supervisory warnings/alerts, the MAS introduced enabling requirements and expanded rules for entities facilitating transmission, exchange, or storage of DPT to bring the sector into regulated frameworks (incl. FATF travel rule) – objective: to establish Singapore as a crypto hub in APAC	January 2021
Hong Kong Securities and Futures Commission (SFC)	Regulatory Sandbox Framework for crypto exchanges	<u>Focus:</u> regulatory experimenting with crypto exchanges <u>Description:</u> a sandbox approach which allows crypto exchange platforms to voluntary opt-in to licensing arrangements so that the SFC can determine how best to regulate this emerging space in order to enable innovation and manage risk.	November 2018
Financial Services Agency (FSA) of Japan	Licensing & Regulatory Regime for crypto-currencies	<u>Focus:</u> crypto-currency <u>Description:</u> intense licensing and regulatory regime focussed on supervision of cryptocurrency-exchanges. Establishment of a crypto-currency self-regulatory organisation in order to develop a set of regulatory standards and rules.	Since April 2017

Source: Deutsche Bank, Crypto-Assets – Key Regulatory Developments, January 2022, Katharina Paust-Bokreziou, various national and international websites.

Note: non-exhaustive, focus on Core Global Regulators as per appendix + key regions

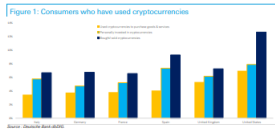
Strategy
Future Payments

Bitcoin: A Payment Method? Not Yet!

Over the weekend, Bitcoin got its biggest upgrade in four years. Will the improvements promised by the Taproot upgrade (which went live this weekend) and the Lightning Network be enough to move Bitcoin from a speculative asset to a universal payment method?

Bitcoin is seen as a relevant solution to the current weaknesses of cross border and instant payments, one that is also independent of political powers. But so far, its extreme volatility, high transaction costs, and its troubling carbon footprint have been major obstacles to its widespread use for payments.

In 2021, Bitcoin transactions nearly tripled. El Salvador even became the first country to adopt Bitcoin as legal tender in September. But the overall share of Bitcoin payments is still very limited. According to our exclusive survey, approximately 60% of those who hold the cryptocurrency have used it to purchase goods and services. In other words, between 7% and 7% of consumers have used Bitcoin as a means of payment over the past three months. In volume, this represents less than 2% of all the Bitcoin transactions.



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Strategy
Future Payments

Cryptocurrencies: When regulation becomes mainstream

- Over the past few weeks, regulatory activities around cryptocurrencies have made major headlines. In September, China decided to ban private cryptocurrencies. On September 30, at a congressional hearing, Federal Reserve Chair Jerome Powell said he had "no intention" of banning cryptocurrencies. Last week, US regulators cleared the path for investors to trade physically backed cryptocurrency exchange-traded funds (ETFs) and Bitcoin touched a record high of \$66,875 last Wednesday.
- This year has been a regulatory game changer. Policymakers in most advanced economies are laying the foundations for the strong regulatory frameworks that will likely be implemented starting in early 2022. With clearer regulation of private cryptocurrencies, we expect to see increased adoption rates and more price stability within the next two or three years.
- In this article, we summarize the approach, goal, timing, and general market based criticisms of the key current and forthcoming crypto asset regulations in the US, European Union, UK, China, India and Japan.

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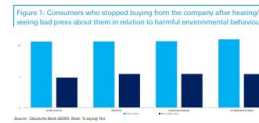
Strategy
Future Payments

Decarbonizing Crypto: In Search of Sustainability

In May 2021, Elon Musk criticized Bitcoin for its massive energy consumption, which requires heavy reliance on fossil fuels. He has a point. Mining just one bitcoin consumes a larger carbon footprint than nearly two billion Visa transactions. Data shows that 70% of Bitcoin's global energy consumption is generated from non-renewable sources such as coal.

Bitcoin's market cap grew from \$70 billion to over \$1 trillion between November 2018 and November 2021. During that period, its annual global energy consumption increased nearly four times, to over 200 terawatt hours (TWh).

Although Bitcoin's environmental impact was barely mentioned at the COP26 in November 2021, this remains a key issue for crypto users. According to our exclusive survey, crypto users are far more attuned to the environment. Over 53% of crypto users have stopped buying from the company after hearing or seeing bad press in relation to harmful environmental behaviour. And almost twice the number of crypto users would be prepared to pay for various goods and services if the company was claiming to address climate change.



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Latest research

Strategy
Future Payments

Bitcoin vs. Ethereum: "Digital Gold" vs. "Digital Silver"?

- At a Congressional hearing last Thursday, Federal Reserve Chair Jerome Powell said he had "no intention" of banning cryptocurrencies. Following the announcement, Bitcoin price surged on October 1 and this morning has been trading over \$50,000. If we look at the big picture, bitcoin prices have risen by nearly 70% since the beginning of the year.
- Again, nothing new here. What happened over the last few days is an illustration of what we have said many times: (i) Bitcoin is here to stay but will remain ultra-volatile; (ii) regulators will crack down.
- Ethereum is big and significantly different than Bitcoin. Both have room to coexist. Think about Bitcoin as "digital gold" and Ethereum as "digital silver". Silver is cheaper than gold, because there is more supply, but it is still a rare precious metal with an industrial use.
- Gold does not mean untouchable. History reminds us that nothing is impossible. In 1933, then-President Franklin Roosevelt signed Executive Order 6102, which forbade "the hoarding of gold coin, gold bullion, and gold certificates within the continental United States."

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Strategy
Future Payments

CBDCs: Ideas are easy but . . . execution is everything

- Last week, the German Banking Industry Committee published a report (tagged) arguing in favour of a digital euro. While there are good reasons to issue a digital euro, the biggest challenge remains execution.
- Yesterday, after a consultation process earlier this year (tagged), the ECB Governing Council agreed to move to the two-year "investigation phase" of developing its central bank digital currency (CBDC). Assuming all goes well, it will take another three years to issue the digital euro.
- Advanced economies must overcome two barriers for populations to adopt digital currencies: lower interest rates and cultural/inertia norms.
- This article also presents the updated job of July status of central bank digital currency projects (both retail and wholesale) around the world.

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The Future of Payments: Series 2
Part III. Bitcoins: Can the Tinkerbell Effect Become a Self-Fulfilling Prophecy?
#PositiveImpact
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Appendix 1

Important Disclosures

*Other information available upon request



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