

Digital Assets Update 4Q25: Quantum Risks and Market Shifts

Currencies/monetary policy/economics/digital/banking/finance

Group Research

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This is our quarterly update on digital assets. Please refer to the end of this article for a set of useful resources and links to past publications

Summary

Heightened volatility, risk-off sentiment, deepening interest in stablecoins, and quantum computing advances characterize the digital asset world as 2025 draws near conclusion.

Main points

Crypto markets have seen a sell-off since October, with sentiment impacted by large liquidations and weakness in tech stocks

A possible exclusion of listed digital asset treasury companies from equity indices could also restrain buying impetus

Recent advances in quantum computing have renewed longer-term concerns over cryptos, but mitigation efforts could accelerate

Collateralization of cryptos by established banks may raise liquidity, premiums, and utility, but also brings volatility

Tokenized money, including CBDCs, tokenized deposits, and stablecoins, are under active discussion

Introduction

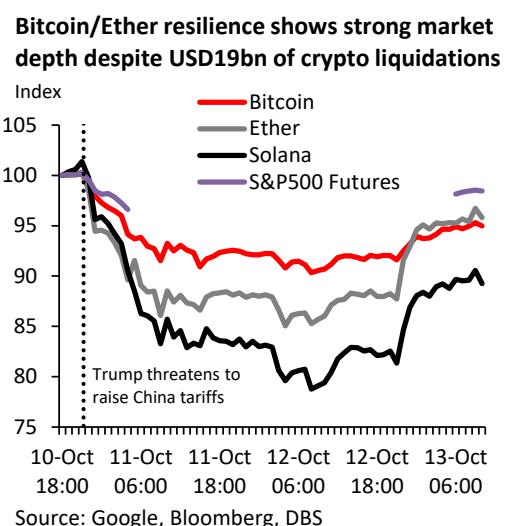
Mirroring the year's geoeconomic volatility, digital assets have also been undergoing torrid swings. Risk-off for conventional financial assets tends to imply risk off for digital assets, as seen in the price developments in the last few months. We delve into related market developments in this report in depth.

Recent advances in quantum computing have renewed longer-term concerns over cryptos. We examine basic concepts, recent developments, and implications.

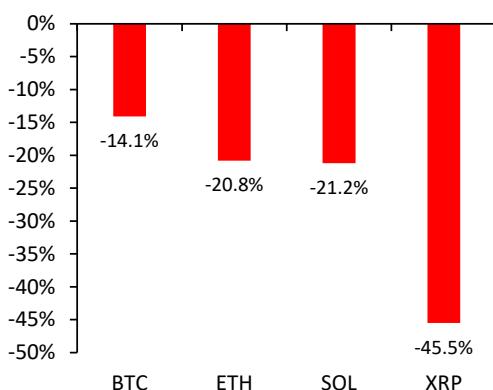
Stablecoins, energised by the US government's [Genius Act](#), have caught the attention of policy makers and private sector around the world. We focus on the stablecoin ecosystem and various country initiatives in Asia. We also cover latest developments with respect of central bank digital currencies.

Crypto market shifts

Crypto market sentiment has softened markedly since 10 October, when global markets were hit by Trump's threats to impose an additional 100% tariff on Chinese imports. Crypto prices fell sharply in response to the announcement, triggering over USD19bn of position liquidations in crypto markets. This marks the largest single-day flush on record, with over USD4.6bn of BTC longs (0.2% of market cap) and USD3.8bn of ETH longs (0.8% of market cap) closed out. All other crypto tokens also saw liquidations that were almost as large as that for BTC and ETH combined, and their impact on altcoin prices was significantly larger, with liquidity also disappearing.

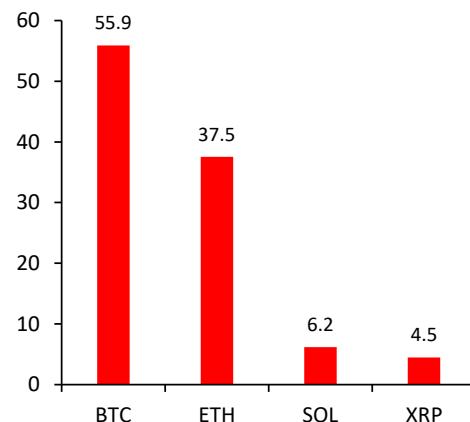


**Maximum single day price decline on 10 Oct
(based on lowest intraday price)**



Source: CoinMarketCap, DBS

24h trading volume on 10 Oct (USD bn)



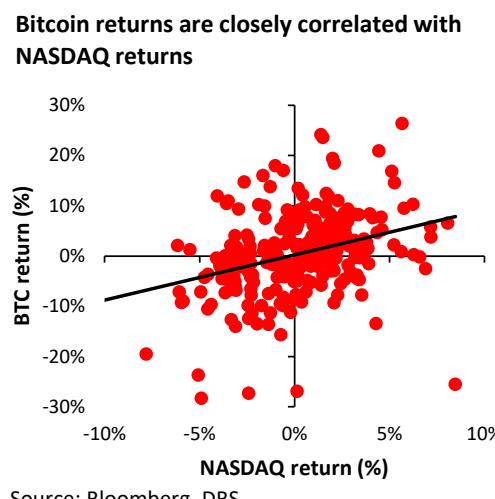
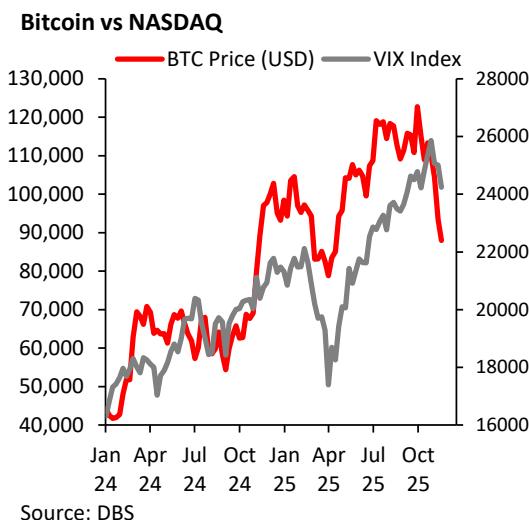
Source: CryptoSlate, DBS

Immediately after the 10/10 wave of crypto liquidations, BTC and ETH saw drawdowns of 14.1% and 20.8% smaller than drawdowns in many altcoins. Strikingly, both BTC and ETH were also able to recover and narrow the gap with S&P500 futures after the weekend. This underscores a greater resilience for Bitcoin and Ether than previously appreciated, reflecting their deeper liquidity and higher institutional interest in the crypto eco-system.

Post 10/10, while crypto prices initially stabilised and began recovering in late Oct, crypto markets entered a second round of correction in Nov, tracking the broader decline in tech stocks as the NASDAQ fell 7% from its late Oct peak. From an all-time high of USD126k on 6 Oct, BTC has since fallen to USD114k in late Oct, before entering into a bear market and dipping to USD85k level in late Nov. Ether (ETH) also followed a similar path, easing from near-record levels around USD4.8k towards USD3.8k in late Oct, before declining to USD2.8k, and marking a >40% correction from its peak.

A flaring of market risks

What are the factors that had led to a sustained correction in crypto markets? Beyond the shock of the 10/10 liquidations, there were subsequent developments that deepened crypto negativity. **One key factor is a sell-off in tech stocks** that started in November. Investors are turning skittish on tech sector valuations due to a jump in capital commitments funded by borrowings, with US tech firms having issued over USD170bn of bonds year-to-date in Nov 2025, almost double of their 2023 full year issuance. Given high correlations between tech stocks and cryptos, this had dented crypto sentiment.



Adding to concerns are new risks of digital asset treasury companies (DATCOs) being excluded from equity indices. A proliferation of listed companies leveraging their balance sheets to acquire crypto assets have raised questions on whether these companies should be considered as investment funds, which are not eligible for index inclusion. On 10 October, MSCI had announced that it will extend an ongoing consultation on the eligibility of DATCOs for its Global Investable Market Indexes, with classification rules possibly based on a 50% asset threshold, or a company's own definition as a DATCO, or on capital raising primarily to accumulate digital assets (see [MSCI](#)). The consultation will end on 31 Dec, with the conclusion announced by 15 Jan 2026. MSCI has also published a list of 39 listed companies that could be affected by the proposed rule change on eligibility, with 20 currently included in its indices.

Given the size of passive funds tracking MSCI indices, future index exclusion will see funds getting reallocated out of DATCOs, which should weigh on their market valuations to some extent. **A fall in DATCOs' valuations compared to the value of their assets may reduce their ability to accumulate digital assets** or even lead to sales of digital assets to fund share buybacks. Markets have already responded to these risks. The EV-to-BTC NAV multiplier of one of the largest Bitcoin Treasury companies has fallen sharply from around 2 in June to just slightly above 1.1 as of late Nov. More broadly, DATCOs have seen their valuation premiums over their digital asset holdings shrinking or reversing into a discount.

While both market factors posed headwinds, they cannot fully explain the sharp decline in crypto prices of late. On a percentage return basis, the declines in BTC (~ -20%) and ETH (~ -25%) since end October have been far larger compared to the decline in the NASDAQ (~ -5%). And even if markets are right in anticipating DATCOs' probable exclusion from MSCI indices, the combined market cap of all 20

affected DATCOs is just USD 115bn, based on MSCI data. This is but a small fraction of the near USD 700bn losses in market cap since Sep for Bitcoin and Ether. Arguably, these short-term market factors are not fully adequate in explaining the large magnitude of cryptos' declines since Sep. Other technology-based factors could thus be at work.

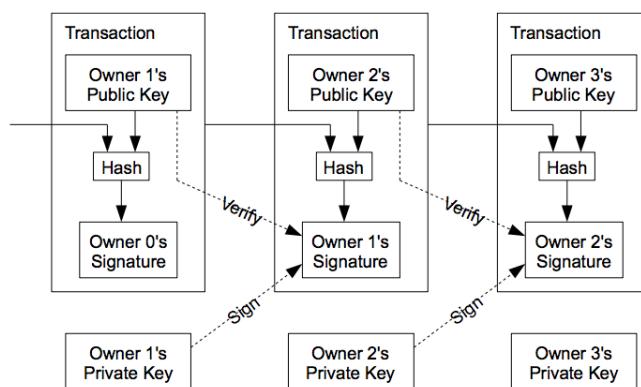
Coincidentally or not, the recent bout of crypto weakness has occurred amid renewed attention over a known unknown—the risk posed by quantum computing.

Quantum risks

Quantum implications for cryptocurrencies

Quantum computing is fundamentally different from classical computing, as it can represent information in not just a binary 0|1 form (or a bit), but also as a superposition of both states (or a qubit). In theory, quantum computing-based algorithms can make use of interference and entanglement associated with superposition to reduce the number of operations to find patterns, giving them a speed advantage over classical computing algorithms.

Why does that matter for cryptos? The core concept of crypto ownership is the possession of a digital private key which confers the ability to sign transactions for a crypto address, which is in turn derived from a public key. When someone initiates a crypto transaction, it is broadcast to the network with the digital signature created by the sender's private key. Miners or validators then verify whether the signature matches the sender's public key (and address) and whether the transaction is valid, before including it on the blockchain or rejecting it. Nakamoto (2008) provided a schematic on how a chain of transactions related to a Bitcoin can be digitally signed and verified with both public-private keys.



Source: Nakamoto

The crux of crypto transaction security is that an owner's private key—which grants signing authority—must remain secret, even though the public key is openly known. This is enabled by an asymmetric cryptographic relationship between private-public keys, which is based on a mathematical "one-way function": one that allows the public key to be easily derived from a private key (for verification), but not the other way around. Both Bitcoin and Ethereum uses cryptography based on elliptic curve discrete logarithms. For this class of functions, classical computers require an impossibly long time (or exponential time) to compute the private key from the public key. But for quantum computers, Shor (1994) showed that this could be computed in a much shorter time (or polynomial time) using a quantum algorithm now known as Shor's algorithm.

In practical terms, the state of quantum computing hardware today is nowhere close to breaking elliptic-curve signatures. Even if public keys are exposed during transaction broadcast, attackers cannot compute the private key in a short enough timeframe to race for a competing transaction to be lodged on the blockchain. Furthermore, security has been enhanced since the earliest days of Bitcoin, with public keys no longer disclosed without an initiation of a transaction.

Still, rapid progress in quantum computing has driven a shift in risk perceptions across the crypto community. UT Austin quantum researcher, Scott Aaronson, opined that confidence in Shor-breakable cryptography remaining safe for the next 5 years could be unwarranted. Ethereum co-founder, Vitalik Buterin, also gave repeated warnings about the risk posed by quantum computers.

Going forward, the US is planning to commit significant resources to quantum computing research as part of its AI push. Indeed, the White House's Genesis Mission announced in November has placed "quantum information science" as a key science and technology domain of national importance. Increased competition within the AI sphere could accelerate research advances in quantum computing, bringing forward the timeline for quantum hardware with sufficient qubits and fault tolerance to be a plausible threat to public-key cryptography. Ultimately, rising capabilities in quantum computing pose risks to not just cryptocurrencies, but also stablecoins that are secured by blockchain encryption technology.

Given the frontier nature of quantum computing, it is likely that quantum hardware that can threaten encryption will be initially limited to nation states and large corporates. Existing laws against computer abuse could be strengthened to deter blockchain attacks by such sophisticated actors. In recognition of these risks, the US National Institute of Standards and Technology (NIST) has also initiated a process to evaluate and standardize quantum-resistant public-key cryptographic

algorithms, ushering in the age of post-quantum cryptography (or PQC). Once standardized, PQC could be deployed on cryptocurrency networks. Despite decentralization, both Bitcoin and Ethereum communities have been able to reach social consensus for upgrades, either through Bitcoin Improvement Proposals (BIPs) or the leadership of the Ethereum Foundation. Just as the threat from quantum computing draws closer, risk mitigation efforts are also likely to be accelerated in the coming years.

Collateralization

Increasing acceptance of crypto as collateral

Traditional financial institutions are moving to integrate digital assets in their service offering despite their higher volatility and technology risks. Media reports suggest that a large US bank could accept Bitcoin and Ethereum as collateral by the end of the year ([Bloomberg](#)). This builds on the bank's earlier acceptance of Bitcoin ETFs as collateral, with Ether ETFs also being a possibility.

Why are established banks looking to enter crypto-backed lending space now? The decision could be motivated by (i) emerging sizable market opportunity, (ii) improved asset risk profile, and (iii) successes seen amongst pioneer crypto banks.

Sizable opportunity with rising adoption amongst high-net worth (HNW) individuals and corporates. Sommer and Lutter (2025) estimate that HNW investors allocate about 3% of portfolios to cryptocurrencies, with allocation at 15% for ages 21–42 and 5% for 43 and older. A younger skew suggests stronger growth ahead. With Capgemini putting North American HNW wealth at USD30trn in 2024, individuals could hold as much as USD900bn in crypto. In Asia, family offices are reportedly planning to lift allocations toward ~5%. Corporates are also participating via shareholder-funded purchases. According to Bitcoin Treasuries and CoinGecko, public companies hold ~1m BTC and ~4.7m ETH, worth over USD100bn.

While traditional banks have not published their loan-to-value ratios, startup lenders typically offer 50–70% LTV on crypto-backed loans. Assuming a 50% LTV and a 10% margin spread, the crypto lending opportunity could be worth USD50bn in net interest income per year.

Improved risk profile of more established cryptocurrencies. For a collateral to be effective, it should be relatively liquid and its value easy to determine. With the

proliferation of ETFs and increased institutional participation, Bitcoin and Ether have already achieved a high degree of liquidity. While cryptocurrencies remain volatile, the recent crypto wipeout on 10 Oct 25 underscored that BTC and ETH have a degree of resilience to market shocks.

Early evidence of profitable business case. Finews reported that two Swiss pioneer crypto banks are nearing breakeven. One has posted positive EBITDA for 2024 and appears on track to reach full-year breakeven in 2025, while the other is guiding for breakeven by 2026. Commission and crypto-lending income have proven to be steady income drivers, compared to trading-driven revenues.

Impact of collateralization on crypto markets

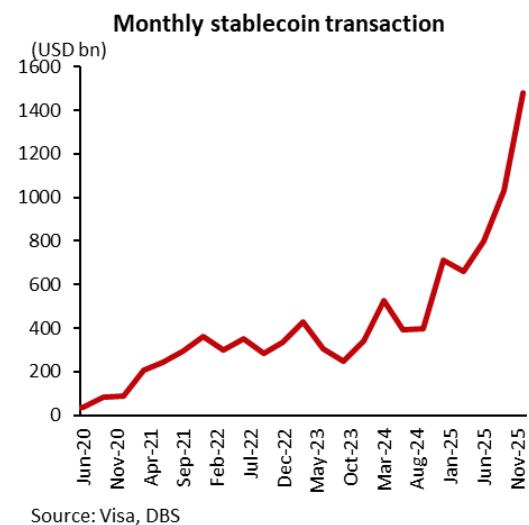
Evidence across markets suggests that collateral eligibility boosts asset values and liquidity. Zevelev (2017) found that homeowners in Texas valued their properties about 4% higher after home-equity borrowing was legalised in 1998. In euro-area credit markets, Pelizzon et. al. (2020) point out that bonds on the ECB's collateral list trade at a premium and show higher turnover, while Mesonnier et al (2017) found that eligible issues see rates fall by roughly 7 bps. Consistent with this, Ai et. al. (2017) found that collateralizable assets earn excess returns, with a long-short portfolio delivering about 8% on average. Given these empirical studies across other asset markets, Bitcoin and Ether could see a pricing uplift and improved liquidity if they are to gain broader acceptance as collateral.

However, volatility could increase should the funds be used to back more purchases. Brumm, J., et al. found that the reuse of collateral can raise leverage and significantly increase financial market volatility. Nonetheless, they concluded that limited re-use can improve economic well-being for society ("welfare") by improving risk sharing. However, beyond a certain level, it could lead to excessive leverage in the system and decrease welfare. This highlights the importance of determining a suitable and sustainable loan-to-value limit to support risk sharing without encouraging excessive leverage.

Stablecoins and CBDCs

Stablecoins

Central banks, regulators and financial institutions have created several forms of tokenised money, including central bank digital currencies, tokenised deposits and **stablecoins**. We discussed the backdrop of the stablecoin market and its implication on the financial markets in [Digital Assets Update 3Q25: Embracing tokenization and stablecoins](#). These are forms of digital cash which are issued as tokens on a blockchain, increasingly emerging as an alternative globally to existing/conventional financial as well as payments architecture. The underlying characteristics of stablecoins include, a) designed to maintain a stable value; b) be less volatile than cryptocurrencies; c) programmable i.e., can be managed and controlled, which make these a reliable medium of exchange. In this update, we capture few of the key developments in this space.



Average supply of stablecoins (all varieties included) rose to \$268.7bn as of November 2025. While growing rapidly, this amounts to less than ~1% of the global daily transactions, with legacy payment infrastructure handling volumes of ~\$6-7trn. The market capitalisation of stablecoins has grown by over 400% since 2000, surpassing the crucial \$300bn by November 2025 (1), two-thirds of which belongs to USDT or Tether. According to the IMF and BIS, the market size could jump ten-fold to approximately US\$2trn by 2028. Annual transaction volume reached US\$ 51.5trn as of October 2025 (2) (adjusted for high-frequency and high-volume trading, real volumes stood at \$10.4trn). The adjusted transaction volume in the last 30 days jumped to \$1.4trn, exceeding Visa/Mastercard combined volumes. Around 80% of stablecoin usage is linked to crypto trading. The market remains highly consolidated and USD-

centric, with over 90% comprising of USDT and USDC, as well as 90% of the fiat-backed stablecoins pegged to the US dollar.

Notably, regulators are in midst of discussions on the punitive Basel rules that are due to kick in next years. The crypto rules that were agreed upon three years ago and likely to take effect next year, require banks to apply a risk weighting of 1250% to volatile digital assets such as crypto. These rules were amended in 2024, adding that any assets which use blockchains would be subject to most restrictive capital rules (3). Ahead of this, banking and financial sector participants sought a reassessment of these restrictions via collective letter in August 2025, without which banks will be unwilling to participate in the crypto asset market (4). US Federal Reserve has reportedly expressed plans to not implement these Basel rules, alongside Bank of England.

Country initiatives

More national regulators and governments are taking cognisance of the popularity and spread of stablecoins, especially the dominant role of US dollars in these instruments, which poses the risk of ‘dollarisation’ in economies that have weak existing institutional or financial market systems. Notably, **US Federal Reserve’s Stephen Miran** remarked that stablecoins could impact monetary policy, as the asset class’s size balloons to \$1-\$3trn within this decade. That said, he also highlighted that an intermediation of banks was not a risk as the GENIUS Act does not permit stablecoins to offer yield and it is not covered by the federal deposit insurance. Elsewhere in the West, **UK** modified some of the rules surrounding stablecoins, by allowing part of the assets to be invested in Gilts and exempting few businesses from ownership limits. Despite these changes, stakeholders were of the view that these rules but UK as a disadvantage vs US.

Asia has taken the lead in adopting these changes and undertaking domestic initiatives. **Singapore, Hong Kong, and Japan are amongst the few who have taken a lead in issuing stablecoins under their jurisdiction, with India also joining the fray.**

Hong Kong was amongst the first few in the region to publish regulations governing fiat-referenced stablecoins (FRS), frontrunning the US Genius Act. This includes various aspects including the need for any entity issuing FRS in or from Hong Kong, or actively marketing such stablecoins to the Hong Kong public, must obtain a license from the HKMA. Add to this, licensed stablecoins must be fully backed by high-quality, highly liquid reserve assets. This, in effect, prohibits algorithmic stablecoins. Separately, the HKMA launched EnsembleX, the next phase of Project Ensemble for tokenized deposits and tokenization, with the pilot phase due to run till next year with real money transactions. Seven banks and other firms are reportedly participating in the pilots. Unlike banks’ internal tokenised deposit solutions, this will allow interbank payments.

Singapore's MAS had tabled, in August 2023, the features of a new regulatory framework that sought to ensure value stability for stablecoins issued in the country. These were meant to be applied to single currency stablecoins (SCS) pegged to the SGD or any other G10 currency. More recently, the head of the central bank cautioned against unregulated stablecoins and instruments built on permissionless blockchains, with plans to prepare draft legislation, giving importance to sound reserve backing and assurance of redemption. Authorities also hold the view that tokenised bank liabilities and CBDCs might be more central to the country's digital economy. The country's largest domestic banks has partnered with an asset management provider and blockchain company to provide its stablecoin offering. Private player StraitsX which issued the XSGD, the only SGD backed stablecoin and likely a major non-USD stablecoin in the region, has been working with regulators and traditional financial stakeholders to support cross border payments.

Japan's JPYC introduced the world's first yen-pegged stablecoin, marking the debut for the freely convertible currency. This stablecoin will be backed by domestic deposits and JGBs. Three of the country's largest banks have since received the approval to kickstart a trial to study a joint stablecoin, meant to be used for inter, and intra company settlements.

India is reportedly preparing to launch its state-backed stablecoin using government debt as a collateral, as early as 1Q2026. Advocates of this push highlighted that this move would lower borrowing costs and diversify the country's investor base. The Asset Reserve Certificate (ARC) being developed by global player Polygon and India's Anq aims to be backed 1:1 by sovereign debt or T-bills. This ARC is designed to work alongside the existing RBI's e-rupee. Legislative clarity is awaited, on aspects such as whether these would be considered as securities or payment instruments and the regulatory body (securities regulator or the central bank, for instance). If this is launched successfully, this would mark the first tradable stablecoin, backed by state assets but issued privately.

China has adopted a more gradualist approach, with private sector players, which includes payment and nonpayment providers, who had previously expressed plans to launch their stablecoins, slowing the shift. Besides attempts to expand the usage of e-CNY, we expect the authorities to study and deepen their understanding into associated regulatory implications especially as USD-associated assets dominate the stablecoin space.

Central bank digital currencies

The space of central bank digital currencies continues to register interest, though falling short of the incrementally strong interest in stablecoins.

Most recently, **Europe expressed plans to move to the next phase of digital euro**, building on the preparation period which ran from October 2023 to October 2025. A pilot for digital currency will be launched in 2027, subject to the timely approval from regulators and lawmakers, with a full-scale launch due in 2029. The authorities pitched the e-euro as an alternative to private and USD-dominated stablecoins. ECB chief economist and a member of the executive board Philip Lane also highlighted in a IMF opinion piece that there were few who saw reason in promoting stablecoins, issued and operated by private sector intermediaries. However, he argued that stablecoins would further expand the private money universe, rather than act as a substitute for central bank money, adding that the A stable value of a stablecoin in terms of currency was not intrinsic (unlike the liability of the central bank). Nonetheless, plans to launch a digital euro in two years have run into a pushback from EU lawmakers and the banking industry, saying that the e-euro could undermine private sector payment systems as well as stirring a debate over the cost to make the switch. We expect to simmer with a close watch over the pilot/ trial phase that starts in over a year's time.

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