

FX Insight

Cryptocurrencies Making Waves

Central Bank Digital Currencies (CBDC) - How Far is this Future?

In June 2016, then-Fed Chair Janet Yellen urged central banks to delve into research regarding Bitcoin, blockchain and distributed ledger technologies. Since then, there has been a burst of exploratory research and trials by global central banks on wholesale and retail Central Bank Digital Currencies (CBDCs). Even so, a BIS survey in 4Q 2020 showed that 60% of central banks surveyed do not expect to issue any type of CBDC in the next 1-6 years. However, this unwilling majority had shrunk over the years which suggests an increasing, albeit gradual, likelihood of global CBDC roll-out/issuance. The future of widespread use of CBDCs whilst still distant has been getting nearer. China was one of the first few central banks to start researching on digital currencies in 2014 and its progress seems to be the swiftest amongst major economies with the 2022 Winter Olympics speculated to be an opportunity for PBoC to roll-out e-RMB to be used by foreign participants and audience. In ASEAN, Thailand and Singapore seem to have the most intensive research and development on CBDCs, having experimented in cross-border payments while Malaysia, Indonesia and Philippines are still at the earlier stages of research.

Bitcoin Has Gone Institutional

2020 is widely recognized as the year bitcoin goes institutional. There are a handful of anecdotal examples of institutional interests in cryptocurrencies picking up pace. Fidelity launched its inaugural bitcoin-only fund while MicroStrategy announced adding Bitcoin to Treasury; PayPal announced that its users in US can buy, sell and hold 4 cryptocurrencies including Bitcoin, Ethereum, Litecoin and Bitcoin Cash. This year, BlackRock added Bitcoin futures as an eligible investment to 2 funds, Tesla revealed it bought US\$1.5bn worth of Bitcoin while Morgan Stanley becomes the first big US bank to offer Bitcoin funds to its wealthier clients. Other ways to gauge institutional activity is via Grayscale's Bitcoin Trust (BGTC) - the only publicly traded exchange-traded fund investing in Bitcoin. Its crypto assets under management (AUM) rose 1,500% since inception in early-2020 and Grayscale highlighted that the growth was due to institutional investors, particularly the hedge funds.

- Notably, the massive growth in Bitcoin interest has occurred alongside Bitcoin being given many "labels" or attributes. In the last section of this report, we discuss whether some of these are apt, and reveal the fluid nature of Bitcoin price dynamics in its wild ride thus far.

Analysts

Saktiandi Supaat
(65) 6320 1379
saktiandi@maybank.com.sg

Christopher Wong
(65) 6320 1347
wongkl@maybank.com.sg

Fiona Lim
(65) 6320 1374
fionalim@maybank.com.sg

Tan Yanxi
(65) 6320 1378
tanyx@maybank.com.sg

Popular Attributes	Interim Findings
Speculative Risk-on Asset?	Yes, near-term. Bitcoin and equity price moves may remain positively correlated in the near-term, but this relationship likely arose as a result of the recent flush in global liquidity, and may ease as global monetary and fiscal stimulus gradually tapers going forward.
Safe Haven Asset?	No. Bitcoin tends to see sell-offs when risk aversion spikes in broad market sentiments.
Inflation Hedge?	Likely ineffective hedge against conventional, lukewarm inflation. Due to scarcity, hedging effects may be more significant in instances of large inflation shocks or when inflation concerns are induced by large fiscal handouts, but Bitcoin's short history means that it has yet to prove itself in these aspects.
Dollar/Fiat Replacement?	No, but investors should note Bitcoin's emerging negative correlation with dollar, and concomitant positive correlation with other FX (e.g., ASEAN currencies), when including Bitcoin in asset portfolios with significant currency exposures.
Portfolio Diversifier?	To some extent, given that price swings are still tied to developments in the crypto space (regulation, tech, public adoption). Could be more effective as a diversifier when positive correlation with equities fade going forward.

Central Bank Digital Currencies - How Far Away is this Future?

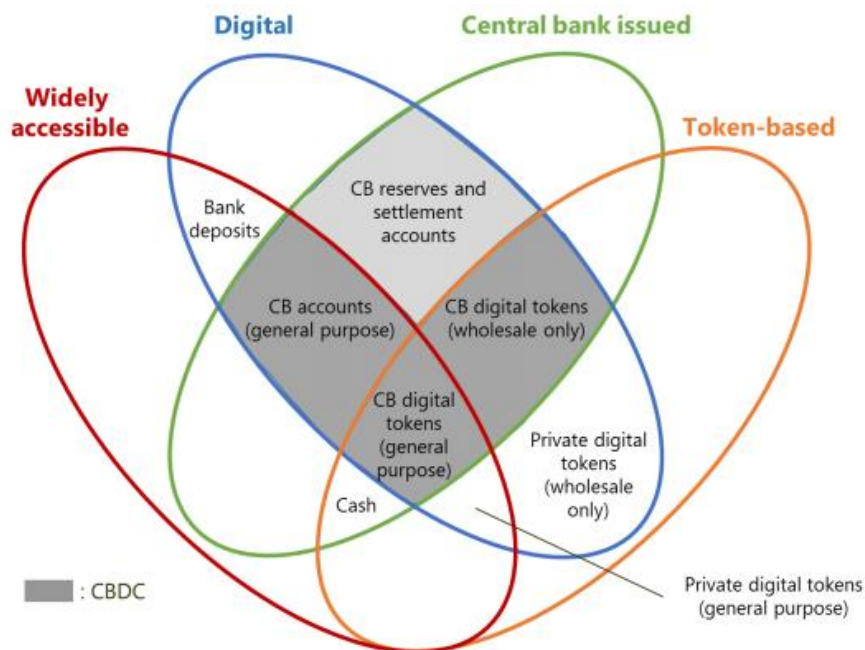
In June 2016, then Fed Chair Janet Yellen urged central banks to delve into research regarding Bitcoin, blockchain and distributed ledger technologies. At that time, Bitcoin had been in existence for around 7 years (since 2009) and the rise of crypto assets amongst other factors have arguably spurred more central banks to foray into exploratory research and developmental work on Central Bank Digital Currencies (CBDCs). PBoC had started its research into its own digital currency in 2014. While the current Treasury Secretary's stance towards Bitcoin and other cryptocurrencies had largely been dismissive, Yellen highlighted that *"Blockchain could have very significant implications for the payments system and the conduct of business"*.

Understanding CBDCs

CBDC is a new form of digital central bank money - a liability of the central bank, denominated in an existing unit of account that can serve as both a medium of exchange and a store of value. To some extent, central banks have been using digital money as reserves or settlement account balances that are held by commercial banks or non-bank financial institutions. Taking reference from the Mar 2018 publication by the Bank for International Settlements (BIS) for better clarity, - the CBDC that we refer to here forth refers to the **digital form of central bank money that is not used as balance in traditional reserves and settlement accounts**.

To further illuminate the peculiarities of CBDCs, Bech and Garratt had presented the taxonomy of money to bring out four properties of money and how different forms of CBDCs along with other types of monies are categorized.

The Taxonomy of Money (aka Money Flower)



Notes: The Venn-diagram illustrates the four key properties of money: *issuer* (central bank or not); *form* (digital or physical); *accessibility* (widely or restricted) and *technology* (account-based or token-based). CB = central bank, CBDC = central bank digital currency (excluding digital central bank money already available to monetary counterparties and some non-monetary counterparties). *Private digital tokens (general purpose)* include crypto-assets and currencies, such as bitcoin and ethereum. *Bank deposits* are not widely accessible in all jurisdictions. For examples of how other forms of money may fit in the diagram, please refer to the source.

Source: Bank for International Settlements, Bech and Garratt (2017)

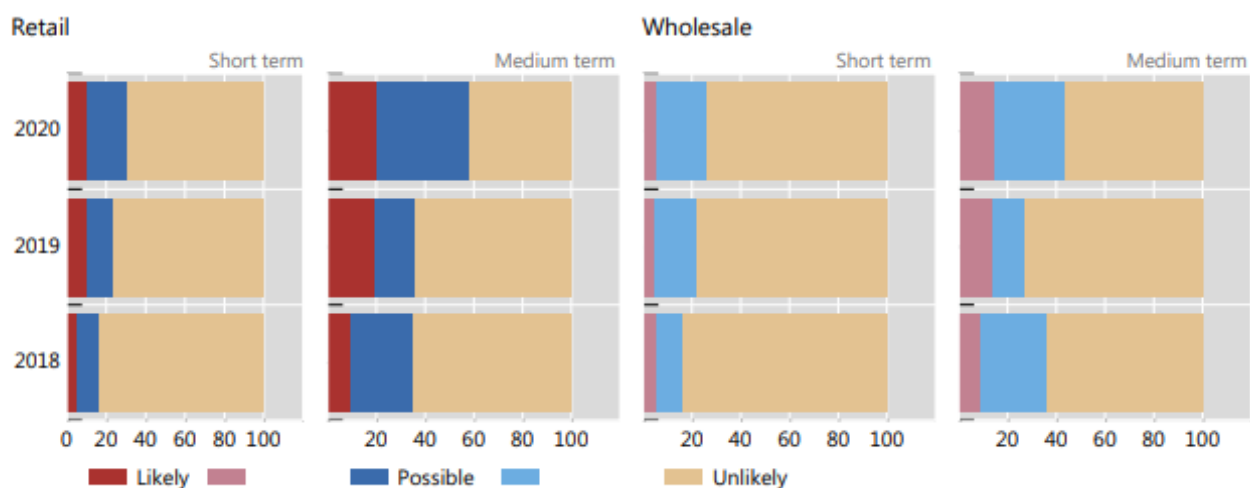
For simplicity's sake however, CBDCs are more commonly divided into two broad categories 1) Wholesale and 2) General Purpose, retail.

Since 2016, there has been a burst of exploratory research and trials by global central banks on wholesale and retail CBDCs.

Most research and trials conducted by central banks so far were primarily on the potential feasibility and aimed for a proof of concept. According to a BIS survey in 4Q 2020, 60% of the central banks were still in the experimental stage of work or aiming for proofs-of-concept on CBDC while only 14% have moved towards the more advanced, development and pilot stage. BIS also highlighted that 60% of central banks do not expect to issue any type of CBDC in the next 1-6 years. However, this unwilling majority had shrunk over the years which suggests an increasing, albeit gradual, likelihood of global CBDC roll-out/issuance. The future of widespread use of CBDCs whilst still distant has been getting nearer.

The Likelihood of CBDC Issuance Increased

Share of Respondents (%)



Note: Short-term denotes 1-3 years; Medium Term denotes 1-6 years. "Likely" combines "very likely" and "somewhat likely". "Unlikely" combines "very unlikely" and "somewhat unlikely".

Source: BIS Central Bank Survey on CBDCs

According to the same survey conducted by BIS, 7 out of 8 central banks that are in the advanced stage of work on CBDCs are from emerging markets. It is worth noting that their local circumstances were key motivations for the central banks to take CBDCs more seriously. Most of them have an aim of improving financial inclusion either due to disperse population or a lack of bank accounts for a large part of the population. For Venezuela, President Maduro was keen on gaining access to other "international sources of finance" as the country and its currency are hurt by ongoing hyperinflation. The disparity in demographics and economic environment explained why DM central banks are less compelled to progress further in their work on CBDCs.

Despite a lack of progress in CBDCs, there is an undeniable broad interest in the topic.

Motivations for Work on CBDCs	Concerns/Hurdles to CBDC adoption
<p>1. Decline in Cash Transactions</p> <p>The sharp decline in cash transaction in the past decade is a strong motivation for central banks such as Riksbank and PBoC to progress relatively quickly in their respective works on CBDCs as digital currencies can become an effective central bank instrument as digital payments become prevalent in these societies.</p> <p>2. Threats of Other Digital Assets</p> <p>More compelling is the potential threat of cryptocurrencies such as Bitcoin, stablecoins like Diem. Tencent and Alibaba (facilitating >90% of mobile transactions) were also said to be experimenting with digital assets at some point. Monetary policy could be significantly less effective if cryptocurrencies were to play a greater part of the economy (somewhat like dollarization). China has banned all cryptocurrency trading and initial coin offerings in 2017.</p> <p>3. Financial Inclusivity</p> <p>A strong motivation for EM countries to push for CBDCs. As we have mentioned in the earlier section, CBDCs are seen as a viable tool to loop adults that do not yet have a bank account into the financial system and enable the individuals to reap the benefits of the access. The ease of payments with CBDC could also help people with lower literacy levels use digital payments.</p> <p>4. Potential Efficiency Gains and Improvement in terms of Credit/Settlement Risks</p> <p>The use of distributed ledger technology and peer-to-peer transfers can allow CBDCs transactions to occur beyond normal banking hours for wholesale banking transactions. The efficiency gains can also occur in retail transactions. Project Jasper-Ubin found improvements in counterparty risk for cross-border interbank payments and settlements.</p>	<p>1. Legality of CBDCs</p> <p>In Oct 2020, China drafted a PBoC law to give legal status to the DCEP system and to include the digital yuan as part of the fiat currency. However not every country can adjust their legislation as swiftly to provide central banks the authority to issue digital currencies.</p> <p>2. Cybersecurity and Privacy Issues</p> <p>The distributed ledger created for CBDCs may still be vulnerable to cyber-threats and privacy issues.</p> <p>3. Scalability</p> <p>Most of the projects on CBDCs are done with a few participants. The Project Jasper-Ubin found that even though cross-border payment between Canada and Singapore is a success, the scalability of networks could be limited.</p> <p>4. Financial Stability</p> <p>The role of financial intermediation could be played more by the central bank with the CBDC issuance. There could be unintended effect on market liquidity and risk assets and as a result impact market functioning. Depending on the characteristic of the CBDC (interest-bearing or otherwise), demand could be redirected away from the repo market.</p> <p>5. Potential Compatibility Issues for Cross-border Payments and Anti-money laundering enforcements</p> <p>Cross-border payments using CBDCs are found to be potentially less effective if countries use different distributed ledger technologies. Due to the token-nature (anonymity) of the CBDCs, AML/CFT requirements could be hard to enforce. In addition, there is a greater likelihood that arbitrage and speculative activity could take place given the decentralized nature and potentially increase the FX volatility during times of stress.</p>

Source: Various Research papers including Payments Canada, BIS, MAS

The Work Done on CBDCs

The scope of research and trials done in most central banks were to some extent similar, broadly covering these aspects as listed:

- ✓ Tokenised Cash (and some other securities such as bonds, equities)
- ✓ Digital Ledger Technology (DLT) with Real Time Gross Settlement (RTGS), use of Liquidity Saving Mechanisms (LSM)
- ✓ Delivery Vs. Payment - A settlement process to ensure payment is made before or at the same time as the delivery of the securities.
- ✓ Cross Border Payment

With the use of DLT, central banks digital currencies could be available beyond the usual banking hours. Central banks need to decide on other aspects of their CBDCs such as the **degree of anonymity; transfer mechanism (peer-to-peer, or via an intermediary); interest-bearing (or not); potential quota** on holdings for participants. Central banks may develop their distributed ledgers with different combinations of the abovementioned. **Combine that with the varied infrastructure, the eventual properties and behaviours of CBDCs issued by respective sovereigns along with their impact on payments/monetary policies are thus likely to vary.**

Cross-border payments typically require the collaboration of at least two central banks such as the Project Jasper-Ubin which was borne from the partnership between the Bank of Canada and the Monetary Authority of Singapore.

Project Jasper-Ubin

Between Mar-Jun 2016, the Bank of Canada launched Project Jasper in partnership with Payments Canada and five R3 member banks in Canada- to gain an understanding of how distributed ledger technology can change payments in Canada. As of the completion of Phase 3 in 2018, Bank of Canada has achieved a proof of concept for the viability in payment, securities settlement system “in a manner aimed at respecting the privacy and scalability requirement of the Canadian system”.

In 2016, MAS built on the experience of Project Jasper, using the architecture, code and lessons learnt to apply on Project Ubin. Phase 1 was launched in Nov 2016. The five phases of Project Ubin which spanned over 5 years include:

Phase 1: *tokenising SGD* - proof of concept project to conduct interbank payments using Blockchain technology

Phase 2: *re-imagining RTGS*; - prototype of 3 different models for decentralized interbank payment and settlements with LSM

Phase 3: *Delivery versus Payment (DvP)*, - capabilities for settlement of tokenized assets across different blockchain platforms

Phase 4: *Cross-border Payment vs. Payment (PvP)*

Phase 5: *Broad ecosystem collaboration to explore the development of the multi-currency payments model*¹

Phase 4 of Project Ubin was the collaboration with Bank of Canada that gave birth to Project Jasper-Ubin and had a successful experiment on cross-border and cross-currency payments (SGD-CAD) using CDBC. Thereafter, MAS went on to phase 5 and managed to develop a blockchain-based multi-currency payments network that enabled payments to be carried out in different currencies on the same network. The goal is to better understand the potential efficiency gains for the broader economy that could be attained through better connectivity and integration.

Link - <https://www.mas.gov.sg/schemes-and-initiatives/project-ubin>

China's Digital Currency, Electronic Payment (DC/EP), e-RMB

The Development of DC/EP

2014	Former PBoC Governor Zhou Xiaochuan sets up project group on DC/EP
2016	Research Institute to Develop CBDC
Sep 2017	Initial Coin Offering and Trading of Cryptocurrencies Banned
2019	Pilot Programs started to conduct closed testing of the digital yuan
2020	Trials of the digital currency were conducted in Shenzhen, Suzhou, Chengdu and Xiongan with hypothetical scenarios related to the 2022 Winter Olympics
Oct 2020	China drafted a PBoC law to give legal status to the DCEP system and to include the digital yuan as part of the fiat currency.
2021	Jan - Chengdu distributed CNY50mn in a lottery trial on 27 Jan. Feb - China handed out CNY40mn in another public lottery as part of digital currency tests. 200,000 red packets were distributed in Beijing and Suzhou starting on 10 Feb 2021. 10,000 businesses in Suzhou were expected to accept the e-RMB during the trial.

Quick Understanding of DC/EP or rather e-RMB

- Legal tender
- Part of the fiat currency system, replacing Money Supply M0 (bank notes and coins)
- Not interest-bearing
- Adopts a two-tier system:
 - Layer 1 - PBoC will issue and redeem e-RMB via commercial banks
 - Layer 2 - Commercial banks redistribute CBDC to retail market participants.

China was one of the first few central banks to start researching on digital currencies in 2014 and its progress seems to be the swiftest amongst major economies. However, it seems a tad more unwilling to use blockchain and distributed ledger technology at this point, noting technical issues and the immense requirement of computing power to verify each transaction also impose a significantly limit the speed of transactions. The technology is thus not scalable. PBoC Yi Gang had said that there is no preset specific technical routes for DCE. Both blockchain technology and existing electronic payment solutions are under consideration. Looking forward, there are more lottery trials expected in more venues this year. The 2022 Winter Olympics present an opportunity for PBoC to roll-out e-RMB to be used by foreign participants and audience.

State of CBDC Progress, Cryptocurrency Stances in ASEAN

	Singapore	Malaysia	Indonesia	Thailand	Philippines
Time of Initial Foray, CBDC Focus	Nov 2016, Wholesale CBDC	Nov 2017, -	Feb 2017, Potentially Wholesale & Retail	Aug 2018, Wholesale CBDC	Jul 2020, -
Notable Milestones for CBDC or Related Projects	5 phases of CBDC Trials: - Tokenised cash - Real Time Gross Settlement (RTGS) - Delivery of tokenised security asset against payment of cash asset. - Cross border payment (in conjunction with BoC) - Integration and connectivity with other blockchain networks for other functional uses.	Working paper on implications of CBDC Blockchain-related developments: - 9 banks have collaborated on developing blockchain applications for trade finance	Working Paper on implications of CBDC BI joined the Task Force for the Acceleration and Expansion of Regional Digitalization (Satgas P2DD) to support national digitization and 2025 vision of the Indonesian Payment System Blueprint.	CBDC trials: - Tokenised Cash/Bonds - RTGS - Cross-border payment project “m-CBDC Bridge” (together with HKMA, CBUAE, PBoC Digital Currency Institute)	Launch of CBDC working group Authorizing sale of retail govt bonds through a blockchain powered app developed by UnionBank Likely no plans to launch CBDC before 2023
Central Bank’s Stance Towards Cryptocurrencies (Typically Latest)	Jan 2021 - Payment Services Act is enhanced to tighten control over cryptocurrencies - any entity that facilitates the transmission, exchange or storage of digital payment tokens (DPT) aka cryptocurrencies will now have to be licensed.	2014 - BNM stated that Bitcoin is not legal tender. Jan 2021 - There are 56 firms dealing with digital currencies reporting to BNM as institutions. BNM cautioned “consumers should exercise the necessary caution and understand risks associated with digital currencies”.	BI prohibits the use of volatile cryptocurrencies for payment in the country. However, Indonesia allows for the ownership of crypto-assets and for trades through an official exchange rupiah-backed stablecoins (such as IDRT).	2018 - BoT banned FIs from investing in cryptocurrency, offering cryptocurrency exchanges and creating platforms for crypto trading. 17 Mar 2021 - BoT uncovered private developments of stablecoin known as THT and deemed any activity involving THT as illegal.	BSP recently tightened its guidelines on cryptocurrencies. Jan 2021 - The exchange, transfer and safekeeping of virtual assets, or instruments enabling control over them will be subject to the BSP’s licensing requirements.

Source: Various media sources and central bank announcements

Global Cryptocurrency Market Trends - An Overview

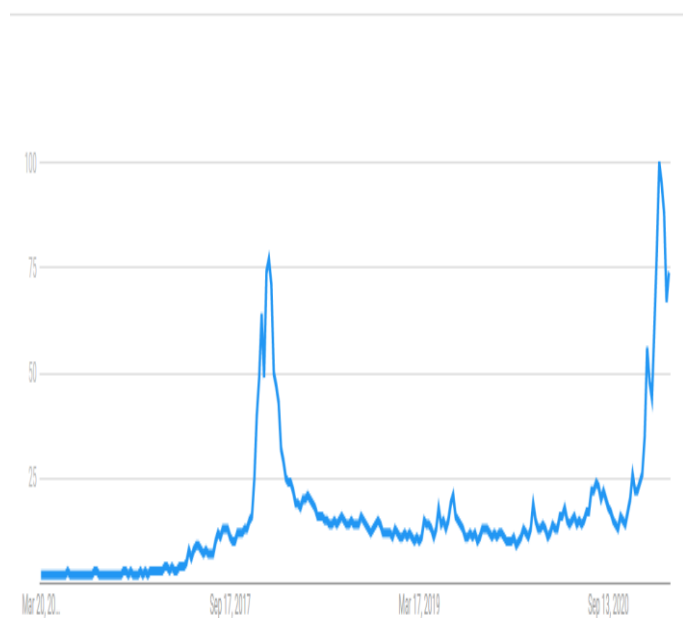
“All truth passes through three stages. First it is ridiculed. Second it is violently opposed. Third it is accepted as being self-evident.”

Philosopher Arthur Schopenhauer

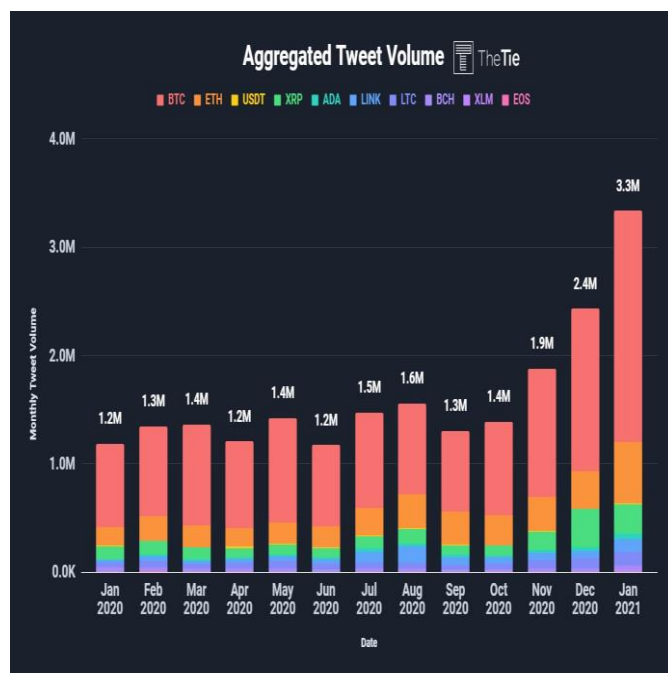
Institutional and Retail Interests in Cryptocurrencies is On the Rise

Cryptocurrency is no longer a niche topic and is fast becoming mainstream. Google search trends revealed that “crypto” searches on Google soared to an all-time high in Feb-2021, far exceeding the previous peak in early-2018. The keyword “crypto” even received a perfect Google Trends score of 100 (an indication of maximum relative interest). Elsewhere on Twitter, total tweet volumes devoted to cryptocurrency was 181% higher in Jan-2021 than a year ago.

Google Search Trends for “Crypto” soared to all-time High and Hit a Perfect Score of 100



Tweet Volumes on Crypto-related products such as bitcoin, Ethereum, Litecoin, etc. Saw Momentum Picking Up Pace



Source: Google Search Trends, The TIE, Maybank FX Research & Strategy

And to some extent, gradually looking like an “asset class”. For instance, there is Bitcoin futures trading on CME Group’s derivative exchange while S&P Dow Jones indices is looking to launch a cryptocurrency index in partnership with crypto data provider Lukka this year (an indication of investor driven demand for crypto benchmarking)

For this section, we look at global cryptocurrency market trends, in terms of its growing size, adoption and usage.

For a start, we refer to a leading crypto analytics and research firm, Chainalysis’ 2020 Global Crypto Adoption Index. The index ranked all 154 countries according to these 4 metrics: (1) on-chain cryptocurrency value received; (2) on-chain retail value transferred; (3) no. of on-chain cryptocurrency deposits and (4) peer-to-peer (P2P) exchange trade volume and each metric weighted by purchasing power parity per capita.

We extracted the table and populate where ASEAN countries compare below.

Global Crypto Adoption Index - Top 10, ASEAN and Selected Countries

Overall Rank	Country	Countries' Rank of sub metric feeding into the Global Crypto Adoption Index			
		On-Chain value received	On-Chain retail value received	No. of On-Chain crypto deposits	Peer-to-peer exchange traded volume
1	Ukraine	4	4	7	11
2	Russia	7	8	5	9
3	Venezuela	19	14	15	2
4	China	1	1	95	53
5	Kenya	37	11	57	1
6	USA	5	6	39	16
7	South Africa	12	9	41	10
8	Nigeria	14	7	112	3
9	Colombia	25	18	61	4
10	Vietnam	2	2	44	81
11	India	3	3	129	32
12	Thailand	17	15	21	33
14	UK	15	19	42	17
16	Philippines	9	13	91	44
17	South Korea	8	10	24	97
23	HK & Macau	39	62	10	23
25	Malaysia	38	27	47	36
32	Indonesia	11	12	75	103
50	Singapore	73	94	8	54

Source: 2020 Geography of Cryptocurrency Report (Jul 2019 - Jun 2020) by Chainalysis, Maybank FX Research & Strategy (ASEAN countries shaded)

Crypto Activities is Global. China and US are the prominent economic powerhouses that made it to the top 10 list of crypto adoption while EM countries such as Ukraine, Russia and Venezuela top the list. Amongst ASEAN, Vietnam takes the lead, coming in at 10th place, with other ASEAN nations, Thailand and Philippines not too far off. Singapore lags other ASEAN nations, coming in at 50th position.

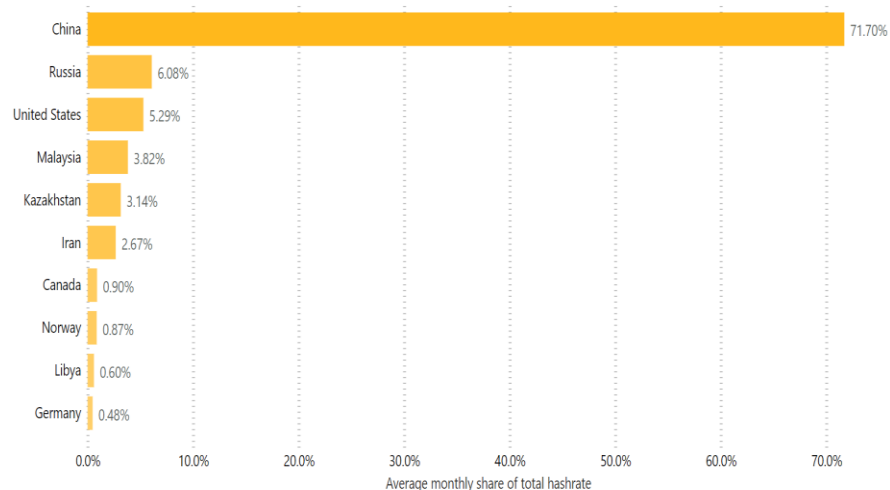
Asia Leads in Crypto Transaction. In terms of cryptocurrency transaction (professional traders and non-professional, individuals), measured by both on-chain value received and on-chain retail value received, China, Vietnam and India top the list.

East Asia is World's Largest Cryptocurrency Market. The region accounts for 31% of all cryptocurrency transacted in the last 12 months. Addresses located in the region received \$107bn worth of cryptocurrency, 77% more than second highest receiving region - Western Europe. Much of it is likely due to crypto mining activity. Using aggregate data from participating mining pools such as BTC.com, Poolin and ViaBTC, which represents approximately 37% of bitcoin's total hashrate, China

alone controls >70% of Bitcoin's global hashrate - a measurement of how much computing power goes towards mining Bitcoin. US took 3rd place with 5.3% while Malaysia is 4th place with 3.8% share of global hashrate.

- Breakdown by China city level puts Xinjiang (30%) and Sichuan (18.6%) in the lead. Lack of regulations and extremely cheap electrical rates in China previously saw the rise of mining activities there but according to a recent report from 8btc, Chinese Bitcoin miners have started to gradually migrate to Nordic countries like Sweden and Norway due to eco-friendly green energy in the region.

Bitcoin Mining Market Share (% of Global Hashrate)

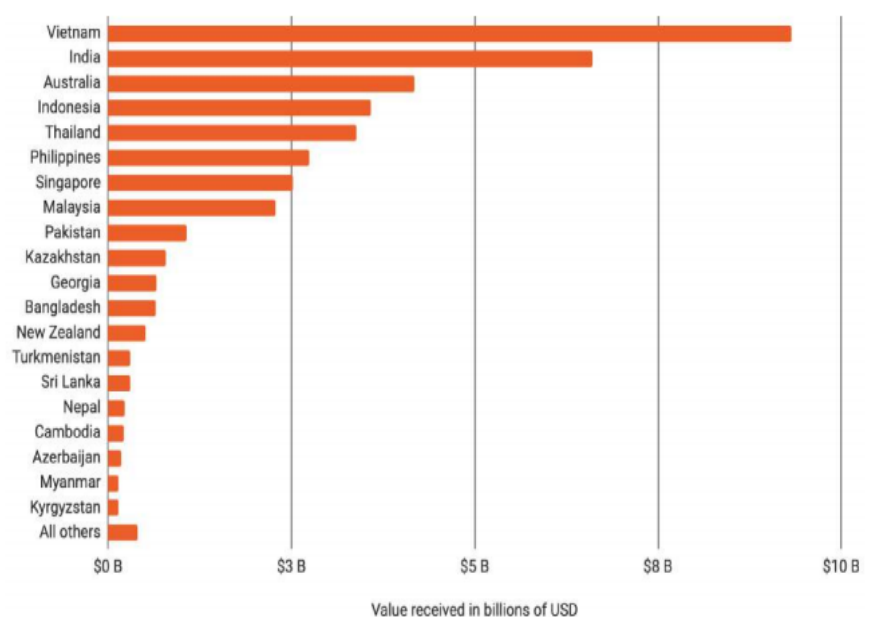


Note: Underlying data provided by BTC.com, Poolin and ViaBTC (data from 3Q 2019 to 2Q 2020)

Source: University of Cambridge Centre for Alternative Finance, Maybank FX Research & Strategy

Central & Southern Asia and Oceania region has the 5th most cryptocurrency activity out of the 8 regions with \$40bn cryptocurrency received. This represents 11% of all crypto transacted. Vietnam and India take the lead. Retail activity is high and the study suggests users are turning to cryptocurrencies for remittances and everyday transactions.

Value Received on-chain by Country (Central & South Asia and Oceania region)



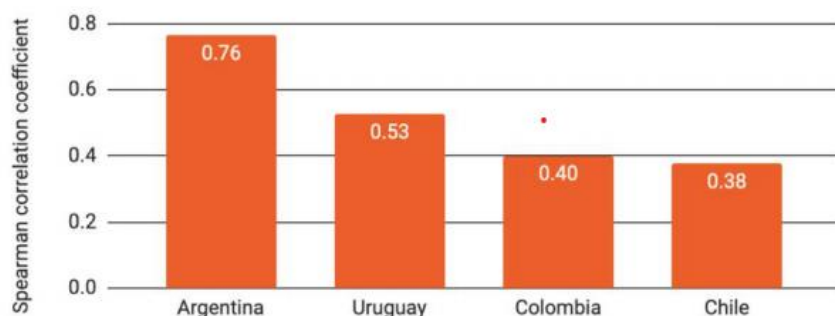
Source: Chainalysis

As an Alternative Store of Value and Hedge in Times of Uncertainties. The report also noted that Venezuela represents an example of what drives crypto adoption in EM countries and how citizens use crypto to mitigate economic instability.

- Central Bank of Venezuela (BCV) has put in circulation 1mio Bolivar banknote, in addition to new banknotes of 200,000 and 500,000, reflecting the hyperinflation Venezuela has been experiencing for years. BCV reported that CPI increased 2,665% in 2020).

Their data also show that people in LATAM use cryptocurrency more, as a store of value when the domestic currency was losing value to inflation. Correlations between USD value of P2P crypto transaction volume and currency devaluation in some LATAM nations such as Argentina, Uruguay, Colombia and Chile are significant.

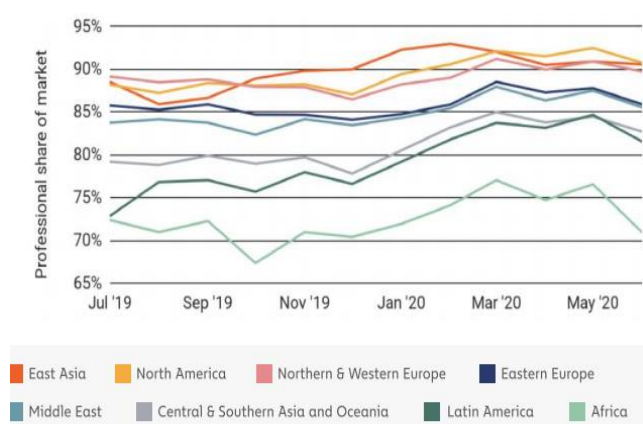
Correlations Between P2P Transaction Volume (Bitcoin) and LATAM FX per USD (Jul-2019 to Jun-2020)



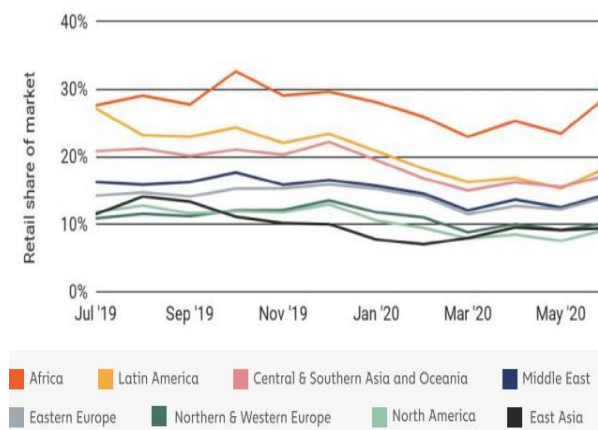
Source: Chainalysis, Localbitcoins, paxful via CoinDance

Professional Traders Dominate Crypto Activities Globally. Around 90% of all transaction transferred by East Asia, North America and Northern & Western Europe in most months (over Jul-2019 to Jun-2020) were attributed to professional-sized transfers (above \$10k USD-equivalent of cryptocurrencies).

Professional share of Cryptocurrency volume transferred by Region (Jul 2019 to Jun 2020)



Retail share of Cryptocurrency volume transferred by Region (Jul 2019 to Jun 2020)



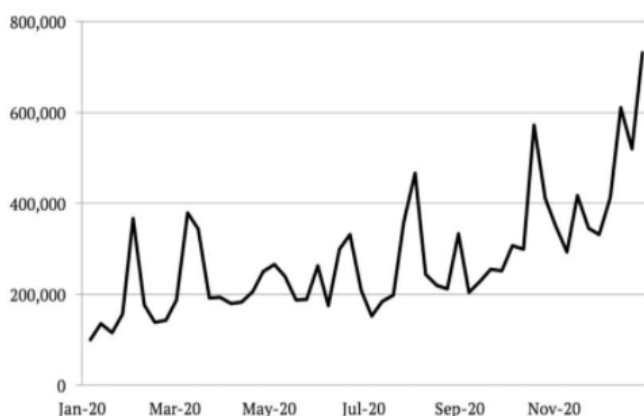
Source: Chainalysis

Remittances the Main Driver of Retail Demand in ASEAN. In terms of retail activity (considerably smaller relatively to professional), Central and Southern Asia and Oceania (CSAO) region as a whole has the 3rd highest share, after Africa and Latin America regions. Some of these activities in the CSAO region is likely due to overseas remittances. This is also in line with the Global Consumer Survey

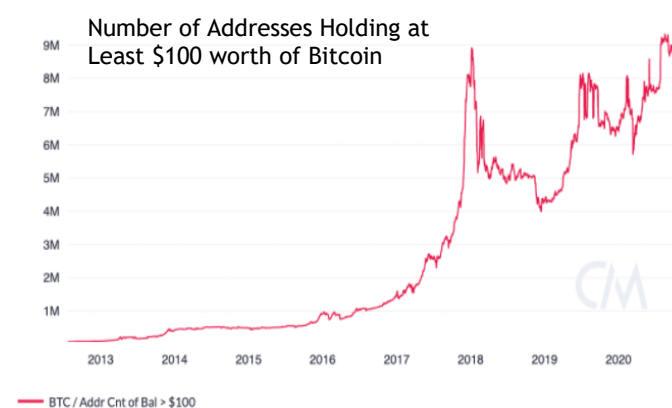
conducted by Statista¹, which shows crypto adoption is gathering momentum in Southeast Asia, with 21% of Vietnamese and 20% of Filipinos saying they used digital assets in 2020 and that remittances make up much of Vietnamese and Filipinos' demand for crypto.

Bitcoin Demand is Broad Based. Chainalysis data revealed that “whale wallets” bought 731,000 Bitcoins from exchanges in the last week of Dec-2020, this represents a third of all Bitcoins bought on exchanges during that period. The buying interest is also not just confined to “whale” players but small/medium players. Trend basically suggests that interest in Bitcoin is broad-based and is a positive signal for long-term adoption.

Growing Demand from Big Players “Whale Wallets” and



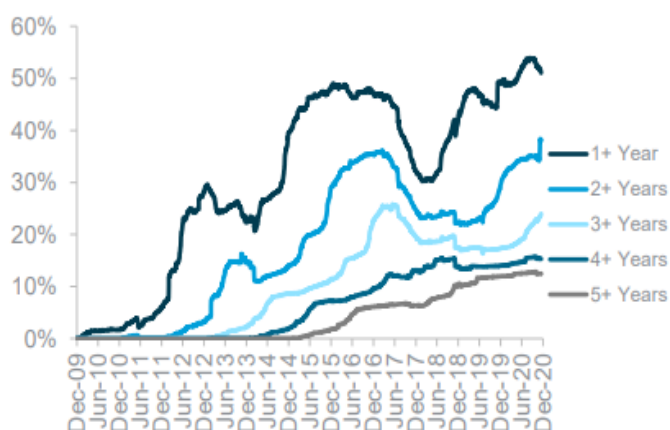
... Smaller Players As Well



Source: Chainalysis, Coin Metrics

Bitcoin Increasingly Used as a Store of Value. The holding period for Bitcoin has experienced a significant increase, with the % of Bitcoin held for at least a year rising to all-time highs, underscoring the point that Bitcoin may no longer be perceived as a short-term speculation vehicle but rather a potential shift in perception and use as a portfolio diversification tool, a store of value or even a macro hedge. Bitcoin velocity is also near its lowest levels since 2011. Falling velocity is consistent with the notion that Bitcoin is increasingly being used as a store of value, rather than a medium of exchange.

% Bitcoin Supply Held Over Time



Bitcoin Velocity Near Lows



Source: Coin Metrics

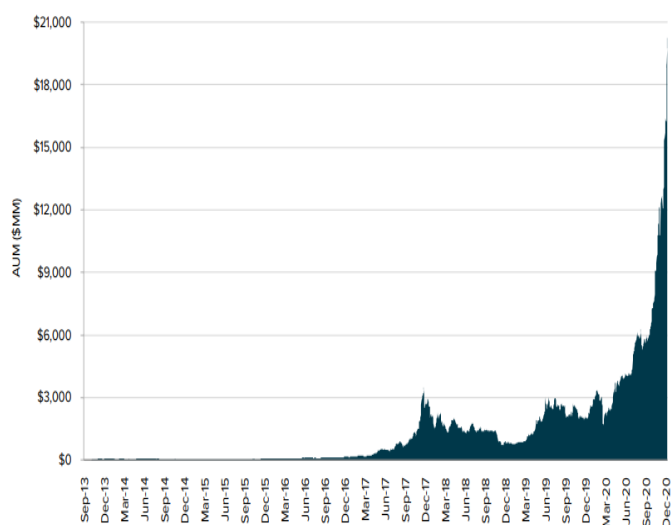
¹ How Common is Crypto?, Statista Global Consumer Survey, Feb 2021
March 19, 2021

2020 Widely Recognized as the Year Bitcoin Goes Institutional. There are a handful of anecdotal examples of institutional interests in cryptocurrencies picking up pace. In Aug-2020, Fidelity launched its inaugural bitcoin-only fund while MicroStrategy announced adding Bitcoin to Treasury (subsequently reported that it has purchased more than \$1bn worth of Bitcoin). In Nov-2020, PayPal announced that its users in US can buy, sell and hold 4 cryptocurrencies including Bitcoin, Ethereum, Litecoin and Bitcoin Cash. In Dec-2020, MassMutual invested US\$100mio in Bitcoin. In Jan-2021, BlackRock added cash-settled Bitcoin futures as an eligible investment to 2 funds - BlackRock Strategic Income Opportunities and BlackRock Global Allocation Fund Inc. while Tesla revealed it bought US\$1.5bn worth of Bitcoin. Most recently, Morgan Stanley becomes the first big US bank to offer its wealthier clients access to 3 Bitcoin funds.

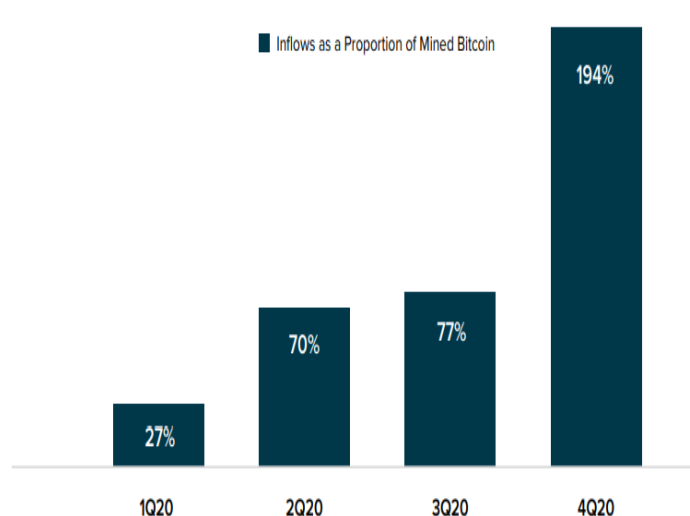
Other ways to gauge institutional activity is via Grayscale's Bitcoin Trust² (GBTC) - the only publicly traded exchange-traded fund investing in Bitcoin and "Whale Wallets" (defined as wallets holding more than 1,000 Bitcoins).

For Grayscale, its crypto assets under management (AUM) rose from \$2bn in early-2020 to \$20.2bn in end-2020 and has now exceeded \$30bn as of Jan-2021, representing 1,500% increase. Grayscale highlighted that the growth was due to institutional investors, particularly the hedge funds. It also noted that inflows into GBTC have continued to rise as a % of mined Bitcoin to nearly 200% in 4Q-2020 - a case of demand outstripping supply.

Grayscale AUM - a Proxy of Institutional Flow



Inflows into GBTC Outstripped Mined Bitcoins



Source: Grayscale, Coin Metrics

Uncorrelated Returns the Main Appeal to Institutional Players. We looked at a few surveys here to understand Institutional investors' behaviors and attitudes towards cryptocurrencies. In the next section, we attempt to see if some of these perceptions of Bitcoin price properties hold true over time, utilizing Bitcoin's evolving correlations with other asset classes including typical FX.

A more recent study conducted by Bitwise Asset Management (a leading provider of index and beta crypto funds based in San Francisco) in Dec-2020 revealed that 54% of advisors (respondents) selected "low or uncorrelated returns" as a key

² Grayscale investments is the world's largest digital currency asset manager and sponsor of GBTC, solely and passively invested in Bitcoin, enabling investors to gain exposure to Bitcoin in the form of a security while avoiding the challenges of buying, storing and safekeeping Bitcoin directly. It is also the first digital currency investment vehicle to attain the status of an SEC reporting company. Further details can be found [here](#): Form 10 of US SEC.

motivation for including crypto in portfolios while “high potential returns” and “inflation hedging” saw an uptick of interests from advisors.

What Is Attractive About Adding Crypto Exposure to Client Portfolio

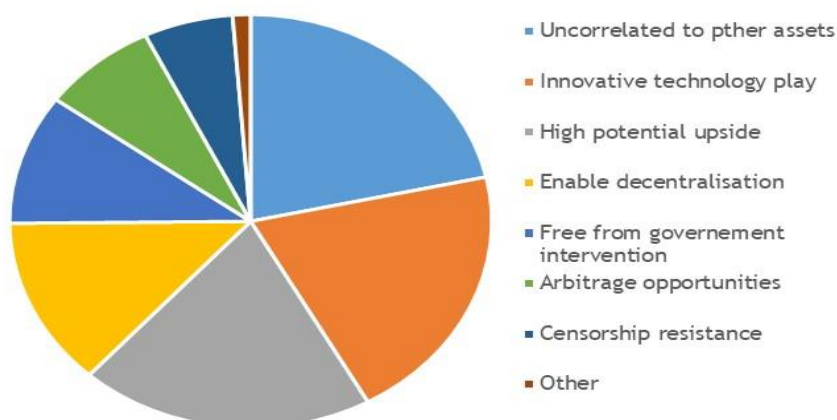
	2021 Survey	2020 Survey
Low of Uncorrelated Returns with Other Asset Classes	54%	54%
High Potential Returns	38%	30%
Something New to Offer Clients	28%	23%
Clients Are Asking for it	27%	26%
Inflation Hedging	25%	9%
Others	7%	9%

Source: Bitwise/ETF Trends 2021 Benchmark Survey of Financial Advisor Attitudes Toward Cryptoassets, Jan 2021

An earlier survey (published in Jun-2020) conducted by Fidelity Digital Assets in collaboration with Greenwich Associates across 800 US and European institutional investors and ultra-high net worth individuals) also revealed similar findings with Bitwise/ETF Trends survey. Most (36%) institutional investors (respondents) chose “uncorrelated to other assets” as the main appeal of digital assets, followed by innovative technology play (34%) and high potential upside (33%).

Fidelity noted that the survey concluded before pandemic which led to broad de-risking in Mar-2020 and that drove the flight from relatively more liquid assets to cash causing correlation of all assets to go to one. *Digital assets were also sold off alongside traditional assets, seemingly damaging one of the most frequently cited value propositions - lack of correlation.* But Fidelity noted that digital assets like Bitcoin have starting to move independently after the period of elevated correlation.

Appeal of Digital Assets



Source: The Institutional Investors Digital Asset Survey, 2020 Review Fidelity Digital Assets, Maybank FX Research & Strategy

Characterizing Bitcoin Price Dynamics

Frequent observers of Bitcoin and other crypto assets may find prices being prone to periods of wild swings induced by positive or negative crypto-specific news.

Supply and Demand Drivers

Examples of **positive demand drivers** could include **news of greater mainstream adoption, instances of public support by influential individuals, more benign regulatory developments, or progress in hitting project-specific milestones.**

Examples of negative demand drivers may include greater regulatory scrutiny or in some cases, outright imposition of penalties with regards to crypto-related activities. For instance, after a weekend rally that took it past US\$61,000, bitcoin declined by more than 10% on 15-16 Mar, with markets focusing on renewed threats from the Indian government in banning cryptocurrencies. Authorities are reportedly preparing a bill that would criminalize possession, issuance, mining, trading and transferring of crypto-assets. If the bill is passed, it would be among the strictest restrictions of its form globally.

Concerns over scams or fraud over parts of the cryptocurrency ecosystem may also induce periods of risk aversion in crypto asset markets. A Jun 2018 tweet from South Korean crypto exchange Coinrail confirming that a hack had caused a loss of 30% of the tokens traded on the platform led to a 10% tumble in Bitcoin price. More recently, a 6% sell-off in Bitcoin on 21 Dec 2020 was linked to a hack in a popular hardware wallet for crypto users, Ledger.

Meanwhile, supply-side drivers are a tad fuzzier for Bitcoin and other crypto assets. **Bitcoin and most other cryptocurrencies have finite supply by design.** There will only be 21 million Bitcoin in existence, with around 18.7 million having been “mined” and currently in circulation. In this case, **supply side expectations for individual currencies are usually stable**, except perhaps in the case of “halving” (or equivalent) events. “Halving” refers to the process whereby the block reward for mining new bitcoin is halved when miners verify transactions, meaning that the pace of increase in “new” Bitcoin supply is halved as well. Bitcoin halving occurs approximately every four years. Despite this being a well-known piece of information, Bitcoin price has shown some tendency to rise in the lead-up to and after halving events (July 2016, May 2020).

Another supply-side consideration could be the increasing supply of crypto assets as a whole, with new projects being created frequently. On this, we note that the crypto space tends to be “top-heavy” in nature, with Bitcoin accounting for around 60% of overall crypto asset market capitalization, and the top 10 cryptocurrencies accounting for around 85%. This implies that cryptocurrencies with poorly-designed supply dynamics (i.e., supply increases too quickly), poor project fundamentals, weak followings, usually see negligible relative value. **Supply dynamics for the “core” part of the crypto market which sees the greatest interest is likely to be largely stable over time and price swings are more likely to come from demand side triggers.**

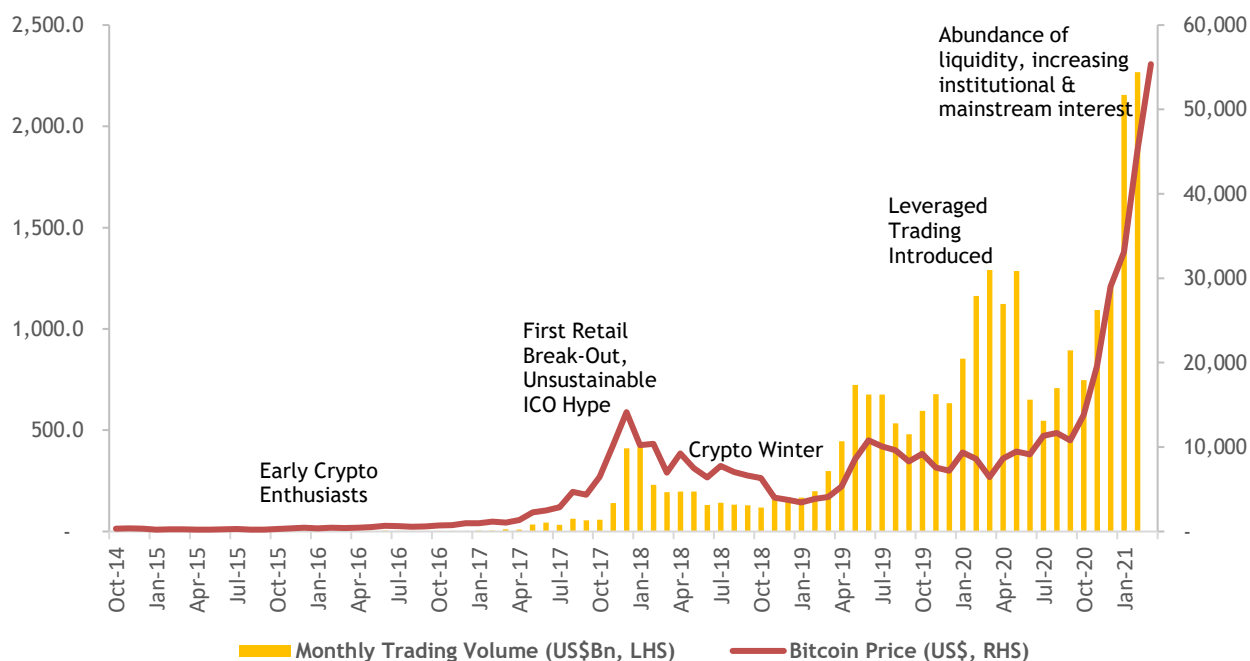
But aside from the above-mentioned price triggers, **Bitcoin is also increasingly thought to exhibit linkages to the broader macro and financial landscape.** For instance, it has been touted to have many “roles”, including but not limited to:

- (i) a speculative risk-on asset,
- (ii) a haven asset,
- (iii) an inflation hedge,
- (iv) a replacement for the dollar and other fiat currencies.
- (v) portfolio diversifier.

In truth, there is probably no one “correct” answer. In this section, we attempt to shed some light on Bitcoin’s fluid nature by:

- (i) tracing the evolution of the different phases in Bitcoin price and trading volumes over the years,
- (ii) using rolling correlations to identify Bitcoin’s relationships with different conventional financial asset prices.

Bitcoin’s Wild Ride Over the Years



Source: Bloomberg, Yahoo Finance, Maybank FX Research & Strategy

Prior to 2017, Bitcoin price was largely hovering below US\$1,000. Over this period, trading activity was likely dominated by early crypto enthusiasts, but even then, there were tentative signs of increasing interest in Bitcoin as an asset, with monthly trading volumes quadrupling from just below US\$1bn in late 2014 to US\$3.6bn by Dec 2016.

The first break-out in retail interest in Bitcoin occurred in late 2017, buoyed in part by a proliferation of Initial Coin Offerings (ICO) promising incentive stakes in emerging crypto/blockchain projects in various forms. Retail investors piled into cryptocurrency assets mainly on hype and momentum, but the fierce rally in Dec 2017 to Jan 2018 proved unsustainable.

Over the course of 2018, many projects in the cryptocurrency space failed due to fraud, technological constraints, or lack of mainstream functional interest. There was also a cloud of uncertainty regarding increasing regulatory scrutiny on cryptocurrency-related activities. Trading volumes pulled back and Bitcoin prices were largely on the decline in 2018, with some online commentators calling this period the Crypto Winter.

While Bitcoin prices continued to swing in familiar trading ranges in 2019, the main game-changer was the large increase in trading volumes over this period. Monthly trading volumes almost quadrupled from US\$169bn in Dec 2018 to US\$634bn in Dec 2019. This occurred on the back of the introduction of margin trading in Bitcoin products by multiple large crypto exchanges, which likely attracted large retail investors and nascent institutional investor interest. Global interest in Facebook’s Libra project also brought renewed attention to the cryptocurrency space in the same year.

Aside from a liquidity crunch-linked pullback in Mar at the onset of Covid-19, 2020 has proven to be a spectacular year for Bitcoin. Accommodative monetary and fiscal policy resulted in an abundance of liquidity which could have spilled over to the cryptocurrency space. Dedicated crypto funds such as Grayscale Bitcoin Trust saw robust inflows, and declarations of investment intent or positions by influential individuals such as Paul Tudor Jones and Stanley Druckenmiller, or by publicly listed companies such as Tesla or MicroStrategy (prominent business analytics platform) added evidence of increasing interest among high net worth individuals, businesses and institutions.

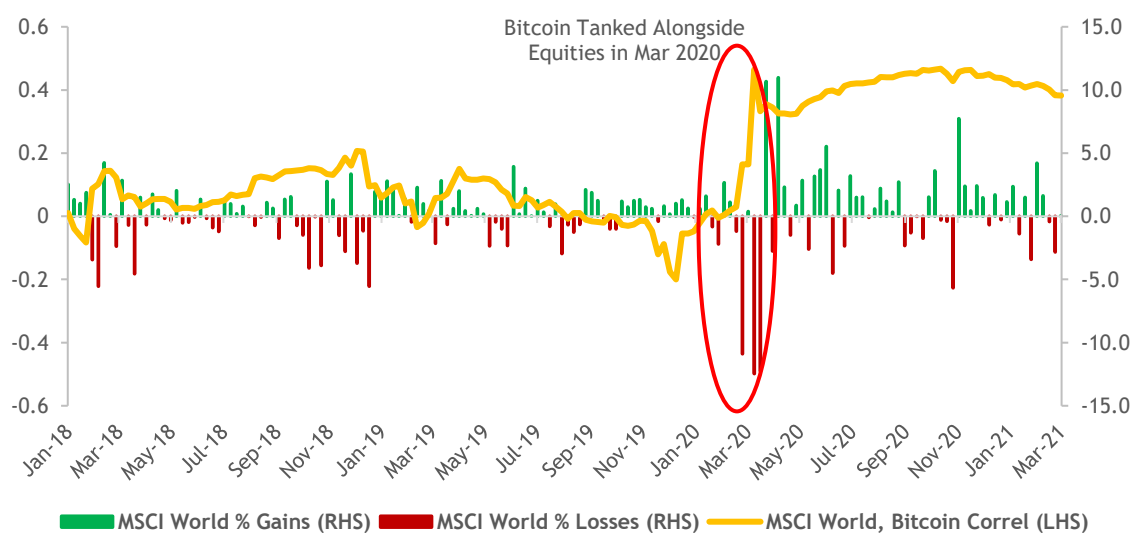
As a result, both Bitcoin prices and trading volumes reached new record highs in early 2021.

Bitcoin's Evolving Price Properties

We utilize 52-week rolling correlations of returns in Bitcoin and other assets to better understand the nature of Bitcoin over different periods.

(i) Risk-on Asset Behaviour Emerged During Post-Covid; Not a Haven

52-Week Rolling Correlation Between Bitcoin & MSCI World % Returns



Source: Bloomberg, Maybank FX Research & Strategy Estimates

Co-movements in Bitcoin and equities (proxied by MSCI World Equity Index) were largely modest in extent prior to 2020 (i.e., yellow line not significantly different from 0). Moves in equities and bitcoin over this period were likely driven by different factors.

This changed with the onset of Covid. As central banks and fiscal authorities moved to calm markets, an abundance of liquidity arising from global monetary and fiscal stimulus, and sustained risk-on sentiments anchored on the global post-Covid recovery narrative led **both stocks and bitcoin to rise alongside**. In other words, returns in equities and Bitcoin became directionally aligned over this period.

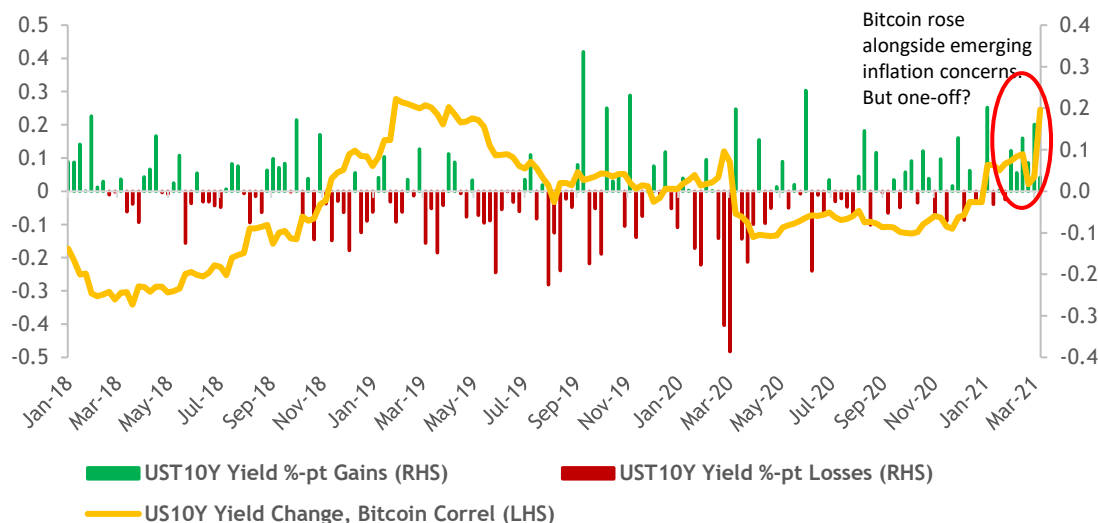
We postulate that Bitcoin and equity price moves may remain positively correlated in the near-term, but as the extent of global monetary and fiscal stimulus gradually tapers going forward, the magnitude of the positive correlation might ease. When their correlation declines, Bitcoin may be better suited to perform the function of a portfolio diversification asset.

Also, despite frequent claims that Bitcoin has the characteristics of a haven asset, this is likely not the case. In Mar 2020, fears of lockdowns and a stand-still in economic activity led to a liquidity crunch and aggressive sell-offs in Bitcoin

occurred alongside broader equity declines (red bars). This twin sell-off also occurred in Q4 2018 as well. Given that Bitcoin is not able to compensate for equity losses (i.e., requires negative correlation between Bitcoin and equities) in asset portfolios, Bitcoin's safe haven characteristics appears lacking at the moment.

(ii) Insufficient Evidence of Broad Inflation Hedging Properties

52-Week Rolling Correlation Between Bitcoin Returns & UST10Y Yield Changes



Source: Bloomberg, Maybank FX Research & Strategy Estimates

Concerns over longer-term inflationary pressures can be proxied by increases in the UST 10Y yield. If Bitcoin has inflation hedging characteristics, it should exhibit a positive correlation with UST yields, especially in periods when UST yields are increasing, i.e., yellow line should be in positive territory when we see more green bars. **But there is a lack of evidence from the chart above to show that this holds historically.**

A quick caveat. We note that the latest episode of yield spikes in Feb-Mar 2021 (rising inflation concerns) was indeed accompanied by rising bitcoin prices. In this instance, we postulate that a common trigger contributed to both moves. More specifically, the massive US\$1.9trn stimulus package in the US could have led to expectations for expansion in consumption demand, government borrowings, demand-pull price pressures, while also providing incremental retail funds (fiscal handouts) for potential injection into Bitcoin markets.

To some extent, this demonstrates that **Bitcoin may potentially be able to hedge against sporadic bouts of inflationary expectations induced by episodes of large fiscal handouts.** But aside from the extraordinary circumstances during Covid-19 pandemic, **such instances may be much rarer going forward.**

We draw a parallel to gold here. Studies have shown that the relationship between gold and conventional, lukewarm inflation trends to be quite weak. **Rather, gold performs better as a hedge against large inflation shocks**, such as the spikes in price pressures caused by surging oil prices in the late 1970s and early 1980s. The same may be true for Bitcoin due to arguments of its scarcity (finite supply of 21mn, circulating supply of 18.7mn), but this remains to be seen.

Regression of $\log(\text{Bitcoin})$ Against Inflation

Betas	US Inflation	SG Inflation	MY Inflation	ID Inflation	TH Inflation	PH Inflation
Bitcoin	-0.8	-0.8	-0.2	-0.7	-0.3	0.0

Note: US inflation refers to US PCE Core, while ASEAN inflation refers to monthly headline CPI inflation.

Source: Bloomberg, Maybank FX Research & Strategy Estimates

For what it's worth, we also do a quick quantitative check by regressing $\log(\text{Bitcoin})$ against inflation readings in US and the ASEAN countries, with results shown in the table above. The estimated betas can be interpreted as % price moves in Bitcoin per %-point increase in inflation. We used monthly data from Jan 2017 to Feb 2021, as price moves prior to 2017 (when price was <US\$1k) were likely induced primarily by developments in the crypto space.

Notably, estimated betas range from negligible to modestly negative, whereas positive betas (asset price rises when inflation rises) would be required to demonstrate inflation hedging properties. **The results here are also likely skewed due to Bitcoin's short history.** From 2017 till now, Bitcoin prices were on a rapid ascend whereas inflationary pressures in US and ASEAN were muted or largely softened.

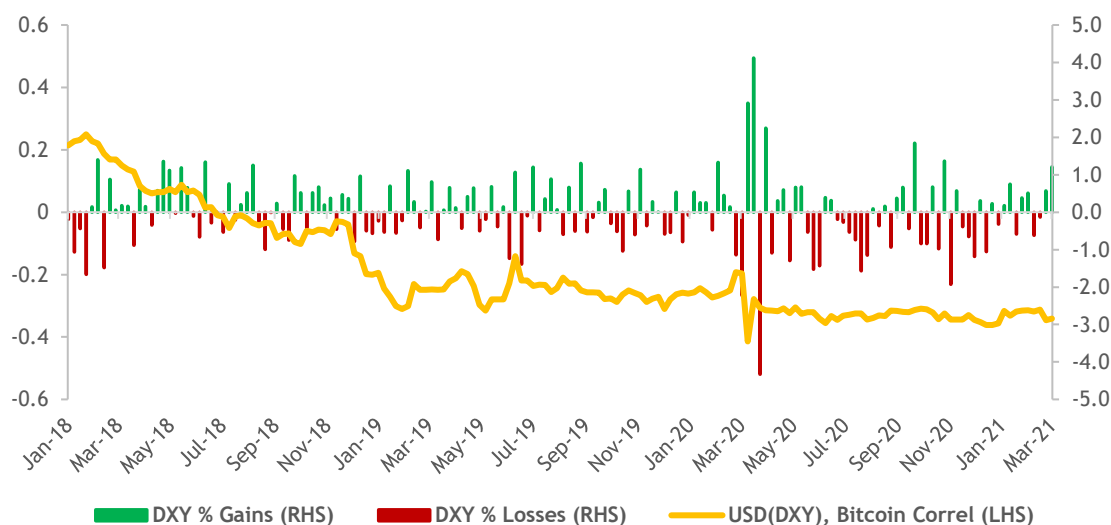
Descriptive Statistics of Returns (Jan 2017 to Feb 2021)

	Bitcoin	Gold	US 10Y Treasury Note
Mean of Mthly Return (%)	11.59	0.80	0.15
Std Deviation of Mthly Returns (%)	27.83	3.57	1.2

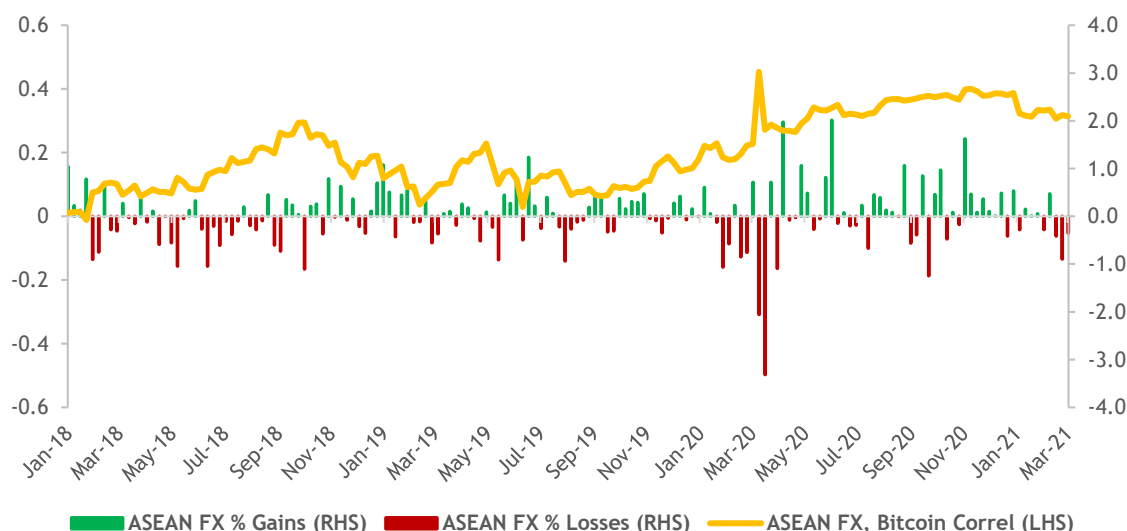
Source: Bloomberg, Maybank FX Research & Strategy Estimates

Lastly, we note that volatility in Bitcoin price moves is many-fold that of gold or US bonds. The perception of Bitcoin's value changes rapidly due to its complex set of price drivers (discussed in earlier section), and Bitcoin may just be too new an asset class to have a stable set of price properties.

In short, **Bitcoin has negligible inflation hedging properties, except possibly in instances of large inflation shocks or when inflation concerns are induced by large fiscal handouts, but Bitcoin's short history means that it has yet to prove itself in these aspects.**

(iii) Emerging Negative Correlation with USD, Positive Correl. with ASEAN FX**52-Week Rolling Correlation Between Bitcoin Returns & USD (DXY) % Changes**

Source: Bloomberg, Maybank FX Research & Strategy Estimates

52-Week Rolling Correlation Between Bitcoin Returns & ASEAN FX % Changes

Note: ASEAN FX refers to average of changes in SGD, MYR, THB, IDR, PHP (USD-crosses).

Source: Bloomberg, Maybank FX Research & Strategy Estimates

Bitcoin's negative correlation with USD started emerging in 2019, and rose in magnitude in 2020.

While some crypto enthusiasts have touted Bitcoin as a potential competitor to the dollar, this is unlikely to be the true cause behind this negative co-movement. According to the latest (2019) BIS Triennial Survey of Turnover in OTC FX markets, trading in FX reached US\$6.6trn per day in Apr 2019, with the USD being on one side of 88% of all trades. On the other hand, daily bitcoin trading volumes pale in comparison, averaging US\$50-60bn daily in the first half of Mar 2021.

Rather, one possible reason could be that with Bitcoin prices commonly denominated in USD, periods of decline in the dollar (vs. other FX) leads Bitcoin to look cheaper in local currency terms for global investors, and this might encourage incremental bitcoin demand at the margin, supporting prices. To some extent, this is corroborated by rising positive correlation between Bitcoin returns

and ASEAN FX over the past one-and-a-half years. **This effect may be more pronounced when trading volumes are larger.** We note that as identified earlier, 2019 was the year when Bitcoin trading volumes spiked due to the introduction of leveraged trading in Bitcoin products as well as potential nascent institutional interest.

Of course, a **softer USD, rising ASEAN FX environment post Mar-2020 is usually also synonymous with a positive global growth recovery outlook**, so a rising Bitcoin over this period could be **pricing in procyclical elements in market sentiments** as well.

Going forward, if Bitcoin trading volumes continue to be on the uptrend, its negative correlation with the dollar could become more entrenched over time.

Conclusion

While the 2017 run-up in crypto was largely driven by private traders - crypto enthusiasts, speculators, the 2020-21 run-up is mainly driven by institutional traders - funds, asset management companies, financial institutions. The cryptocurrency market today can be described as more mature than 2017 - wider variety of derivatives and futures as well as Bitcoin-funds.

Regulators have also taken interest with a burst of exploratory research and trials by global central banks on wholesale and retail CBDCs. If we can compare the adoption of cryptocurrency to the adoption of internet, Bitcoin has approximately the same number of users as the internet in 1997. According to International Data Corporation (IDC), 70mio people were connected to the internet by 1995 (1.7% of world's population) but this grew to 5.8% of world population in 2000. Internet World Stats show that the number of users on the internet ballooned to 4.8bn by the end of 2020, representing 62% of world's population. Bitcoin's mass adoption is growing at a fast rate when compared to the internet and is projected that Bitcoin may have around 1bn users within the next 4 years.

While Bitcoin looks likely to stay around for a while, it should be noted that its nature is dynamically evolving over time (see table of findings), and participants in the cryptocurrency markets should keep in mind the age-old adage that change is the only constant.

Popular Attributes	Interim Findings
Speculative Risk-on Asset?	Yes, near-term. Bitcoin and equity price moves may remain positively correlated in the near-term, but this relationship likely arose as a result of the recent flush in global liquidity, and may ease as global monetary and fiscal stimulus gradually tapers going forward.
Safe Haven Asset?	No. Bitcoin tends to see sell-offs when risk aversion spikes in broad market sentiments.
Inflation Hedge?	Likely ineffective hedge against conventional, lukewarm inflation. Due to scarcity, hedging effects may be more significant in instances of large inflation shocks or when inflation concerns are induced by large fiscal handouts, but Bitcoin's short history means that it has yet to prove itself in these aspects.
Dollar/Fiat Replacement?	No, but investors should note Bitcoin's emerging negative correlation with dollar, and concomitant positive correlation with other FX (e.g., ASEAN currencies), when including Bitcoin in asset portfolios with significant currency exposures.
Portfolio Diversifier?	To some extent, given that price swings are still tied to developments in the crypto space (regulation, tech, public adoption). Could be more effective as a diversifier when positive correlation with equities fade going forward.

Source: Maybank FX Research & Strategy

Glossary - Some Key Terms Used in Report

Term	Brief Definition
CBDC - Central Bank Digital Currency	A digital form of money issued by the monetary authority of the country that is part of its fiat currency.
DLT - Digital Ledger Technology	A digital system that enables simultaneous records of transactions of assets across a network in multiple places by multiple participants.
DvP - Delivery Vs. Payment	A settlement process to ensure payment is made before or at the same time as the delivery of the securities.
LSM - Liquidity Savings Mechanisms	An arrangement of payments that features netting and offsetting of transactions to typically reduce the overall liquidity requirement.
RTGS- Real Time Gross Settlement	An instantaneous fund transfer system.

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Published by:



Malayan Banking Berhad
(Incorporated In Malaysia)

Foreign Exchange

Singapore

Saktiandi Supaat
Head, FX Research
saktiandi@maybank.com.sg
(+65) 6320 1379

Christopher Wong
Senior FX Strategist
Wongkl@maybank.com.sg
(+65) 6320 1347

Fiona Lim
Senior FX Strategist
Fionalim@maybank.com.sg
(+65) 6320 1374

Yanxi Tan
FX Strategist
tanyx@maybank.com.sg
(+65) 6320 1378

Fixed Income

Malaysia

Winson Phoon Wai Kien
Fixed Income Analyst
winsonphoon@maybank-ke.com.sg
(+65) 6231 5831

Se Tho Mun Yi
Fixed Income Analyst
munyi.st@maybank-ib.com
(+60) 3 2074 7606

Indonesia

Juniman
Chief Economist, Indonesia
juniman@maybank.co.id
(+62) 21 2922 8888 ext 29682

Myrdal Gunarto
Industry Analyst
MGunarto@maybank.co.id
(+62) 21 2922 8888 ext 29695

Sales

Malaysia

Azman Amiruddin Shah bin Mohamad Shah
Head, Sales-Malaysia, GB-Global Markets
azman.shah@maybank.com
(+60) 03-2173 4188

Singapore

Janice Loh Ai Lin
Head of Sales, Singapore
jloh@maybank.com.sg
(+65) 6536 1336

Indonesia

Endang Yulianti Rahayu
Head of Sales, Indonesia
EYRahayu@maybank.co.id
(+62) 21 29936318 or
(+62) 2922 8888 ext 29611

Shanghai

Joyce Ha
Treasury Sales Manager
Joyce.ha@maybank.com
(+86) 21 28932588

Hong Kong

Joanne Lam Sum Sum
Head of Corporate Sales Hong Kong
Joanne.lam@maybank.com
(852) 3518 8790