

Research Report

ETFs and the Growing Virtual Asset Ecosystem in Global Financial Markets



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SUMMARY

Since the 1990s, the internet has passed through three distinct evolutionary stages. The first, Web 1.0, emerged in the 1990s and was built on static web pages with limited interaction between users and content creators. Web 2.0 followed in the 2000s, built on responsive webpages offering interactivity, social connectivity, and user-generated content.

Web 3.0 is the latest evolution stage for the industry and is built on advanced technologies such as blockchain. Web 3.0 allows users to create, own and exchange virtual assets in a decentralised storage model, where users' identities are attributed to a digital wallet connected to a distributed network (always or when in use) with no single, centralised operator.

As Web 3.0 models have grown, so has the market for virtual assets, including bitcoin, ether and other cryptocurrencies and tokens. Despite a high degree of decentralisation through blockchain, new market intermediaries have emerged in the ecosystem, including crypto exchanges and crypto brokers, providing financial services for virtual assets.

With product and service innovation expanding, investor participation in the virtual asset space is increasing. Recent studies show that virtual assets offer different levels of return and volatility profiles compared to traditional financial asset classes.

However, new products and services come with risks. Therefore, market authorities and regulators have adopted various regulatory regimes for virtual assets to balance market development needs and financial stability.

Currently, investors can access virtual assets directly via crypto firms and indirectly through cryptocurrency derivatives, exchange-traded funds (ETFs) and other investment funds, as well as shares in blockchain companies.

In recent years a diverse set of virtual asset ETFs with various investment styles have been launched in global markets. While virtual asset ETFs offer risk-return profiles typically different from those of traditional financial assets, they may also potentially expose investors to higher risks.

With the listing of two ETFs on bitcoin futures and one ETF on ether futures as of January 2023, the Hong Kong market has become the first in Asia to offer virtual asset ETFs. Further regulatory enhancements is expected to help grow the virtual asset ecosystem in Hong Kong in the future.

1. THE GLOBAL DEVELOPMENT OF VIRTUAL ASSETS

1.1 Web 3.0 and blockchain technology

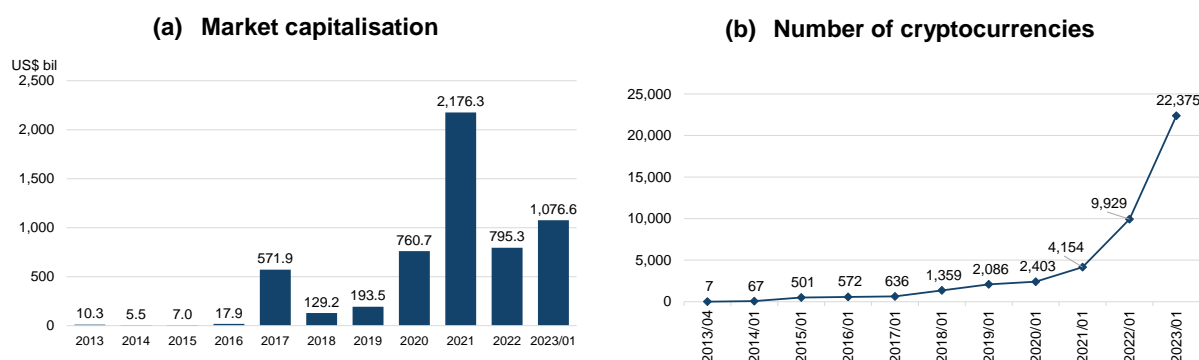
The third generation of the internet, or Web 3.0, is defined by decentralisation, openness and high user utility¹, anchored in advanced technologies like blockchain².

In Web 3.0, users create, own and exchange virtual assets in a decentralised storage model where users' identities can be attributed to a digital wallet connected to a distributed network (always or when in use) with no single, centralised operator.

In the financial markets, the emergence of Web 3.0 has brought forward the development of a new ecosystem of virtual assets. Virtual assets refer to all types of representation of value or claims in digital form that rely on the use of distributed ledger technology (DLT)³, excluding central bank digital currencies (CBDC), which are digital forms of national currencies that are legal tender (i.e. the direct liability of the central bank)⁴. In addition to the emergence of virtual assets, in Web 3.0 there are also innovations in the processes of issuance, trading and settlement for virtual assets and existing financial assets.

The market capitalisation of virtual assets has increased from US\$10.3 billion in 2013 to US\$1,076.6 billion in January 2023 (see Figure 1a), or to approximately 2% of the combined equity market capitalisation of the New York Stock Exchange (NYSE) and NASDAQ⁵. The number of cryptocurrencies has risen significantly from seven in April 2013 to 22,375 at the end of January 2023 (see Figure 1b). Alongside, the total number of global crypto owners rose from 306 million in January 2022 to 425 million in December 2022⁶.

Figure 1. Market capitalisation and number of cryptocurrencies (April 2013 – Jan 2023)



Source: Data of market capitalisation was obtained from *Coinmarketcap.com* and data of number of cryptocurrencies during April 2013 to January 2022 was obtained from “How many cryptocurrencies are there? Guide to the crowded market”, published on *capital.com*, 17 July 2022, and that of January 2023 was obtained from *Coinmarketcap.com*. Data downloaded on 30 January 2023.

¹ The Web refers to the World Wide Web (WWW), which evolved from Web 1.0 to Web 2.0 and then to Web 3.0. Web 1.0 refers to the first generation of the Web since launch during the 1990s and early 2000s — the read-only web for information sharing. Web 2.0 refers to the second generation of web at the current stage — read-write web which facilitates interactivity, social connectivity, and user-generated content through platform providers. See “Web 3.0 explained, plus the history of Web 1.0 and 2.0”, published on *Investopedia.com*, 23 October 2022.

² See “How will Web3 and the metaverse create opportunities”, published on Ernst & Young’s website, 12 October 2022.

³ DLT is a decentralised digital synchronised database managed by multiple participants, across multiple nodes. Blockchain is a type of DLT where transactions are recorded with an immutable cryptographic signature called a hash. (See “What is distributed ledger technology?”, webpage on *r3.com*).

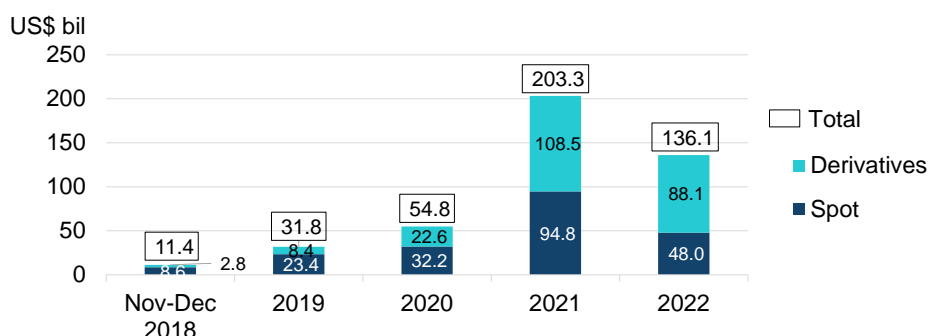
⁴ See “Crypto-assets: Implications for consumers, investors and business”, published on the website of the US Department of the Treasury, September 2022.

⁵ Calculated based on the monthly statistics on the World Federation of Exchanges (WFE).

⁶ The number of crypto owners is measured by the number of wallets. See “Crypto market sizing report 2022”, *crypto.com*, 19 January 2023.

Cryptocurrency trading has also grown, with the average daily turnover (ADT) of cryptocurrencies (including spot and derivatives) increasing from US\$31.8 billion in 2019 to US\$136.1 billion in 2022 (see Figure 2). Cryptocurrency spot trading ADT grew by 105% from US\$23.4 billion to US\$48.0 billion, representing about 21% of the combined ADT of equities on NYSE and NASDAQ over the same period⁷.

Figure 2. ADT of cryptocurrencies (Nov 2018 – 2022)



Note: ADT is calculated as the total turnover value divided by the number of calendar days.

Source: "Exchange review", monthly issues since Jun 2018, *cryptocompare.com*.

1.2 The ecosystem of virtual assets — products, services and participants

According to a International Monetary Fund (IMF) report, virtual assets can be classified into unbacked crypto-assets (e.g. bitcoin and ether), stablecoins, tokenised securities, utility tokens, non-fungible tokens (NFTs) and CBDCs. Table 1 presents the key characteristics of each type.

Table 1. Virtual asset types — Key characteristics			
Type	Examples	Issuer	Features
Unbacked crypto-assets	Bitcoin, ether	Usually decentralised	<ul style="list-style-type: none"> Designed to be used as a means of exchange Limited rights for token holders No single issuer to be held accountable for regulatory responsibilities Transferable
Stablecoins	Tether (code: USDT), USD Coin (code: USDC) and TerraUSD (code: UST) pegged to the US dollar	Usually centrally issued by crypto exchanges and crypto firms	<ul style="list-style-type: none"> Designed to be value-stable Stability mechanism can be backing or collateralisation by a commodity, fiat currency, multiple currencies, virtual assets or algorithms
Tokenised securities	Tokenised bonds or equities	Centrally issued by a known issuer	<ul style="list-style-type: none"> Meets the definition of a security in each respective jurisdiction Within the regulatory perimeter
Utility tokens	Basic Attention Token (code: BAT) and Chainlink (code: LINK)	Centrally issued by a known issuer	<ul style="list-style-type: none"> Right to a product/service are accepted across multiple ecosystems Transferable Can be used as a means of exchange
NFTs	NFT art (digitalised piece of art)	Usually centrally issued by a known issuer	<ul style="list-style-type: none"> Right to ownership of a specific product Collectible and non-substitutable

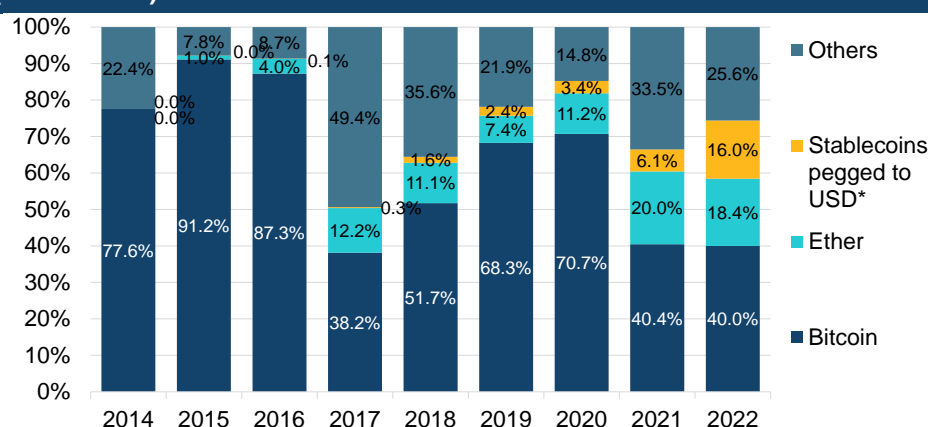
⁷ The ADT of equities on NYSE and NASDAQ were US\$121.8 billion in 2022 and US\$109.0 billion respectively in 2022. (Source: Calculated based on monthly statistics from the WFE's website.)

Type	Examples	Issuer	Features
CBDCs	e-CNY	Centrally issued by a state or central bank	<ul style="list-style-type: none"> Designed to be value stable Stability mechanism is usually sovereign fiat currency

Source: Bains, P., A. Ismail, F. Melo and N. Sugimoto, "Regulating the crypto ecosystem", published on the IMF's website, Note/2022/007, September 2022.

Bitcoin and ether accounted for about 40% and 18% of the total market capitalisation of virtual assets, respectively, at the end of 2022. (See Figure 3.)

Figure 3. Distribution of period-end market capitalisation of major cryptocurrencies (2014 – 2022)



* Stablecoins pegged to USD comprise Tether, USD Coin and Binance USD.

Source: *Coinmarketcap.com*, data downloaded on 30 January 2023.

Bitcoin and ether have played a role in promoting the decentralisation of financial services, which is not only related to payments, but also to a wide range of financial transactions.

Compared to fiat currencies, the use of bitcoin has the potential to reduce transaction costs through financial dis-intermediation, protect transaction systems from being hacked and provide privacy to the holders⁸.

Compared to the blockchain technology for bitcoin, **Ethereum** (the platform for ether) offers more advanced programmability. It enables the flexible development and execution of programmes (decentralised applications, or called "DApps"), thereby facilitating the use of smart contracts since the related computer codes for executing contractual duties can be uploaded to the blockchain and run autonomously⁹. In this way, ether and other smart contract blockchains help solve the challenges of interoperability and sustainability that are faced by earlier blockchains like bitcoin¹⁰.

Smart contracts are useful for financial services in areas including the exchange of money, property, or shares. By leveraging smart contract technology and the emergence of new blockchains, there are significant opportunities for innovations across the financial system.

⁸ See "Bitcoin 101: Its history, futures, and features", white paper published on the website of Purpose Investments, 1 February 2022.

⁹ See "Ether 101: Its history, futures, and features", white paper published on the website of Purpose Investments, 13 August 2021.

¹⁰ Interoperability is the ability to connect with other blockchains as well as off-chain data. Sustainability is the ability to scale in an environmentally sustainable way while retaining a robust governance structure. See "Chapter 2. The crypto ecosystem and financial stability challenges", *Global Financial Stability Report*, published on the IMF's website, October 2021 issue.

With the continuous development of a diverse set of cryptocurrencies to support automated, decentralised platforms that operate using smart contracts, **decentralised finance (DeFi)** is evolving rapidly.

Most of these platforms are built on the Ethereum blockchain and use Ethereum-based tokens to represent assets. However blockchains such as Solana, Polkadot and Avalanche are also gaining in popularity. The applications of DeFi include the trading of virtual assets, borrowing and lending, asset tokenisation, custody and payment. The market size of DeFi grew from US\$15 billion at the end of 2020 to about US\$110 billion at the end of September 2021¹¹.

Stablecoins are key components in DeFi to connect virtual assets with the traditional financial system. Stablecoins are cryptocurrencies where the price is designed to be pegged to a reference asset (e.g. financial assets like fiat currencies, commodities and securities, or other cryptocurrencies)¹².

Stablecoins can be used for the settlement of spot and derivatives trades of virtual assets on exchanges. Tether is the largest stablecoin and targets a 1:1 peg with the US dollar (USD). However, it is worth noting that the pegging mechanism of a stablecoin is not backed by a central bank or any institution and the peg may not hold in adverse market conditions (see Section 1.4).

Different from traditional financial assets, the **issuance of virtual assets** is usually decentralised so that issuers are often unknown to users¹³. There are several ways to create and issue virtual assets, the three most popular being “pre-mining”, “continuous mining”, and a hybrid of the two with different timings of issuance¹⁴. The mining process to add a block to the chain can adopt “proof-of-work” or “proof-of-stake” mechanisms:

- Under proof-of-work mining, which is adopted in the creation of bitcoin and early-days cryptocurrencies, many miners compete to solve a difficult computational puzzle to create a valid block;
- Under proof-of-stake mining, which is adopted by ethereum and other blockchains such as Polkadot, Solana, Cardano, one validator is selected for one block based on the selection algorithm that takes their stake into account, and this avoids duplication of computation for mining and saves a significant amount (up to 99.95%) of electricity consumed for computation capacity¹⁵.

Virtual assets are usually **distributed** in five main ways: pre-token sale, initial coin offering (ICO) or token sale¹⁶, mining, airdrops¹⁷ and forks¹⁸. The distribution is usually accompanied by a white paper on the virtual asset.

¹¹ See “Chapter 2. The crypto ecosystem and financial stability challenges”, *Global Financial Stability Report*, published on the IMF’s website, October 2021 issue.

¹² See “Stablecoins 101: What are crypto stablecoins, and how do they work?”, published on *cointelegraph.com*, viewed on 8 December 2022.

¹³ See Bains, P., A. Ismail, F. Melo and N. Sugimoto, “Regulating the crypto ecosystem”, published on the IMF’s website, Note/2022/007, September 2022.

¹⁴ In pre-mining, all the tokens are created in one batch in a single event; in continuous mining, virtual assets are likely to be created on an ongoing basis or at frequent intervals throughout a designated period or until a set deadline.

¹⁵ See “Ether 101: Its history, futures, and features”, white paper published on the website of Purpose Investments, 13 August 2021.

¹⁶ ICO or token sale is a method of fundraising for early-stage virtual asset projects where tokens are sold to speculators in exchange for fiat currencies, stablecoins, or more established virtual assets.

¹⁷ An airdrop refers to the case where virtual assets are distributed to a user’s wallet, either for free or in exchange for performing actions in support of the cryptocurrency project that issued the token (see “What are airdrops in crypto?”, published on *bitstamp.net*, 16 January 2023).

¹⁸ When a fork happens, the chain splits — producing a second blockchain that shares all the original’s history, but is headed off in a new direction. See “What is a fork?”, webpage on Coinbase’s website, viewed on 30 January 2023.

White papers form an important part of the disclosure process and provide the market and users with clear, accurate, and understandable explanations of the virtual assets issued and other essential information such as key personnel and governance arrangements.

Crypto exchanges and **crypto brokers** facilitate the buying and selling of spot virtual assets and provide a much wider scope of services than traditional securities exchanges. Crypto exchanges and some traditional exchanges (e.g. CME Group) offer futures on virtual assets.

The **custody** of virtual assets takes place via “wallets”, which is a kind of device or programme that contains private keys to secure the asset ownership¹⁹. A wallet can be managed by the user itself or delegated to a third-party custodian (that is, a “wallet provider”), which is often a crypto exchange, but it can also be a non-exchange third-party service provider.

Wallets can be classified as “hot” (connected to a online network) or “cold” (stored offline usually in an air-gapped device²⁰). Holding virtual assets in hot or cold wallets can have implications for the convenience/efficiency of virtual asset transfers and the security of holdings²¹.

The virtual asset ecosystem continues to evolve and is expected to become a potential game changer for the future development of the financial system. To support the evolution of the ecosystem, the financial market infrastructure and regulatory regime would need to be enhanced and reformed as appropriate.

1.3 Virtual assets as alternative investments

Virtual assets have different characteristics from those of traditional financial asset classes, and so would have different return and volatility patterns.

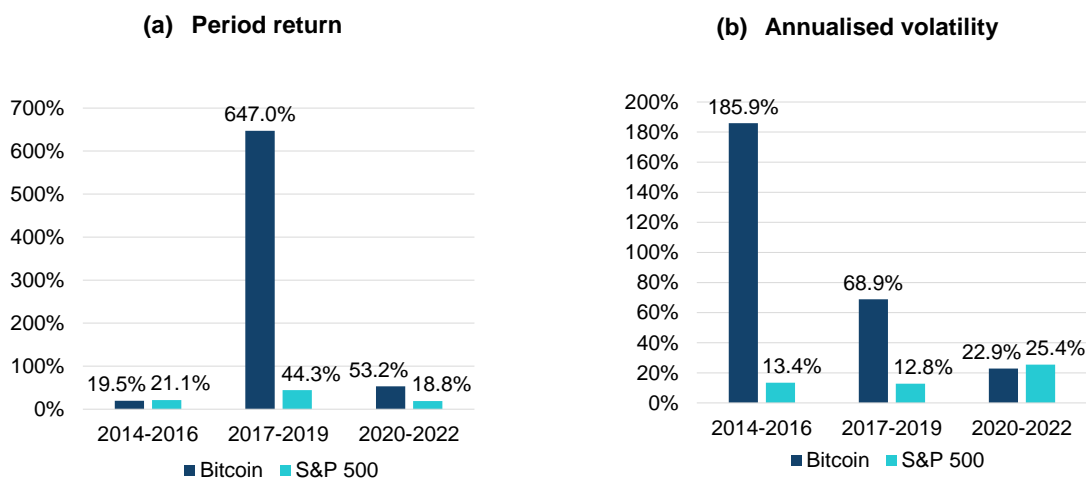
Historically, the price returns and volatilities of certain virtual assets were significantly higher than traditional financial assets. During the consecutive three-year periods from 2014 to 2022, the period returns on bitcoin ranged from a low of 19.5% for the period 2014-2016 to a high of 647% during the period 2017-2019 (versus 21.1% and 44.3%, respectively, for the S&P 500 Index); the annualised price volatility of bitcoin ranged from a low of 22.9% in the period 2020-2022 to a high of 185.9% in the period 2014-2016 (versus the range of 12.8%-25.4% for the S&P 500 Index). It is worth noting that the annualised volatility of bitcoin appears to have declined over time. (See Figure 4.)

¹⁹ See “Cryptocurrency wallet: What it is, how it works, types, security”, published on *Investopedia.com*, 27 May 2022.

²⁰ An air-gapped device is one that is not connected to outside networks like the internet.

²¹ For cold wallets, which are held offline, the cryptocurrencies in them need to be transferred online in an amount required to settle a transaction. On the contrary, hot wallets offer the benefit of convenience since there is no need to transfer the amount of cryptocurrency from offline to online for transactions. However, as hot wallets are online and connected to the internet, these wallets are more vulnerable to online attacks than cold wallets.

Figure 4. Three-year period return and annualised volatility of bitcoin versus S&P 500 Index (2014 – 2022)



Note: Annualised volatility is calculated by the standard deviation of daily returns multiplied by the square root of 252 (the assumed number of trading days in a year).

Source: Calculated based on data from *investing.com*.

A Morningstar study found that, during the period from 2015 to January 2022, the average correlation coefficient of the index returns in virtual assets with those in other major asset classes was 0.15%, the lowest among different asset classes (except for US short-term interest rate) (see Table 2).

Nevertheless, a separate analysis found that the correlation between price returns of virtual assets with traditional assets may change over time — the correlation coefficient between the daily returns of S&P 500 Index and bitcoin price increased from 0.012 during 2017-2019 to 0.405 during 2020-2022 (see Figure 5).

This may possibly be attributable, to some extent, to the increased participation of traditional financial institutions in digital assets²². According to Fidelity's 2021 institutional investor digital asset study²³, 52% of investors surveyed globally have an investment in digital assets, with Asia and Europe seeing higher rates of investment than the US. State Street and DBS have launched their own digital asset arms to cater for investor needs.

In view of the different performance of virtual assets vis-à-vis traditional assets, market participants may consider potential diversification benefits from adding virtual assets to their investment portfolios.

²² See Yuyama, T., Y. Ikeno, S. Zhang, S. Matsuo and J. Angel, "Can crypto assets be safe-haven assets during crisis periods?", available on SSRN's website, 31 July 2022.

²³ "The institutional investor digital assets study", published on Fidelity Digital Assets' website, September 2021.

Table 2. Correlation coefficients between index returns of cryptocurrencies and other major asset classes (2015 – Jan 2022)

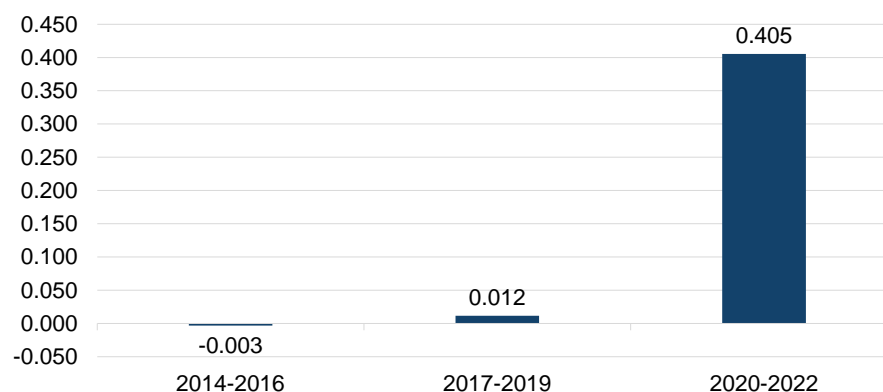
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	—	0.25	0.19	0.28	0.22	0.15	0.12	0.09	0.20	0.21	0.23	0.10	0.06	-0.10
2	0.25	—	0.93	0.88	0.72	0.71	0.27	0.04	0.77	0.27	0.59	0.45	0.46	-0.08
3	0.19	0.93	—	0.82	0.70	0.71	0.20	0.00	0.80	0.20	0.58	0.50	0.53	-0.11
4	0.28	0.88	0.82	—	0.80	0.62	0.24	0.03	0.78	0.36	0.65	0.52	0.53	-0.11
5	0.22	0.72	0.70	0.80	—	0.49	0.30	0.11	0.74	0.53	0.67	0.54	0.45	-0.09
6	0.15	0.71	0.71	0.62	0.49	—	0.50	0.36	0.64	0.31	0.60	0.31	0.31	-0.07
7	0.12	0.27	0.20	0.24	0.30	0.50	—	0.83	0.40	0.57	0.54	0.03	-0.03	0.06
8	0.09	0.04	0.00	0.03	0.11	0.36	0.83	—	0.23	0.55	0.48	-0.22	-0.23	0.25
9	0.20	0.77	0.80	0.78	0.74	0.64	0.40	0.23	—	0.41	0.84	0.57	0.61	-0.07
10	0.21	0.27	0.20	0.36	0.53	0.31	0.57	0.55	0.41	—	0.60	0.25	0.11	0.05
11	0.23	0.59	0.58	0.65	0.67	0.60	0.54	0.48	0.84	0.60	—	0.45	0.47	-0.03
12	0.10	0.45	0.50	0.52	0.54	0.31	0.03	-0.22	0.57	0.25	0.45	—	0.90	-0.17
13	0.06	0.46	0.53	0.53	0.45	0.31	-0.03	-0.23	0.61	0.11	0.47	0.90	—	-0.13
14	-0.10	-0.08	-0.11	-0.11	-0.09	-0.07	0.06	0.25	-0.07	0.05	-0.03	-0.17	-0.13	—
Avg	0.15	0.48	0.47	0.49	0.48	0.43	0.31	0.19	0.53	0.34	0.51	0.33	0.31	-0.05

Indices:

- 1 - MVIS CryptoCompare DA 100 PR USD (digital asset)
- 2 - Russell 1000 TR USD (US large cap stocks)
- 3 - Russell 2500 TR USD (US small cap stocks)
- 4 - MSCI EAFE NR USD (Non-US major market stocks)
- 5 - MSCI EM NR USD (Emerging market stocks)
- 6 - FTSE Nareit Equity REITs TR USD (REITs)
- 7 - Bloomberg US Treasury US TIPS TR USD (US Treasury inflation-linked bonds)
- 8 - Bloomberg US Agg Bond TR USD (US bonds)
- 9 - Bloomberg US Corporate High Yield TR USD (US corporate bonds)
- 10 - Bloomberg Gbl Agg Ex USD TR USD (Global bonds)
- 11 - JPM EMBI Global TR USD (Emerging market bonds)
- 12 - DJ Cmmnty TR USD (Commodities)
- 13 - DJ Cmmnty Energy TR USD (Energy)
- 14 - FTSE Treasury Bill 3 Mon USD (US short-term interest rate)

Note: The average correlation coefficient is the simple average of the correlation coefficients of the returns of the index concerned with those of other indices.

Source: “2022 Cryptocurrency landscape: Morningstar’s first analysis of crypto uncovers the home truths of this novel, heavily concentrated, and highly volatility asset class”, published on Morningstar’s website, 5 April 2022.

Figure 5. Correlation coefficient of daily returns between S&P 500 Index and bitcoin price (2014 – 2022)

Source: Calculated from the daily closing prices of S&P 500 Index and bitcoin from *investing.com*.

1.4 Evolving regulatory regimes for virtual assets

The first cryptocurrency, bitcoin, was launched in 2009, being a new asset class developed outside the traditional financial system and its institutional framework. Over time, product and service innovation has enriched the virtual asset ecosystem and increased investor participation (see section 1.2 above).

However, new products and services come with risks. If not properly controlled, the risks may bring about financial instability that may jeopardise the financial system and even have repercussions for the entire economy.

Inadequate regulatory oversight on all kinds of financial activities, including those on virtual assets, may lead to problems of market integrity and insufficient investor protection. At times of adverse market sentiment, over-reactive selling may amplify market volatilities and pose challenges to effective risk management by market institutions.

In 2022, several adverse events hit the virtual assets market in a row. These include the sharp decline in prices of major cryptocurrencies following the collapse of the peg between two cryptocurrencies — TerraUSD (ticker:UST) and Terra (ticker:LUNA), and the bankruptcies of several major crypto firms:

- **Collapse of the peg between UST and LUNA:** UST was an algorithmic stablecoin backed by LUNA (an unbacked cryptocurrency) to keep the unit price at US\$1. If the unit price of LUNA is US\$100, a user can redeem 1 LUNA for 100 UST, or redeem 100 UST for 1 LUNA. The unit price of LUNA rose to a high of US\$116 in April 2022, but then dropped significantly. The sharp price decline caused a downward spiral in the prices of UST and LUNA and, since early May 2022, the peg was broken in that the unit price of UST stayed significantly below US\$1²⁴. This also triggered sell-offs of other major cryptocurrencies. It has been reported that investors' losses reached US\$40 billion²⁵.
- **Bankruptcies of major crypto firms:** Some major crypto firms, including Three Arrows Capital (3AC) and FTX, filed for bankruptcy in 2022, resulting in significant losses for investors (see Table 3).

These bankruptcies heightened concerns over fraud, market manipulation and the adequacy of investor protection, highlighting the importance of regulatory oversight and advanced risk management for the virtual assets market²⁶.

²⁴ See "UST stablecoin briefly loses peg, LUNA drops 10%", published on *coindesk.com*, 7 May 2022.

²⁵ See "How a trash-talking crypto founder caused a \$40 billion crash", *New York Times*, 18 May 2022.

²⁶ See "Viewpoint — Lessons from the year of crypto", published on the website of the Futures Industry Association, 4 January 2023.

Table 3. Bankruptcy cases for major crypto firms in 2022			
Crypto firm	Type of institution	Date of filing bankruptcy	Potential triggers for bankruptcy
FTX	Crypto exchange	November 2022	A sell-off of FTX's native token, FTT, and a large volume of withdrawals; allegations that the founder had funneled customer deposits to FTX's affiliated trading firm, Alameda Research, and the exchange suffered withdrawals of about US\$6 billion in just 72 hours
BlockFi	Crypto lender	November 2022	Ties to FTX, and it had relied on a US\$400 million FTX credit facility to stay afloat
Three Arrows Capital (3AC)	Crypto hedge fund	July 2022	Collapse of the peg between UST and LUNA; as the prices of cryptocurrencies declined sharply, the company is unable to repay loans worth billions of USD
Voyager Digital	Crypto lender	July 2022	Collapse of the peg between UST and LUNA; 3AC defaulted on a crypto loan worth more than \$650 million granted by Voyager Digital
Celsius Network	Crypto lender	July 2022	Collapse of the peg between UST and LUNA; Celsius Network has been embroiled in disputes over fraud investigations, disparate treatment of customer accounts, customer privacy, and its huge spending on a new bitcoin mining facility.
Core Scientific	Crypto miner	December 2022	Unpaid debt of US\$7 million from Celsius Network
Genesis Global Capital	Crypto lender	January 2023	Ties to FTX, Genesis froze customer redemptions in November 2022 after major exchange FTX filed its bankruptcy

Source: "Factbox-Crypto companies crash into bankruptcy", *Reuters*, 2 December 2022.

Despite the above events, the increasing significance of virtual assets to the future development of the financial system has been recognised by market authorities and market rules and regulations are evolving to seek a balance between market development and financial stability.

From the global experience of regulatory developments, market authorities and regulators have adopted various regulatory regimes for virtual assets in the areas of the definition of virtual assets, licensing requirements, tax arrangements and investor access (see Table 4).

Table 4. Regulations on virtual assets of selected markets					
Market	Type of classification for virtual assets	Licensing requirements	Other requirements	Tax arrangements	Virtual asset ETFs* available
Brazil	Asset	Virtual asset service providers (VASPs)	Regulatory sandbox	Subject to capital gains taxes (with a specific official document on cryptocurrency taxes)	Yes
Canada	Commodity	Crypto trading platform and dealers	Advertising and marketing of cryptos	Same as commodities	Yes
Mainland China	—	Banning crypto exchanges, ICOs, mining and all other related activities	Only e-CNY (CBDC) is allowed	—	No
Germany	Units of account	Exchanges and custodians	Citizens and legal entities are allowed to trade virtual assets	Treated as private money; exempted for capital gains <EUR 600 held for <1 year and sales of cryptos held for >1 year	Yes
Hong Kong	Virtual commodity, but not a legal tender	VASPs	Allows crypto exchanges to operate; allow trading of cryptocurrencies by professional investors but ban on crypto trading by retail investors	No capital gains taxes	Yes

Table 4. Regulations on virtual assets of selected markets					
Market	Type of classification for virtual assets	Licensing requirements	Other requirements	Tax arrangements	Virtual asset ETFs* available
Japan	Property value, but not a legal tender	Crypto exchanges	Self-regulatory bodies governing exchanges and STO	Treated as "miscellaneous income" for income tax with varying tax rates	No
Singapore	Capital market product	Payment service providers, including crypto exchanges	Guide on digital token offering and guidelines to discourage cryptocurrency trading by general public	Businesses accepting tokens are subject to normal income taxes; tax deduction will be allowed for individuals on purchasing/disposal of cryptocurrencies	No
Switzerland	Private wealth asset	Cryptocurrency businesses of all types and blockchain companies	Regulations on tokens (including laws on DLT)	Subject to wealth tax; realised capital gains are exempted and losses are not tax-deductible	Yes
United Kingdom (UK)	Cryptocurrencies are not considered as currencies or commodities, but cryptocurrency derivatives are regarded as financial instruments under the Markets in Financial Instruments Directive II (MIFID II)	VASPs and crypto exchanges	Banning the trading of cryptocurrency derivatives	No specific tax legislation for cryptos; income tax and capital gains tax apply	Yes
United States (US)	Vary across regulators: <ul style="list-style-type: none"> • Securities being regulated by the Securities and Exchange Commission (SEC); • Commodities being regulated by the Commodity Futures Trading Commission (CFTC); • Currencies being regulated by the Treasury 	Not available	Not available	Requires investors to disclose yearly cryptocurrency activities on their tax returns	Yes

* Virtual asset ETFs are ETFs tracking the performance of virtual assets.

Source: "Cryptocurrency regulations by country", published on Thomson Reuters' website, April 2022.

Key observations are:

- The definition of virtual assets varies across markets and so do regulatory regimes. Regulatory responsibilities may be shared by a number of regulators in a market.
- Transactions of virtual assets are subject to taxes and anti-money laundering rules in many markets. In some markets, transaction rules and mechanisms applicable to virtual assets are the same as for traditional financial assets, and there may be specific rules and mechanisms applicable only to virtual assets in other markets.
- Certain virtual asset service providers (e.g. crypto exchanges and crypto brokers) are subject to licensing requirements for enhanced supervision of their activities.
- The degree of investor accessibility to virtual asset products varies across markets. All transactions of cryptocurrencies are banned in Mainland China, which on the other hand is actively developing e-CNY (CBDC in China). Some markets allow retail investors to trade cryptocurrencies directly through licensed crypto exchanges. In addition, innovative products/services such as security token offering (STO) and virtual asset exchange traded funds (ETFs) have been introduced to widen investor access.

2. TAPPING INTO VIRTUAL ASSET OPPORTUNITIES THROUGH ETFS

2.1 Direct and indirect access to the virtual assets market

There are direct and indirect access channels to virtual assets. Direct channels include trading cryptocurrencies through crypto brokers or crypto exchanges or subscribing to new issues of cryptocurrency in ICOs. Indirect channels include investing in shares of blockchain companies, futures on cryptocurrencies, as well as ETFs and other funds focused on blockchain companies and/or cryptocurrencies.

Direct access channels to virtual assets usually involve the use of financial services which may not be properly regulated. While certain markets regulate crypto brokers or crypto exchanges, the custody of cryptocurrencies (the “wallets”) may not be well-regulated. Investors would need to know how to manage their own wallets or hold cryptocurrencies in centralised third-party wallets. In addition, the liquidity of cryptocurrencies are fragmented across different vendors and may be low, particularly for those other than bitcoin and ether.

For direct access, transaction fees vary significantly across the type of service provider. Retail brokers, payment applications and centralised crypto exchanges facilitate transactions between fiat currencies and cryptocurrencies. These intermediaries may provide centralised custody services so that investors need not maintain their own wallets.

Investors can also trade cryptocurrencies via DeFi crypto exchanges. In contrast with the order book system on centralised crypto exchanges, DeFi crypto exchanges offer trading services through smart contracts on a blockchain. In addition, transactions on DeFi crypto exchanges are limited to cryptocurrencies only but not for fiat currencies and the custody of cryptocurrencies is in investors’ own wallets.

The transaction fee on DeFi platforms is the fee or cost required to conduct a transaction on the blockchain and denominated in small fractions of the cryptocurrency (e.g. ether on Ethereum platform)²⁷. An anecdotal examination of the transaction costs for the purchase of cryptocurrencies found that the fees ranged from zero to 6.22% (see Table 5).

Type of service provider	Cost/fee (% of transaction value)	Cost/fee type
Retail brokers (e.g. Robinhood, Webull, Swissquote)	0.00% – 1.00%	Spread / transaction fee
Payment applications (e.g. PayPal, Venmo and CashApp)	1.80% – 2.30%	Spread
Centralised crypto exchanges (e.g. Coinbase, Binance and Kraken)	0.06% – 1.90%	Spread / transaction fee
DeFi crypto exchanges (e.g. Uniswap, Sushiswap and Kyber)	0.6% – 6.22%	Transaction fee

Note: The costs/fees are calculated for a purchase of US\$500 worth of cryptocurrencies.

Source: “2022 Cryptocurrency landscape: Morningstar’s first analysis of crypto uncovers the home truths of this novel, heavily concentrated, and highly volatility asset class”, published on Morningstar’s website, 5 April 2022.

In contrast to direct channels, **indirect channels** of access to virtual assets, i.e. through traditional forms of financial products (with innovative underlying assets), both cash products

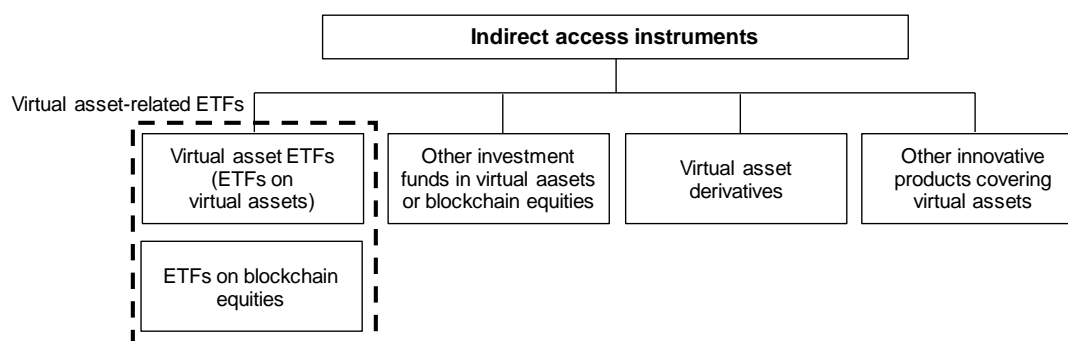
²⁷ See “Gas (Ethereum): How Gas Fees Work on the Ethereum Blockchain”, published on *Investopedia.com*, 27 September 2022.

and derivative products, would rely on financial services provided by the traditional financial system, for which the regulatory regime is relatively mature.

The related financial products include ETFs and other investment funds issued by financial institutions, which directly invest in virtual assets or related products (including derivatives on virtual assets).

In addition, shares of listed blockchain companies (companies engaged in virtual assets business) also offer investors the exposure in virtual assets. ETFs on blockchain equities are also a kind of indirect means to get exposure to virtual assets. ETFs on virtual assets (“virtual asset ETFs”) and ETFs on blockchain equities (“blockchain equity ETFs”) are collectively referred to as “virtual asset-related ETFs” hereinafter. Figure 6 presents the conceptual classification of instruments for indirect access to virtual assets.

Figure 6. Categorisation of instruments for indirect access to virtual assets



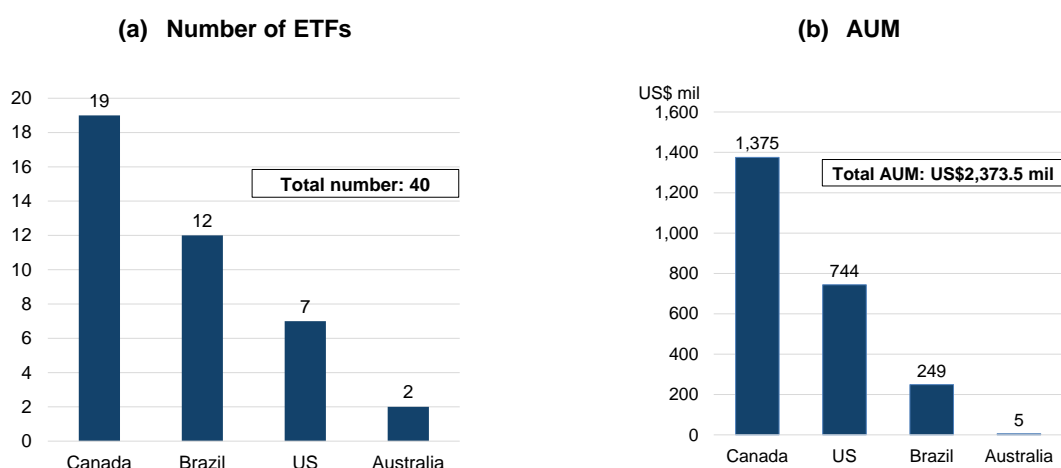
Source: HKEX analysis.

These products in their traditional form are subject to disclosure requirements and other regulatory requirements under the conventional regulatory regime, possibly with special requirements to cater for the product design (e.g. position limits and large position reporting for futures) in order to control overall market risk.

2.2 Virtual asset ETFs available in global markets

Virtual asset ETFs emerged in early 2021 as a new class of ETF (see Figure 6 above). Virtual asset ETFs are typically ETFs on cryptocurrencies and/or tokens.

At the end of November 2022, there were 40 virtual asset ETFs traded in Canada, Brazil, the US and Australia, with total assets under management (AUM) of US\$2.4 billion (see Figure 7).

Figure 7. Number and AUM of virtual asset ETFs (end-Nov 2022)

Note: The sample comprises all virtual asset ETFs as classified according to Bloomberg's definition, with AUM data obtained from Morningstar for these ETFs as far as available.

Source: Bloomberg for number of virtual asset ETFs; Morningstar for AUM, calculated based on data of individual ETFs.

Virtual asset ETFs have the following characteristics:

(1) Physical ETF or futures-based ETF

A virtual asset physical ETF holds the physical virtual asset while a virtual asset futures-based ETF hold futures contracts on the virtual asset.

The world's first virtual asset ETF was a bitcoin physical ETF launched in February 2021 in Canada²⁸. Brazil and Australia followed suit to issue their bitcoin physical ETFs in June 2021 and May 2022, respectively.

In the US, only virtual asset futures-based ETFs are allowed. The first one²⁹ was issued in October 2021 tracking the performance of futures on bitcoin traded on the Chicago Mercantile Exchange (CME).

In Asia, the first two futures-based ETFs on bitcoin and ether, respectively, were listed in Hong Kong in December 2022, with the third one listed in January 2023³⁰.

(2) Bitcoin and other cryptocurrencies as underlying assets

Apart from bitcoin ETFs, Canada, Brazil and Australia have also approved ETFs on ether, but ETFs on ether are not yet approved in the US.

Canada and Brazil also allow virtual asset ETFs on other cryptocurrencies and/or tokens. In February 2022, the first ETF on a DeFi index of DApp tokens (or crypto index) was launched in Brazil³¹.

(3) Various active management strategies

Virtual asset ETFs in the US, Canada and Brazil adopt not only long-only strategies, but also yield-generating strategies through option portfolio, inverse (short) strategies, crypto indices and other active management strategies.

²⁸ Purpose Bitcoin ETF (ticker: BTCC) was listed on the Toronto Stock Exchange on 18 February 2021.

²⁹ ProShares Bitcoin Strategy ETF was listed on the New York Stock Exchange on 19 October 2021.

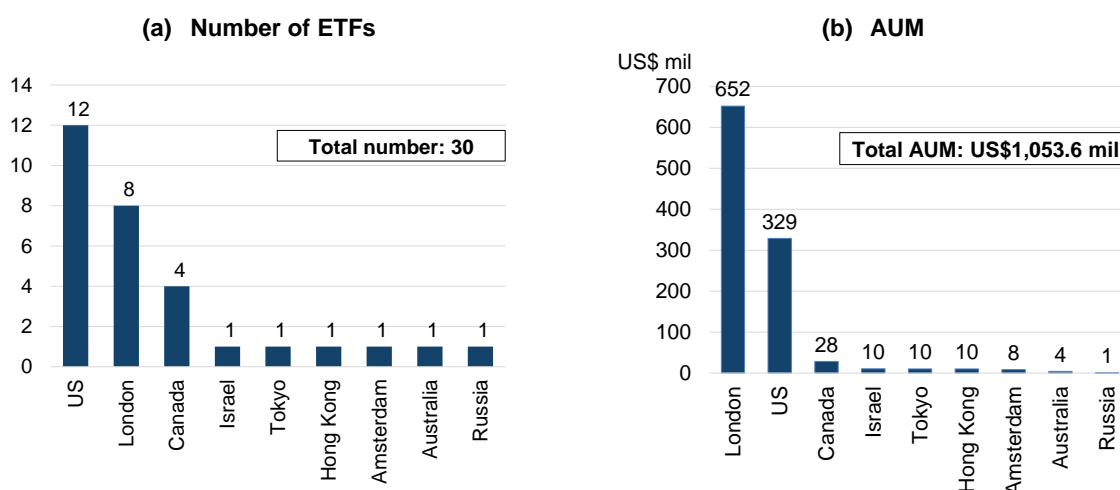
³⁰ These three ETFs were listed on the Stock Exchange of Hong Kong (SEHK), comprising CSOP Bitcoin Futures ETF, CSOP Ether Futures ETF listed on 16 December 2022 and Samsung Bitcoin Futures Active ETF listed on 13 January 2023.

³¹ See "Brazilian asset manager Hashdex launches DeFi ETF on local stock exchange", published on *coindesk.com*, 18 February 2022.

Alongside with virtual asset ETFs, ETFs on equity indices of listed blockchain companies (referred to as “blockchain equity ETFs” hereafter) have also been launched in a number of markets. The underlying equities include the stocks of crypto exchanges, crypto brokers and blockchain technology companies listed on traditional stock exchanges.

As at the end of November 2022, there were 30 blockchain equity ETFs globally, with a total AUM of US\$1.05 billion, traded in the US, London, Canada, Israel, Tokyo, Hong Kong, Amsterdam, Australia and Russia (see Figure 8). Markets in the US, London and Canada dominated both by the number and AUM of these ETFs.

Figure 8. Number and AUM of blockchain equity ETFs by market (end-Nov 2022)



Note: The sample comprises all blockchain equity ETFs as classified according to Bloomberg’s definition, with AUM data obtained from Morningstar for these ETFs as far as available.

Source: Bloomberg for number of blockchain equity ETFs; Morningstar for AUM, calculated based on data of individual ETFs.

Both the number and AUM of virtual asset ETFs were higher than those of blockchain equity ETFs, reflecting the stronger demand for instruments with direct investment in virtual assets than for indirect investment through related equities.

Given the dominance of bitcoin in the virtual asset market (see Section 1.2 above), the price of bitcoin reflects the market sentiment in cryptocurrencies and blockchain equities and therefore is related to the valuation of the underlying assets of virtual asset-related ETFs.

Understandably, the market size and turnover of virtual asset ETFs and blockchain equity ETFs would be related to the price movements of bitcoin — their correlation coefficients with the bitcoin price were found to be all positive during January 2021 to November 2022, ranging from 0.332 to 0.920³² (see Figures 9 and 10).

That means rising bitcoin prices may attract more investments to virtual assets and related products and contribute to the build up of the market size and liquidity of virtual asset-related ETFs.

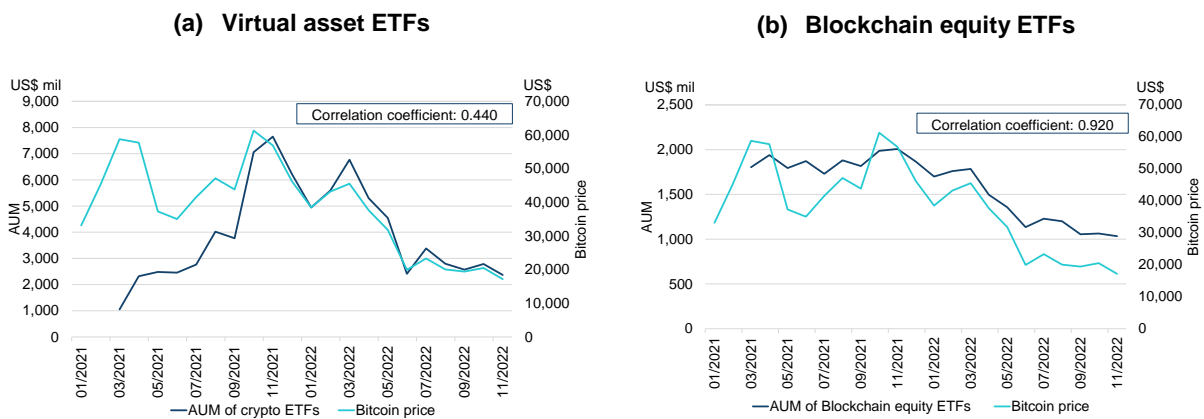
Apart from investment sentiment in virtual assets like bitcoin, innovative market developments may also stimulate investor participation and bring about market growth. In October 2021, the US market launched the first virtual asset ETF on bitcoin futures and this had led to sharp

³² Correlation analysis was performed on the month-end bitcoin price with the month-end AUM and monthly turnover value of the two kinds of ETFs during Jan 2021 to Nov 2022. For virtual asset ETFs, the correlation coefficients of bitcoin price with the ETFs’ AUM and turnover were 0.440 (statistically significant at 5% level) and 0.332 (statistically insignificant) respectively. For blockchain equity ETFs, the correlation coefficients of bitcoin price with the ETFs’ AUM and turnover were 0.920 and 0.629 (both were statistically significant at 5% level) respectively.

increases in the AUM and turnover of virtual asset ETFs, much faster than the rising trend in bitcoin price (see Figures 9a and 10a). This would have contributed to the lower correlation of the change in bitcoin price with the AUM/turnover of virtual asset ETFs during the study period of 2021 to 2022 than with the AUM/turnover of blockchain equity ETFs (see Figures 9b and 10b).

Moreover, the market influence of bitcoin price may diminish over time upon new developments in the virtual asset market. For example, the use of the Ethereum platform may continue to expand (e.g. in the use of DeFi and smart contracts) such that the price of cryptocurrencies such as ether that adopt Ethereum blockchain may play a bigger role in the market.

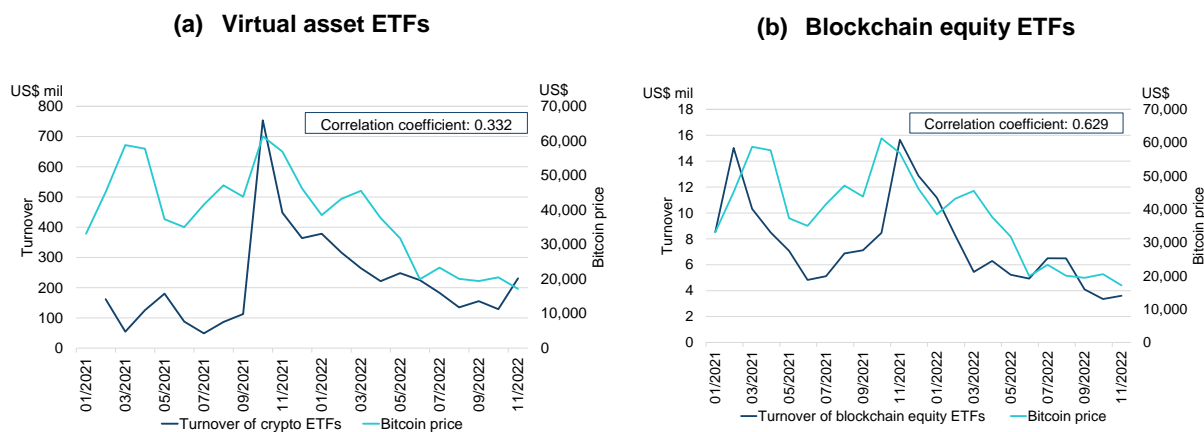
Figure 9. Month-end AUM of virtual asset ETFs and blockchain equity ETFs and month-end bitcoin price (Jan 2021 – Nov 2022)



Note: The sample comprise all virtual asset ETFs and blockchain equity ETFs as classified according to Bloomberg's definition, with AUM data obtained from Morningstar for these ETFs as far as available.

Source: AUM of ETFs are calculated based on data of individual ETFs from Morningstar; bitcoin prices are obtained from *Investing.com*.

Figure 10. Monthly total turnover value of virtual asset ETFs and blockchain ETFs and month-end bitcoin price (Jan 2021 – Nov 2022)



Note: The sample comprise all virtual asset ETFs and blockchain equity ETFs as classified according to Bloomberg's definition, with turnover data obtained from Morningstar for these ETFs as far as available.

Source: Turnover values of ETFs are calculated based on data of individual ETFs from Morningstar; Bitcoin prices are obtained from *Investing.com*.

2.3 Risk-return profile of virtual asset ETFs

Given the different nature of the asset type underlying virtual asset ETFs, they may have different risk-return profiles than those of traditional equity investments and investments through blockchain equity ETFs.

Among the 70 virtual asset and blockchain equity ETFs as of end-November 2022 (see Figures 7 and 8 above), the top 10 largest virtual asset-related ETFs had an AUM of US\$2,571 million, accounting for about 75% of the total³³.

Of these top ten ETFs, eight were virtual asset ETFs and two were blockchain equity ETFs. Among them, six investment styles are identified and the largest ETFs in each investment style are chosen for an analysis of return performance vis-à-vis the price returns of bitcoin and S&P 500 ETF³⁴ during the two-year period from 2021 to 2022, with an attempt to anecdotally examine the potential opportunities offered by these innovative types of products.

The six products under study are presented in Table 6³⁵.

ETF product	Investment style	Underlying asset	AUM (as of end-Nov 2022)	% of total AUM of virtual asset-related ETFs	Launch date
Product 1	Active management	Cryptocurrencies and related derivatives	US\$576.9 million	16.8%	19 Oct 2021
Product 2	Physical bitcoin	Bitcoin	US\$369.7 million	10.8%	25 Feb 2021
Product 3	Physical ether	Ether	US\$270.1 million	7.9%	20 Apr 2021
Product 4	Crypto index	Index on cryptocurrencies and/or tokens	US\$186.7 million	5.4%	26 Apr 2021
Product 5	Inverse strategy	Cryptocurrency derivatives	US\$119.8 million	3.5%	22 Jun 2022
Product 6	Blockchain equity index	Equities of blockchain companies	US\$446.7 million	13.0%	11 Mar 2019

Source: Data of AUM of individual ETFs from Morningstar; other information from respective websites of ETF issuers.

As shown in Table 6, the analysed ETFs offer varied exposures to virtual assets through investing in cryptocurrencies and/or their derivatives or in blockchain equities.

The daily returns of virtual asset ETFs under study (Product 1 to Product 5) were found to have a relatively high correlation with that of bitcoin, but just a moderate degree of correlation with that of the SPDR S&P 500 ETF under study (ticker: SPY)³⁶.

³³ As of end-November 2022, the top 10 largest virtual asset ETFs were (in descending order of AUM): ProShares Bitcoin Strategy ETF, Invesco CoinShares Global Blockchain UCITS ETF, Purpose Bitcoin ETF, CI Galaxy Ethereum ETF, 3iQ CoinShares Bitcoin ETF, Hashdex Nasdaq Crypto Index ETF, CI Galaxy Bitcoin ETF, Purpose Ether ETF, ProShares Short Bitcoin Strategy ETF and First Trust Indxx Innovative Transaction & Process ETF. (Note: The AUM of individual ETFs are obtained from Morningstar and the classification of ETFs is based on Bloomberg's definition. Source: Morningstar and Bloomberg.)

³⁴ The largest ETF on S&P 500 index traded in the US, i.e. SPDR S&P 500 ETF Trust (SPY), is used in our analysis.

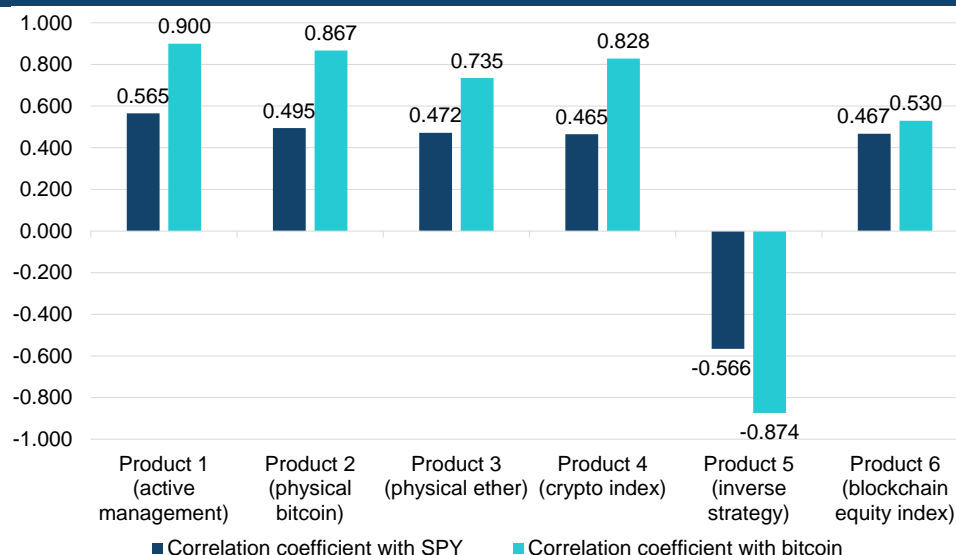
³⁵ These ETFs are respectively: ProShares Bitcoin Strategy ETF (active management), Purpose Bitcoin ETF (physical bitcoin), CI Galaxy Ethereum ETF (physical ether), Hashdex Nasdaq Crypto Index ETF (crypto index) and ProShares Short Bitcoin Strategy ETF (inverse strategy). and Invesco CoinShares Global Blockchain UCITS ETF (blockchain equity index).

³⁶ The correlations between the returns of Product 5 with those of bitcoin and SPY were found to be negative because Product 5 adopts an inverse strategy, i.e. investing in an inverse direction of the movements of the underlying asset.

In comparison, a moderate degree of correlation was found for the daily return of the blockchain equity index ETF (Product 6) with those of both SPY and bitcoin, yet the degree of correlation with bitcoin price returns was still slightly higher. (See Figure 11).

The findings imply that virtual asset ETFs and, to a lesser degree, blockchain equity ETFs can provide portfolio diversification opportunities vis-à-vis traditional equity investments.

Figure 11. Correlation coefficients of daily returns between selected virtual asset-related ETFs and S&P 500 ETF/bitcoin (2021 – 2022)

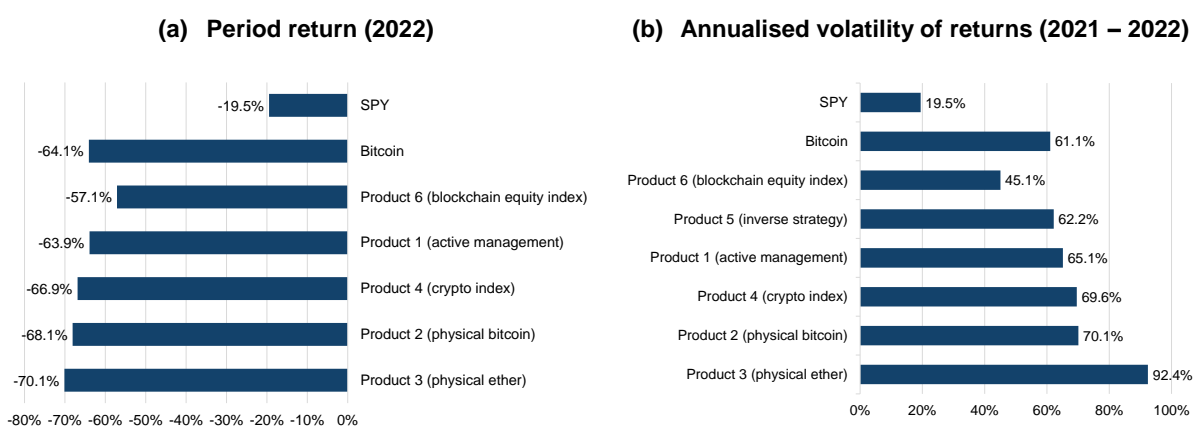


Note: Daily closing prices are converted into USD based on the daily exchange rates obtained from *investing.com* to calculate the daily returns for each of the ETFs under study, starting from their respective launch date or January 2021, whichever the later.

Source: Daily closing prices of individual ETFs are obtained from *investing.com*.

When bitcoin experienced a much greater price decline than US equities (represented by SPY) in 2022, all virtual asset ETFs under study (excluding product 5 with inverse strategy which was launched in mid-2022) experienced a similar degree of negative returns (see Figure 12a).

The annualised volatilities of returns of the virtual asset-related ETFs under study were found to be much higher than that of SPY (the S&P 500 ETF) during the period 2021 to 2022, and the returns of all of them except Product 6 (on blockchain equity index) were more volatile than that of bitcoin. The findings highlighted the relatively high risk of investing in virtual asset-related ETFs (see Figure 12b).

Figure 12. Period return and annualised volatility of selected virtual asset-related ETFs

Note: Period return in 2022 is calculated as the percentage change in price in USD (converted based on the exchange rates obtained from *investing.com*) during the year. Annualised volatility of the return of a product is calculated as the standard deviation of the product's daily returns in USD prices during 2021 to 2022 (starting from the product's launch date, or January 2021, whichever is later), multiplied by the square root of 252 (the assumed number of trading days in a year). Product 5, which was launched on 22 June 2022, was excluded from the chart on period return.

Source: Calculated based on data of daily closing prices of individual ETFs from *investing.com*.

2.4 ETFs as a regulated, indirect and convenient way to gain exposure to virtual assets

ETFs and other forms of investment funds on virtual assets or related equities offer an increasing selection of cryptocurrencies and shares of blockchain companies.

From the results presented in Section 2.3 above, virtual asset-related ETFs offer relatively different risk-return profiles compared to those of traditional financial assets, bearing in mind that they also incur relatively high risks.

Compared to unlisted funds, ETFs are often more cost effective³⁷. As of end-November 2022, the average expense ratio of virtual asset ETFs was about 0.91%³⁸, compared to the expense ratio of about 2% for the largest closed-end bitcoin fund in the US³⁹.

Secondly, ETFs are more liquid and transparent than unlisted funds because they are traded in the secondary market and market-making arrangements are usually in place.

ETFs can be traded any time during exchange trading hours, while unlisted funds cannot (e.g. mutual funds can only be subscribed or redeemed in the primary market once a day after the market is closed when the funds' asset values can be determined from market closing prices of securities).

In addition, the information of holdings of ETFs is usually disclosed on a daily basis, compared to the infrequent disclosure of the information of unlisted funds (e.g. quarterly for mutual funds in the US)⁴⁰.

³⁷ See HKEX research report, "The inclusion of ETFs in Stock Connect — Implications and opportunities", published on HKEX's website, 4 July 2022.

³⁸ Calculated based on the data of individual ETFs from Morningstar.

³⁹ Source: "Grayscale's bitcoin investors have trust issues", *Bloomberg*, 7 December 2022.

⁴⁰ See "Mutual funds vs. ETFs: A side-by-side comparison", published on *Yahoo Finance* website, 9 February 2023.

Thirdly, the price of an ETF is expected to be close to its net asset value (NAV) due largely to arbitrage between primary and secondary markets, while an investment fund on the same underlying asset may not due to liquidity problem⁴¹. As of end-November 2022, the average price premium relative to NAV was about -0.24% for virtual asset ETFs and 8.12% for blockchain equity ETFs⁴². Although the magnitude of the price premiums was significantly higher than that (0.01%) for the equity ETF, SPY, they were lower than that of the largest closed-end bitcoin fund in the US which was traded at a discount of more than 40% in early December 2022, having plummeted from a premium of about 50% in early 2021⁴³.

While direct access to virtual assets may require technical knowledge about the virtual asset market and may involve bigger risks under a relatively immature regulatory regime, indirect access like virtual asset-related ETFs can be a starting point for institutions and retail investors to tap into the new asset class in a low-cost, transparent, convenient and regulated environment.

It is expected that product innovation will continue to enrich the ecosystem of virtual asset-related ETFs to further widen the investment choices of virtual assets.

3. ETFS AND THE DEVELOPMENT OF AN ECOSYSTEM OF VIRTUAL ASSETS IN HONG KONG

3.1 The role of policy in growing Hong Kong's ecosystem

Over the past few years, the ecosystem of virtual assets has advanced substantially in terms of market structure and the policy and regulatory framework.

In respect of market structure, global financial institutions and service providers are entering this space and building institutional-grade infrastructure⁴⁴. Their entry has driven the growth of the digital ecosystem, making it more sophisticated in providing services that are comparable to mainstream finance.

According to the Securities and Futures Commission of Hong Kong (SFC), investors bought HK\$10 billion in virtual asset funds via overseas platforms in 2021, up from HK\$8 million in 2020, and investors have been gaining a better understanding of the risks of trading virtual assets⁴⁵.

Looking at where crypto assets investment teams are physically located, according to PwC's 4th Annual Global Crypto Hedge Fund Report 2022⁴⁶, in the year 2021, Hong Kong ranked third by number of managers, hosting 6% of crypto hedge fund managers. The US and the UK occupied the top two spots (representing 30% and 10% of crypto hedge fund managers respectively. (See Figure 13.)

⁴¹ See "The magic of ETF primary markets: A look behind the curtain", published on Natixis' website, 15 August 2022; Wells Fargo Investment Institute, "Investing in bitcoin", published on Wells Fargo's website, October 2021.

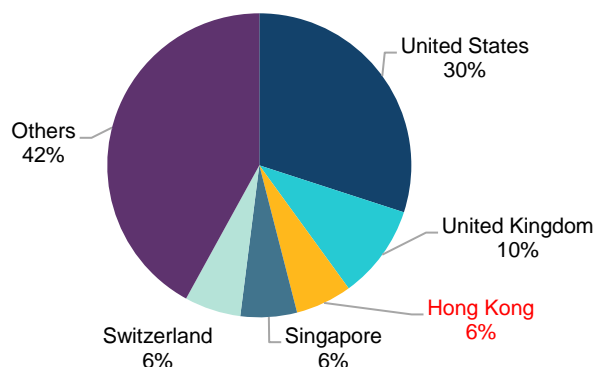
⁴² Calculated from the price premiums of individual ETFs from Morningstar.

⁴³ Source: "Grayscale's bitcoin investors have trust issues", *Bloomberg*, 7 December 2022.

⁴⁴ See Julia Leung, "Embracing Innovation, Regulation and the Future of Finance", Keynote Address at *Hong Kong FinTech Week 2022*, 31 October 2022.

⁴⁵ Source: Ditto.

⁴⁶ See PwC report, *4th Annual Global Crypto Hedge Fund Report 2022*, published on PwC's website, 8 June 2022.

Figure 13. Top five locations of crypto hedge fund managers (2021)

Source: PwC report, *4th Annual Global Crypto Hedge Fund Report 2022*, published on PwC's website, 8 June 2022.

The sudden collapse of FTX in 2022 demonstrated the importance of proper regulation in the sector (see Section 1.4 above). Regulatory issues such as the confirmation of legal ownership and the review of property rights remain to be resolved in the industry. More regulatory deliberations would be required to enhance the protection of investor interests in the market.

In respect of the policy and regulatory framework for virtual asset activities in Hong Kong, this has been continually undergoing evolution. According to the SFC, it has gained experience over the years in regulating virtual asset trading platforms and fund managers⁴⁷.

The SFC has applied a pragmatic approach in introducing a comprehensive regulatory framework for regulating virtual asset trading platforms. The framework covers various areas including the custody of client assets, cybersecurity, market surveillance and risk management.

As a first step, the SFC introduced its regulatory framework for virtual assets in 2018⁴⁸, which imposes a “professional investors only” requirement for crypto-asset customers. These customers include customers of SFC-licensed trading platforms, STOs and virtual asset funds.

On 28 January 2022, the SFC and the Hong Kong Monetary Authority (HKMA) issued the **Joint Circular on Intermediaries’ Virtual Asset-Related Activities**. The joint circular permitted securities brokers and banks to offer their clients dealing services in virtual assets provided that they partner with an SFC-licensed exchange and comply with other regulatory requirements. The joint circular also clarifies the requirements that apply to the distribution of virtual asset-related products.

On 31 October 2022, the SFC provided updates on this front in the keynote address made by its then Chief Executive Officer (now the Chief Executive Officer) at Hong Kong FinTech Week 2022, where its latest policy stance on guardrails for retail access to virtual asset products was introduced. More specifically, the keynote address offered guidance on the issuance of ETFs on virtual assets futures and STOs. The keynote address represents a key milestone in the sense that the regulator has affirmed its policy position in further embracing and enriching the ecosystem of virtual assets in Hong Kong.

⁴⁷ Source: Julia Leung, “Embracing Innovation, Regulation and the Future of Finance”, Keynote Address at *Hong Kong FinTech Week 2022*, 31 October 2022.

⁴⁸ Source: “Statement on regulatory framework for virtual asset portfolios managers, fund distributors and trading platform operators”, *Policy Statements and Announcements* on the SFC’s website, 1 November 2018.

With Hong Kong's world-class financial infrastructure and legal and regulatory regime, the Government of the Hong Kong Special Administrative Region (HKSAR) aims to promote the sustainable development of financial services along the whole virtual asset value chain. On 31 October 2022, the Financial Services and the Treasury Bureau (FSTB) released the ***Policy Statement on Development of Virtual Assets in Hong Kong***⁴⁹.

In this policy statement, the HKSAR Government stated that it “is prepared to embrace the future of finance and commerce, supporting the underlying technologies of virtual assets and promoting their benefits in our market”, and that it “welcomes the clustering of Fintech and virtual assets community and talents in Hong Kong”. It stated that “the vision presented in this policy statement will be achieved by facilitating policies, comprehensive and balanced regulations, risk-based guardrails, as well as our pilot projects”.

The policy statement outlined a number of pilot projects to demonstrate Hong Kong's commitment and determination to explore and develop financial innovations together with the global virtual assets community:

- (1) **NFT issuance for usage in Hong Kong Fintech Week 2022** — As a proof-of-concept project to engage the Fintech and Web3 community;
- (2) **Green bond tokenisation** — Tokenising green bond issuance by the government for subscription by institutional investors; and
- (3) **e-HKD** — The potential “backbone” and anchor bridging legal tender and virtual assets, offering price stability and confidence needed to empower more innovations around STOs.

On 7 December 2022, as an effort in formulating a comprehensive and balanced regulatory framework for virtual asset activities to protect investors, the HKSAR Legislative Council passed the *Anti-Money Laundering and Counter-Terrorist Financing (Amendment) Bill 2022*, imposing a new licensing regime on virtual asset service providers from June 2023 under the purview of the SFC⁵⁰.

The passage of this bill reinforces Hong Kong's status as an international financial centre with an enhanced regulatory framework for protecting investors in virtual assets.

On 31 January 2023, the HKMA issued the *Consultation Conclusion to the Discussion Paper on Crypto-Assets and Stablecoins*, in which the HKMA proposes to bring certain activities relating to stablecoins under regulatory control, and indicates the expected regulatory scope and key regulatory requirements.

According to the HKMA, it will announce the regulatory arrangements and next steps in due course⁵¹. This would be another key step forward in establishing the appropriate regulatory environment to help address financial stability risks possibly posed by virtual assets, and in promoting the orderly and sustainable development of the industry.

On 20 February 2023, SFC issued a consultation paper⁵² on details of a new licensing regime for virtual asset service providers. The consultation will include types of products and conditions for retail investors to trade in virtual assets, such as requirements for market capitalisation, liquidity and other criteria. This represents an opportunity for the financial

⁴⁹ Source: FSTB's website.

⁵⁰ Source: “Government welcomes passage of Anti-Money Laundering and Counter-Terrorist Financing (Amendment) Bill 2022”, *HKSAR Government press release*, 7 December 2022.

⁵¹ Source: “Conclusion of discussion paper on crypto-assets and stablecoins”, *press release* on the HKMA's website, 31 January 2023.

⁵² See *Consultation Paper on the Proposed Regulatory Requirements for Virtual Asset Trading Platform Operators Licensed by the Securities and Futures Commission*, issued by SFC, 20 February 2023.

service sector in Hong Kong to widen their reach to retail investors in their virtual asset businesses.

The move is expected to facilitate the Hong Kong market in building up a more regulated environment for the orderly and healthy development of its virtual assets ecosystem and achieving a higher level of protection for retail investors.

3.2 Hong Kong's regulatory regime for virtual asset ETFs

As discussed in the previous sections, the global virtual assets landscape has evolved rapidly over the past few years. A relatively broad range and a growing number of investment products providing exposure to virtual assets, including virtual asset ETFs, have been made available to global retail and professional investors and have become increasingly popular. The development in Hong Kong is no exception.

According to the *Joint Circular on Intermediaries' Virtual Asset-Related Activities* issued by the SFC and the HKMA in January 2022, SFC-licensed and registered intermediaries are allowed to offer trading of ETFs on eligible virtual asset futures to retail investors in Hong Kong.

In light of recent developments in the virtual assets landscape, the SFC has been considering the authorisation of investment products providing exposure to virtual assets to meet investor demand with appropriate safeguards for investor protection. On 31 October 2022, the SFC issued the ***Circular on Virtual Asset Futures Exchange Traded Funds***⁵³ (hereinafter referred to as the "ETF Circular"), accepting applications for authorisation of virtual assets futures ETFs, with relevant regulatory requirements as safeguards for investor protection. The key product requirements specified in the circular are given below:

Eligible futures

Only virtual asset futures traded on conventional regulated futures exchanges are allowed, subject to the management company demonstrating that:

- (1) the relevant virtual asset futures have adequate liquidity for the operation of the virtual asset futures ETF; and
- (2) the roll costs of the relevant virtual asset futures contracts are manageable and how such roll costs will be managed.

At the initial stage, the SFC will only authorise ETFs based on bitcoin and ether futures traded on the CME. The SFC may consider expanding the scope of eligible virtual asset futures markets as appropriate.

Investment strategy

Active investment strategies are expected to be adopted by management companies of virtual asset futures ETFs, so as to allow flexibility in portfolio composition (e.g. diversification of futures positions with multiple expiry dates), rolling strategy, and handling of any market disruption events.

The net derivative exposure of a virtual asset futures ETF shall not exceed 100% of the ETF's total net asset value.

⁵³ Source: SFC's website.

Disclosure

The product key facts statement of a virtual asset futures ETF shall contain upfront disclosure of the investment objective and key risks associated with investment in virtual asset futures such as:

- (1) potentially large roll costs of virtual asset futures; and
- (2) operational risks related to virtual asset futures (such as margin risk and risk associated with mandatory measures imposed by relevant parties).

Distribution

Virtual asset futures ETFs are regarded as derivative products and virtual asset-related products. The distribution of these products are subject to related rules and guidelines⁵⁴.

Investor education

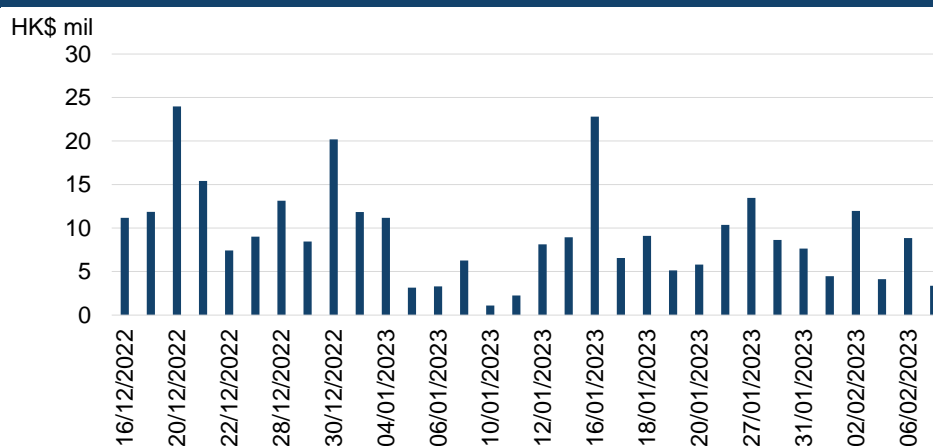
The management company of a virtual asset futures ETF is expected to carry out extensive investor education before launching the ETF.

3.3 Asia's first virtual asset ETFs

After the release of the ETF Circular, on 16 December 2022, Asia's first virtual asset ETFs — one ETF on bitcoin futures and one ETF on ether futures — were listed on HKEX. The ether futures ETF is also the first in the world.

Subsequently, the market saw the listing of the third virtual asset ETF in January 2023, making two ETFs available on bitcoin futures and one ETF on ether futures⁵⁵. These ETFs adopt active management strategies of standardised, cash-settled futures contracts traded on the CME. The ADT of these ETFs was about HK\$9.3 million from 16 December 2022 to 7 February 2023 (see Figure 14).

Figure 14. Total daily turnover of virtual asset ETFs listed in Hong Kong (16 Dec 2022 – 7 Feb 2023)



Source: Calculated based on daily turnover of individual ETFs from Bloomberg.

⁵⁴ These included the *Code of Conduct for Persons Licensed by or Registered with the Securities and Futures Commission*, the Joint Circular, and other related guidelines.

⁵⁵ They are CSOP Bitcoin Futures ETF (stock code: 3066), CSOP Ether Futures ETF (stock code: 3068) and Samsung Bitcoin Futures Active ETF (stock code: 3135).

With this milestone launch of the first batch of virtual asset ETFs is an important component of the virtual asset ecosystem in Hong Kong, global investors can now gain exposure to the virtual assets space under a regulated environment for the first time during Asian hours.

With virtual asset ETFs, investors can enjoy the benefits of accessibility and ease of trading for participating in this asset class since the trading of virtual asset ETFs does not require a separate trading account and a crypto wallet as that required for direct trading in virtual assets.

Moreover, compared with holding virtual assets in hot wallets which may be vulnerable to online attack, investors would be subject to a higher level of asset protection as the virtual asset ETFs they invested in Hong Kong are regulated by the market regulator.

The successful launch of virtual asset ETFs in Hong Kong reflects the authorities' commitment to the development of the virtual assets ecosystem in Hong Kong and the market's appetite for related products. Looking into the future, more thematic virtual asset ETFs and other virtual asset products are expected to be made available in the Hong Kong market.

4. CONCLUSION

Supported by the development of Web 3.0 and blockchain technology, virtual assets have become an increasingly important component in the financial system.

Regulatory regimes governing virtual assets are evolving to strike a balance between market development and financial stability. Currently, investors can access virtual assets directly through crypto exchanges or brokers, or indirectly through investment funds, including ETFs.

A diverse set of virtual asset ETFs have been launched in global markets for investors to build exposure to cryptocurrencies and listed blockchain companies.

As an international financial centre with a robust regulatory regime, the Hong Kong market is poised to grasp the potential opportunities offered by the development of virtual assets.

A foundational regulatory regime has been established for the healthy development of the virtual asset ecosystem in Hong Kong and the first batch of virtual asset ETFs have been listed which would serve as a starting point to support related product innovations. Further regulatory enhancements is expected to help grow the virtual asset ecosystem in Hong Kong in the future.

Disclaimer

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Hong Kong Exchanges and Clearing Limited

8/F, Two Exchange Square
8 Connaught Place
Central, Hong Kong

hkexgroup.com | hkex.com.hk

info@hkex.com.hk
T +852 2522 1122
F +852 2295 3106