

# State of Crypto

Issue 9 / May 2023

21shares



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## Inside Crypto Exchange-Traded Products

# The World's First and Largest Crypto ETP Issuer

Digital asset investments for everyone, with simple access to your trades through your broker. Easy, safe and fully regulated.

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# Executive Summary

- **The Evolution of Investment Products & Cryptoassets:** Crypto ETPs bring increased accessibility, transparency, liquidity, and legitimacy. Currently, investors who want exposure to Bitcoin or Ethereum navigate complex and sometimes offshore exchanges or invest in unregulated funds with a high-risk level. A spot Bitcoin ETP simplifies this process by allowing investors to buy and sell shares of the ETP on a regulated exchange, just like they would with any other stock or ETF.
- **What's an Exchange-Traded Product?** In most jurisdictions, ETP is an umbrella term for three product structures – Exchange-Traded Funds (ETFs), Exchange-Traded Notes (ETNs), and Exchange-Traded Commodities (ETCs). However, in Switzerland, the term ETP is more akin to an ETC, as the product is a debt instrument fully collateralized with physical assets, such as gold or Bitcoin. It's crucial to understand that not all investment products are created equally. Products based on futures and closed-end funds are associated with risks not present in spot and physically-backed ETPs.
- **An Inside Look at ETP Construction:** The ETP ecosystem can be divided into the primary and secondary market. Only Authorized Participants (APs) can transact with the ETP issuer in the primary market, where shares are created and redeemed at their fair value, called the NAV. In contrast, in

the secondary market, where investors buy and sell existing shares at market price through a stock exchange or over-the-counter (OTC), a whitelist of liquidity sources is supported by regulated market makers (MMs). The creation/redemption process allows Authorized Participants to manage the ETP inventory and in the secondary market to keep the ETP price close to the value of its underlying assets (NAV). The arbitrage mechanism between the primary market (NAV) and the secondary market price is central to ETPs. Finally, secondary market liquidity is just the tip of the iceberg when it comes to the overall liquidity of an ETP.

• **The Different Ways to Invest in Cryptoassets:** Investors have many ways to get exposure to cryptoassets, depending on their risk profile, tech savviness, and regulatory constraints. This non-exhaustive list includes many venues: crypto exchanges, futures and options markets, decentralized exchanges, stock trading applications, OTC desks, hedge funds, ETPs, and investment trusts. Broadly, there are two primary considerations after conducting due diligence on the underlying assets and the counterparties: 1) how to purchase cryptoassets and 2) how to store them. We conclude that the ETP structure provides the easiest and most secure way for institutional investors to invest in cryptoassets.





“The ETP structure provides the easiest and most secure way for institutional investors to invest in cryptoassets.”

# Introduction

We are thrilled to release our insights into the emergence of crypto ETPs (Exchange-Traded Products) and their impact on the cryptoasset market.

For years, investors seeking exposure to cryptoassets such as Bitcoin or Ethereum have had to navigate complex user experiences and invest in sometimes unregulated exchanges or funds. However, pioneered in Switzerland by our co-founders Hany and Ophelia, crypto ETPs have opened the door for a new regulated investment vehicle.

In this magazine, we dive deep into the mechanics of ETPs, exploring their differences from other investment vehicles and

their potential benefits for investors. We also analyze the impact of ETPs on the potential for increased adoption among traditional investors and the implications for the overall cryptoasset ecosystem in light of last year's debacles.

Whether you're a seasoned investor or just getting started, this edition is a must-read for anyone interested in this burgeoning industry.

**Hany Rashwan, CEO**  
**Ophelia Snyder, President**  
**Eliézer Ndinga, Director of Research**



# About Our Research

21Shares is the world's leader in providing access to crypto through simple and easy-to-use products — co-founded by Hany Rashwan and Ophelia Snyder.

















The research team is a cross-functional department collaborating with the distribution, product, and engineering teams. Composed of professionals with substantial experience in the cryptoasset industry, our team places education at the core of our industrial research as we stand by free and publicly accessible content; and strongly believe information asymmetry contradicts the crypto ethos and philosophy. We provide data-driven, cutting-edge, unique insights into the crypto markets and macroeconomic factors likely to influence the state of this industry.

More than 10,000 investors read our research notes and reports on a weekly basis, ranging from private banks, asset managers, professional traders, hedge funds, tier-1 media outlets, and regulators.

- Eli  zer** | Director of Research
- Alistair** | Director of Capital Markets
- Adrian** | Senior Research Associate
- Alessandro** | Capital Markets Associate
- Carlos** | Research Analyst
- Karim** | Research Associate
- Leena** | Research Associate
- Tom** | Research Analyst



<div data-bbox="251 284 609 364" data-label="Section-Header"> <h1>Glossary</h1> </div>	<div data-bbox="804 179 975 350" data-label="Image"> </div> <div data-bbox="1003 177 1417 385" data-label="Text"> <p><b>Blockchain:</b> A public ledger of transactions verified by a peer-to-peer network of computers and maintained by a consensus mechanism to confirm data. Every blockchain wallet has a unique public key or account number and a private key or pin code.</p> </div> <div data-bbox="1672 179 1843 350" data-label="Image"> </div> <div data-bbox="1871 177 2284 415" data-label="Text"> <p><b>Cryptoassets:</b> Digital assets whose global transaction history is stored on a blockchain. Cryptoassets serve as a medium of exchange and unit of account of a network like Bitcoin to pay for transaction fees and reward operators, also known as miners or validators.</p> </div>	<div data-bbox="2358 179 2529 350" data-label="Image"> </div> <div data-bbox="2557 177 2971 385" data-label="Text"> <p><b>Exchange-Traded Fund (ETF):</b> A fund that directly tracks the underlying performance of an index, such as a basket of securities. The EU standard for ETFs is governed by UCITS, which imposes structural, disclosure, and portfolio diversification requirements.</p> </div>
<div data-bbox="121 622 292 794" data-label="Image"> </div> <div data-bbox="320 620 749 766" data-label="Text"> <p><b>Authorized Participant (AP):</b> An Authorized Participant is a financial intermediary that has access to the ETP primary market to create and redeem ETP shares.</p> </div>	<div data-bbox="804 622 975 794" data-label="Image"> </div> <div data-bbox="1003 620 1417 796" data-label="Text"> <p><b>Centralized exchanges:</b> The primary fiat onramps to buy and sell cryptoassets. They operate similarly to stock exchange platforms, relying on order book systems while offering intuitive user interfaces.</p> </div> <div data-bbox="1672 622 1843 794" data-label="Image"> </div> <div data-bbox="1871 620 2284 796" data-label="Text"> <p><b>Decentralized exchanges:</b> A platform built on a blockchain that facilitates the buying and selling of tokens in a non-custodial fashion. Their underlying pricing technology is dubbed an Automated Market Maker (AMM).</p> </div>	<div data-bbox="2358 622 2529 794" data-label="Image"> </div> <div data-bbox="2557 620 2971 796" data-label="Text"> <p><b>Exchange-Traded Note (ETN):</b> Uncollateralized debt security that provides access to the performance of an asset or index. Typically ETNs are only issued by a bank or other large financial institutions.</p> </div>
<div data-bbox="121 1066 292 1237" data-label="Image"> </div> <div data-bbox="320 1064 733 1272" data-label="Text"> <p><b>Arbitrage:</b> Arbitrage is the strategy of taking advantage of price differences in different markets for the same asset. As long as there is a market for the underlying asset, the arbitrage mechanism allows an ETP to closely track its benchmark.</p> </div>	<div data-bbox="804 1066 975 1237" data-label="Image"> </div> <div data-bbox="1003 1064 1417 1179" data-label="Text"> <p><b>Coin entitlement:</b> A term referring to the amount per share of, for example, cryptoassets like Bitcoin or Ethereum that is held by the investment vehicle.</p> </div> <div data-bbox="1672 1066 1843 1237" data-label="Image"> </div> <div data-bbox="1871 1064 2284 1393" data-label="Text"> <p><b>Exchange-Traded Product (ETP):</b> In Switzerland, the term ETP refers to a senior, secured, non-interest-bearing debt issued by an SPV and listed on the Swiss stock market. In other jurisdictions, investors usually think of an ETP as a generic term that encompasses Exchange-Traded Funds (ETFs), Exchange-Traded Notes (ETNs), and Exchange-Traded Commodities (ETCs).</p> </div>	<div data-bbox="2358 1066 2529 1237" data-label="Image"> </div> <div data-bbox="2557 1064 2971 1209" data-label="Text"> <p><b>Futures contract:</b> A futures contract allows investors to bet on an asset's price by having them agree to buy or sell it at a specific price and point in time.</p> </div>
<div data-bbox="121 1509 292 1681" data-label="Image"> </div> <div data-bbox="320 1507 733 1622" data-label="Text"> <p><b>Backwardation:</b> Backwardation is a market condition where the futures price is below the spot price for a particular asset.</p> </div>	<div data-bbox="804 1509 975 1681" data-label="Image"> </div> <div data-bbox="1003 1507 1417 1592" data-label="Text"> <p><b>Contango:</b> Contango is a market condition where the futures price of an asset is higher than the spot price.</p> </div> <div data-bbox="1672 1509 1843 1681" data-label="Image"> </div> <div data-bbox="1871 1507 2284 1745" data-label="Text"> <p><b>Exchange-Traded Commodity (ETC):</b> Collateralized debt security giving access to daily returns of, among others: individual commodities (e.g., gold and oil), commodity baskets, and currencies. In Switzerland, this product structure is called an Exchange Traded Product (ETP).</p> </div>	<div data-bbox="2358 1509 2529 1681" data-label="Image"> </div> <div data-bbox="2557 1507 2971 1592" data-label="Text"> <p><b>Liquidity:</b> How quickly an investment can be sold without impacting its market price.</p> </div>

 <p><b>Market Maker (MM):</b> A market maker refers to a firm that engages in two-sided markets of a given security. It means that it provides bids and asks in tandem with the market size of each security. A market maker seeks to profit from the difference in the bid-ask spread and provides liquidity and market depth to financial markets.</p>	 <p><b>Private key:</b> Every public key is paired with a private key, serving as a password to unlock funds from a wallet.</p>	 <p><b>Smart contract:</b> A smart contract is a digital code that enforces pre-defined conditions once valid on a blockchain.</p>	 <p><b>UCITS:</b> An Undertaking for Collective Investment in Transferable Securities (UCITS) is an investment fund for liquid assets and can be distributed publicly to retail investors across the EU.</p>
 <p><b>Over-the-Counter (OTC):</b> OTC refers to the trading of securities between two counterparties, without the supervision of a regulated exchange.</p>	 <p><b>Public key:</b> The public key is a cryptographic code for receiving cryptoassets. It is analogous to account numbers for value transfers over a blockchain.</p>	 <p><b>Special Purpose Vehicle (SPV):</b> An SPV is a subsidiary company that is formed to undertake a specific business purpose or activity.</p>	 <p><b>Wallet:</b> A software that secures and conceals your private keys.</p>
 <p><b>Physical replication:</b> Replication method where a security holds the underlying assets it is designed to track.</p>	 <p><b>Recovery phrase:</b> A secret recovery phrase is the backup of all private keys. It allows the recovery of funds, even without the original wallet or device.</p>	 <p><b>Stock exchange:</b> A stock exchange is a regulated marketplace where securities, such as stocks and commodities, are bought and sold.</p>	 <p><b>Software wallet (hot storage):</b> A software wallet connected to the Internet that stores private keys digitally on a mobile device, PC, or laptop. They tend to be easy to use but vulnerable to malware and hacks.</p>
 <p><b>Primary market:</b> The primary market is where new shares are issued and delivered to the market for the first time.</p>	 <p><b>Secondary market:</b> The secondary market is where investors buy and sell existing shares through a stock exchange or via an over-the-counter venue.</p>	 <p><b>Synthetic replication:</b> Replication method where a security uses financial engineering to artificially replicate the performance of the underlying assets. They are usually based on derivatives (e.g., futures, forwards and swaps).</p>	 <p><b>Hardware wallet (cold storage):</b> A hardware wallet is a physical device that stores private keys in an isolated environment, similar to a vault. The advantage of using a hardware wallet is that it operates in a ring-fenced environment, away from the Internet and its associated threats.</p>



# The Evolution of Investment Products & Cryptoassets





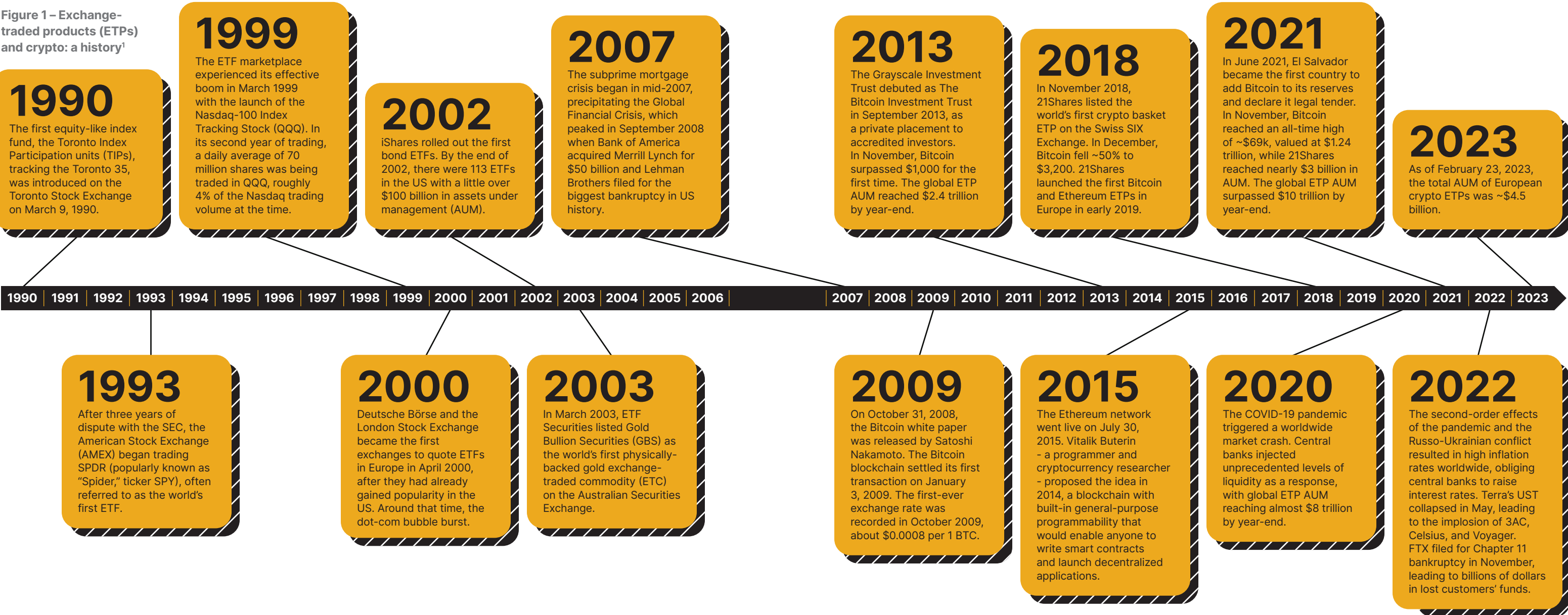
# Exchange-Traded Products (ETPs) and Crypto: A History

Over the last 30 years, innovations like exchange-traded funds (ETFs) combined with the rise of the Internet have made financial markets more accessible, transparent, and affordable. The cryptoasset industry is experiencing a similar adoption phase with the rise of exchange-traded products (ETPs). Crypto ETPs bring increased accessibility, transparency, liquidity, and

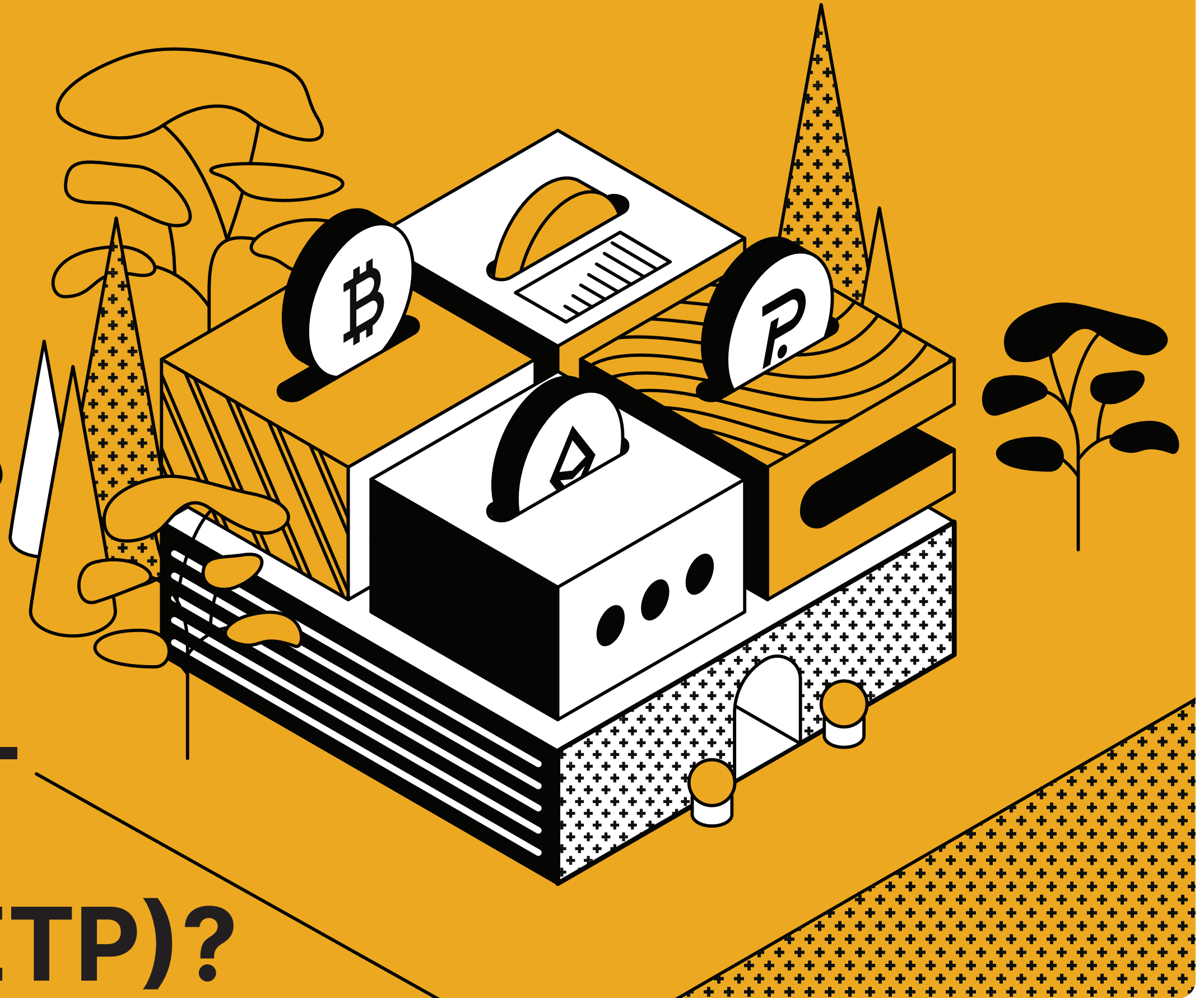
legitimacy. Currently, investors who want exposure to Bitcoin or Ethereum navigate complex and sometimes offshore exchanges or invest in unregulated funds with a high-risk level. A spot Bitcoin ETP simplifies this process by allowing investors to buy and sell shares of the ETP on a regulated exchange, just like they would with any other stock or ETF.

“A spot Bitcoin ETP allows investors to get exposure to Bitcoin by simply buying and selling shares of the ETP on a regulated exchange, just like they would with any other stock or ETF.”

Figure 1 – Exchange-traded products (ETPs) and crypto: a history<sup>1</sup>



# What's an Exchange- Traded Product (ETP)?



# ETP Types: ETF vs. ETN vs. ETC

**Exchange-traded products (ETPs) are financial instruments designed to track the performance of an underlying asset or a basket of assets.** ETPs trade on regulated exchanges, like stocks and other securities, providing investors with an easy way to invest in various asset classes, markets, and investment strategies.

**In most jurisdictions, ETP is an umbrella term for three product structures: Exchange-Traded Funds (ETFs), Exchange-Traded Notes (ETNs), and Exchange-Traded Commodities (ETCs).** Though similar from a distance, there

are fundamental differences between them, as seen in Figure 2.

**Why is a crypto ETP important?** Many traditional investors have strict compliance requirements, which may make it difficult for them to invest directly in crypto exchanges. For example, pension funds and insurance companies are often subject to regulatory oversight, which may require them to invest only in regulated and approved securities. Investing in a crypto ETP, a regulated financial instrument traded on a stock exchange, may be a more compliant and convenient way for these investors to gain exposure to Bitcoin, Ethereum, or a basket of cryptoassets.

Figure 2 – ETP types

ETP type	Exchange-Traded Fund (ETF)	Exchange-Traded Note (ETN)	Exchange-Traded Commodity (ETC)
Definition	The most common ETP type. It refers to a basket of securities, similar to an index mutual fund, but trades on a stock exchange.	An unsecured, non-interest-bearing bond issued by a large bank or other financial institution.	A senior, secured, non-interest-bearing debt security listed on a stock exchange.
Legal structure	Equity participation in a fund	Uncollateralized debt	Collateralized debt
Regulatory compliance	In the EU, the standard for ETFs is governed by <b>UCITS</b> , which imposes <b>structural, disclosure, and portfolio diversification requirements</b> .	Not governed by UCITS. Significantly lost popularity after the 2007-9 Global Financial Crisis due to capital adequacy requirements at banks.	Not governed by UCITS. It allows replicating the performance of a single underlying commodity physically.
Cryptoasset eligibility	✗	✓	✓
Provides access to	Equity and commodity indices, fixed income, money markets, private equity, and more.	Some ETNs offer exposure to niche product areas not available in an ETF framework.	Precious metals, industrial metals, energy products, agricultural products, cryptoassets like Bitcoin.
Counterparty risk	Limited to ETFs using derivatives or engaging in securities lending.	Risk that the issuer defaults on the note is not mitigated by collateral.	Investors in the debt instrument have priority claims over collateral.
UCITS: An Undertaking for Collective Investment in Transferable Securities (UCITS) is an investment fund that invests in liquid assets and can be distributed publicly to retail investors across the EU.			21shares ETPs
Sources: 21Shares			21shares

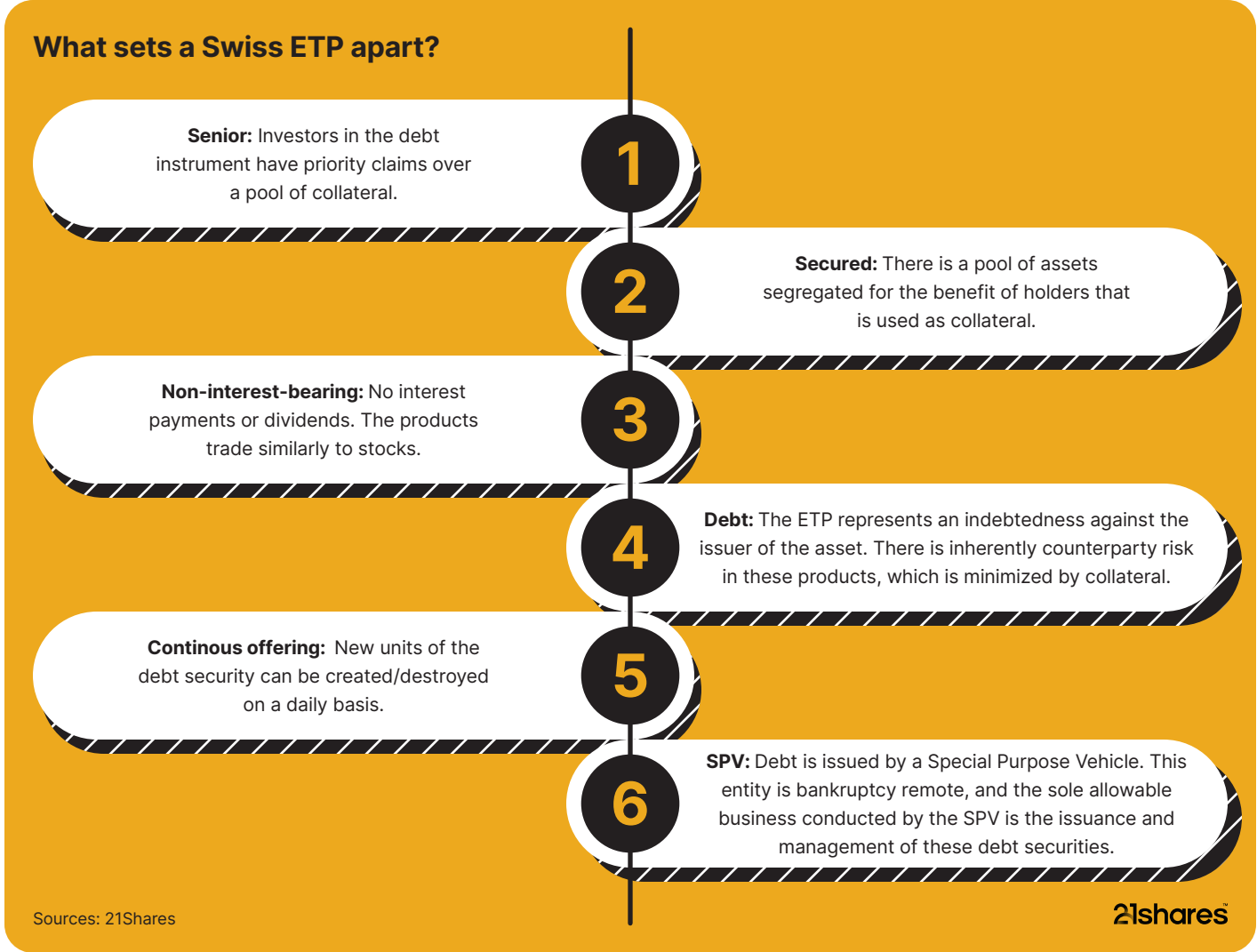
# ETCs are Called ETPs in Switzerland

In Switzerland, the structure of ETPs is slightly different compared to other countries. **In Switzerland, the term ETP is more akin to an ETC, as the product is collateralized with physical assets, such as gold or Bitcoin.** In addition, the assets are segregated and ring-fenced away from the issuer.

This legal separation provides additional protection to in-

vestors in the event of issuer bankruptcy. Overall, the Swiss legal structure for ETPs is designed to provide a high level of investor protection and regulatory oversight while providing flexibility for issuers to create a wide range of investment products and strategies. These advantages have made Switzerland a popular destination for ETP issuers.

Figure 3 – Swiss ETP characteristics



# ETPs vs. Structured Products?

Thus far, we have focused almost exclusively on ETPs. In this regard, tracker certificates are also a popular choice among investors, so it's crucial to understand how it differs from an ETP.

Tracker certificates are derivative securities that form part of a broader category known as structured products. The critical difference lies in “derivative,” as tracker certificates replicate the performance of the underlying asset artificially using financial engineering (e.g., futures, forwards, or swaps) or even using an underlying physical ETP.

On the other hand, as we have learned, Swiss ETPs hold the underlying asset it is designed to track, which minimizes the tracking error and counterparty risk.

Figure 4 – Tracker certificate vs. Swiss ETP

Investment product	Tracker certificate	Exchange-Traded Product (ETP)
Definition	A tracker certificate is a structured product that allows investors to get exposure to an underlying asset without actually owning the asset.	A Swiss ETP is a senior, secured, non-interest-bearing debt issued by an SPV and listed on the Swiss stock market.
Legal structure	Uncollateralized debt (similar to an ETN).	Collateralized debt (similar to an ETC).
Replication method	Synthetic replication: performance of the target assets is replicated artificially using financial engineering.	Physical replication: ETP holds the underlying assets it is designed to track.
Regulation	Not governed by UCITS.	Not governed by UCITS.
Cryptoasset eligibility	✓	✓
Term length	Some tracker certificates have an expiry date. That means they only track an underlying asset for a predetermined length of time (e.g., one year). Investors get paid out its going value at the time of expiry.	ETPs do not have a maturity date.
Fees and transparency	Less transparent on the fees. Usually, tracker certificates are priced in by the issuer facing their clients (deciding what to charge as entry/exit cost). Also, they may not have independent auditors, market makers, and custodians.	ETPs charge an all-inclusive fixed management fee. In addition, they have independent auditors, market makers, and custodians.
Counterparty risk	Risk that the issuer defaults on the tracker is not mitigated by collateral.	Investors in the debt instrument have priority claims over collateral.
		21shares™ ETPs

Sources: 21Shares

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# Not all Investment Vehicles are Created Equal

Just as there are different ETP types, there can be fundamental discrepancies in how investment vehicles are structured.

The matrix in Figure 5 compares closed-ended to open-ended structures on the vertical axis and futures-based to spot investment vehicles on the horizontal axis.

Figure 5 – Investment Vehicle Matrix: closed vs. open-end, futures-based vs. spot

	Futures	Spot
Open-End	<div><div>✗ Synthetic replication: fund holds a portfolio of futures, forwards, and swap contracts.</div><div>✓ Creation/redemption: MMs/APs facilitate creations and redemptions (primary market).</div><div>✓ Visibility into holdings: typically daily.</div><div>✓ Pricing: primary market - NAV, Secondary market - market determined.</div><div>✓ Liquidity: secondary market (intraday) and primary processes (end of day).</div></div>	<div><div>✓ Physical replication: fund holds the underlying assets it is designed to track.</div><div>✓ Creation/redemption: MMs/APs facilitate creations and redemptions (primary market).</div><div>✓ Visibility into holdings: typically daily.</div><div>✓ Pricing: primary market - NAV, secondary market - market determined</div><div>✓ Liquidity: secondary market (intraday) and primary processes (end of day).</div></div>
Closed-End	<div><div>✗ Synthetic replication: fund holds a portfolio of futures, forwards, and swap contracts.</div><div>✗ Fixed number of shares: closed-end funds can only be traded in the secondary market.</div><div>✗ Visibility into holdings: typically monthly or quarterly.</div><div>✗ Pricing: IPO price, after IPO - market price, usually trades at a premium or discount.</div><div>✗ Liquidity: subject to market liquidity (secondary market).</div></div>	<div><div>✓ Physical replication: fund holds the underlying assets it is designed to track.</div><div>✗ Fixed number of shares: closed-end funds can only be traded in the secondary market.</div><div>✗ Visibility into holdings: typically monthly or quarterly.</div><div>✗ Pricing: IPO price, after IPO - market price, usually trades at a premium or discount.</div><div>✗ Liquidity: subject to market liquidity (secondary market).</div></div>
	Futures	Spot

MM = Market Maker      AP = Authorized Participant      NAV = Net Asset Value      IPO = Initial Public Offering

Sources: 21Shares

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# An Inside Look at ETP Construction

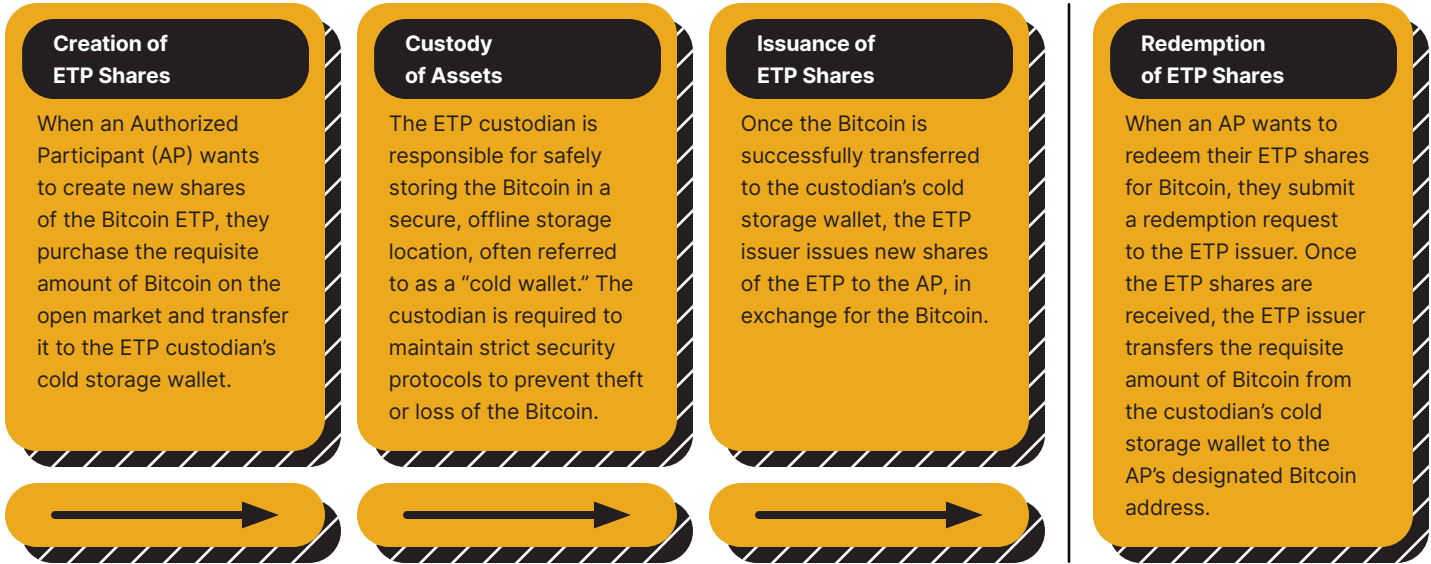
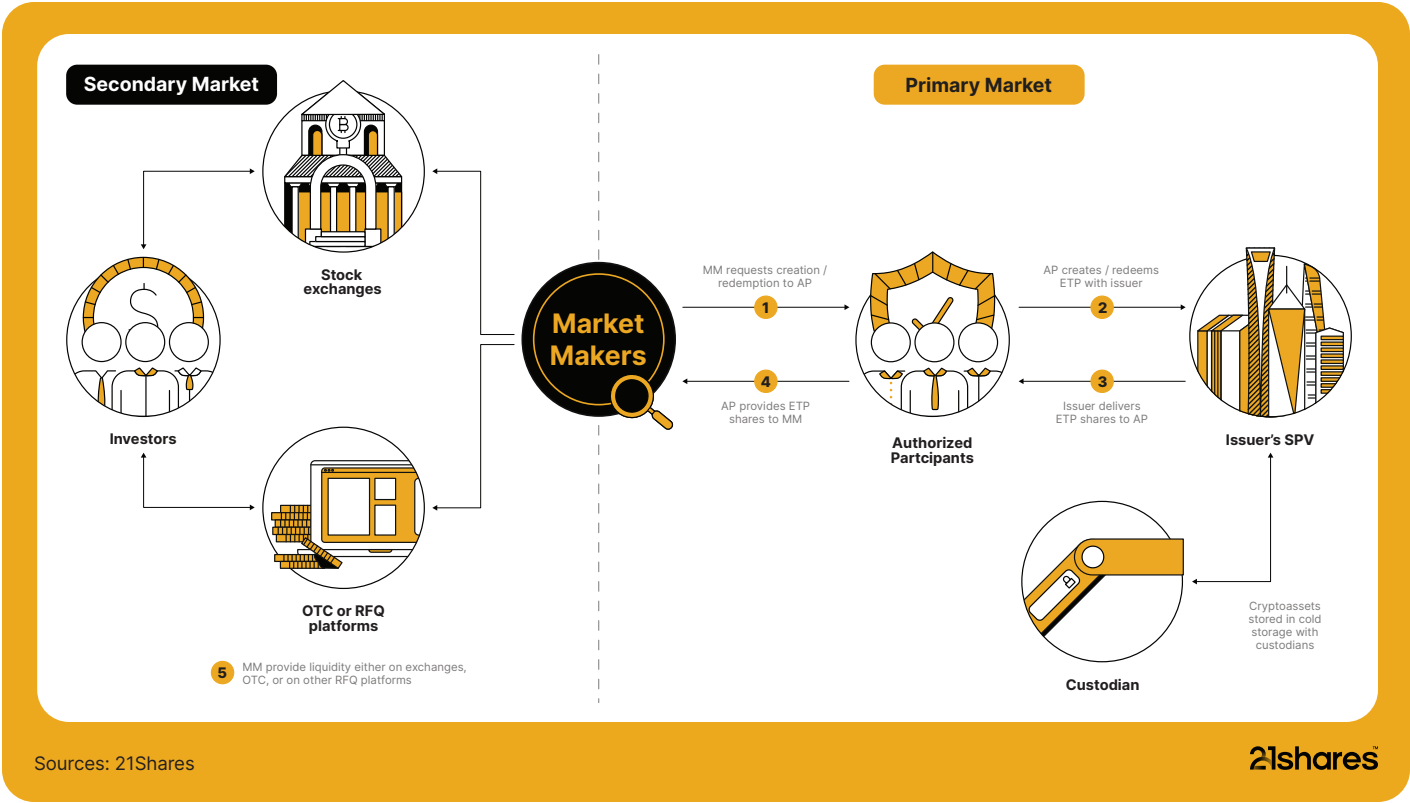


# Overall Transaction Workflow

# The Primary Market: Creation and Redemption Mechanism

The primary market is where the creation and redemption of ETP shares take place. ETP shares are created by an **Authorized Participant (AP)**, which is typically a large financial institution. Authorized Participants can create or redeem ETP shares in two different ways : 1) by delivering to the issuer's custodian the underlying cryptoassets directly or 2) by delivering fiat currencies like US dollars or Swiss Francs. The preferred delivery mechanism is with cryptoassets for crypto ETPs. Throughout the entire transaction workflow, the ETP's **independent custodian** would be responsible for tracking all transactions and balances, reconciling them against the ETP's records, and reporting them to the ETP issuer and any relevant regulatory authorities.

Figure 6 – ETP transaction workflow



# The Role of Independent Custodians

**Independent custodians** play an important role in the operation of crypto ETPs by providing secure storage for the ETP's underlying assets, typically held in the form of cryptoassets such as Bitcoin. Some benefits of using independent custodians include the following:

- 1. Enhanced security:** Independent custodians have specialized expertise in the secure storage of cryptoassets and provide state-of-the-art security measures to protect assets from theft, hacking, or other types of attacks.
- 2. Reduced counterparty risk:** Using an independent custodian where assets are ring-fenced away from the ETP issuer reduces the counterparty risk associated with a single point of failure. This can help increase the resilience of the ETP in the face of unexpected events or market disruptions.  
The custodian will typically use a multi-signature system.

This means that the private keys required to access the assets are split across multiple devices or individuals. For example, the custodian may require that three out of five designated individuals must sign off on any transaction involving the assets. This reduces the risk of any single individual or device being compromised and misusing the assets.

- 3. Improved transparency:** Independent custodians provide regular reports on the status of the ETP's assets, including information on their security, and other relevant details. This can increase transparency and accountability for the ETP's management and provide investors with greater confidence in the integrity of the ETP.

Overall, using independent custodians for crypto ETPs can provide a range of benefits that help increase the security, transparency, and regulatory compliance of these investment vehicles.

Figure 7 – Benefits of using institutional-grade independent custodians

Security practices	Benefit
Segregated assets	Issuers can independently verify their assets on the blockchain.
Whitelisting of wallets	User and transaction validation - a security feature that allows crypto withdrawals to only go to pre-designated addresses (using 2FA).
Cold storage	Private keys are stored offline to protect from the risk of hacking - the most secure crypto storage method.
Regulated entity	Conformity to traditional custodial standards in the US or Switzerland.
Insurance	Protection of clients' assets in the event they are stolen.
Transparency	Ability to view customers' assets on-chain 24/7.
Financial and security audits	Maintains records of cryptoassets in client's custodial account that enable custodian to be reasonably and properly audited.

Sources: 21Shares

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“For a Bitcoin ETP, given that the underlying market is open 24/7 and BTC is traded on various exchanges, the ETP will use a fixing price (similar to gold) to determine the NAV.”

## The Primary Market: The Net Asset Value (NAV)

Understanding what the **Net Asset Value (NAV)** per ETP share means is crucial. The NAV is the official fair value of an ETP, representing the current market value of all the investments held by an ETP, minus management and trading fees. ETPs are created and redeemed by APs at more or less the NAV.

**Why is the NAV important for investors?** The NAV was created for ETPs in order to provide investors with an accurate and transparent way to evaluate the value of the investment vehicle's underlying assets. From the NAV per share, investors can also discover how many cryptoassets like Bitcoin they hold in an ETP with a metric called **Coin Entitlement**. To calculate the Coin Entitlement, the total amount of Bitcoin held by the fund is divided by the total number of shares outstanding. For example, if an investment vehicle holds 100 BTC and has 10,000 shares outstanding, the Coin Entitlement would be 0.01 BTC per share. Another example, if an investor holds 1,000 shares in an ETP with a Coin Entitlement of 0.01 BTC per share, they would have exposure to 10 BTC (0.01 BTC x 1,000 shares).

**How is the NAV calculated?** For Equity ETFs tracking US

stocks, the NAV will be determined with the closing prices of the index the ETF tracks. For a Bitcoin ETP, given that the underlying market is open 24/7 and BTC is traded on various exchanges, the ETP will use a fixing price (similar to gold) to determine the NAV. The fixing price will usually be around the end of a trading day. Calculated at the end of each trading day, the NAV per share represents the total value of the Bitcoin held by the ETP minus liabilities such as management fees and trading fees; and then divided by the number of outstanding shares.

The NAV can also help to prevent overvaluation or undervaluation of the ETP shares, as investors can use the NAV to determine whether the market price of the shares in the secondary market accurately reflects the value of the underlying Bitcoin assets. We will dive more into the secondary market in the following section.

Overall, the NAV is an important tool for ensuring transparency and accuracy in the valuation of a Bitcoin ETP and can help to improve investor confidence in these types of investment vehicles.

“Market makers are better positioned to manage the risk of a crypto exchange going down, which could occur due to technical issues, cyber-attacks, or other unforeseen events like FTX or Mt. Gox.”

# The Secondary Market: Market Price

The **secondary market** is where existing crypto ETP shares (after being issued in the primary market) are bought and sold among investors on regulated stock exchanges via their brokerage account or over-the-counter (**OTC**), just like individual stocks. The performance of an ETP share, or its market price in the secondary market, is determined by the supply and demand of its underlying assets (e.g., Bitcoin or Ethereum). A crypto ETP will follow 1:1 the daily performance of an asset but the market price of the ETP may differ from the net asset value (**NAV**) of the underlying assets. In the following section, we explain how Authorized Participants ensure the market price trades close to the ETP’s fair value (NAV).

Regulated **market makers (MMs)** play a critical role in ensuring the liquidity and stability of financial markets in the secondary market. **MMs maintain bid and ask prices for the ETP shares and step in to buy or sell shares when there is an**

**imbalance in supply and demand.** By providing liquidity and helping to ensure that the ETP’s share price remains closely tied to the underlying value of the assets, market makers help increase the efficiency and stability of the ETP.

**One important risk management strategy for market makers is to source liquidity across a whitelist of multiple venues** including centralized exchanges, decentralized exchanges, or OTC desks, rather than relying solely on a single source. **As such, market makers are better positioned to manage the risk of a crypto exchange going down, which could occur due to technical issues, cyber-attacks, or other unforeseen events like FTX or Mt. Gox.**

This risk management practice reduces the likelihood of disruptions to market functioning and ensures that investors are still able to buy and sell an ETP at fair market prices.

# Arbitrage Mechanism: Market Price vs. the NAV

As mentioned previously, in general, the **market price** in the secondary market of a Bitcoin ETP may differ from its **NAV** due to various factors, such as market demand for the ETP shares, liquidity conditions, trading volume, and the efficiency of the arbitrage mechanism. Figure 8 illustrates two scenarios of arbitrage when shares trade at a premium and discount to the NAV. Figure 9 provides a concrete example with the 21Shares Bitcoin ETP.

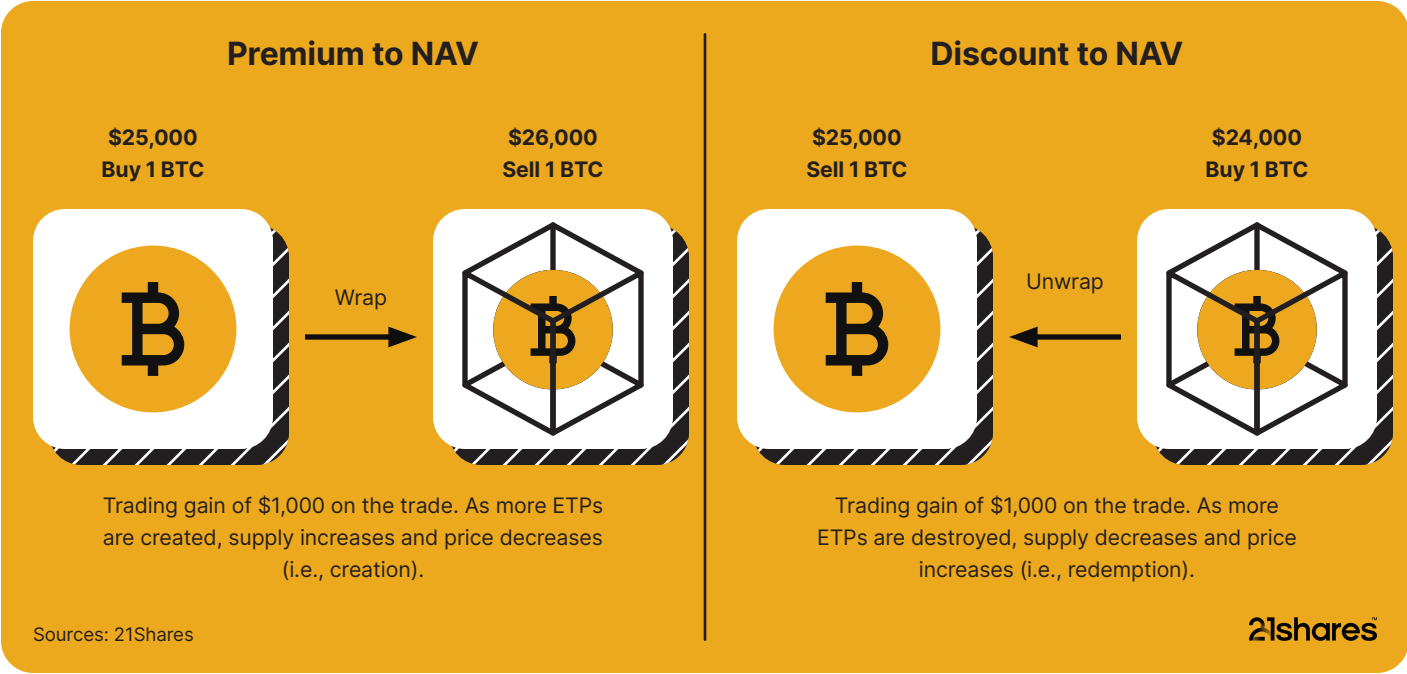
**Premium to NAV:** If the market price is higher than the

NAV, it is said to be trading at a premium.

**Discount to NAV:** if the market price is lower than the NAV, it is said to be trading at a discount.

**The market price of an ETP must closely track the NAV thanks to the risk-free arbitrage mechanism with creations and redemptions:** This mechanism allows the Authorized Participants to arbitrage any difference between the market price and the NAV, thereby keeping the market price of the ETP in line with its NAV.

Figure 8 – Arbitrage: What ensures ETPs accurately reflect prices of underlying assets?



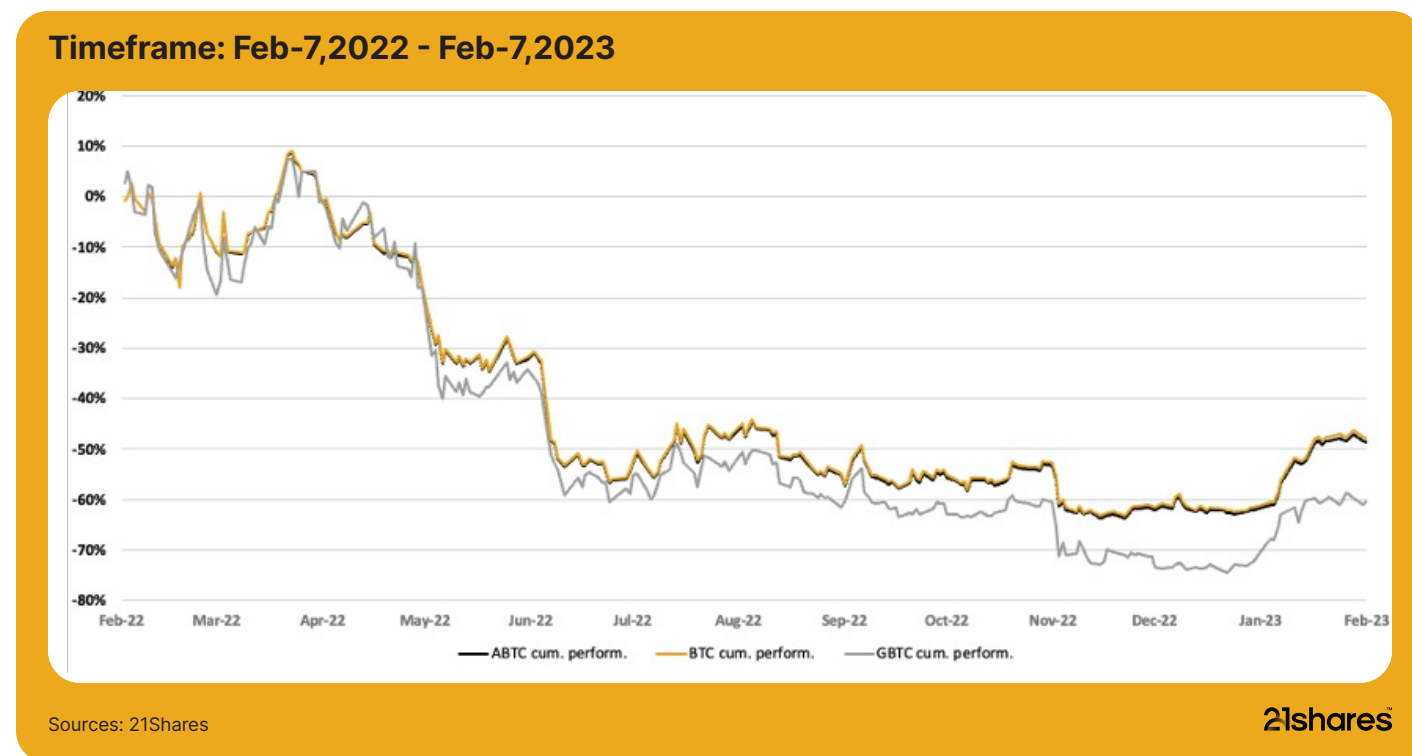


# Arbitrage Mechanism: 21Shares' ETPs vs Grayscale's Investment Trusts

**21Shares' Bitcoin ETP shares trade close to the NAV** thanks to creations and redemptions from APs in the primary market. In other words, investors have a 1:1 exposure to Bitcoin, as seen in Figure 9. Conversely, Grayscale's **GBTC, a closed-end fund that holds Bitcoin, does not allow for direct redemptions of its shares for the underlying Bitcoin due to regulatory constraints.** With the lack of a redemption program, in December 2020,

GBTC's market price in the secondary market was trading at a significant premium of around 40% to its NAV, meaning that investors were paying \$1.40 for \$1 worth of Bitcoin held by the trust. As of March 17, 2023, GBTC traded at a discount of 37% to the NAV. In other words, investors were paying \$0.63 for \$1 worth of Bitcoin held by the trust.

Figure 9 – Performance: ABTC vs. BTC vs. GBTC



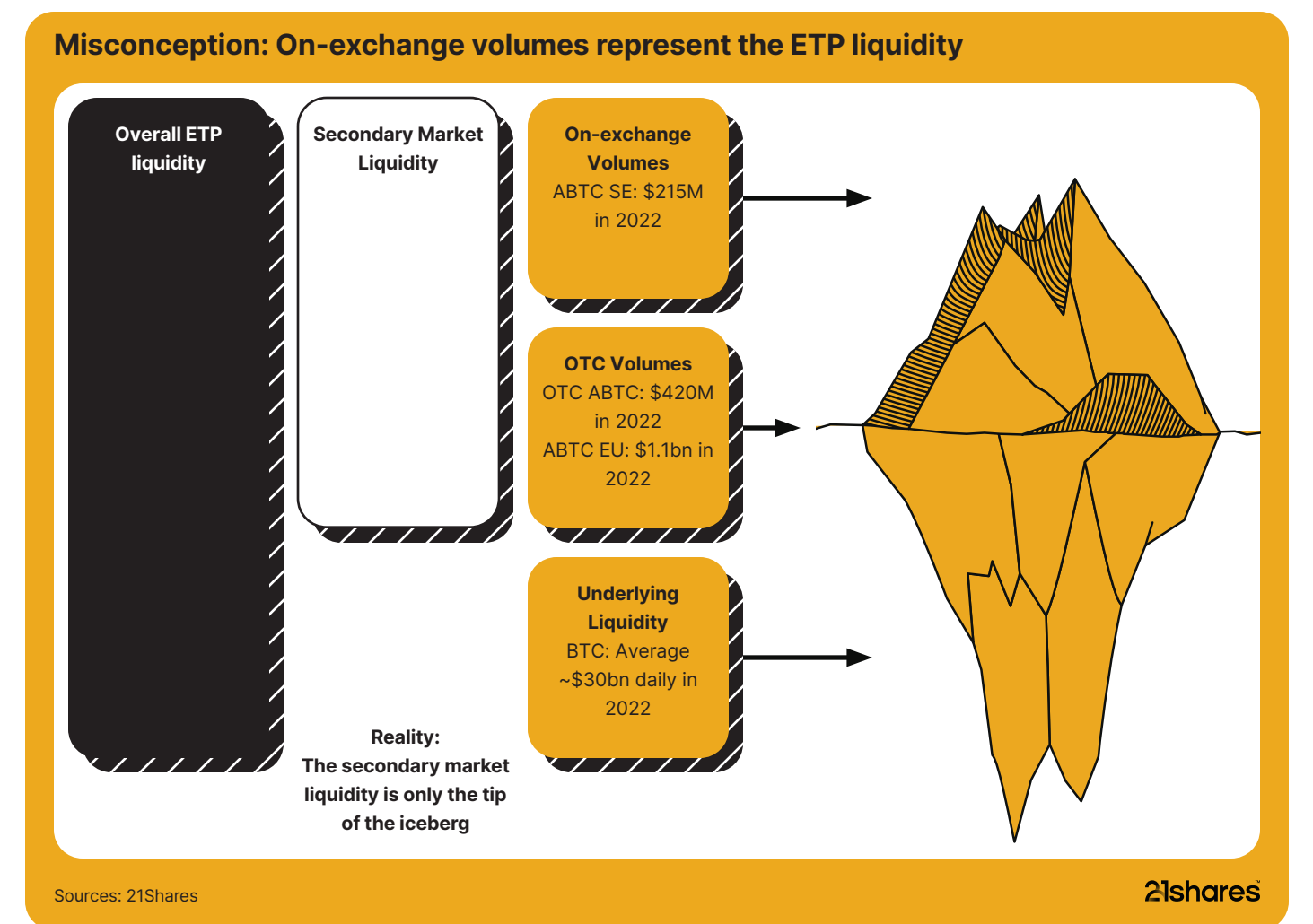
# Understanding ETP Liquidity

The secondary market liquidity is comprised of a) **on-screen via the stock exchange** and b) **OTC liquidity**. There are common misconceptions about ETP liquidity, as **many investors may believe that the on-screen traded volume represents the overall market depth. But this is not the case. For significant investments, like hundreds of millions of dollars, ETP investors can benefit from deep liquidity thanks to market makers allowing them to tap into various liquidity sources to execute large trades.**

The overall ETP liquidity also depends on the liquidity of the

underlying asset (e.g., Bitcoin). Since all the ETPs are listed on regulated exchanges, issuers have mandated MMs to provide liquidity support to the investment vehicles. ETPs, as any other security listed on stock exchanges, have to comply with the rules of that specific exchange, among which **there is a requirement for the MMs to be present in the order books for at least 90% of the time** (rules and criteria are subject to changes depending on the exchange). Overall, the secondary market liquidity is just the tip of the iceberg when it comes to the liquidity of an ETP.

Figure 10 – Overall ETP Liquidity



# The Different Ways to Invest in Cryptoassets



# Centralized Exchanges vs. Decentralized Exchanges vs. ETPs

Investors have many ways to get exposure to cryptoassets, depending on their risk profile, tech savviness, and regulatory constraints. This non-exhaustive list includes many venues: crypto exchanges, futures and options markets, decentralized exchanges, stock trading applications, OTC desks, hedge funds, ETPs, and investment trusts. **Broadly, there are two primary considerations after conducting due diligence on the underlying assets and the counterparties: 1) how to purchase cryptoassets and 2) how to store them.**

While crypto-native investors might choose to trade via a centralized or decentralized exchange, an investment via a regulated financial product might be more suitable for traditional and institutional investors. **In this section, we will solely focus on 1) centralized exchanges, 2) decentralized exchanges, and 3) ETPs.**

## Centralized Exchanges (CEXs)

A centralized exchange is a platform where you can buy and sell cryptoassets, such as Bitcoin and Ethereum, with fiat currencies like USD or EUR. These exchanges allow users to trade cryptoassets with other users or with the exchange itself, similar to a traditional stock exchange.

Users must deposit their funds into a wallet controlled by the exchange. This means that users must trust the exchange to hold their funds securely and not misuse them.

## Decentralized Exchanges (DEXs)

A decentralized exchange is a crypto exchange that operates without an intermediary on a blockchain network like Ethereum. Trades are only crypto-to-crypto and are executed through smart contracts called an “automated market maker” (AMM).

Users have complete control over their funds and are not reliant on a third party to hold and secure their assets.

## Crypto Exchange-Traded Products (ETPs)

Crypto Exchange-Traded Products (ETPs) are investment products traded on traditional stock exchanges, just like stocks, but they are designed to track the performance of cryptoassets, such as Bitcoin and Ethereum.

Assets are held in cold storage by an independent custodian. The custodian will typically use a multi-signature system.

Figure 11 – Ways to invest

Features / Structures	Centralized Exchanges (CEXs)	Decentralized Exchanges (DEXs)	Exchange-Traded Products (ETPs)
Asset Coverage	<b>High:</b> Assets must qualify against a listing criterion before being offered for trading.	<b>High:</b> Anyone can list a token, but coverage is usually siloed to the ecosystem of the corresponding blockchain the DEX is running on.	<b>Low:</b> Assets qualify for listing criterion by local jurisdiction and pass due diligence process by a given issuer. Listing criterion include liquidity and market cap limitations.
Ease of use	<b>User intuitive</b>		<b>As simple as buying any stock or ETF</b>
Custody	<b>Third-party custody</b> provided by a CEX.	<b>Self-custody</b> via hot or cold wallet.	<b>Third-party custodians</b> hold assets segregated from the ETP issuer.
Insurance for Assets	<b>Limited</b>	<b>No</b>	<b>Limited. There typically is insurance protecting against numerous perils, though insurance can differ depending on the custodian.</b>
AML & KYC Requirements	<b>Yes:</b> KYC process with CEX.	<b>Depends: Some DEXs implement Know Your Transaction (KYT)</b> but investors just need to own a non-custodial wallet like MetaMask.	<b>Yes:</b> KYC process with a bank or broker.
Liquidity: Market Depth	<b>Medium to High</b> , generally higher than DEXs.	<b>Variable</b> depending on the amount provided in liquidity pools by market makers. Usually lower than CEXs but some pairs have more market depth on Uniswap vs. centralized exchanges.	<b>High</b> , sourced from market makers across numerous liquidity venues.
Trading hours	<b>24/7</b>	<b>24/7</b>	<b>Stock exchanges' trading hours</b>
Trading settlement	Instant	Variable depending on the network the user is transacting on.	T+2 (i.e., two days after the trade is executed)
Fees	<b>Fixed</b> % of the transaction amount	<b>Fixed swap fees</b> on a DEX, but <b>dynamic and volatile transaction fees</b> of the smart contract platform like Ethereum.	<b>Fixed</b> (stock exchange platform fees + TER)
Risk Exposure	<b>Counterparty risk</b> , such as <b>commingling of assets</b> (e.g., FTX); <b>technological risk</b> with <b>hacking</b> (e.g., Mt. Gox, Bitfinex); <b>regulatory risk</b> if the exchange didn't get regulatory approval to operate in a jurisdiction.	<b>Insolvency risk</b> if the company behind the DEX shuts down, although the protocol can be forked. Potential <b>technological risk</b> and/or <b>loss of private keys</b> from users. <b>Liquidity and regulatory risks</b> , for example, if the DEX freezes assets or prevents users from certain jurisdictions to access the interface.	<b>Heightened security</b> as assets are segregated at independent custodians. Assets are bankruptcy remote and ring-fenced away from the ETP issuer's balance sheet. <b>Regulatory</b> constraints as ETPs are limited by geographical coverage.
Single point of failure	<b>Yes</b>	<b>No</b>	<b>Mitigated</b> with diverse custodians and multi-signature systems.

Sources: 21Shares

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# A Primer on Crypto Custody Solutions

Figure 12 shows the four principal options that investors can choose from for safe-guarding cryptoassets, from self-custody solutions analogous to a physical vault for gold, to relying on a third-party entity such as a crypto exchange.

Figure 12 – Ways to store/custody crypto<sup>2</sup>

		Decentralized Exchange (DEX)		Centralized Exchange (CEX)	Financial Products (ETPs)
		Self-custody		3rd-party custody	
		Hot wallet	Cold storage	Custody via CEXs	Segregated storage via regulated custodians
Description		A hot wallet (or software wallet) is a piece of software that stores the private keys digitally on a mobile device, PC, or laptop.	In cold storage, a physical device known as a “hardware wallet” stores the private keys in an isolated environment.	Investor keeps cryptoassets in a centralized exchange (CEX). The CEX is responsible for managing the security of the funds.	Institutional-grade security features whereby assets are segregated and held in cold storage with regulated custodians.
Advantages		Relatively easy to use and more convenient than hardware wallets for day-to-day operations.	The advantage of using a hardware wallet is that it operates in an offline environment, away from the internet and its associated threats.	CEXs take care of private key management for the customer. All the customer has to do is log into the exchange as with any typical website.	Cold storage; insurance from theft; assets are ring-fenced away from the ETP’s issuer and the custodian.
Disadvantages		The “hot” refers to the wallet being connected to the internet, which makes it vulnerable to malware and hacks.	There is a tradeoff between convenience and security. Hardware wallets can be burdensome for day-to-day use.	Investors cannot interact with the smart contract ecosystem, like DeFi applications.	Investors cannot interact with the smart contract ecosystem, like DeFi applications.
Risks		Malware, hacks, and loss of recovery phrase (backup of private keys) can lead to the permanent disappearance of assets.	Loss of recovery phrase (backup of private keys) can lead to the permanent disappearance of assets.	Significant counterparty risk in the event of CEX bankruptcy (e.g., Mt. Gox, FTX) or hack (e.g., Bitfinex).	Counterparty risk is minimized as there is a presence of an independent trustee and investors in the ETP have senior claims over the collateral.
Examples		MetaMask, Phantom.	Ledger, Trezor.	Coinbase, Kraken, Binance.	Coinbase Prime, Copper Technologies
Sources: 21Shares					



# Case study: Mt. Gox, Bitfinex, and FTX

If investors are reluctant to self-custody their cryptoassets, the other option is to trust a third party. While this removes the complexity of managing one's own private keys, it comes with its own risks, particularly in the case of centralized exchanges (CEXs), as we have seen and learned over the past ten years.

Figure 13 covers three of the most impactful CEX failures: Mt. Gox, Bitfinex, and FTX. For example in 2022, **while FTX filed for bankruptcy, 21Shares' ETPs continued to trade and track the performance of underlying assets 1:1, thanks to the whitelisted liquidity diversity from regulated market makers.** In all cases, **investors should understand that the failure of a centralized entity does not represent the failure of blockchain systems or decentralized protocols.**

It's also crucial to note that **counterparty risk is minimized in the hypothetical event of an ETP issuer bankruptcy** as there is an independent trustee, separate from the issuer and custodian. In addition, investors in the ETP have senior claims over the collateral.

While a **crypto ETP with ring-fenced custody solutions may provide investors with more security and protection**, it is important to note that no investment is completely risk-free. There are still potential risks associated with investing in cryptoassets or any financial product, including market volatility, liquidity risk, and counterparty risk.

Figure 13 – Investor protection mechanisms in CEXs: Mt. Gox, Bitfinex, and FTX<sup>3</sup>

CEX	Mt. Gox	Bitfinex	FTX*
What happened?	Bankruptcy due to poor security practices and operational processes	Hack due to poor security practices	Bankruptcy due to commingling of customers' assets (fraud)
Background	The first crypto exchange, Mt. Gox, was founded by Jed McCaleb on Jul 19, 2010. In 2011, he sold the site to French developer Mark Karpeles. Mt. Gox expanded the usage and recognition of Bitcoin by making it accessible to the mainstream for the first time. It was the world's largest crypto exchange when it filed for bankruptcy.	Bitfinex is a crypto exchange owned and operated by iFinex, the Hong Kong-based company that also owns Tether Limited (issuers of the USDT stablecoin). Bitfinex was one of the world's largest crypto exchanges when it was hacked in 2016.	In 2019, Sam Bankman-Fried and Gary Wang co-founded FTX, a crypto exchange marketed as a platform "built by traders, for traders." Bankman-Fried was also the founder of Alameda Research, a now-bankrupt proprietary trading firm/hedge fund. FTX became one of the world's largest crypto exchanges. The Bahamian-based company secured a \$32 billion valuation in January 2022.
Incident Cause	After a hack in 2011, Karpeles decided to put most of the exchange's BTC into cold storage. Still, the exchange had poor security and operational protocols for managing BTC transactions. There is also speculation that an internal exploit created USD balances from thin air, which were then used to buy and withdraw BTC.	The hack resulted from Bitfinex storing 100% of its client assets in hot wallets. In June 2016, Bitfinex settled with the CFTC for \$75,000 primarily because its cold storage of BTC ran afoul of CFTC regulations. Thus, the move to place all clients' assets in hot wallets was likely due to the fine and CFTC regulations.	At the heart of FTX's problems were the misappropriation of customers' assets and losses at Alameda that most FTX employees did not know existed. There were also reports that Bankman-Fried implemented a "backdoor" system that allowed Alameda to "borrow" \$65 billion of clients' money without their permission.
Investor losses	Mt. Gox said around 750k of its customers' BTC and 100k of its own BTC were stolen, worth ~\$473 million near the time of the filing. At \$20,000 per BTC, the value of the lost 850k BTC would be \$17 billion.	119,756 BTC were stolen, worth about \$72 million at the time (at \$20,000 per BTC, the hacked value would amount to \$2.4 billion).	The bankruptcy filings indicated that FTX had assets and liabilities each in the range of \$10 billion to \$50 billion, and more than 100,000 total creditors. FTX also said it owed its 50 biggest creditors nearly \$3.1 billion.
Creditor claims	Investors who had a balance in BTC or any fiat currency when Mt. Gox ceased operations were able to file a claim with the Mt. Gox trustee in charge of the bankruptcy procedure. There were 23,267 recognized creditors, total claims amounting to \$18.6 billion. After nine years, the Mt. Gox trustee is expected to make repayments in 2023. The Mt. Gox trustee's balance sheet contains ~142k BTC, ~143k BCH, and 69.7 billion JPY (~\$510 million). At \$20,000 per BTC and \$110 per BCH, creditors expect a repayment of around \$3.4 billion or 18.3% of the total claims.	Instead of filing for bankruptcy like Mt. Gox, Bitfinex took a unique approach, allocating the losses across all user accounts and crediting specially-designated BFX tokens to customers at a ratio of 1 BFX to 1 dollar lost. BFX tokens also allowed holders to convert them into shares of iFinex. Within eight months of the breach, all BFX token holders had their tokens redeemed at 100 cents on the dollar or had exchanged their tokens for shares of the capital stock of iFinex, Inc. All BFX tokens were redeemed and destroyed through this process, ending in April 2017.	FTX has identified over 9 million customer accounts, with federal regulators estimating that FTX customer losses exceed \$8 billion. In this regard, it's still unclear where customers stand in the payments waterfall (i.e., the order in which the debtor's liabilities are paid out in insolvency). On Jan 11, 2023, FTX announced that it recovered ~\$5 billion worth of cash and cryptoassets that could help repay customers and investors. However, John J. Ray III, appointed FTX's CEO to quell the crisis, told the House Financial Services Committee that "FTX customers will not fully recover the money." Most likely, the process will take years, as was the case for Mt. Gox.
Sources: 21Shares,		Burniske & Tatar (2018), Blockchain Research Lab, Bitfinex, U.S. Bankruptcy Court for the District of Delaware, Washington Post	

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# Conclusion

Crypto ETPs have the potential to help drive broader adoption of cryptoassets around the world. These financial products allow traditional investors to gain exposure to cryptoassets in a familiar and regulated environment while providing added security and transparency through regulated custodians and trading. As the cryptoasset market continues to evolve, the

use of ETPs is expected to grow, providing investors with even more options for accessing this exciting and burgeoning asset class. However, it is important to note that there are still risks associated with investing in cryptoassets and investors should always conduct their own due diligence and risk assessments before investing in any financial product.

# Footnotes

<sup>1</sup>Source:  
• 21Shares  
• Laurent Deville. Exchange Traded Funds: History, Trading and Research. C. Zopounidis, M. Doumplos, P. Pardalos. Handbook of Financial Engineering, Springer, pp.1-37, 2008. .halshs-00162223  
• [http://www.spdrgoldshares.com/media/GLD/file/First\\_Days\\_Trading\\_28Mar2003.pdf](http://www.spdrgoldshares.com/media/GLD/file/First_Days_Trading_28Mar2003.pdf), <https://www.etf.com/sections/features-and-news/30-etf-milestones-over-30-years>  
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• <https://www.etfbook.com/dashboards/crypto-etp-eu>  
• <https://grayscale.com/qa-what-converting-gbtc-to-an-etf-would-mean>

<sup>2</sup>Hot wallets and cold storage are the most popular self-custodial methods. However, there are two other wallet designs that investors should be aware of: “multisig wallets” and “smart contract wallets.”  
1. Multisig wallets require more than one private key to sign and authorize a crypto transaction. The idea is to increase the security of the funds stored in the wallet by requiring multiple parties to sign off before sending any transactions, removing a single point of failure.  
2. Smart contract wallets are a breakthrough in the security and usability of digital wallets. They can offer features such as social recovery without recovery phrases and automatically blocking transfers to untrusted contacts. As the name implies, they're able to do this by building on smart contracts.

<sup>3</sup>FTX legal case is still ongoing – these are the developments as of writing:  
Nov 18, 2022 – The Bahamas took control of assets held there  
Dec 12, 2022 – Bankman-Fried was arrested by Bahamian authorities and was later extradited to the US.  
Dec 13, 2022 – John J. Ray III, FTX's new CEO, told the House Financial Services Committee that “FTX customers will not fully recover the money.”  
Dec 21, 2022 – Alameda CEO Caroline Ellison and FTX co-founder Gary Wang plead guilty to federal fraud charges.  
Dec 22, 2022 – Bankman-Fried was released on a \$250 million bail, the largest in US history.  
Jan 3, 2023 – Bankman-Fried pleaded not guilty to fraud charges.  
Feb 23, 2023 – Bankman-Fried received four new criminal charges (12 total charges) in a superseding indictment in New York Federal Court.  
Feb 28, 2023 – former FTX engineering director pleaded guilty to criminal charges.

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