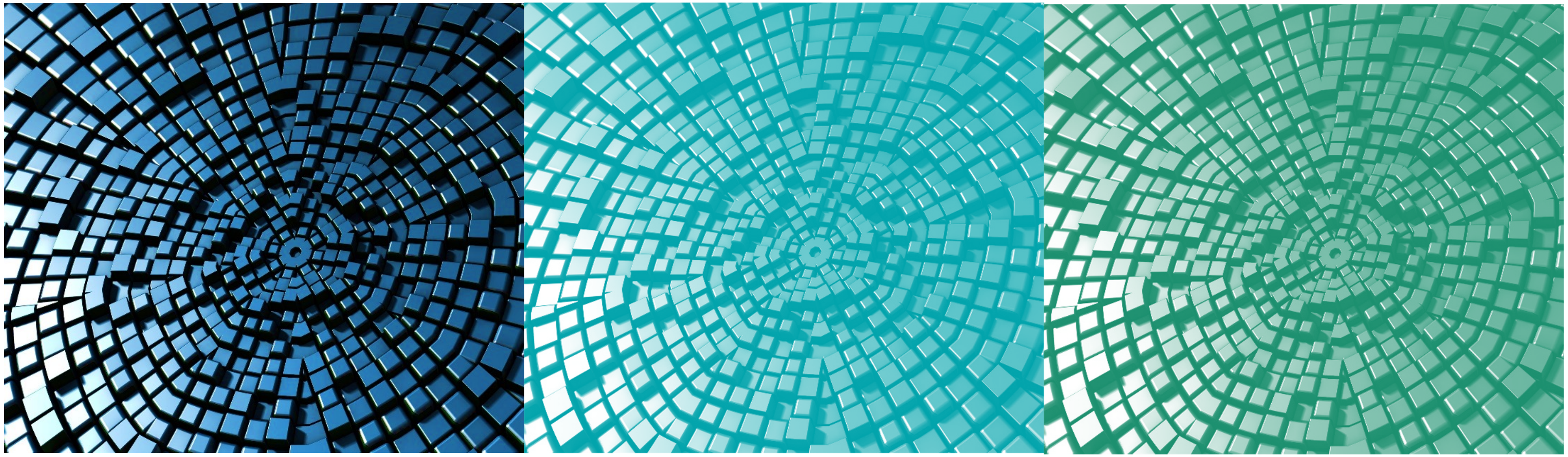
Blockchain Applications

Use Cases – Crypto Derivatives and other Financial Risk Management Issues



Supply chain

- Logistics

International trade

Public administration

- E-governance
- Diplomacy
- Democracy
- Hybrid war
- Real estate issues

Risk management

Financing

- Currency
- Factoring
- Crowdfunding
- Audit
- Accounting
- Insurance
- Financial inclusion
- ETFs
- Banking
  - Central banking
  - Bank to business
  - Bank to customer - individual

Sustainability

- Circular economy
- Energy + electricity
- Other utilities?
- Agriculture

Community development

HR

- Future of work
- Education
- Healthcare

Cybersecurity

IoT

Elements to consider

- Costs per business transaction
- ”The last mile” – credible linkages between a physical asset and its blockchain virtual counterpart
- Incentives, mechanism design, game theory, theories of asymmetric information, and models for economic constructs like auctions
- Tokenisation
- Risks
  - - to blockchain development and diffusion
  - - blockchain as risk mitigation tool – see audit pervasiveness

Central bank linkages

Global public goods – environmental linkages

Behavioral issues

Predictive capacities – forecasting – see risks

Network resilience

The political economy of the blockchain

Governance

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Risks

- Blockchain's low transaction speed – risk for enterprises that depend on high-performance legacy transaction processing systems
- Legal and regulatory concerns around data privacy, intellectual property, enforceability of contracts, and choice of jurisdiction

(Deloitte, 2019

Insights - David Schatsky, Amanpreet Arora, Aniket Dongre)

increase in transaction speeds

standards and interoperability

ease of implementation

regulatory advancements

expansion of consortia

Technical Feasability

Tech aplicability

Key vectors of progress that could drive wider adoption of blockchain.

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Assets? (Source> Fintech project)

- Main statistical difference between Cryptocurrencies and other asset classes: tail behavior.
  - Moments and memory are of subliminal importance.
  - Nonlinear classification with SVM provides proficient results forrisk analysts and regulators.
  - Cryptocurrencies are completely separated by the other types of assets, as proved by Maximum Variance Components Split method.

Transactions involving cryptocurrency

- on-chain
  - takes place natively in the cryptocurrency network and is logged into the public ledger
  - there have been various proposals to use on-chain transations primary as a settlement layer (i.e., to record a number of transactions as a compound) rather than to record each individual transaction.
- off-chain
  - not directly recorded on the ledger
  - For example - occurs when an exchange matches orders between its customers and updates an internal database of each customer’s holdings without settling this information to any public ledgers.

Derivatives Markets

- People could use derivative markets to hedge against certain price movements,

- **BUT**

- in turn, derivative markets with high leverage may create instability cycles:
  - volatility in cryptocurrency prices then causes more liquidations in derivative markets, which results in volatile cryptocurrency prices.

Crypto Derivatives trading

- can either be done on CeFi or DeFi exchanges or customer-to-customer (C2C)
  - 1) *Centralized Finance (CeFi) exchanges* - act as an intermediary to manage the crypto transactions and activities of users
    - Binance, Coinbase, Libra
    - Users create an account
    - they support cross chain exchange for multiple cryptocurrencies
  - 2) *Decentralized Finance (DeFi) exchanges* - which eliminate the need of any third party to control the activities of users, thus allowing technology to take over and users having authority to manage their transactions and deals.
    - users are the sole owners of their data, hence there is no chance of funds being stolen or misused or vulnerable to thefts.
    - users are responsible for managing their own funds and activities.
    - Permissionless
    - Totle, Kyber, MakerDAO

CoinMarketCap – June 28, 2021 – Biggest CryptoDerivatives Market

#	Name	Volume(24h)	Maker Fees	Taker Fees	Open Interests	No. Markets	Launched
1	Binance	$64,149,985,141 ▲ 9.35%	0.02%	0.04%	$9,237,609,040	150	Jul 2017
2	OKEx	$14,974,271,049 ▲ 16.61%	0.02%	0.05%	$2,515,911,837	179	Jan 2014
3	Bybit	$11,728,297,354 ▲ 11.91%	-0.025%	0.075%	$2,180,871,705	12	Mar 2018
4	Huobi Global	$10,791,865,460 ▲ 10.29%	0.02%	0.04%	$1,306,871,070	91	Sep 2013
5	CoinTiger	$8,668,264,949 ▲ 15.28%	0%	0%	$4,163,378,593	60	Dec 2017
6	FTX	$7,506,157,297 ▲ 15.39%	0.02%	0.07%	$2,016,098,772	112	Feb 2019
7	ZBG	$5,021,795,598 ▲ 11.52%	0.025%	0.075%	$8,180,270,640	13	Jul 2018
8	Phemex	$3,787,771,487 ▲ 17.11%	-0.025%	0.075%	$477,352,370	23	Nov 2019
9	Bitget	$3,656,552,774 ▲ 4.02%	0.04%	0.06%	$416,494,661	19	Apr 2018
10	Bingbon	$3,063,624,887 ▲ 8.78%	0.02%	0.045%	$359,052,444	19	May 2018

A situation

- Liquidation events occur when traders cannot fulfill margin requirements for holding crypto derivative positions and often exacerbate price moves.
- In April 2021, bitcoin (BTC, +5.14%) futures had a record $10 billion worth of liquidations in one day after data showed leveraged traders were excessively skewed bullish.
- The liquidation coincided with a near **15%** drop in BTC from an all-time high of around $65,000.

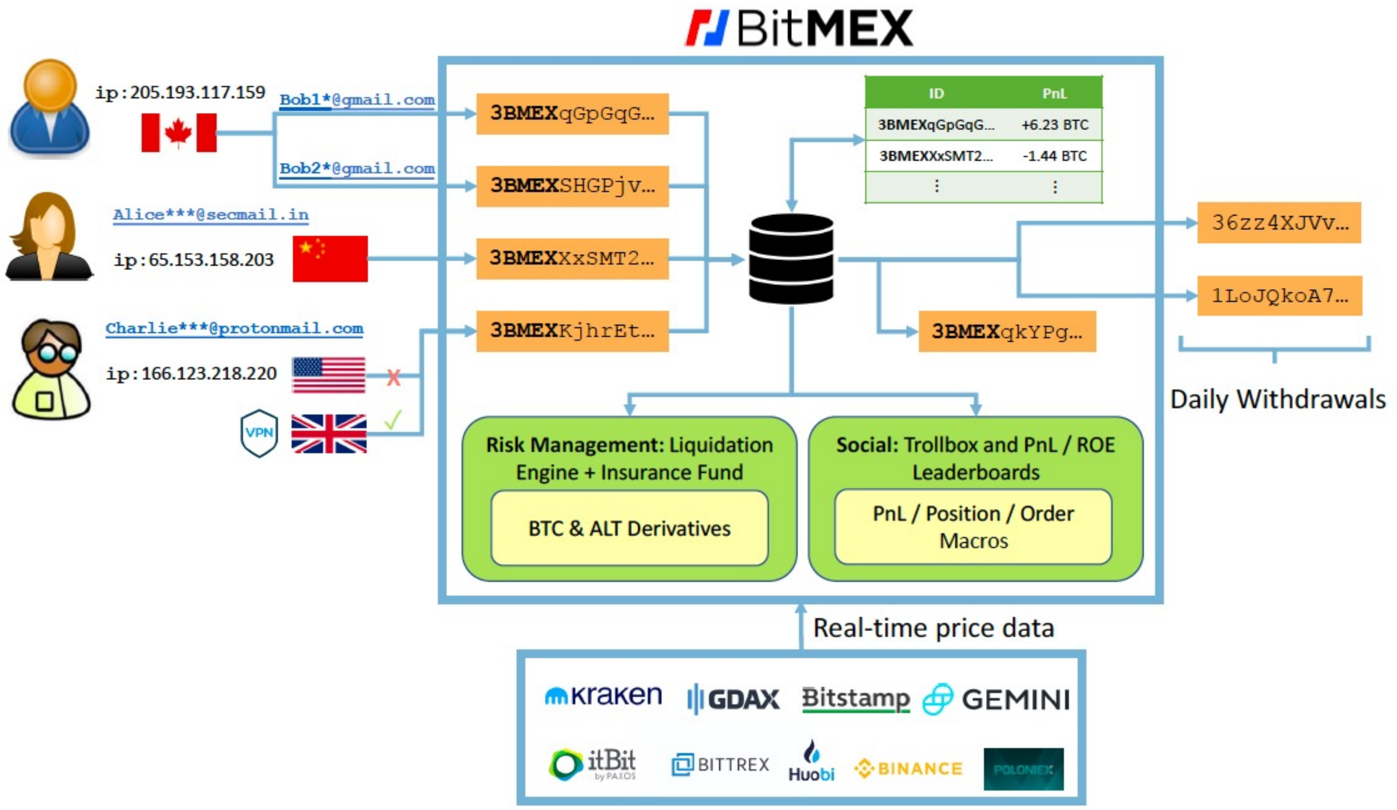
FCA – UK – Financial Conduct Authority

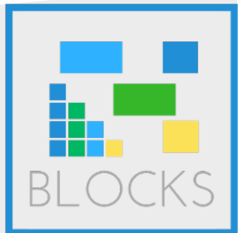
- In force – 6 Jan 2021
  - final rules banning the sale of derivatives and exchange traded notes (ETNs) that reference certain types of cryptoassets to retail consumers
- These products cannot be reliably valued by retail consumers because of the:
  - inherent nature of the underlying assets, which means they have no reliable basis for valuation
  - prevalence of market abuse and financial crime in the secondary market (eg cyber theft)
  - extreme volatility in cryptoasset price movements
  - inadequate understanding of cryptoassets by retail consumers
  - lack of legitimate investment need for retail consumers to invest in these products
- KYC / AML Rules

BitMex

- a cryptocurrency exchange that trades exclusively in cryptocurrency derivatives

- Launched in Nov 2014





Usual Types of contracts

- ***Forward contract** = a **cash market transaction** in which delivery of the underlying asset is deferred until after the contract has been made at the **price determined on the initial trade date**.* – up to 18 months, no earlier than 10 days

- **Futures contract** = a **standardized** contract, to buy or sell un underlying asset at a certain date in the future, at a **market determined price (the futures price)**. – up to 18 months, no earlier than 10 days

- **Options contracts** = A contract that, in exchange for the option price, gives the option buyer **the right, but not the obligation**, to buy (or sell) a financial asset at the exercise price from (or to) the option seller within a specified time period, or on a specified date (expiration date).

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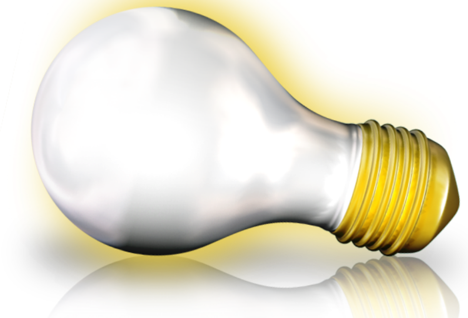
Crypto Types of contracts



Perpetual Contract = derivatives that unlike futures or options ***do not have an expiration or settlement date*.** Traders are able to keep their positions open for as long as they want under certain conditions. One of these is that the account must contain a *minimum amount* of BTC.

Another distinct factor to consider is the **funding rate**. This is a unique mechanism that helps tether the price of the perpetual contract to that of Bitcoin. Because of its time limit, the price of a futures contract will always converge with the price of the underlying asset at expiration.

Since ***perpetual contracts don't expire***, their prices can start deviating significantly from bitcoin's prices.

Crypto Futures contract = a ***contract*** or an agreement between two parties to purchase and sell BTC at a given price at a specific *future date* (hence the name). However, neither party is required to actually hold the underlying asset, in this case, Bitcoin. Instead, they simply ***settle the contract in USD*** or any other agreed-upon currency. What distinguishes futures contracts from other derivative instruments is the specific settlement date.

Crypto Options contracts = A contract that, in exchange for the option price, gives the option buyer **the right, but not the obligation**, to buy (or sell) a financial asset at the exercise price from (or to) the option seller within a specified time period, or on a specified date (expiration date).

Blockchain Simplified

Types of Crypto Derivatives

– Swaps –
An agreement between two parties to exchange cash flow between one another.

- Futures -
A contract between buyer and seller to agree to trade their asset at a pre-decided price on a future date.

– Forwards –
An over-the-counter contract between buyer & seller to agree to trade their asset at a pre-decided price on a future date

–Options –
A contract between buyer & seller to agree to trade their asset at pre-decided price on a future date, but without any obligations.

–Perpetual Futures -
A "no expiry" contract between buyer & seller to agree to trade their asset anytime in future.

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Futures

Basic Positions

- Long (Buy)
- Short (Sell)

Terms

- Delivery Date
- Assets

Options

Basic Positions

- Call (Buy)
- Put (Sell)

Terms

- Exercise Price
- Expiration Date
- Assets

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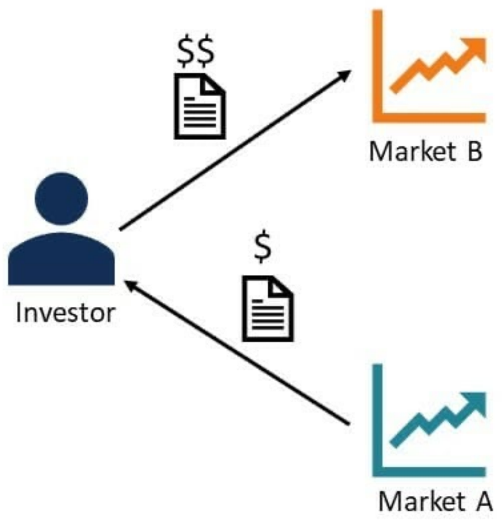
- To hedge risks
- To speculate (take a view on the future direction of the market)
- To lock in an arbitrage profit
- To change the nature of a liability
- To change the nature of an investment without incurring the costs of selling one portfolio and buying another



Source: Corporate Finance Institute

- Long positions
  - Traders who take on smaller contract sizes
  - betting on bullish price movements.
- Short positions
  - hedgers who own spot market bitcoin or
  - cryptocurrency miners who want to manage revenue volatility by locking in prices for a specific delivery date in the future
  - more likely to be price-neutral in terms of their overall positions, ==> BTC futures market more of a speculative net-long play
- “This is why there is a distinct asymmetry with long positions that are more leveraged with small position sizes”

Crypto Futures – an Example on CME

CONTRACT UNIT	5 bitcoin
MINIMUM PRICE FLUCTUATION	Outright: $5.00 per bitcoin = $25.00 per contract Calendar Spread: $1.00 per bitcoin = $5.00 per contract
TRADING HOURS	CME Globex: Sunday - Friday 6:00 p.m. - 5:00 p.m. ET (5:00 p.m. - 4:00 p.m. CT) with a 60-minute break each day beginning at 5:00 p.m. ET (4:00 p.m. CT) CME ClearPort: 6:00 p.m. Sunday to 6:45 p.m. Friday ET (5:00 p.m. - 5:45 p.m. CT) with a 15-minute maintenance window between 6:45 p.m. - 7:00 p.m. ET (5:45 p.m. - 6:00 p.m. CT) Monday - Thursday.
PRODUCT CODE	Outright: BTC
LISTING CYCLE	Nearest two Decembers and nearest six consecutive months. If nearest six consecutive months comprise nearest December, one additional deferred December will be listed. When a nearby December expires, a June and a second December will be listed.
TERMINATION OF TRADING	Last Day of Trading is the last Friday of contract month. Trading in expiring futures terminates at 4:00 p.m. London time on Last Day of Trading.
POSITION LIMITS	Spot Position Limits are set at 2,000 contracts. A position accountability level of 5,000 contracts will be applied to positions in single months outside the spot month and in all months combined.
BLOCK MINIMUM	5 contracts
PRICE LIMITS	Price Limits
SETTLEMENT	Cash settled by reference to final settlement price, equal to the CME CF Bitcoin Reference Rate (BRR) on last day of trading.

- CME Group listed options on Bitcoin futures on January 13, 2020
- The maximum order size is 100 contracts.
- Bitcoin Reference Rate – BRR - is a daily reference rate of the U.S. Dollar price of one bitcoin as of 4:00 p.m. London time. It is representative of the bitcoin trading activity on Constituent Exchanges and is geared towards resilience and replicability.

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EFP – Exchange for Physical

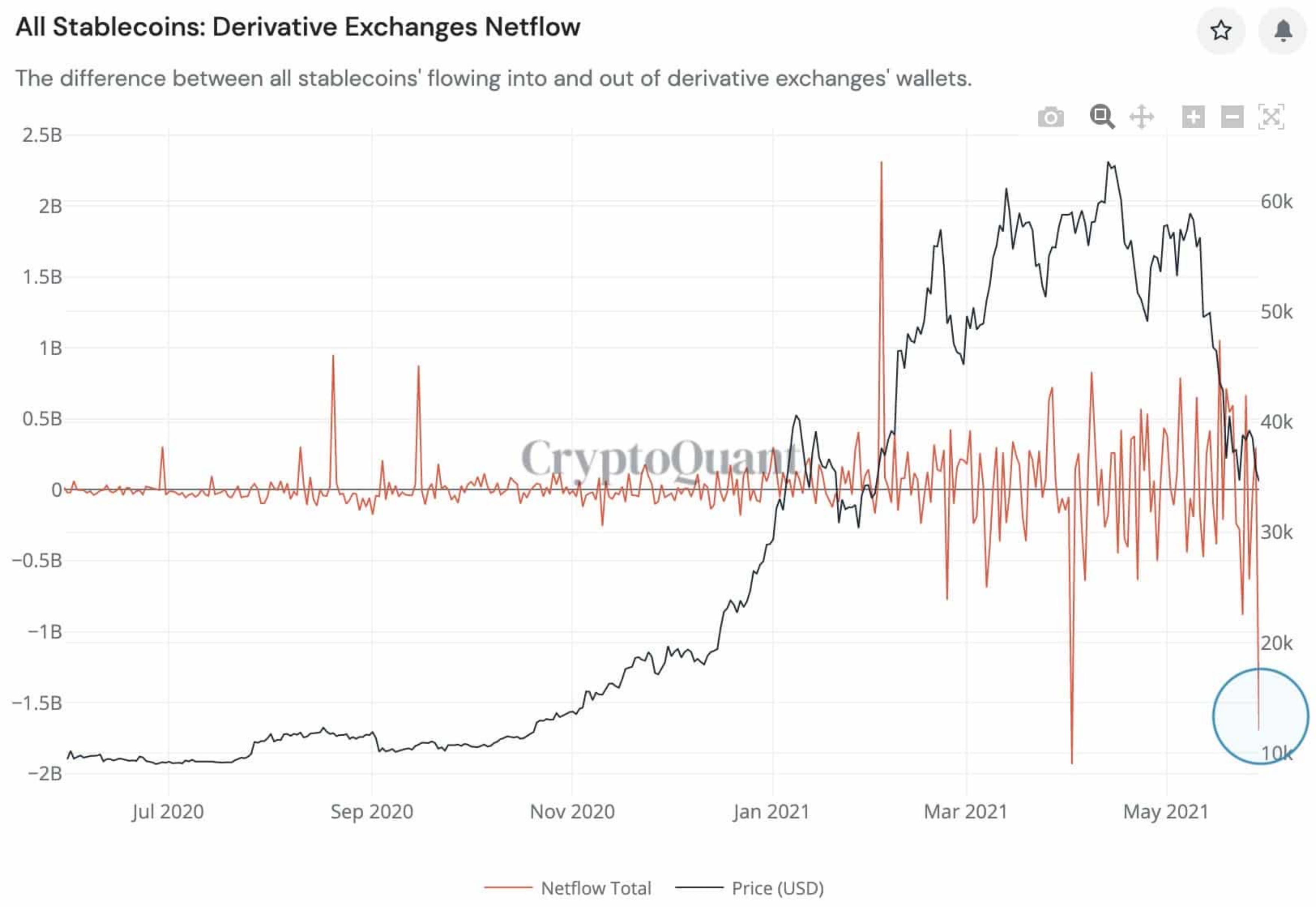
- Exchange for Physical (EFP) transactions are **<u>privately negotiated trades</u>** between two counterparties allowing them to simultaneously transfer a futures position for an equivalent spot market position or vice versa.
- Clients can use the mechanism to efficiently transfer their bitcoin exposure from a physical to a futures position depending on their specific goals.
  - Party B agrees to sell 500 bitcoin to Party A and buy 100 bitcoin futures from Party A (economically, both parties are risk neutral).
  - Additionally, the two parties agree to a spread of $5 between the spot and futures price.
  - If bitcoin is at $6,500; Party B receives $3,250,000 on the sale of bitcoin to Party A. Simultaneously, Party B buys the futures contracts from Party A at a price of $6,495 ($6,500 - $5).
  - For the futures contract, Party B would need to maintain, at least, 37% margin*, or $1,201,575. The difference between the bitcoin sale price and the margin that needs to be posted is 'freed-up' capital and may be used by Party B as needed.
  - By using an EFP, Party B, benefits from the leverage offered through the futures contract and is able to free-up $2,048,425 while still maintaining exposure to bitcoin.

BTC Options on Futures - an Example from CME

- CME options on bitcoin futures give the buyer of a call/put the right to buy/sell one bitcoin futures contract at a specified strike price at some future date.
- Upon termination of trading, in-the-money options, expire into 1 bitcoin futures contract which immediately cash settles to the CME CF **Bitcoin Reference Rate (BRR).**

What about Stablecoins? – A DeFi comparison of two derivative investments

	Adam	Dave
Date of entry	11th of December 2020	11th of December 2020
BTC price predicted	$19500 +	$19500 +
Value at entry	172 XRP at $0.58 (roughly $100)	100 USDC (roughly $100)
BTC Price on 16th Dec. 2020	$19783	$19783
Total returns received	258 XRP at $0.45 = $116	150 USDC (roughly $150)


All Stablecoins: Derivative Exchanges Netflow
The difference between all stablecoins' flowing into and out of derivative exchanges' wallets.
2.5B
2B
1.5B
1B
0.5B
0
−0.5B
−1B
−1.5B
−2B
60k
50k
40k
30k
20k
10k
Jul 2020
Sep 2020
Nov 2020
Jan 2021
Mar 2021
May 2021
CryptoQuant
Netflow Total
Price (USD)

Geo-fencing?

- Derivatives instruments attract a culture of long-biased highly leveraged speculators.
- Smaller traders disproportionately account for liquidations,
- chatbox evidence suggests that many users are obsessively trading 24/7.