kraken INTELLIGENCE
ORDO AB CRYPTO

Traditional Markets vs. Crypto Markets

Out With The Old, In With The New

February 2021

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1.

Introduction

Since the Dutch East India Co.'s public share offering in 1602, public markets have allowed for people of all walks of life to help cultivate, contribute, and profit from a capitalistic system that has pulled many out of poverty. Over time, technological innovations have made markets more advanced and the barriers to entry continue to fall. Today, anyone with a smart phone and bank account can access the same markets that century old institutions have been dabbling in for decades, if not centuries. Though the playing field appears leveled, centralized entities and large institutions continue to take advantage of market participants. Fortunately, technological advances have also led to the rise of the most transparent market to date: cryptoassets.

At a $1.3T market capitalization and counting, the evolving cryptoasset market enables anyone with an internet connection to participate side-by-side with multi-billion dollar institutions on the same platforms and using the same open-source, publicly-available information found on a public blockchain, Github, Twitter, and other public platforms. The crypto market is transparent and open to all, and has not had the types of recent mishaps in the traditional financial markets.

Accordingly, in light of recent events of the US equity market regarding Gamestop (GME) and Main street vs. Wall Street, this report explains the structural differences between crypto and traditional financial markets, using GME as an example. Specifically, it tackles the inefficiencies of traditional financial markets – **how it may give competitive advantages to those with deep pockets and how technological advancements in the cryptoasset market will spill over in traditional markets as the old catches up with the new.**

2.

Comparing Structures

When it comes to traditional markets and cryptoasset markets, it is easy to see a fair number of blatant similarities and differences. This is particularly true when analyzing their market structures, or the characteristics of the market that describes how they operate and how they're designed to allow for efficient competition and pricing. Before participating in a market, individuals and organizations ought to strongly consider market structure to ensure the playing field is level and fair. That said, let's consider the market structure of both traditional markets and cryptoassets.

Market hours

Traditional Markets

Traditional markets have strict hours of trading during the weekdays; traditional markets, such as stocks, commodities, and indices, are typically open for trading between 8:00am and 4:30pm, though some exchanges and markets can vary. For example, the New York Stock Exchange (NYSE) and Nasdaq's (NASDAQ) trading hours are between 9:30am - 4:00pm US Eastern Time (ET), while the London Stock Exchange (LSE) is open for trading between 8:00am - 4:30pm UK time (GMT). While markets are open Monday through Friday, there are numerous banking holidays throughout the year where the market is either closed for the day or open for the first half of the day. Traditional markets also have pre-market and after-market trading hours where select market participants, typically "professional," can trade. The original purpose of structured trading hours was to give brokers alignment on when to show up to the exchange.

CryptoAssets

Unlike legacy markets, crypto markets never sleep; they're open 24/7, 365 days of the year to anyone with an internet connection. Just as blockchains process network transactions around the clock, crypto markets allow participation from all around the world and at any hour of the day. This dynamic grants participants immense flexibility and opportunity since market participants can buy & sell assets at any hour. It also opens the door to cultivating a more efficient and liquid market since all publicly available information can be priced in real-time and buyers & sellers can react as they please.

Intermediaries

When an asset is bought or sold in traditional financial markets, the order must go through a series of intermediaries before it's completed. This reliance is due, in part, to the fact that most market participants are not entitled to trade directly on exchanges. This dependency can subject participants to unilateral acts of intermediaries, such as trading halts or other potentially market-influencing actions made for the intermediaries' own benefit. Therefore, to better understand the structure of legacy markets and how investment decisions are executed, we will break down the role of each intermediary.

Financial Advisors

Financial advisors may or may not work for a large investment firm, but will provide investment advice and execute client's investment decisions. By law, financial advisors have a fiduciary duty to put the client's interest first and act in their best interest; they're also legally obligated to disclose any possible conflicts of interest. Some financial advisors charge clients a percentage of the assets they manage and some charge a fee on a per service basis. Unfortunately, financial advisors do not always act in the best interest of their clients – a problem that has existed for decades.

Broker-Dealers

For those that don't use an investment advisory service, like a financial advisor, investment decisions can be directed to a broker-dealer. Broker-dealers are synonymous

with "brokerages," such as Robinhood, E*TRADE, TD Ameritrade, etc., where users deposit funds and invest/trade. Broker-dealers will either match your order with a buyer/seller (broker) or take the other side of the transaction (dealer). For instance, should you decide to buy Apple stock, your broker-dealer may route your order to a trading venue for execution or sell you the Apple stock directly using their inventory on hand. Brokers make money through trading fees while dealers profit from a bid-ask spread, or the difference between the price the client buys/sells a security and the price at which the dealer bought/plans to sell the asset. Over the years, broker-dealers have adopted business models where the broker-dealer benefits from directing a client's order to a specific party in exchange for a fee.

Market Makers

More often than not, broker-dealers will either send your order to an exchange or to a market maker who buys and sells securities for their own account. While market makers have been around for decades, technological advances have led to the rise of high frequency traders (HFTs) that trade in high volume and at lightning speeds. HFTs with the best technology, most sophisticated algorithms, and located closest to an exchange are typically the most profitable. High frequency traders will go to extreme lengths to create advantage, including building an undersea fiber optic cable that stretches from New York to London to save 5 milliseconds in trading speed.[1] Like broker-dealers, market makers can earn a profit from a bid-ask spread and can be compensated by exchanges in exchange for providing liquidity, known as "rebates."

Exchanges

When an order is directed to an exchange, it hits an electronic list of orders where buyers are matched with sellers, or what is called "an orderbook." As we discussed in our Market Series guide, orders are matched on price-time priority; orders are organized first by price and then the time at which the order was sent. Because market participants must be entitled to trade on an exchange, most individuals have to rely on an intermediary to send the order to an exchange. Exchanges can generate a profit through listing fees charged to companies who want to list their asset on the exchange, data fees for real time market

data, selling trading software to institutional investors that want to receive data faster than other market participants, fees for providing "co-location" services to allow firms to locate their servers close to exchange servers, and through trading fees. In figure 1, we can see Nasdaq's revenue sources between 2017 and 2019. Note that the bulk of revenue came from market services (equity derivative trading and clearing, cash equity trading, FICC and trade management services) and information services (market data, indexes, and investment data & analytics).

Figure 1

NASDAQ's revenue sources

	Year Ended December 31		
	2019	2018	2017
		(in millions)	
Market Services	$ 2,639	$ 2,709	$ 2,418
Transaction-based expenses	(1,727)	(1,751)	(1,537)
Market Services revenues less transaction-based expenses	912	958	881
Corporate Services	496	487	459
Information Services	779	714	588
Market Technology	338	270	247
Other revenues	10	97	236
Total revenues less transaction-based expenses	**$ 2,535**	**$ 2,526**	**$ 2,411**

Source: NASDAQ

Clearing Houses

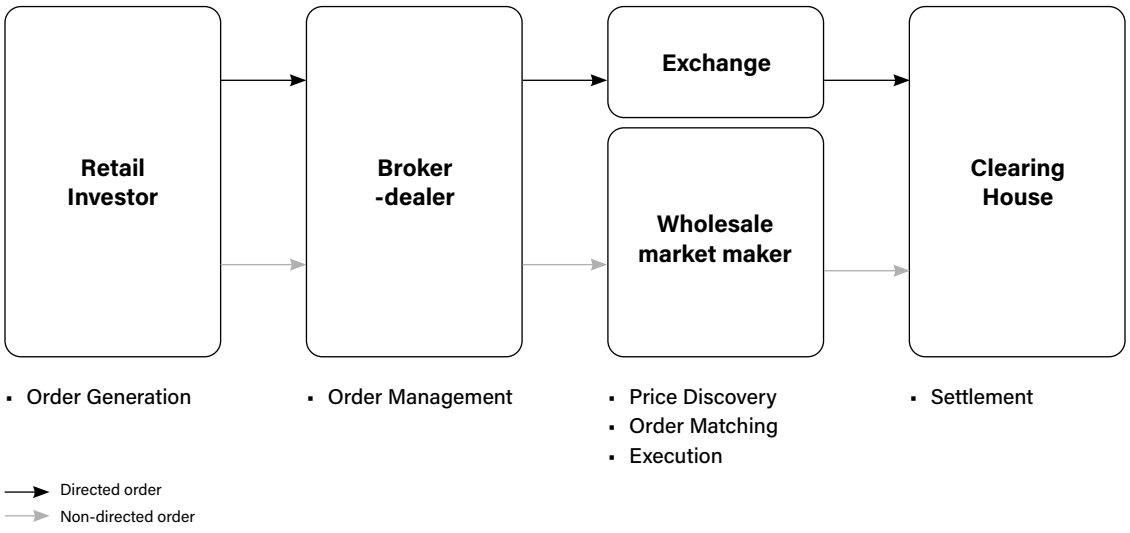
A clearing house is a designated intermediary that ensures that both buyers & sellers in financial transactions honor their contractual obligations. To do so, they act as a middleman by taking the opposite side of all trades (a buyer to every seller and a seller to every buyer). This centralized entity reduces the cost and risk of settling multiple transactions among multiple parties and plays a pivotal role in keeping a financial market

stable. Though tasked with managing market risk, the clearing house is subject to default risk from its members. To manage this risk, clearing houses require their members to post collateral and provide other financial resources to mutualize the risk of loss from a member failure. However, this does not entirely remove the risk of a clearing house becoming a systematic risk. Should one or more large clearing members[2] fail to meet their obligations to a clearing house, the clearing house may not be able to meet its other members, which could have a cascading impact that drags the entire market lower. The failure of a clearing house would require a government bailout to avoid a messy and potentially disastrous bankruptcy that would send shockwaves through financial markets.[3]

Almost all securities transactions in the United States are settled by the Depository Trust & Clearing Corporation (DTCC), which owns two U.S. clearing corporations and one securities depository. Clearing houses make money by charging clearing fees for every trade.

Figure 2

Order flow in traditional markets



CryptoAssets

With the notion of decentralization being a foundational aspect of cryptoassets, it should come as no surprise that crypto's market structure has evolved with minimal reliance on intermediaries. Currently, the vast majority of market participants sign up at an exchange of their choice where they themselves can submit buy and sell orders to the same orderbook that billion dollar financial institutions use. Unlike traditional markets, there is no need to rely on an intermediary to execute your order and settlement is done through the same venue with which you placed the order, be that a centralized exchange, decentralized exchange, or an OTC desk.

A **centralized cryptocurrency exchange (CEX)** is a bilateral market where various assets are listed and users directly buy and/or sell cryptoassets. The exchange offers an array of cryptoassets to trade, validates trades/transactions, and secures the buyer/seller's assets. Cryptocurrency exchanges are different from traditional financial equities exchanges in that all markets are fragmented, meaning the bitcoin/dollar (BTC/USD) market on one exchange is separate from other markets of the same asset pair; each asset pair will have its own price, liquidity, and trading volume depending on the exchange. Once an order is submitted, the order will either be nearly instantly matched and executed or remain on the orderbook until a buyer/seller is found. Should a market participant opt to self-custody his/her cryptoassets, or send the funds to a different exchange, the exchange will send the user's funds to the specified withdrawal address using the cryptoasset's underlying blockchain. Depending on the exchange and network capacity of the blockchain, the user can expect to receive their funds within 10 - 60 minutes. While centralized exchanges typically charge users fees to deposit and withdraw funds to account for default risk and processing fees, the exchange earns a trading fee. Fees vary by exchange, but are widely contingent on whether the user submits an order that makes or takes liquidity and the user's trading volume over the past 30-days.

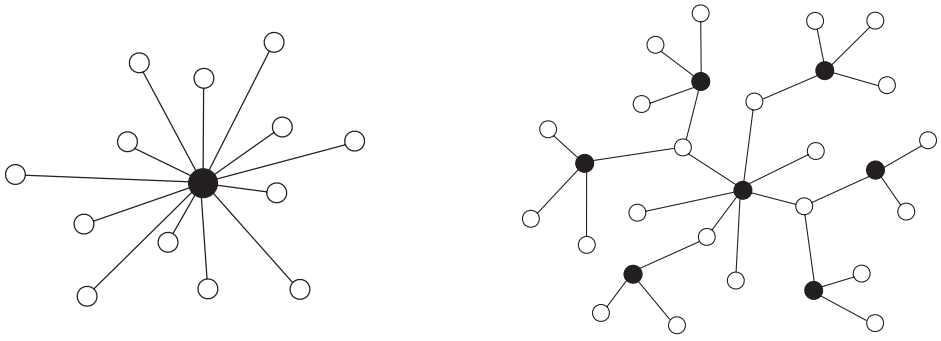
A centralized exchange will keep custody of the customer's funds, positions, trades, and other user information, though some exchanges lean on third parties to custody and protect user funds. Some choose to withdraw their cryptoassets into personal wallets.

Though market participants can earn a yield by lending out their crypto, this lending usually happens on lending/borrowing specific platforms.

If a market participant is transacting in large quantities and is concerned about impacting a cryptoasset's price in the open market, they can turn to an **Over-The-Counter (OTC) trading desk**; OTC desks provide a more personalized service to fill large orders by providing lower transaction costs, competitive prices, and seamless settlement. Most OTC desks require users to go through an AML and KYC verification process, much like centralized exchanges. To make a trade, a trader will provide the user a price at which they are willing to buy or sell a cryptoasset. If an agreement is made, the two parties will exchange assets at the agreed upon price and quantity. Those conducting business with an OTC desk typically do not need to pay a trading fee, but usually pay a spread over market.

Should a market participant not find the service they're looking for at a centralized exchange or OTC desk, they can use a **decentralized exchange (DEX)**. A DEX is akin to a centralized exchange, but there is no single entity that acts as a counterparty to oversee user transactions and funds. Instead, DEXs use automated computer code, also known as "smart contracts," to match and route trades submitted to the DEX orderbook. Essentially, these exchanges allow direct peer-to-peer trading, using blockchain technology to keep track of orderbooks and facilitate trades. DEXs do not hold user funds as there are no "user accounts" on a decentralized exchange, which means users will maintain funds within their own custody from which they can conduct a peer-to-peer exchange.

DEXs are different from centralized exchanges in that users cannot deposit fiat funds and there is no sign-up process required. Oftentimes, these DEXs support markets that buyers and sellers may not have access to on centralized exchanges. Because decentralized exchanges are made up of smart contracts operated on a blockchain, DEXs are not as targeted for hacks and/or vulnerable to server downtime as centralized exchanges.

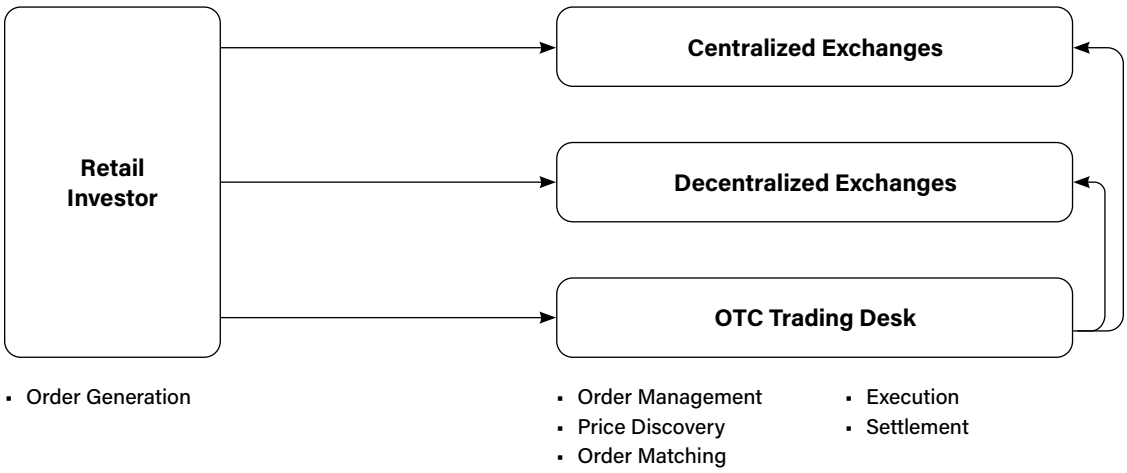


Centralized Network **Decentralized Network**

However, DEXs are not nearly as reliable as centralized exchanges. For starters, DEXs have no central entity ensuring trades are executed, there is no customer support, and service is relatively slow or expensive. As all trades are peer-to-peer (P2P) and transactions happen on the blockchain, users are subject to the blockchain's block time - which is notably longer than centralized exchanges' settlement time. Transactions will need time to settle and be confirmed on the blockchain, which results in scalability issues and higher transaction costs incurred in the process of a single trade. Lastly, DEXs lack advanced trading features and liquidity due to weaker participation.

Figure 3

Order flow in crypto markets



Order Process

Traditional Markets

When a market participant places a trade in traditional securities markets, there are a number of paths that the broker handling the trade can send the order. In fulfilling its "best execution" obligation, the broker will have to consider the order size and a number of other factors before directing the order down a particular path. The four most common paths include the following:

Order to Exchange or Alternative Trading System	The broker directs the order to an exchange or alternative trading system. In some instances, these trading venues will pay a fee for the privilege of executing a broker's order.
Order to Third Party Market Maker	The broker directs the order to a third party market maker for execution. The broker often receives "payment for order flow" from the market maker for these orders.

Figure 4

Major US retail brokers - payment for order flow

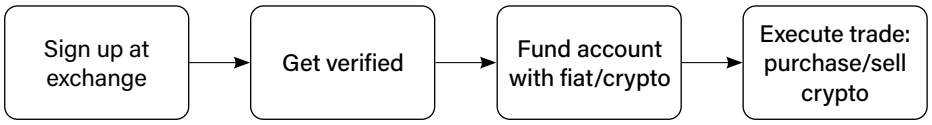
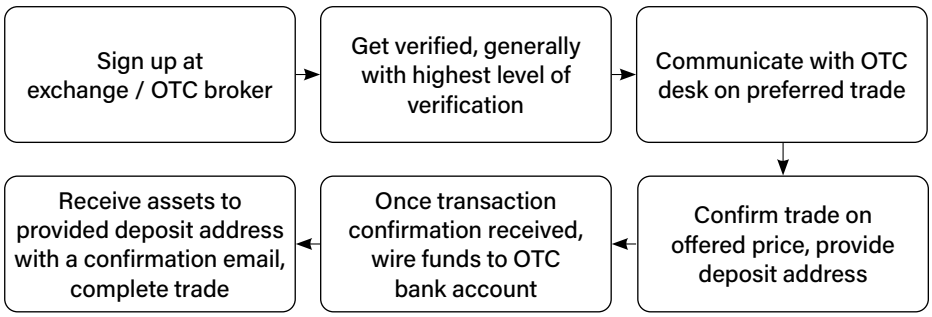
		1Q2020		2Q2020	
Broker	**Trade**	**Payment for orders**	**Rate/100 shares**	**Payment for orders**	**Rate/100 shares**
Robinhood	Equity	$31,116,950	$0.24	$69,116,307	$0.17
	Option	$59,802,125	$0.48	$111,148,089	$0.58
	Total	$90,919,076	$0.36	$180,264,395	$0.30
Charles Schwab	Equity	$25,447,153	$0.11	$32,396,842	$0.11
	Option	$28,517,592	$0.36	$33,745,172	$0.37
	Total	$53,964,745	$0.18	$66,142,014	$0.18
E-Trade	Equity	$29,822,204	$0.16	$50,210,044	$0.15
	Option	$49,829,545	$0.45	$60,117,332	$0.46
	Total	$79,651,749	$0.27	$110,327,376	$0.18
TD Ameritrade	Equity	$72,782,936	$0.15	$144,219,349	$0.15
	Option	$129,597,189	$0.53	$179,991,996	$0.58
	Total	$202,380,125	$0.28	$324,211,345	$0.25

Source: Piper Sandler, SEC filings, CNBC

Internalized trades	The broker decides to fill the order from its own inventory. This allows the broker to make money from a bid-ask spread.
Over-The-Counter (OTC)	When the broker directs a trade to an OTC market, or a dealer network, the order is executed by a market maker in the stock you wish to purchase or sell. Securities trade over-the-counter when they're not listed on a centralized exchange.

CryptoAssets

With crypto, market participants directly participate in order generation and execution by signing up at an exchange, going through the verification process, funding their account, and sending a trade to the exchange's order book all on their own. Market participants have full visibility into execution prices and the exchange's orderbook, which allows them to seek best execution without relying on an intermediary - though some market participants ought to be weary of the exchange's trading fees and potential for slippage. While comprehensive data for traditional financial assets is often limited to a select number of intermediaries, a cryptoasset's order book is open to all. This dynamic innate to cryptoassets is far different from the informational and transactional advantages large market participants have in legacy markets. If market participants decide not to trade on a centralized exchange or directly with an OTC desk, they can turn to a decentralized exchange where smart contracts are used to cross and settle orders on a decentralized orderbook. Ultimately, whichever path market participants take, they can expect transparency from the moment they submit their order to the moment it settles.

Centralized Exchange	
OTC Desk	
Decentralized Exchange	▪ DEXs that are fully decentralized will only require a cryptocurrency wallet ▪ DEXs that are partially centralized can ask for identification ▪ No funding & withdrawing as DEXs are non-custodial ▪ Tokens not yet listed on centralized exchanges may be traded on DEXs, given there is supply & demand

Settlement

Settlement is the process of transferring assets betwen sellers and buyers. As part of the settlement process, there is a procedure known as "clearing," whereby a clearing house assumes the role of *buyer to a seller* and *seller to a buyer* in a transaction and reconciles trade details and obligations. Settlement turns an obligation for payment into the actual transfer of money or assets from one account to another. Though both markets achieve the same end result, settlement for traditional and cryptoasset markets differ substantially.

Traditional Securities Markets

Trade settlement takes place in a central securities depository with the settlement periods varying by country and security type. In Europe, settlement takes 2 business days after

a trade (T+2). In the U.S. settlement is typically T+2, except for options and government securities that take 1 business day (T+1). The reason settlement can take multiple days is largely due to an inefficient market structure. For example, stock trades have to first be forwarded to the clearing house. The clearing house then notifies the details of the trade to the clearing members and custodians before instructions are forwarded to the clearing banks to then transfer funds. While this delay can create operational issues for market participants, it creates an unnecessary counterparty risk because the longer it takes for a trade to settle, the greater the risk that a market participant may incur a loss and fail to deliver the funds or asset. This is particularly true when market volatility is high.

CryptoAssets

In crypto, trades are settled by an exchange on its books or confirmed by the number of blocks on the blockchain following the transaction. Confirmations are deemed as a measure of validity of a transaction, and each exchange or individual decides how many confirmations are needed for each cryptocurrency. The more number of blocks (confirmations) have passed since a transaction was settled onto the blockchain, the more "secure" it's considered. However, for assets like bitcoin, one block takes 10 minutes to generate, which means transaction confirmation time can easily stretch to hours. General rule of thumb is to wait for 6 - 10 confirmations, with every block that is added providing an extra layer of security by the network that has accepted the transaction as valid via consensus. On centralized exchanges, once trades are settled, funds are credited onto a user's account on the books of the exchange to reflect the amount of assets the user holds in their account.

3.

Inefficiencies of Legacy Markets

Despite it never being easier than it is today to participate in traditional markets, the truth is that legacy markets remain inefficient; both new and existing market participants remain exposed to a whole host of risks and inefficiencies that put them and the financial system at risk of loss. Before participating in legacy markets, one ought to know where these inefficiencies lie and how such compares to a more transparent and technologically innovative market, such as cryptoassets.

Traditional Means Inflated

For decades, central banks in various countries have kept financial markets afloat by lowering interest rates, buying trillions worth of assets, and lending trillions. In March 2020, the U.S. Federal Reserve bought $1.1T worth of financial assets and the U.S. Federal Reserve announced plans to purchase corporate debt in what was an unprecedented action under the Federal Reserve Act of 1913.[4] The actions taken by central banks have led to inflated markets, irrational risk taking, and "zombie markets" that are mispriced, distorted for reality, and inefficient in allocating capital. Though we've seen the byproduct of these actions (Asian currency crisis, dot-com bubble, housing crisis, etc.) come and go, their long term consequences have yet to come to a head and the generations of tomorrow will eventually be the ones left holding the bag.

For better or for worse, the crypto market isn't afforded the same luxuries as traditional financial markets, like cheap financing and bailouts. Fortunately, crypto is driven by the production of open-source code that exists thanks to decentralized fundraising and is an open market where the strongest survive.

If You're Not First, You're Last

High frequency traders (HFT) have been using technological advantages for decades to gain an edge over other market participants. HFTs will go so far as to place their servers in the same physical vicinity as exchanges to trade faster and profit from temporary price mismatches. Many argue that HFTs have achieved an unfair advantage over others and have been accused of buying/selling securities at a better price before trading with a counterparty, or "front running." Advantages aside, the International Organization of Securities Commissions (IOSCO) found in 2011 that HFTs can dramatically increase volatility in markets, as epitomized in the the May 6, 2010 flash crash when HFTs started buying and reselling securities at a rapid speed and at an irrational price.[5] The crash, among others, showed that ordinary traders can't manage mounting risk like HFTs can and the electronification of trading at near light speeds means a computer glitch can take down a market.

The economic incentives and market structure currently in place in legacy markets puts market participants at risk and allows for potentially unfair competitive advantages to exist. However, these dynamics do not exist in the cryptoasset market. For starters, the crypto market is cloud-based and fragmented into several centralized and decentralized exchanges around the world, limiting speed advantages based on geography. Not to mention, the mistakes of legacy markets have led the crypto market to prioritize equal opportunity; Kraken's vice president of engineering, Steve Hunt, told CoinDesk in a 2019 article discussing HFTs in crypto that Kraken doesn't do anything special for HFT customers, "We want all customers regardless of size or scale to have equal access to our marketplace."[6] Last but not least, because the minimum price movement of a cryptocurrency is so small, market participants only need to pay a little more to be first to market.

Potentially Dishonest Intermediaries

As market participants don't have direct access to traditional markets, they're forced to trust financial advisors, brokerages, exchanges, and other intermediaries. Though these intermediaries are bound by strict regulations, the structure of legacy markets has yet to evolve and eliminate these concerns. In just the past few years, intermediaries have been caught profiting at the expense of their clients using the following tactics:

Failing to Achieve Best Execution	In the U.S., brokers are legally obligated to give their clients best execution and consider price, speed of execution, and the likelihood of trade execution. This requirement was put in place to address potential conflicts of interest that brokers have in executing client orders. Over the years, the SEC has penalized broker-dealers for failures to provide best execution, most recently fining a brokerage platform $65M for "repeated misstatements that failed to disclose the firm's receipt of payments from trading firms for routing customer orders to them, and with failing to satisfy its duty to seek the best reasonably available terms to execute customer orders."[7]
Failing to Disclose Conflicts of Interest	Because intermediaries may have existing relationships or contractual agreements with other market participants that could create a conflict of interest, intermediaries are required by law to disclose said conflicts of interest when necessary. In May 2019, a Manhattan federal judge ordered seven U.S. stock exchanges to face proposed class-action claims the exchanges sold high-priced services to provide advantages to favored high-frequency trading customers and concealed said services from ordinary investors.[8]
Churning	Some brokers with authority over their client's account may excessively trade the account to generate commissions. This can be seen when an account experiences a jump in transactions, but no change in portfolio value. Most recently in 2020, New Hampshire fined a broker $26M to settle allegations including unauthorized and excessive trading to generate broker fees.[9]
Facilitating Unsuitable Transactions	Since intermediaries are required to provide their services with the client's circumstances and/or investment objectives in mind, intermediaries should never make investment recommendations that are not suitable for their clients. In January 2020, a class-action lawsuit was filed against a firm accused of encouraging buy-and-hold customers to move from commission trading accounts to fee-based advisory accounts without considering the suitability of the recommendations.[10]

The Visible Hand

As markets have matured and attracted strict regulatory practices, they've also arguably become less "free." In today's day and age, markets around the world have been designed such that centralized entities can halt trading and suspend access to the market at their own free will.

Take for instance circuit breakers, which temporarily halts trading in a particular security or market. A trading halt is imposed for regulatory reasons and can be triggered in anticipation of significant news or when the security is abnormally volatile. While some argue that circuit breakers level the playing field by allowing market participants to react, there is little evidence that circuit breakers prevent panic-driven selling or reduce volatility after trading resumes. Others argue that circuit breakers prevent the market from accurately pricing the security and actually accelerate selling because market participants expect a halt. As a matter of fact, after a $5 trillion stock rout in 2015, China adopted circuit breakers in a bid to contain future turmoil. The circuit breaks debuted in 2016 and lasted four days after being blamed for feeding panic selling.[11]

In addition to circuit breakers, service providers have the ability to suspend trading. Whether brokerages suspend trading due to external pressures from regulators, clearing houses, or institutions, centralized power, influence, and market dynamics exist in traditional markets that can limit a market participant's actions at both the best and worst of times. Take for instance in January 2021 when brokerages, such as Robinhood, Ameritrade, and Charles Schwab, suddenly suspended trading in popular "meme stocks."

Being the free market that it is, crypto markets are always open and cannot be widely halted by any centralized entity. While centralized exchanges may temporarily suspend trading to alleviate technical issues, circuit breakers do not exist. Additionally, the breadth of centralized and decentralized exchanges allows liquidity providers to be fully operational at all hours of the day.

4.

The Old Converging With The New

Not only did crypto markets have the good fortune of being able to mimic aspects of legacy markets and learn from and improve upon their inefficiencies and unfair market dynamics, but also a rise to prominence via an emerging technology that was designed to be self-sustaining, transparent, efficient, and widely accessible. Such has led to the development of a trillion dollar market where market participants from all over the world, of all walks of life, and of various backgrounds can participate in what might prove to be the next biggest technological innovation since the internet. As such, there are market dynamics of crypto that legacy markets ought to learn from that could result in a more open, efficient, and equal marketplace than what exists today. The following are aspects of crypto markets that traditional markets can and likely may adopt in the future.

Democratization of Trading

Traditional markets

Despite a boom in investing and trading thanks to greater accessibility of retail-friendly investing apps, new retail entrants to traditional markets remain at a disadvantage to "industry insiders."

However, the recent events surrounding Gamestop (GME) challenged this status quo. What was witnessed in January 2021 was discussions that might occur behind "closed doors" among sophisticated market participants on Wall St. occured instead on public messaging boards among thousands of anonymous, retail market participants from all around the world. It was through the r/WallStreetBets subreddit that retail market participants came together in full transparency to discuss unappreciated value, a major

market inefficiency where there were more shares short than shares in existence, and how their voices could be collectively heard in the open market. It was this decentralized discussion, strategizing, and planning that ultimately pushed GME's stock price and caused the market to reflect the group's opinions, thoughts, and findings.

While the events of Gamestop may have exposed the power of democratized trading, it also unveiled a major flaw in the underlying financial system that wouldn't have come to light otherwise. The army of traders on Reddit understood the brokenness of the existing financial system, identified a major inefficiency in the market, and bet on the carelessness of hedge funds. If we dissect the events of GME alone, at one point approximately 140% of the stock's public float was shorted. A stock's outstanding shares minus restricted shares gives you the number of shares publicly available to trade, or its float. This implies that an excess of 40% of shares were shorted than were available. How does this happen? The current securities settlement system permits failures to deliver securities in settlement, which enable market participants to sell shares short without borrowing securities to settle transactions. This Gamestop event shed light on seemingly broken systems and possibly created the possibility of a new future for securities trading as investors become wary of falling victim to a broken system again in the future.

CryptoAssets

This highlights the pressing need for a democratized financial system. Just as the internet was used to democratize content, crypto is at the heart of democratized finance. It's a system that is open to all, transparent, keeps record of all past transactions with defined ownership of the asset, and requires the validation of the majority to move forward and be confirmed. The ethos of crypto and its underlying blockchain technology provides an avenue for users to pivot from archaic financial systems and closed-door policies that prioritize the wealthy.

Cryptocurrency projects are open-source software, meaning the code undergirding the currencies are accessible to all on Github with additional upgrades also displayed

for all to follow. Cryptoassets benefit from network effects and utilizes the networks that form around running open source code as a service. Once it's filled with users and data, network effect takes hold and additional users will create more value for the entire network. This way participants are incentivized to propagate the network further by sharing information, code, data, and statistics about the cryptocurrency. This becomes the basis of a strong collaborative and cooperative culture of identifying value in the market. In contrast, the traditional financial market is marked by a trickle-down effect of information asymmetry. For example, clients of large Wall Street firms may have access to management teams to discuss topics that are not readily available to the average investor. As a result, trading becomes less a competition and more based on informational asymmetry, depending on financial status or relationship with a company.

We believe the future of traditional finance is eventually headed towards democratized investment systems that aggregate the resources of millions of people to drive innovation and economic prosperity. This democratization will change how we see securities trading, how we view investing, and how the average person can benefit from it economically. Anyone can invest in what they believe will bring about progress or have value, share their findings, and reflect such convictions real-time in the marketplace. There will be no pre-market trading or post-close trading sessions that are open to certain types of investors, or additional fees to utilize services. Markets will come to mirror that of cryptocurrency markets that are accessible without a broker, and run 24/7, 365 days a year. Furthermore, with low-to-no fees, the concept of investments will be made approachable for the average person with a small amount of capital. As capital begets capital, democratization of finance will bring about wealth distribution. Those who have historically been denied access to sources of financial growth will join in regardless of their status and over the years markets will see a more equitable wealth distribution.

Advantages in this type of financial structure will come in the form of technical skill sets of individuals. As data is documented and published online for all to see, the ability to request real-time financial data from APIs on asset-related metrics will give a leg up for the skilled individuals who can react faster to market events by sourcing data that is accurate and up-to-the-second. Developers and consumers will both become more tech-savvy in order to be in-tune with markets. We presume this will also expand to data-driven algorithmic trading where the average investor relies on the performance of machine learning to make investment decisions. Overall, there will be less of a hurdle and higher literacy of investments and of domestic, if not global, financial systems.

All current structures, processes, and settlement systems with intermediaries that create a lag in the traditional financial system can be replaced by code, smart contracts, or other automated processes. Transactions can move to real-time with immediate settlement with no need for a central clearing house in cases of cash transactions with cash on delivery. This will not only cut down on processing time but will bring about even greater security and transparency as is seen with blockchain-based decentralized networks. All assets being traded will be stamped permanently on the blockchain with an owner, time of transaction, and confirmations, which will eliminate the possibility of over-leveraged systems. Furthermore, following the ethos of crypto, cryptocurrency exchanges like Kraken have a vested interest in protecting all traders regardless of their experience or invested capital. Instances of intermediaries or brokers disabling access to user accounts or halting trades altogether, may no longer be a reality. There is immense potential in the current crypto ecosystem that fosters a culture of inclusion, and we believe traditional systems will have to keep up or prepare to fall behind.

Tokenization

The rise of blockchain technology over the past several years has opened the door to tokenized assets, or tokens that entitles its owner a legal claim on a particular asset. The advent of tokenized assets means that many of the benefits native to crypto trading can also be realized in traditional markets, such as the following:

Real Time Settlement	Tokenization means settlement in traditional markets goes from several business days to real time, thus eliminating counterparty credit risk & operational expenses, increasing market liquidity, and potentially eliminating the need for hedging when engaging in cross-border transactions. A recent study by Plutoneo estimates that €1.4T worth of European assets are expected to be tokenized by 2024.[12]
Greater Transparency & Documented Ownership	A migration to tokenized securities means legacy markets would have greater transparency. A token owner's rights and legal responsibilities would be embedded into the token and an immutable record of ownership would exist on the underlying blockchain. The combination of an immutable record and real time settlement would require short sellers to actually borrow securities before selling short, avoiding the over-shorted situation of Gamestop and the possibility of steep losses.
Greater Liquidity	Because tokenizing assets means fractional ownership is possible and assets can easily be traded in a secondary market, one could expect to see greater market participation and thus greater market liquidity.
Greater Efficiency	Since the tokens representing an asset would be embedded with all the necessary info for validating and transferring ownership, all of which is recorded in real time on an immutable blockchain, costly and sluggish back-office operations could be eliminated. This would not only reduce industry expenses, but make processing and validating asset transfers more efficient.
Autonomous Capital Management	Tokenized assets can have dividend payments, time revenue share pay-outs, vesting periods, and lock-ups embedded in the token and executed autonomously, saving both time and money for market participants and asset issuers.
New Markets	Tokenization means assets that couldn't otherwise be sold in the open public due to size or other factors that do not meet exchange listing requirements, are now marketable to market participants, thus opening new markets and allowing for greater portfolio diversification.

Autoliquidation

In the traditional financial world, market participants face the possibility of getting closed out of a trade if they borrow funds to do a trade and do not maintain sufficient collateral. If the market participant faces potential liquidation, they'll first receive an email and/

or phone call from their broker telling them more collateral is needed, at which point the market participant will need to transfer additional assets to avoid liquidation. Not only is this process time and resource intensive, but it also presents unnecessary risks for both parties. In crypto markets, liquidation is automated if users do not have sufficient collateral, thus eliminating systematic risks that can accrue when market participants are too levered and volatility is high. This automated liquidation allows for relatively nascent assets to mature because the ability for market participants to use a fatal amount of leverage and crash the asset is greatly reduced.

Introduction of autoliquidation, either by way of proprietary technology or through programmable smart contracts, into the existing traditional financial markets would eliminate potentially fatal crashes that could make an asset and/or market near worthless, enhance market efficiency, and allow for new markets to flourish.

Decentralized Consensus

From the time that Satoshi Nakamoto created the Bitcointalk[13] forum and posted the first public message in 2009 up until today, the cryptoasset industry has seen hundreds, if not thousands, of internet communities form where users share thoughts, findings, and research ideas openly and freely. Currently, there are more than 2.4M members of the r/Bitcoin subreddit, 1.6M members of the r/CryptoCurrency subreddit, 645K members of the r/Ethereum subreddit, and 332K members of r/CryptoMarkets subreddit, just to name a few. This doesn't even include the thousands of Telegram groups, hundreds of Facebook pages, crypto-focused YouTubers with hundreds of thousands of followers, and the hundreds of thousands of "Crypto Twitter" users. Together, these communities have discovered and shared opportunities to the public that have resulted in the market reflecting a decentralized consensus around the value of a particular cryptoasset.

The rise of Chainlink (LINK), the 10th largest cryptoasset with a market capitalization in excess of $11B, epitomizes said dynamic. Chainlink, a decentralized oracle network, is well known for its ability to provide off-chain data to on-chain resources, but its rise to

prominence and plethora of partnerships can partially be attributed to its community, "LINK Marines," that has long championed its potential, capabilities, and success via blog posts, forum posts, research reports, and "memes."

Figure 5

Crypto memes

Source (LRTB): Decrypt- Ben Munster, The Independent, LCB news, /u/mavensbot, Brainless Tales

While forums, subreddits, and internet personalities focused on investing in legacy markets have long existed, they have yet to mimic much of the community building and subsequent decentralized consensus that has come to prominence in crypto over the past decade. Though the infamous "GameStop short squeeze" attracted millions of new users to the r/WallStreetBets subreddit, one could expect decentralized consensus building in legacy markets to mimic crypto and become a real market force.

5.

Conclusion

Democracy should be at the heart of finance and the opportunity for economic prosperity shouldn't be a luxury afforded to a select few. Legacy markets in the U.S. were once free, open, and transparent, but have evidently evolved into markets where there is a lack of accountability and those with deep pockets appear to be the ones who get a leg up on the rest of society. Here we have shown how legacy markets compared to crypto markets, the various inefficiencies of legacy markets, and how legacy markets can learn from crypto markets to become more fair, efficient, and transparent. But don't take our word for it, the latest Gamestop saga between Main Street and Wall Street proved to the world that the current system is flawed. It also showed that the lack of transparency and various inefficiencies in the traditional financial markets possess a great risk to markets, will continue to negatively impact retail market participants disproportionately, and will only cease to exist should legacy markets mirror crypto markets. Until that time comes, one can expect crypto markets to remain as the only truly free, open, and equal market in town.

Footnotes

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