

National Economic Education Delegation

- **Vision**

- One day, the public discussion of policy issues will be grounded in an accurate perception of the underlying economic principles and data.

- **Mission**

- NEED unites the skills and knowledge of a vast network of professional economists to promote understanding of the economics of policy issues in the United States.

- **NEED Presentations**

- Are nonpartisan and intended to reflect the consensus of the economics profession.

Who Are We?

- **Honorary Board: 54 members**

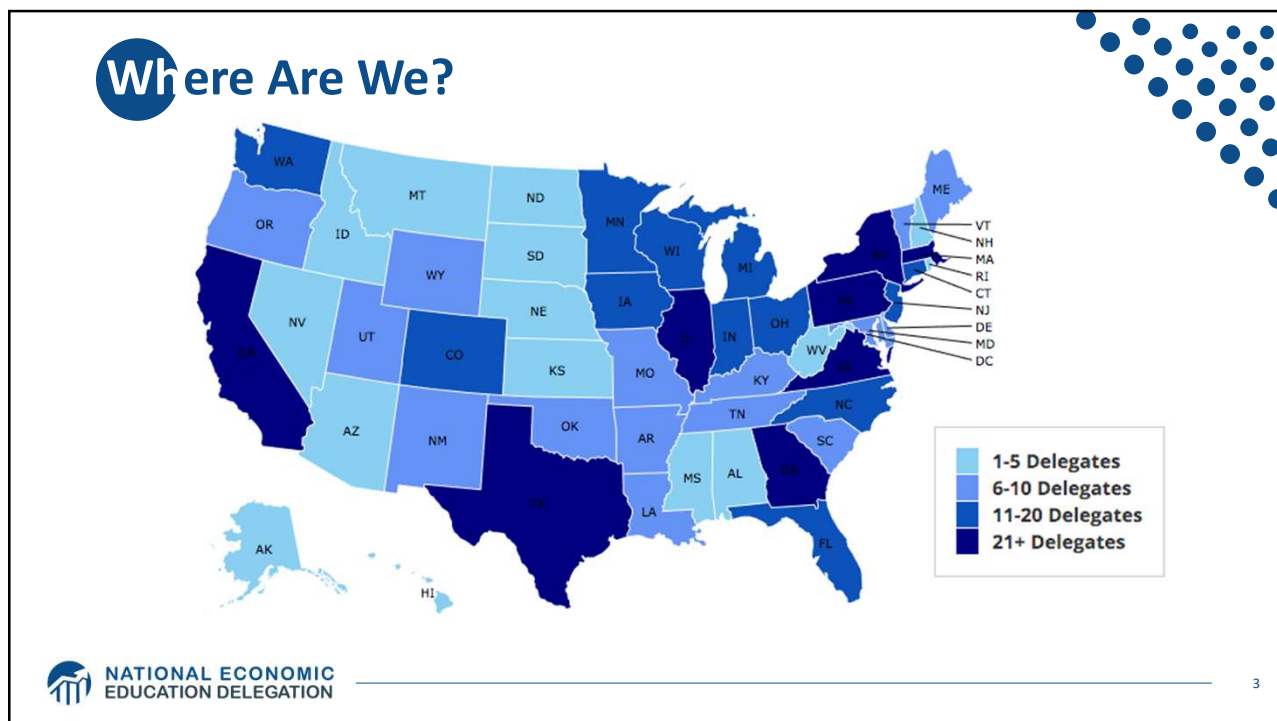
- 2 Fed Chairs: Janet Yellen, Ben Bernanke
- 6 Chairs Council of Economic Advisers
 - Furman (D), Rosen (R), Bernanke (R), Yellen (D), Tyson (D), Goolsbee (D)
- 3 Nobel Prize Winners
 - Akerlof, Smith, Maskin

- **Delegates: 652+ members**

- At all levels of academia and some in government service
- All have a Ph.D. in economics
- Crowdsource slide decks
- Give presentations

- **Global Partners: 48 Ph.D. Economists**

- Aid in slide deck development



- ## Available NEED Topics Include:
- US Economy
 - Healthcare Economics
 - Climate Change
 - Economic Inequality
 - Economic Mobility
 - Trade and Globalization
 - Minimum Wages
 - Immigration Economics
 - Housing Policy
 - Federal Budgets
 - Federal Debt
 - Black-White Wealth Gap
 - Autonomous Vehicles
 - US Social Policy
- NATIONAL ECONOMIC EDUCATION DELEGATION**
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Cryptocurrencies & The Future of Money

Joan Nix,
Associate Professor of Economics
Queens College, CUNY
October 24, 2023



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Submitting Questions

- **Raise your digital hand or submit questions in the chat.**
 - I will try to handle them as they come up.
- **We will do a verbal Q&A once the material has been presented.**
- **Slides will be available from the NEED website tomorrow (https://needelegation.org/delivered_presentations.php)**



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Outline of the Talk

- **Fun Facts about Bitcoin**
- **A little bit on the underlying technology of bitcoin.**
- **Economist evaluation of 2 Key Questions**
 1. Is Bitcoin serving a legitimate economic role?
 2. Is there potential for beneficial, financial innovations using the underlying technology?
- **But, in order to tap that potential, we need:**
 1. Legislation to provide “good” regulation of crypto markets.
 2. The Federal Reserve needs to follow other central banks in creating a safe and secure, digital means of payment: Central Bank Digital Currency (CBDC)

But First, What is Bitcoin?

- **Bitcoin is the first cryptocurrency and was invented in 2008.**
- **Cryptocurrencies are a form of digital money (viz. data on a computer) where account ownership is confidential and where record keeping is decentralized over a multitude of computers**
- **More importantly,...**

Bitcoin Has Started a Revolution in Finance

1. The way we buy and sell things, our “payments system;” the way we save, borrow and invest; the role of banks and other financial firms are rapidly changing.
2. In my view, Bitcoin will *NOT* be an important player in these developments, but the technologies underlying Bitcoin may be.

Bitcoins: What **Was** All the Excitement About?

grwoglom published on TradingView.com, Jun 20, 2023 12:10 UTC-4



 TradingView

Bitcoin and Gold Volatility

grwoglom published on TradingView.com, Jun 20, 2023 15:42 UTC-4



TradingView

One of the Over 60,000 Bitcoin ATMs



3301 S 6th Ave

Give Me a Break?

Big Crypto News! Fidelity will allow Bitcoin 401k!



- ❖ First major retirement plan provider to offer 401k plans that allow direct bitcoin investments
- ❖ Full-time employer ERISA-only plans
- ❖ Rollout in mid-2022
- ❖ Up to 20% allocation
- ❖ Bitcoin only
- ❖ Custodied at Fidelity
- ❖ Fees: account fee of 0.75%-0.90% plus trading fee (TBD)



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An Origin Story Worthy of a Pulp Novel!

- **The Mysterious Satoshi Nakamoto:**
 - Lehman Brothers Bankruptcy, 9/2008
 - Halloween 2008: a white paper is published on the Internet laying out the idea and design for Bitcoin. The author (or authors) used Satoshi Nakamoto as a pseudonym.
 - January 2009: Satoshi releases the first version of the Bitcoin software.
 - 2009-2010: Satoshi releases new versions of the software and is actively involved in Internet Chatter about Bitcoin.
 - April 2011: Satoshi ceases all known and/or verified communications.
- **To this date the identity or identities of Satoshi are unknown.**



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The Possible Economic Role for Bitcoin

Satoshi's Vision: "A purely peer-to-peer version of electronic cash [that] would allow online payments to be sent directly from one party to another without going through a financial institution."

More, prosaically

1. Facilitate payments at lower costs with speed and security

1. E.g., Credit Card Fees (3 percent).
2. Merchant doesn't get paid for at least 2 days.
3. More importantly, cross-border transactions costs were \$1.9 trillion in 2018.
4. 2019 Capital One hackers access personal information of 106 m users

2. Meet the needs of previously unbanked.

1. Particularly a problem in the Developing World, but
2. Fed estimates that 50 million US adults have little or no banking relationships.



Facts about Cryptocurrencies (as of today, noon)

- Bitcoin was the first and is the largest in terms of market cap (total value of all bitcoins) of about \$525 billion.
- Ethereum is in second place with a market cap of about \$210 billion.
- Presently, 13,000 different varieties with a total market cap of about \$1.1 trillion (<https://www.coingecko.com/en>)
- Market cap of domestically listed US companies is about \$40 trillion.



Payments Are Going Digital!



Presently, crypto currencies have little to do with these trends.

But, what about the future?



Underlying Technology of Bitcoin

1. **Digital Token (exists only as data on a computer) whose ownership is cryptographically protected.**
2. **Distributed Ledger, Block Chain Technology.**
3. **Software protocol the provides a “consensus” mechanism on the validity of new transactions.**

Payments based on trust, without a “trusted third party.” (i.e, a bank or the Fed).



So, how does it work?

- Jack, the owner of a bitcoin is given a public number or key and a private encrypted key.
- Jack can trade his bitcoin with Jill by using Jill's public key and verifying the transaction with his private key.
- The new transaction is then posted on a a number of different computers and can be read by anyone.
- The clearing of the transaction is done with public database or distributed ledger called a blockchain through a process know as bitcoin mining.
- First, Bitcoin Miners gather about 3000 new transactions into a "block."
- The next step is to provide a decentralized mechanism to add the new block to the block chain and agree that the transactions are valid



Proof of Work: Bitcoin "Mining"

- The miners' competition involves generating long, random numbers ("hashing") until one of the numbers fits a precise set of attributes.
- Presently, miners produce on the order of 200 million trillion random numbers per second.
- The winning miner then adds the new block to the previous block in the blockchain. The total process takes about 10 minutes
- The incentive for miners is that the winner of the competition gets compensated with new bitcoins and transaction fees.
- However, the miner will not get the reward unless other miners subsequently add new blocks to the first miner's block.
- In this way transactions are added to the chain via a "consensus" of miners.



Bitcoin Mine



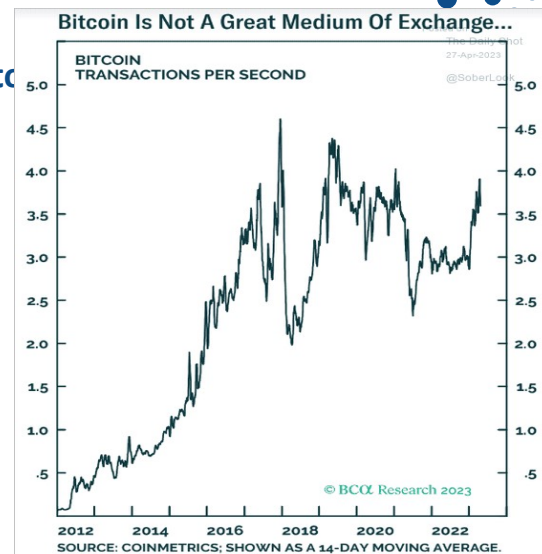
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Question #1: Is Bitcoin serving an economic role

Bitcoin is not and cannot be widely used to settle transactions

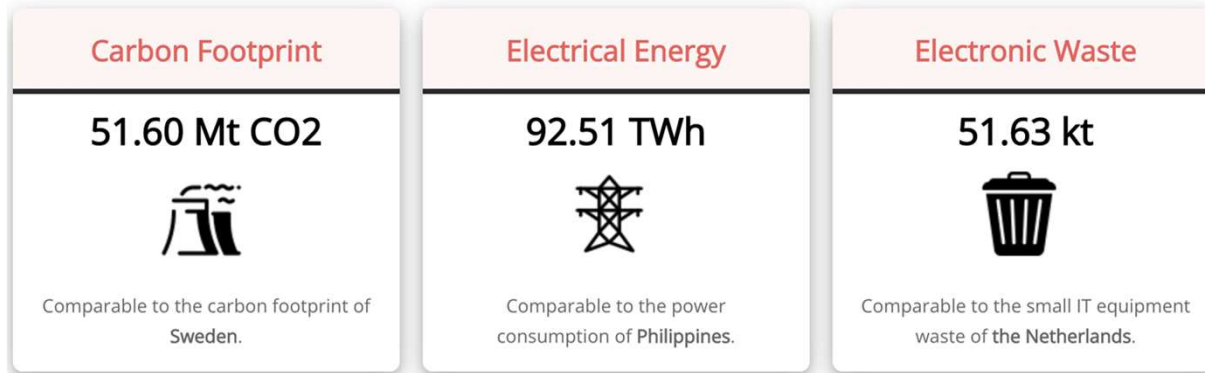
- Scalability?
- Price Instability.
- Transactions costs
- **And, the network is costly**
 1. Resources used in mining
 2. Environmental Costs



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Bitcoin's Environmental Impact

Annualized Total Bitcoin Footprints



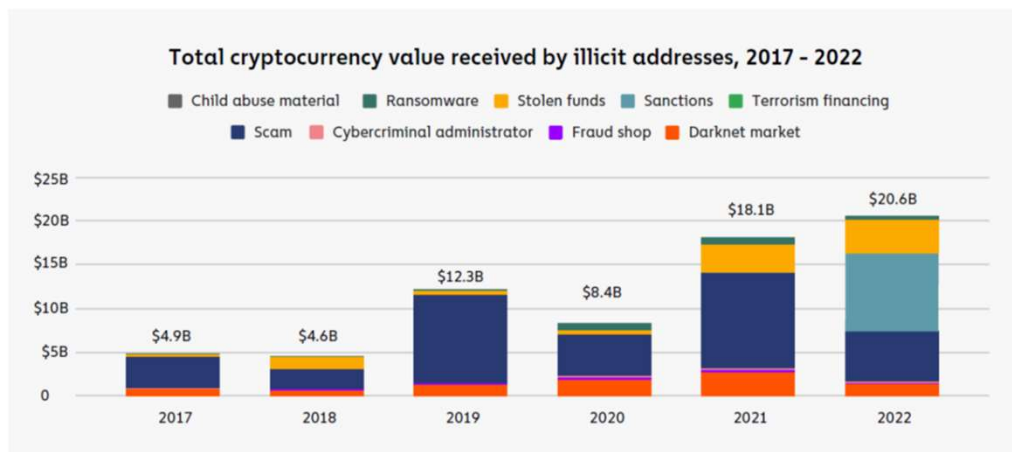
The Merge: Ethereum and Proof of Stake

- **Potential Block Creators place cryptocurrency in specialized wallets that are locked while they are acting as blockchain “validators” (as opposed to “miners”).**
- **Validators are selected randomly, where the odds of being selected are proportional to the value of the currency “staked” in the wallet.**
- **The rest of the process of validation is similar: transaction fees only paid if subsequent blocks are added, but!!**
- **If an invalid block is discovered the staked deposit is forfeited.**

What Role Does Bitcoin (or Ether) Play?

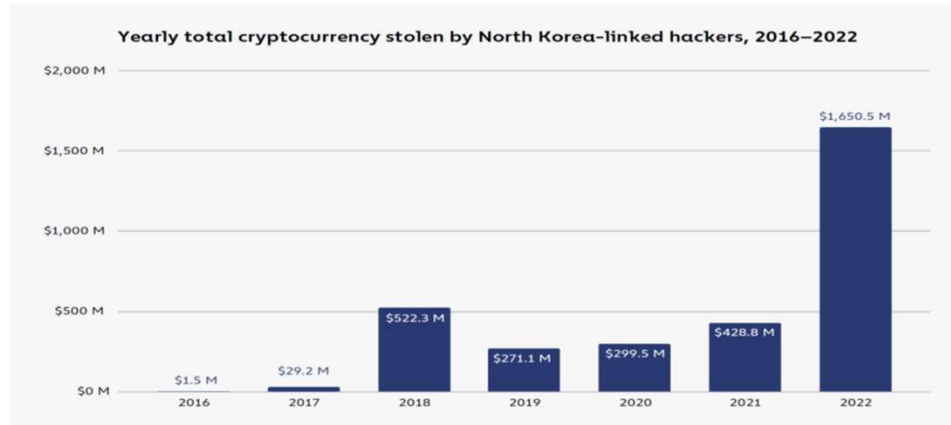
- For some it plays the same role as \$100 bills: 32.8% of all bills in circulation (more than the number of \$1 bills)
- Illegal Activity

Illegal Activity and Bitcoin



Source: *The 2023 Crypto Crime Report*, Chainanalysis, 2/23

Kim Jong Un's New Revenue Source



But What about as a Financial Investment?

- It is hard to argue with the fact that Bitcoin had provided outsized returns for many, albeit very volatile.
- Financial Assets are Promises by the Issuer
- The “fundamental value” of a financial assets is the value of those promises based on the time value of money and the risk that the promises will not be kept.
- What does Bitcoin promise?

How Do Economists Think About Investments?

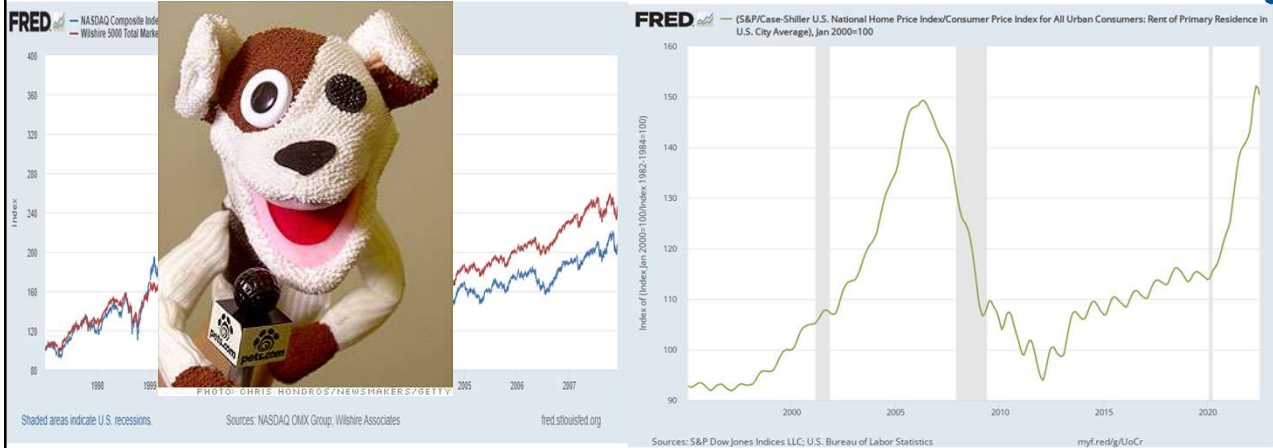
- Good Starting Place

“In the short term the stock market behaves like a voting machine, but in the long term it acts like a weighing machine.”

What is being weighed is prospective payments from the security, or other intrinsic value, i.e. its fundamental value.

Bitcoin?

Does Voting Ever Get it “Wrong?”



Question #2: The Value of the New Technology?

- **Don't Throw the baby out with the bathwater!**
- **The value cryptographically protected digital-tokens is nuanced:**
- **Blockchain technologies have significant promise some of which is already being realized.**
 - Private blockchains, Walmart and its produce suppliers
 - Public Blockchains, Ethereum and smart contracts

See: Mehta N., Agashe A., P. Detroja
Blockchain Bubble or Revolution, 2021

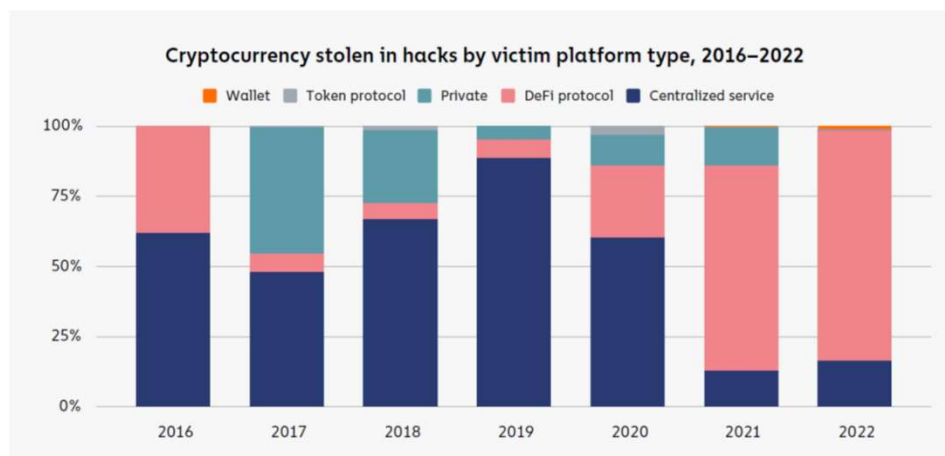
Smart Contracts on the Blockchain

- **A Smart Contract is a computer code that resides on the block chain and is executed based on incoming information.**
- **Example, Parametric Hurricane Insurance via the Blockchain:**
 - Computer program on Ethereum continuously monitors Charleston Executive Airport wind speed for 1 year.
 - If the windspeed is greater than 150 miles per hour, immediately transfers 100 bitcoin to the Seabrook Island Property Association.
 - If the windspeed is less than 150 miles per hour, but more than 125 miles per hour, immediately transfers 75 bitcoin; etc.
- **Smart Contracts are Automatic, Immediate, Irreversible and Uncontestable.**

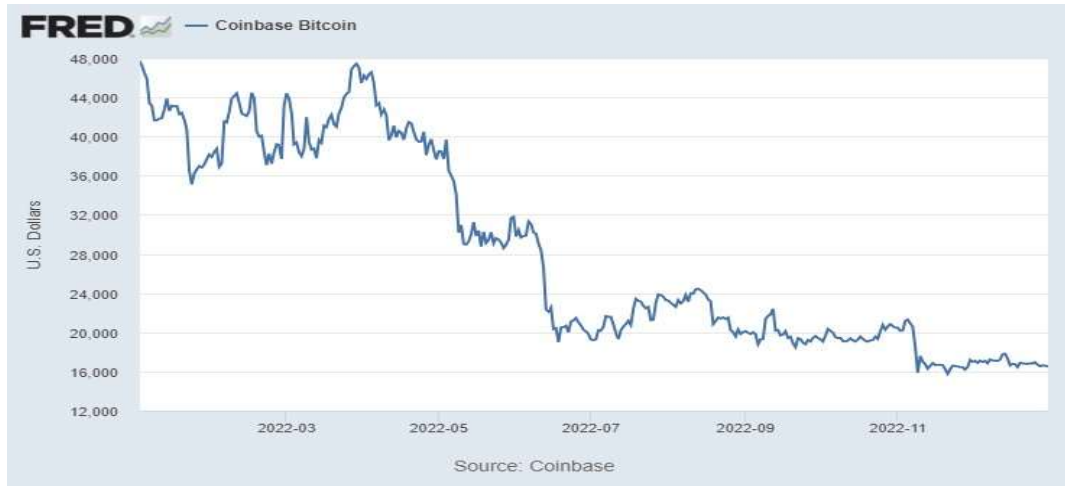
DeFi and Smart Contracts

- **Broad Category of *Decentralized Financial Services***
 - Crypto exchanges, online lending platforms, crypto derivatives, insurance, startup finance, etc.
 - **Smart Contracts are executed mostly on the Ethereum blockchain. No brokers, financial intermediaries, traders, and *little regulation*.**
 - **I personally have not seen the “killer application” of DeFi**
- Note in my insurance example, that bitcoin isn't a great means of payment because of price volatility.**

Clearly, Not Good News for Defi



Enter Tether: Reserve Backed (?) Stablecoin



“Clean Up the Mess on Aisle 3”

- Gary Gensler, Chair of the SEC quote from a *WP* interview.
- Rostin Benham, Chair of the CFTC
- Janet Yellen at Treasury.
- They will act, but they would need Congressional legislation, too:
Cash markets in cryptocurrencies are viewed as commodities and are unregulated



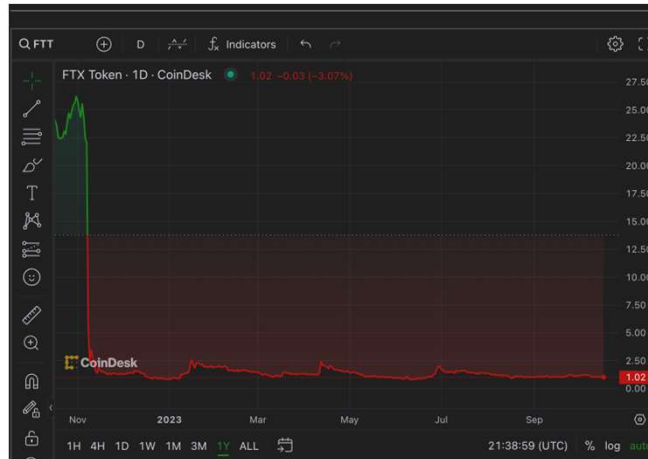
San Bankman-Fried & FTX

- In August, *Fortune* compared the 30-yr old to Warren Buffet.
- Helped save BlockFi and other crypto firms in May 2022.
- Mid November \$32b firm declares bankruptcy; SBF's net worth goes from \$16 billion to 0.
- Misused customer funds to prop up his investment firm Alameda Research.
- Regulation is needed!

Another sad tale of hubris

- But wait . . .
- “John J. Ray III is the new CEO of FTX.
- In his eyes, he has been handed a complete mess.
- ‘Never in my career have I seen such a complete failure of corporate controls and such a complete absence of trustworthy financial information as occurred here,’ he said in a court filing.”

Governance token of FTX



Gemini Exchange Offered an Earn Product

- **“One of the Earn investors was Complainant No. 1, a 73-year-old mother, grandmother, and resident of the State of New York. She and her husband, who are both retired, invested their life savings of over \$199,000 in Earn because they believed Gemini’s marketing statements that Gemini was a safe and secure choice. Complainant No. 1 had hoped to use this money to pay for her grandchild’s education. Outside of her Earn investment, she and her husband have little savings.”**



Believe it or not?

“According to the NYAG, Gemini knew their exposure to Genesis was high risk, but continued to promote the Gemini Earn lending product to retail customers as a safe way to earn profits on their crypto holdings. According to the NYAG, Gemini at one point revised its internal evaluation of Genesis’ creditworthiness to “junk grade”, some of their own risk personnel withdrew their own funds from the Gemini lending program, and one exec compared Genesis’ condition to the Lehman Brothers shortly before its collapse — but no communication was ever made to customers to inform them that the product had become riskier, nor did Gemini ever really stop working with Genesis (despite gestures at doing so a month or two before Genesis ultimately halted withdrawals).”



Who should know what?

- **“Another Earn investor, Complainant No. 2, is a 56-year-old resident of the State of New York. Complainant No. 2 invested approximately \$20,500 in Earn, virtually all his savings. Complainant No. 2 chose Earn because he researched the product and came to believe, based on Gemini’s statements, that Earn was more secure than other interest-bearing cryptocurrency investments.”**



What is Good Regulation?

- **The Principles Are Easy;**

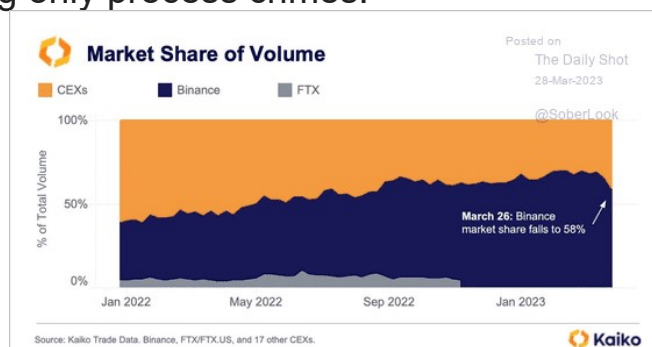
1. Eliminate fraud, abuse and manipulation.
2. Do not let markets be dominated by a small number of powerful firms.
3. Allow startups with new innovations to displace incumbent firms.
4. Minimize risk of a financial crisis.

- **Legislation and Implementation: Hasn't Been Easy**

After SBF: Binance

- Matt Levine, *Bloomberg*, “A decent rule of thumb is that all cryptocurrency exchanges are doing crimes, and if you’re lucky your exchange is doing only process crimes.”

Market Share of
Coinbase, 5%. But, 60%
share of US consumer.



Gary Gensler Has Seen Enough

Gary Gensler quotes from SEC Press Releases announcing enforcement actions against Binance (6/5) and Coinbase (6/6):

1. “...Binance entities engaged in an extensive web of deception, conflicts of interest, lack of disclosure,...”
2. “We allege that Coinbase, despite being subject to the securities laws, commingled and unlawfully offered exchange, broker-dealer, and clearinghouse functions,...”

Can We Turn Our Back on Digital Money?

- The Bank for International Settlement (BIS) and a number of central banks are exploring how the development of Central Bank Digital Currency (CBDC) “contribute to an open, safe and competitive monetary environment that supports innovation and serves the public interest.”
- CBDC would be a government-backed stable coin
 - Retail vs wholesale
 - Blockchain
 - Privacy

The Devil Is In the Details

Where Central Banks Have Issued Digital Currencies

- Many countries as diverse as Sweden, Ecuador and China have begun experiments with CBDCs.



Source: Atlantic Council

- Where's the Fed?

Source: E. Prasad, *The Future of Money*

Who should design our payment system?



Glossary

- *Traditional Money* is currency plus bank checking accounts.
- *Currency* is paper and coin issued by the government. Currency is legal tender and must be accepted for all debts. Transactions using currency are *immediate* and *final* (can't be undone without the agreement of both parties.)
- *Digital Payments* are used for purchases where no physical money is exchanged. Examples include many online banking payments, credit card payments, PayPal.
- *Digital Currency* or *Virtual currency* is a form of money that exists solely in digital form, such as a *digital token* (i.e., as data on a computer). Examples: cryptocurrencies, central bank digital currencies and virtual currencies used in online gaming.
- *Cryptographic identity protection* assigns people two account numbers, or *keys*, one public and one private. Public record keeping is done using the public key and transactions are authorized using the private key.
- *Cryptocurrency* is a digital currency where the owner's identity is protected using cryptographic encryption and where record keeping is done with a public blockchain, e.g., Bitcoin.
- *Stablecoin* is a cryptocurrency with a stable value of \$1, somewhat like a money market mutual fund.



Glossary (Cont.)

- *Distributed ledger* is a database for recording transactions or other information, where the information or ledger is shared on a network of many computers simultaneously.
- *Blockchains* are distributed ledgers where new transactions (new blocks) are added to the chain sequentially when a consensus of the network agrees that the transactions are valid.
- *Decentralized Finance (DeFi)* is peer-to-peer financial activity conducted through public blockchains and smart contracts.
- *Smart Contracts* are computer programs that execute automatically based on external conditions. Example, travel insurance that pays off automatically when a flight is cancelled.
- *Central Bank Digital Currency (CBDC)* is a digital currency issued by a central bank. Different central banks are experimenting with various forms of CBDCs, including some using blockchain technology, electronic wallets and cryptography.



Resources to Learn More

- N. Mehta, et.al. *Blockchain Bubble or Revolution*
- E Prasad, *The Future of Money* (<https://youtu.be/o3NuHb7V1IA>)
- Presidential Working Group on Financial Markets, 11/1/21 (https://home.treasury.gov/system/files/136/StableCoinReport_Nov1_5_08.pdf)
- Federal Reserve White paper (<https://www.federalreserve.gov/publications/files/money-and-payments-20220120.pdf>)
- Executive Order: <https://www.whitehouse.gov/briefing-room/statements-releases/2022/03/09/fact-sheet-president-biden-to-sign-executive-order-on-ensuring-responsible-innovation-in-digital-assets/>



Economic Needs Don't Go Unmet for Long

Meeting the Banking Needs in Less Developed Countries: Mobile Money.

M-Pesa:

1. Started in Kenya in 2007 and now available in 10 countries.
2. Buy M-Pesa credits from "agents" (local shop) which can be transferred to others with an M-Pesa account via cellphone.
3. 96 percent of Kenyan households have a mobile account

Grameen Foundation:

Making Cash Digital is the Key to Possibility

When Poor Women Control their own money, it no longer controls them.

