

MMS 562F – Tech Driven Transformation

Stablecoins

Campbell R. Harvey

Duke University and NBER



Facebook digital currency initiative #1.



3 Lessons That Startups Can Learn From Facebook's Failed Credits Experiment



Facebook Credits
The quick and easy way to get items in your favorite games and apps on Facebook.



What are Facebook Credits?

Just like tokens at an arcade or amusement park, credits are a secure way to play games and buy virtual and digital goods on Facebook. You can buy credits using your credit card, PayPal, mobile phone or another payment method.

Redeem Your Facebook Credits Gift Card

Facebook Credit gift cards are available in retail stores. Find a store near you.

[Redeem Gift Card](#)

Facebook

How to use Facebook Gifts



Facebook digital currency initiative #2.

TECHNOLOGY

R.I.P. Facebook Gifts

In loving memory of Facebook Gifts: No one used you, and you made us feel kind of weird. 2008-2014.



A gift for
Lee Linden

\$20



GUND Teddy Bears

Maybe three times lucky?

THE WALL STREET JOURNAL.

DOW JONES | *Market Gains* ★★★★★ FRIDAY, MAY 3, 2019 - VOL. CCLXXIII NO. 103 WSJ.com ★★★★★ \$4.00
S&P 26307.79 ▲ 122.35 0.5% NASDAQ 8096.77 ▲ 0.2% STOXX600 388.84 ▲ 0.6% 10-YR TREAS. ▼ 12/32, yield 2.552% OIL \$61.81 ▲ \$1.79 GOLD \$1,269.70 ▲ \$11.70 EURO \$1.1173 YEN 111.51

What's News
Business & Finance

Facebook is recruiting financial firms and online merchants to help launch a cryptocurrency-based payments system. **A1**

◆ The social network based on a mix of personal data whose views it deemed too inflammatory. **A5**

◆ Trump said Mexico with

Facebook Plans for Crypto Payments

Facebook Inc. is recruiting dozens of financial firms and online merchants to help launch a cryptocurrency-based payments system on the back of its gigantic social network.

Maybe three times lucky?

Secret
“Project Libra”





Facebook Plans for Crypto Payments

Facebook Inc. is recruiting dozens of financial firms and online merchants to help launch a cryptocurrency-based payments system on the back of its gigantic social network. The effort, should it succeed, threatens to upend the traditional, lucrative plumbing of e-commerce and would likely be the most mainstream application yet of cryptocurrency. It comes as the social-media giant is under



Facebook Isn't Going After Bitcoin. It's Going After the Dollar

This one is blockchain-based and interacts with WhatsApp, Messenger and Instagram (with potentially 2b users)

- Linked to a basket of currencies
- \$1 billion allocated to the project

Why Facebook's libra cryptocurrency is in trouble

PUBLISHED FRI, OCT 25 2019 • 3:23 PM EDT



Andrea Miller
@ANDREAJASMILLER

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The Education of Jamie Dimon



VIDEO 01:57

Jamie Dimon: Bitcoin will eventually blow up; it's a fraud

The Education of Jamie Dimon



The Education of Jamie Dimon

MarketWatch

Jamie Dimon: 'I don't really give a shit about bitcoin'

By [Aaron Hankin](#)

Published: Oct 31, 2018 12:02 p.m. ET

On the eve of bitcoin's 10th birthday, Jamie Dimon said he never intended to be the leader of the bitcoin haters



Getty Images

The Education of Jamie Dimon



Jamie Dimon says he regrets calling bitcoin a fraud and believes in the technology behind it

PUBLISHED TUE, JAN 9 2018 • 7:42 AM EST | UPDATED TUE, JAN 9 2018 • 7:50 PM EST



The Education of Jamie Dimon



[FINANCE](#)

JP Morgan is rolling out the first US bank-backed cryptocurrency to transform payments business

PUBLISHED THU, FEB 14 2019 • 5:59 AM EST | UPDATED THU, FEB 14 2019 • 7:13 PM EST



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FINANCE

JP Morgan is rolling out the first US bank-backed cryptocurrency to transform payments business

PUBLISHED THU, FEB 14 2019 • 5:59 AM EST | UPDATED THU, FEB 14 2019 • 7:13 PM EST

All in



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Mechanic's Bank note of 1856, Augusta, Georgia. Before the Civil War, most paper money in the United States was privately issued.



Boone County Bank note, Lebanon, Indiana 1858. During this era the U.S. had no central bank and paper money was issued by a variety of private banks. Some was even issued by manufacturing and retail companies. This money was backed by gold, silver, real estate, stocks, bonds, and a wide variety of other assets.

Eurodollars and Eurotokens

US dollar collateralized coins the modern version of “Eurodollars”

- Eurodollars are U.S. dollar bank deposits held outside the US
- Started out in Europe (hence the name) but can be any country
- Not subject to Federal Reserve regulations
- Massive daily market volume
- Is the future - Eurotokens?

Other Financial Institutions

David Solomon, CEO Goldman Sachs: June 27, 2019

- *“Assume that all major financial institutions around the world are looking at the potential of tokenization, stablecoins and frictionless payments.”*

Other Financial Institutions

David Solomon says Goldman Sachs is looking into using blockchain to digitize assets

PUBLISHED FRI, JUN 28 2019 • 8:27 AM EDT | UPDATED FRI, JUN 28 2019 • 11:17 AM EDT

KEY POINTS

- Goldman's CEO tells French newspaper Les Echos the firm is conducting "extensive research on the concept of tokenization."
- He also says the future of payment systems is bound to live on blockchain.



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Who is Next?

Who is Next?



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Where do stablecoins fit in taxonomy?

1. First Gen/Gold 2.0: Bitcoin (BTC), Litecoin (LTC)

2. Distributed Computation Tokens: Ethereum (ETH), Tezos (XTZ), EOS, and DFINITY

3. Utility Tokens: Programmable blockchain assets: Storj, Golem (GNT), Sia (SC), FileCoin



Where do stablecoins fit in taxonomy?

4. Security Tokens: Represent stocks, bonds, other assets, ASX initiative

- STO=Security Token Offering; ETO=Equity Token Offering

5. Fungible Tokens: ERC-20, Decentraland (MANA), REP

6. Non-fungible Tokens: ERC-721, Dharma debt agreements, Decentraland (LAND)

Where do stablecoins fit in taxonomy?

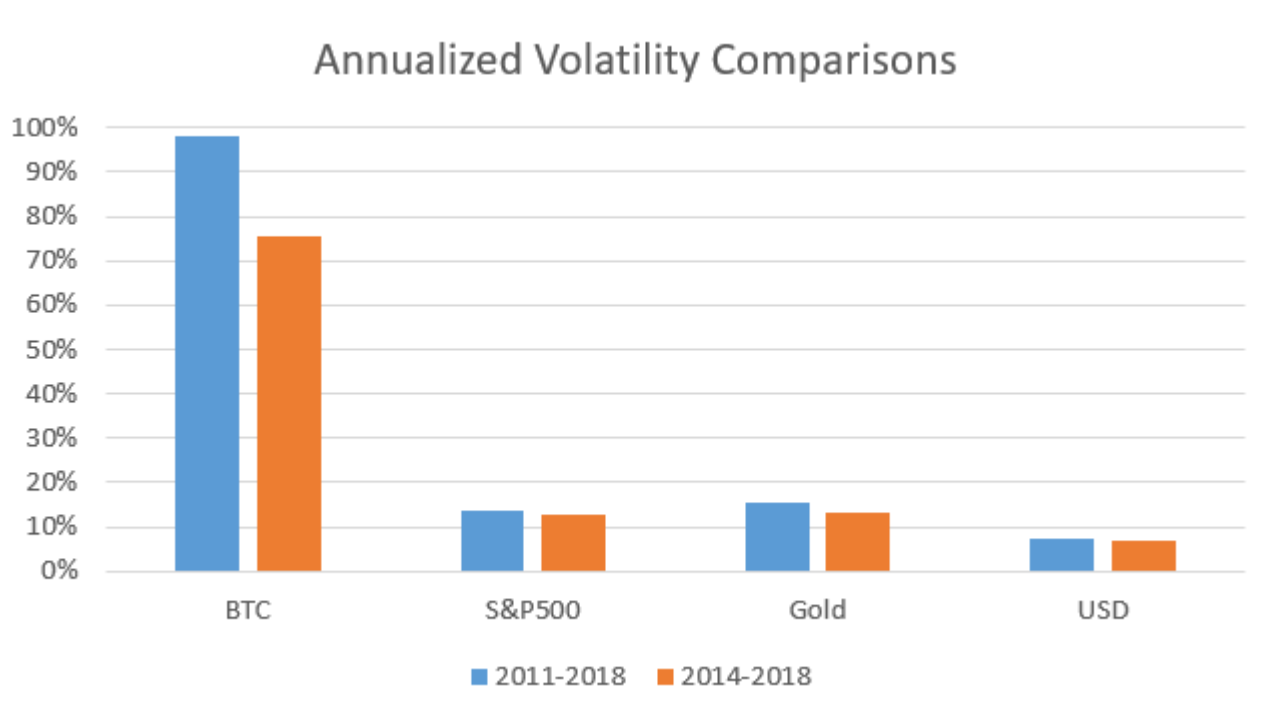
7. Stablecoins:

- Fiat Collateralized: USDT, USDC, TUSD, LBXPeg, JPMcoin, Libra, Amacoin?
- Natural Asset Collateralized: Digix Gold (DGX), Tiberius Coin (TCX), Swiss Real Coin (SRC), D1 Coin
- Crypto Collateralized: Maker DAO's DAI
- Non-Collateralized: Basecoin
- National Cryptofiat: Fedcoin, Petro, Eurocoin, CADCoin,...

Why do we need stablecoins?

Cryptocurrencies are too volatile

- Bitcoin as a transaction method will not be viable until the volatility is decreased. Currently, it fails as a store of value.



	BTC	S&P500	Gold	USD
2011-2018	98.1%	13.7%	15.6%	7.2%
2014-2018	75.6%	12.8%	13.0%	7.0%

Cryptocurrencies are too volatile

- Ripple plunges 56% in intraday trading February 13, 2020



<https://www.bitmex.com/app/trade/XRPUSD>




Stablecoin basics

Five different types

1. Fiat collateralized
2. Real asset collateralized
3. Crypto collateralized
4. Non-collateralized
5. National cryptofiat

Stablecoin basics

1. Fiat-collateralized coins

- Tether is the largest (USDT) also very controversial 
- TrueUSD (TUSD) exchange directly into escrow so TUSD never touches your USD
- LBXPeg tied to sterling; 
- BitCNY 
- Candy backed by Mongolian tugrik
- Sometimes called IOU coins – if there was ever a problem with the collateral, the token holders are owed the fiat.



Stablecoin basics

1. Fiat-collateralized coins

- USDC (Circle) accepted on many exchanges like Poloniex (which Circle owns)
- Paxos Standard (PAX) and Gemini Dollar (GUSD) approved by New York State Department of Financial Services



Stablecoin basics

USD Coin (USDC)



Stablecoin basics

Tether (USDT)



Stablecoin basics

The issuer of a star cryptocurrency is being sued for \$1.4trn

 **Tether (USDT)**

Investors allege that Tether deliberately inflated a mega-bubble



Stablecoin basics

The issuer of a star cryptocurrency is being sued for \$1.4trn

 **Tether** (USDT)

Investors allege that Tether deliberately inflated a mega-bubble



Stablecoin basics

2. Real asset-collateralized coins



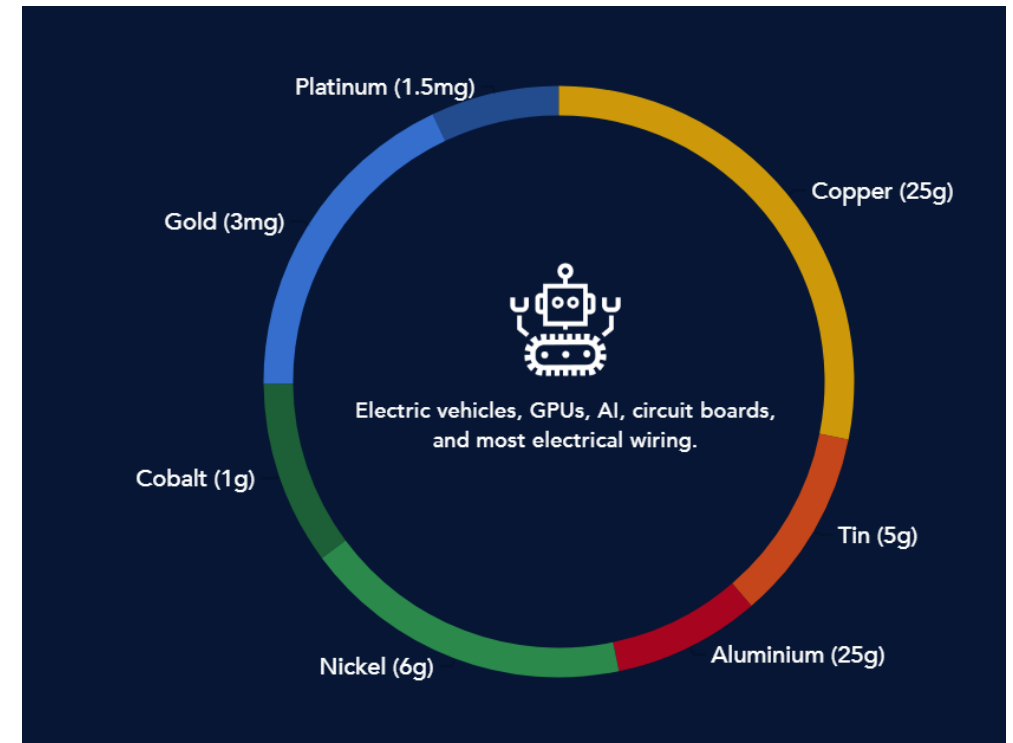
- Digix Gold (DGX) ERC-20 and 1 DGX=1 gram of gold. Gold in vault in Singapore and audited every three months.
 - Can redeem (recast) in physical gold in 100g or 1000g lots. Need to be physically present
 - Procedures fully compliant with AML/CFT regulations set out by the monetary authority of Singapore.
 - Transaction fee of 0.13%
 - Daily Demurrage Fee covers the cost of vault and audit is 0.60% (annualized)

Stablecoin basics



2. Real asset-collateralized coins

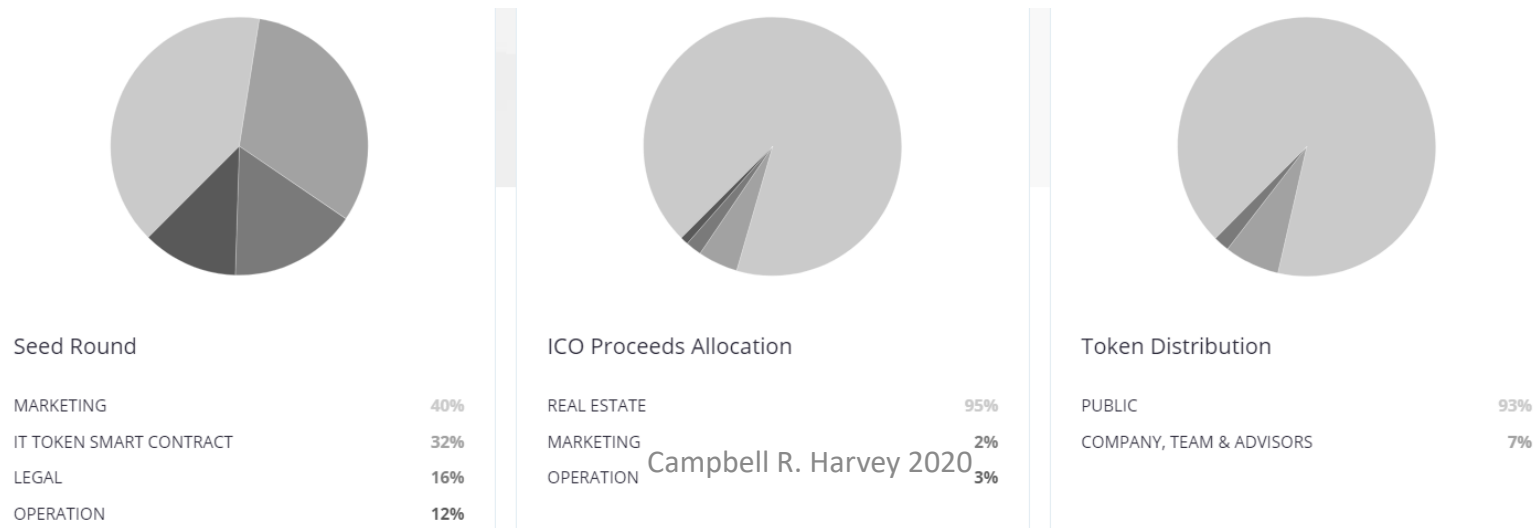
- [Tiberius Coin](#) (TCX) combo of 7 precious metals used in tech hardware
 - Technology Metals: Tin (14%) and copper (23%)
 - Electric Vehicle / EV Metals: Cobalt (10%), nickel (11%), and aluminum (7%).
 - Stability Metals: Gold (17%), palladium (13%), and platinum (6%).
- Fees claimed less than 2% p.a.
- Sale delayed due to credit card companies asking for high fees



Stablecoin basics

2. Real asset-collateralized coins

- [Swiss Real Coin](#) (SRC) backed by portfolio of Swiss real estate. Interesting, the holders vote on the investment choices!
- This is an Security Token Offering (STO) was planned for 2019. Despite considerable interest, project on hold.



Stablecoin basics



2. Real asset-collateralized coins

- [Carats.io](https://carats.io). 14 point quantitative grading/pricing mechanism
- Ethereum ERC-20
- [White paper](#)



Stablecoin basics

3. Crypto-collateralized coins:

- Suppose you own a house and want a home equity loan. The bank gives the loan but you pledge your house as collateral. The collateral is worth more than the loan (over-collateralized).
- If the house drops in value, the loan may be called. If you can't payback, the house is auctioned off.
- This is an example of a *Collateralized Debt Position* or CDP



Stablecoin basics

3. Crypto-collateralized coins:

- Let's do a deeper dive on [MakerDAO's DAI](#)
- It is an ERC-20 token which means it is native to the Ethereum blockchain. The token represents a small amount of ETH but also represents DAI (which has a much higher value)

Stablecoin basics



The Dai Stablecoin System

Whitepaper

<https://makerdao.com/>

By the Maker Team

December 2017

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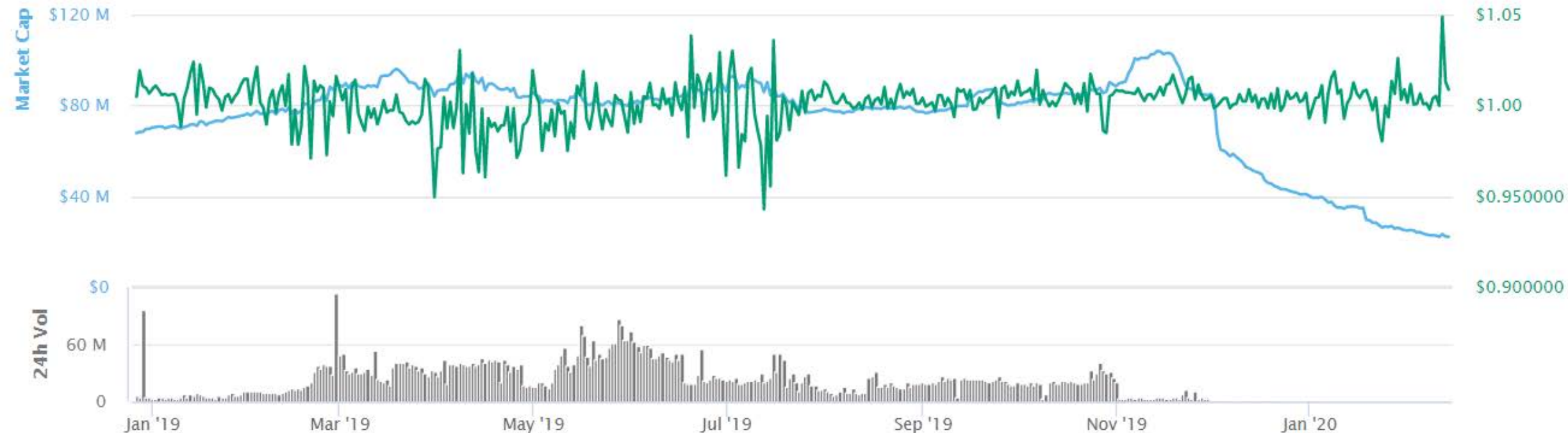


Stablecoin basics

3. Crypto-collateralized coins: MakerDAO

- DAI is a cryptocurrency that has a mechanism that allows it to be pegged to the USD. So $\$1=1$ DAI (approximately)

 **Dai** (DAI)





Stablecoin basics

3. Crypto-collateralized coins: MakerDAO

- Suppose $1 \text{ ETH} = \$100$. In addition, suppose the initial collateral ratio is 1.5 (you must post \$1.50 in collateral for every DAI borrowed)
- You send 1 ETH to a smart contract which allows you to borrow 66 DAI (some rounding). There is also a “stability fee” which is similar to interest.
- As long as $\text{ETH} > \$100$, then the system is secure. However, what happens if ETH drops in value?



Stablecoin basics

3. Crypto-collateralized coins: MakerDAO

- Suppose ETH drops to \$75. In addition, the “maintenance” margin collateralization ratio is 1.25. The drop in ETH triggers the equivalent of a *margin call*.
- If you are close to the maintenance margin, you need to repay by sending 66 DAI to the contract. After doing that, you would be refunded the ETH (about 1 ETH, there is a stability fee)
- If you do not repay and you go below the collateralization ratio, you will be liquidated.



Stablecoin basics

3. Crypto-collateralized coins: MakerDAO

- There is a group called “keepers” that are constantly checking the blockchain for contracts that have fallen below the maintenance margin. They can trigger a liquidation.
- Keepers is a general term for those that maintain a blockchain – they are not specific to MakerDAO



Stablecoin basics

3. Crypto-collateralized coins: MakerDAO

- Now let's consider liquidation. In our contract, there is 1 ETH. These ETH are auctioned off for DAI. To be clear, the trade is selling ETH and buying DAI (which should have a positive price impact on DAI)
 - The auction is looking to sell enough ETH to obtain 66 DAI
 - Price of ETH is \$75. Usually, this would cost 0.88 ETH (66/75).
 - However, in the auction you might need to pay more than 0.88 ETH (which means the price of DAI increases relative to ETH)



Stablecoin basics

3. Crypto-collateralized coins: MakerDAO

- After the 66 DAI are purchased in the open market and returned to the CDP (which is just a smart contract), the residual is paid back to the borrower. Suppose the DAI are bought in auction for 0.90 ETH. This means that 0.1 ETH is returned to you. So you have 66 DAI and 0.1 ETH. You could also sell the 66 DAI for ETH and you would end up with approximately 1 ETH (where you started).
- Note, the 66 DAI are destroyed (reducing the supply of DAI)
- The stability mechanism works the other way too – if DAI increases above the peg, then the collateralization ratio is changed. Who changes the collateralization ratio?



Stablecoin basics

3. Crypto-collateralized coins: MakerDAO

- There is much more to the system than my explanation
- The maker token (MKR) holders determine the collateralization rates and they regulate the system (and get paid for it)
- However, MKR are the buyers of last resort – if there was ever a situation where there was not enough collateral to cover the DAI, MKR is created and sold to cover the residual
- MKR holders are, hence, strongly incented to responsibly regulate.



Stablecoin basics

3. Crypto-collateralized coins: MakerDAO

- There is also a fail safe called Global Settlement
- If the system under attack, a Global Settlement is triggered where you can exchange the DAI directly for ETH through a smart contract and collateral will be released to the owners



Stablecoin basics

3. Crypto-collateralized coins: MakerDAO

- DAI also allows for leveraged ETH positions
- Suppose you have 1 ETH = \$100 and you enter into a CDP and get 66 DAI.
- You use DAI to buy more ETH (0.66 ETH). [Assume do this only once.]
- Now you profit (or lose) with leverage.
- Suppose price rises, e.g., ETH=\$200
 - You would usually have profited by \$100 or 100% return
 - You have 1.66 ETH which is worth \$332. You buy 66 DAI for \$66 and repay the CDP leaving you with \$266 (a profit of 166%)



Stablecoin basics


3. Crypto-collateralized coins: MakerDAO

- At the beginning, the system allows for only one type of collateral: ETH
- They have generalized to other ERC-20 or ERC-721 tokens
- This opens a range of interesting ideas. For example, you might have an ERC-20 that represents an investment in a diversified portfolio of stocks and bonds. Essentially, almost any collateral (as long as it is tokenized) can be pledged.



Stablecoin basics

3. Crypto-collateralized coins: MakerDAO

- DAI is a cryptocurrency that has a mechanism that allows it to be pegged to the USD. So $\$1=1$ DAI (approximately).  **Dai (DAI)**



Stablecoin basics

4. Non-collateralized coins: [Basis](#), [Kowala](#), [Fragment/Ampleforth](#)

- Common feature: a dynamic monetary policy to target a particular exchange rate (much like Central Banks attempt)
- For example, the Swiss National Bank was worried about CHF appreciating. They tried to peg to Euro.
 - Wednesday January 14, 1.2 CHF= 1 Euro
 - Thursday January 15, 0.85 CHF = 1 Euro



Stablecoin basics

4. Non-collateralized coins

Common stability mechanisms:

- Dynamic monetary supply
- Stability fees (allows money supply to contract)
- Reliance on arbitrage

Stablecoin basics

5. National cryptofiat



A total of 63 banks have responded. They represent jurisdictions, which cover about 80 percent of the population of the world and more than 90 percent of its entire economic output.

Stablecoin basics

5. National cryptofiat

IMF Predicts Central Banks to Issue Digital Currencies

“...**[1]** the falling use of cash is motivating the study of CBDC as an alternative, robust, and convenient payment method, as well as the potential to have **[2]** negative interest rates. The CBDC could also facilitate contestability of the payment market and **[3]** reduce the chances of a few large providers dominating the system. In developing countries, the focus is more on **[4]** improving operational and cost efficiency. In some countries with underdeveloped financial systems and many unbanked citizens, the CBDC is seen as means to **[5]** improve financial inclusion and support digitalization. Other reasons for considering CBDC include **[6]** enhancing financial integrity. A nonanonymous CBDC could facilitate the monitoring of transactions.”

Stablecoin basics

5. National cryptofiat

- Just a matter of time.
- Paper currency is not the future.

Need:

- Everyone with a smart phone
- Everyone with Internet

Stablecoin basics

FORTUNE

Why China's digital currency is a 'wake-up call' for the US



Why China's digital currency is a 'wake-up call' for the US

Stablecoin basics



LIVE TV



Chinese investors told to 'stay rational' after Xi Jinping's blockchain embrace



Stablecoin basics

FORTUNE

Why China's digital currency is a 'wake-up call' for the US



 CNBC



MARKETS

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CNBC TV

China's new digital currency could encourage worldwide use of the yuan

Conclusions

- Cryptocurrencies are much more diverse than bitcoin
- First generation of cryptocurrencies have failed to be a prudent store of value given extreme volatility
- Stablecoins solve the volatility problem
- Potentially millions of organizations will issue stablecoins

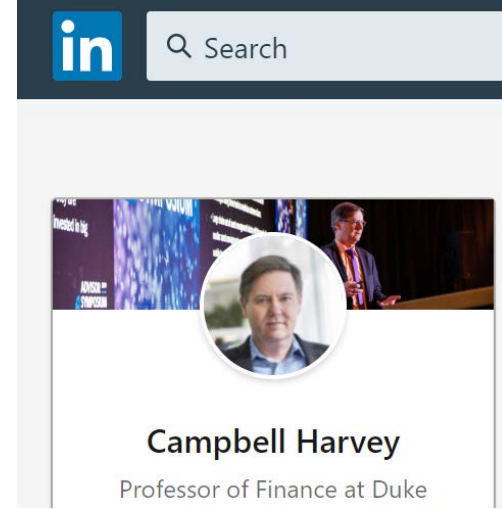
Future work

Forthcoming...

#DeFi: The World of Decentralized Finance

Campbell R. Harvey

Contact – Follow me on LinkedIn!



cam.harvey@duke.edu

@camharvey

<http://linkedin.com/in/camharvey>

SSRN: <http://ssrn.com/author=16198>

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