

Paper 1: Currency Volatility Explained

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Executive Summary

Does FinTech help with central bank planning? What about international business?

We have heard that payment systems are changing with the use of digital currencies such as stablecoins and cryptocurrency or is this just a fad? Will the system we know as money receive an upgrade, revolutionize the way we conduct business and lead our daily lives or merely additional outlets for speculation.

This paper addresses each question and our findings show stable coins, a form of digital currency has less volatility than most of the G20 currencies against the USD. Value can be transferred with less volatility, thus stablecoins can be used to facilitate business. This paves a realistic way to reduce the risk of doing international business which requires payment to suppliers and receiving money from customers.

We conclude that using virtual currencies is possible today and has been for the past 5 years.

The audience of this paper are retail investors, casual foreign exchange traders who care about 1% moves in currency because they place limited capital into the market. It is also for technologists who want to understand the potential for digital currencies with deeper insight to the relationship with fiat currencies.

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Looking towards the future, worldwide acceptance of digital assets is poised to grow because its capabilities are coming into use and in comparison with some physical assets are more fungible and mobile which is important in a world with more crises than ever before. Eleven years ago, Bitcoin was created, and this first success story of an alternative system of value built on top of blockchain technology spawned whole new systems based on decentralized trust. We now have additional ways to pay for goods and services and a new class of financial derivatives to trade.

A store of value built on top of cryptography is nothing new - banks themselves have been using data tapes and big mainframe computers since the 50s and 60s to digitally store a customer's data and records of how much money one has with the bank. So the concept of digital money is not new, but for once in a millenia, there are competitors in the financial industry imbued with the ability to issue alternative currencies, attempting to challenge the dominance of banks of the global financial system.

The most efficient and universal system of mutual trust ever formulated is money. Conventional economics textbooks have defined money as (1) a medium of exchange, (2) a store of value, and (3) a standard of value.

Thus, the system of money has to accomplish 4 things:

1. Stable
2. Valuable
3. Trackable
4. Trustable

1) Money's value has to be as stable as possible over a period (minimal volatility)

Empirical evidence from [Baldwin, Skudelny and Taglioni \(2005\)](#) discovered that 'the effect of exchange rate uncertainty is negative in the European Union. As volatility decreases and approaches zero there are marginal increases in trade and robust positive changes in business activities.

2) Money's value should deflate as little as possible over a period (minimal devaluation/inflation).

Research from the [IMF in 1984](#) on G7 countries also shows that inflation is induced by volatility, which brings a host of economic problems. Empirically, inflation has no relationship to economic growth and thus brings no benefits.

'We find the conventional wisdom to be consistent—consistently wrong, that is. We find no evidence of any relationship between inflation and growth at annual inflation rates less than 40 percent—our definition of high inflation. We do find a short- to medium-run relationship between high inflations and growth, but it is a negative relationship. And we find there is no lasting damage to growth from discrete high inflation crises, as countries tend to recover back toward their pre-crisis growth rate.' ([M Bruno, W Easterly - Federal reserve Bank of st. louis Review, 1996](#))

3) A ledger or its equivalent should be employed to keep track of the flow of money for accountability purposes, defined as "money-of-account". (Keynes 1930; Knapp 1924)

4) Money needs to be trusted by everyone as general legal tender, which is seen in 'fiat currency' as governments and central banks proclaim them as legal tender.

According to the European Common Bank (ECB), Bitcoin and other digital assets are "*a kind of unregulated digital money, which is subscribed and usually controlled by their developers, and used and accepted by the specific virtual community*" ([ECB, Virtual Currency Schemes, October 2012, p. 13](#)), '*and belongs into the category of virtual currency schemes with bidirectional flow.*' ([Max Kubát / Procedia Economics and Finance 30 \(2015 \) 409 – 416](#)), *as legal tender can be exchanged for bitcoin and vice versa, and can be used to purchase goods and services in the real economy* (ECB, Virtual Currency Schemes, October 2012, p. 14).

Although cryptocurrency's reputation may not meet the "Trustable" criteria in professional or political circles, we argue that a monetary unit chosen as a value measure need not be always used extensively. As an example, in America during the colonial period, the British pound represented the standard of value, while the then currently accepted medium of exchange was the Spanish currency. By this rationale, as long as there is a standard of value pegged to a widely accepted standard (as is the case with stablecoins pegged to the US Dollar), it does locally function as currency within a system, has a value that is accepted within its users and can facilitate the movement of goods and services, and thus functions as a subset of money.

'The problem of the "right" definition of money is, in this sense, fundamentally empirical.'
(David Laidler, The Definition of Money, Aug 1969)

With the advent of the internet, the concept of money can be easily digitized, hence digital currencies. Besides fulfilling the above prerequisites, we also propose that the definition of digital currencies have to fulfill a fifth criteria:

5)The capability to rapidly transfer value between parties at low costs to facilitate faster business transactions in a direct manner. ([Farrell, 2015, An Analysis of the Cryptocurrency Industry](#))

Business transactions today are conducted in a roundabout manner - slow, inefficient and bureaucratic. To get an international transaction across, multiple details which the sender does not care about have to be input, such as the IBAN code for banks, the bank account numbers, branch codes..., and due to the inefficiencies of the systems, a transaction sent after a certain time will have to wait until the next business day.

We can make transportation systems efficient, build tall skyscrapers, have almost all people adopt mobile phones, but have yet to make transporting value - as old as our existence - efficient.

Digital payment systems can be built atop mobile platforms - only 3 things are required to wire transactions - the receiver's details, amount of money, and a confirmation 'tap', bypassing all cumbersome processes.

The act of enabling value to be transported around the globe in the blink of an eye enables businesses to do business anytime, anywhere, and this is extremely disruptive.

Can you imagine a world where invoices are processed in a matter of hours instead of days, weeks or even months, delighting businesses by eliminating bad debt? What about consistently giving paychecks the minute it hits 12A.M the first of every month to delight employees? Low payment fees to conduct international business, low currency volatilities and the associated risk from holding foreign currency?

The possibilities delight endlessly!

In this paper, we shall examine the ability of individual fiat and digital currencies to serve as a medium of exchange. This is the first of a three-part series that examines the various forms of currency in our financial system from the aspect of volatility, valuation, transactional risk, as well as investigating the significance of digital assets in our financial system. We will start with a review of fiat currencies.

Today, there are 164 currencies in the world. The full list of currencies that exist globally are available in table 4 in the appendix (source: <https://www.countries-ofthe-world.com/world-currencies.html>), which represent the ability to facilitate business throughout the world.

Focusing on the G20 Fiat Currencies

The Group of Twenty, or the G20, is the premier forum for international economic cooperation. The G20 brings together the leaders of both developed and developing countries from every continent.

Collectively, G20 members represent around 80% of the world's economic output, two-thirds of global population and three-quarters of international trade. Throughout the year, representatives from G20 countries gather to discuss financial and socioeconomic issues.

(source: <https://g20.org/en/about/Pages/Participants.aspx>)

The G20 members are Argentina, Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Italy, Japan, Mexico, Russia, Saudi Arabia, South Africa, Republic of Korea, Turkey, the United Kingdom, the United States and the European Union (EU).

There are 17 fiat currencies amongst the G20 countries, but only 16 fiat pairs because fiat currency of other countries are benchmarked against the US Dollar.

The individual currencies include:

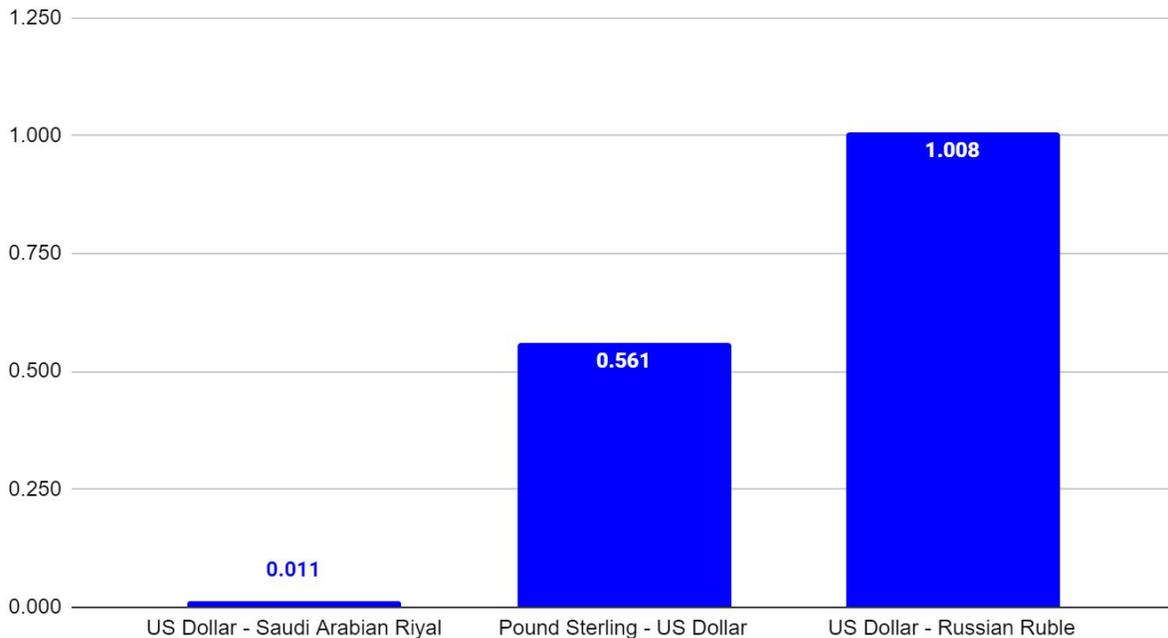
the Argentine Peso (USDARS), Australian Dollar (AUDUSD), Brazilian Real (USDBRL), Canadian Dollar (USDCAD), Chinese Yuan (USDCNY), Euro (EURUSD), Indian Rupee (USDINR), Indonesian Rupiah (USDIDR), Japanese Yen (USDJPY), Mexican Peso (USDMXN), Russian Ruble (USDRUB), Saudi Arabian Riyal (USDSAR), South African Rand (USDZAR), South Korean Won (USDKRW), Turkish Lira (USDTRY) and the Pound Sterling(GBPUSD).

The G20 countries use strong management to trade within a range to to the dollar are:

Argentina, Australia, Brazil, Canada, China, Germany, France, India, Indonesia, Italy, Japan, Mexico, Russia, Saudi Arabia, South Africa, South Korea, Turkey, the United Kingdom.

Considering the concepts of money presented above, one of the key qualities to determine its usefulness to a country's economy is its volatility. We looked at all the USD currency pairs in the G20 to see which may be the best forms of money and which may present a challenge to doing business or safely digitizing. In the chart below, we show the G20 USD currency pairs that represent are at the minimum, median and maximum volatility.

G20 Fiat currencies' averaged volatility % (30 day period)



Data source: investing.com, WallStreetJournal (September 2014 to January 2020)

The Saudi Arabian Riyal has the least volatility against the US Dollar and meets the requirements for fast stable business. In the middle of the G20 currencies is the Pound Sterling which indicates UK and US have decoupled their currency and their economies over the years. The Russian Ruble is at the end of the G20 currencies and the most volatile which may be indicative of the least linked economic fundamentals between the two countries.

Collectively, G20 members represent around 80% of the world's economic output, two-thirds of global population and three-quarters of international trade. (source: G20 website) Thus, these currency pairs would undoubtedly have more liquidity and be of significant economic trade ties and thus serve as strong indicators of how trade is pictured in the global economy.

With this we have a range of volatility to evaluate fiat against digital currencies. Considering the economists perspective, the USD/SAR could be the most useful trade, but it may be difficult to conduct business purely in this pair due to central bank restrictions in both countries. Any central bank controlled currency can be recalled or managed by its sovereign. Looking next at digital currencies more options could be available as money and add the characteristics of digital which mean facilitating transactions globally at a lower cost and faster speed which delights the world!

Introducing Digital Currencies

Digital currencies are defined by ([Barrdear and M Kumhof - 2016](#)) as ‘any electronic form of money, or medium of exchange, that features a distributed ledger and a decentralised payment system’.

We shall first examine the types of digital currency that exist in our financial system.

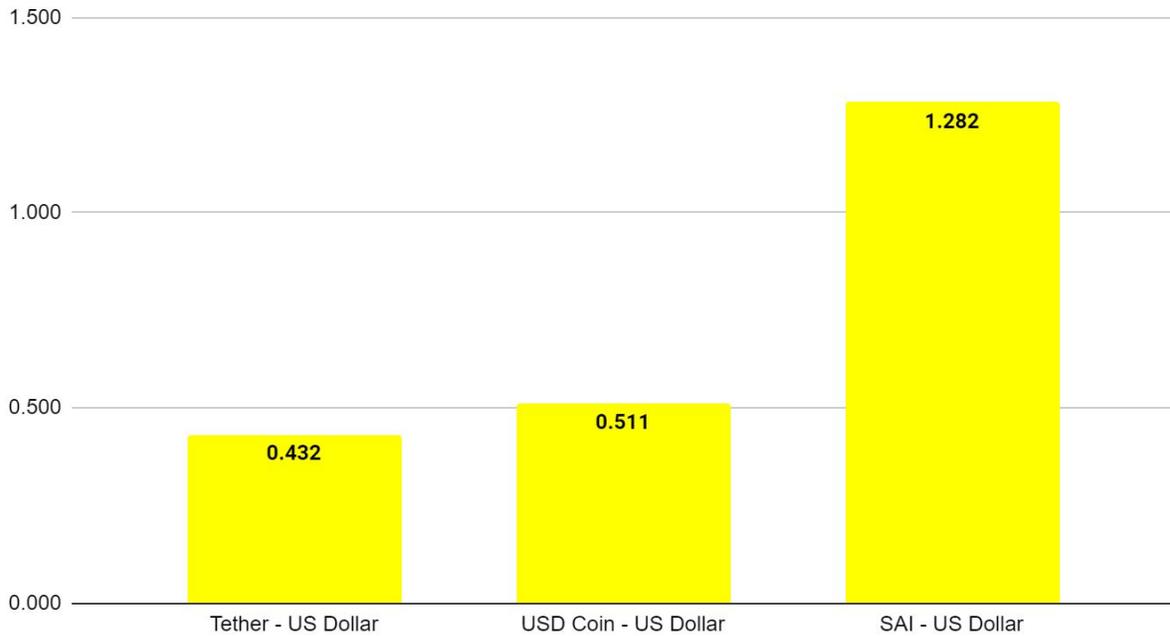
Digital Currency	Traits
Central bank digital currencies	Issued by central banks, well regulated, trusted, value directly pegged to fiat currency, runs on ¹ private blockchains.
Cryptocurrencies classified as Stable coins	Stablecoins are cryptocurrency technology based money that is economic theory backed and enables pure digital transfer of value. Issued by third parties, directly pegged to fiat currency, assurance provided by bank deposits to value of coins issued in the ecosystem, external auditors audit bank deposit value.
Cryptocurrencies	Issued by third parties, value hard to correlate and hard to compute, price floats based on supply and demand.

Table 1: Types of digital currencies

Currencies that serve as good mediums of exchange should have values that are minimally volatile for as long as possible. Now, let us examine the volatilities of fiat currencies versus a subset of digital currencies known as stablecoins.

1

Stablecoins' averaged volatility % (30 day period)



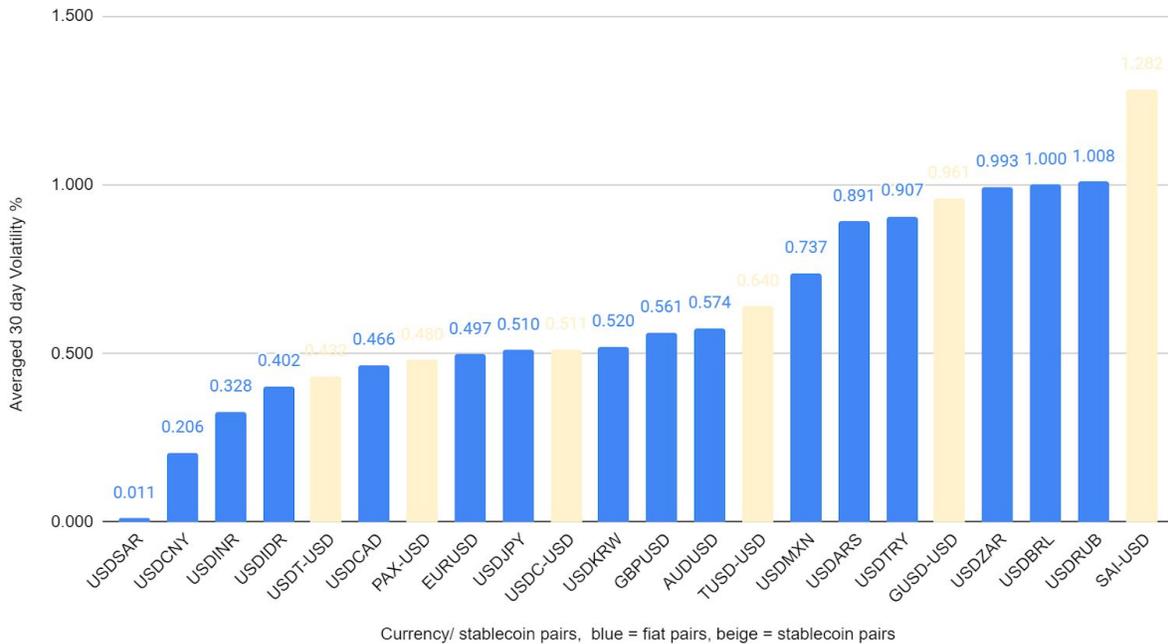
Data source: Coinmarketcap (September 2014 to January 2020)

There are 6 major stablecoins that are used in the cryptocurrency space that are pegged to the US Dollar. In order of increasing volatility,

Less volatile than the USD Coin against the US Dollar	More volatile than the USD Coin against the US Dollar
Tether, Paxos	TrueUSD, Gemini Dollar, SAI

Comparing paper based fiat with stable coins below is a chart of all the G20 fiat currencies and stablecoins' averaged volatilities.

Averaged 30 day volatility of G20 fiat currencies and stablecoins (in percentages)

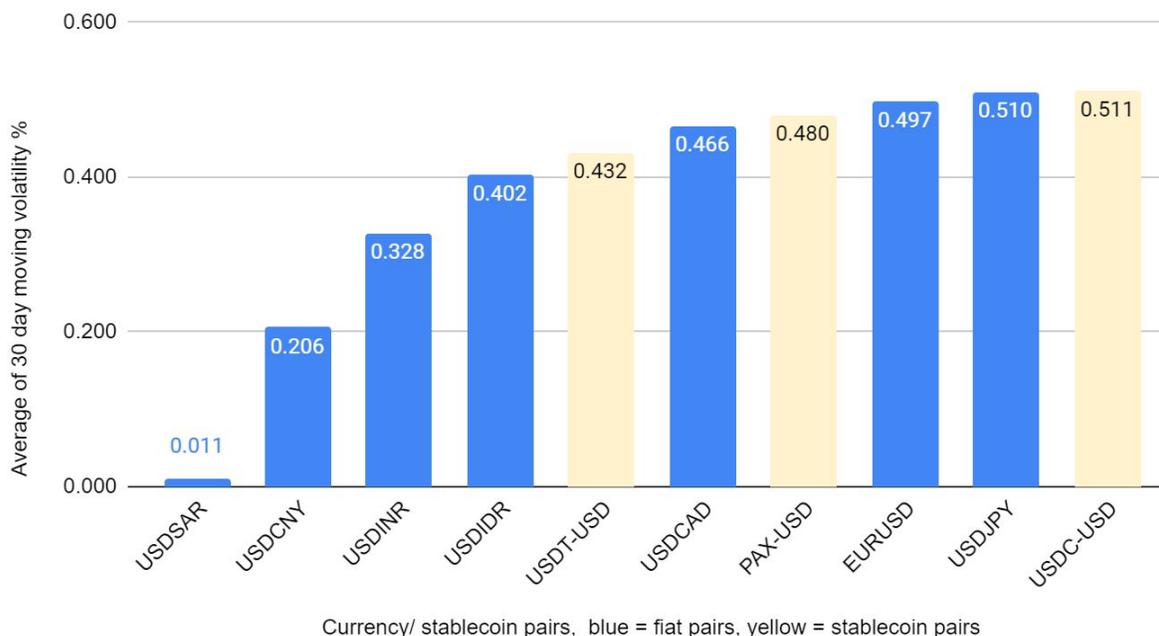


Data source: Coinmarketcap, investing.com, WallStreetJournal (September 2014 to January 2020)

The top 5 most stable currencies include the Saudi Arabian Riyal, Chinese Yuan, Indian Rupee, Indonesian Rupiah and a stable coin, USDT. A digital currency is more stable than 15 of the G20 currencies. The least volatile fiat currencies have in common a different combination of the following factors: these nations are top trading partners with the United States, have good governance to maintain a welcoming environment for foreign direct investments, a central bank that is focused on maintaining currency stability, produces the United States most commonly imported goods (oil, machinery, vehicles, electronic components).

Going deeper we can see in the next chart that 3 stable coins are in the top 10 most stable G20 currencies. These are feasible for global trade with hedging because a company is not locked in to just one digital currency.

Top 10 G20 fiat currency and stablecoins with the lowest volatility %



Putting together a chart of the top 10 most stable G20 currencies and stablecoins, We can observe that there are at least 3 stablecoin pairs that are more stable than half of the G20 fiat currency pairings, and provides a strong basis to conclude that stablecoins are as stable as fiat currency.

We do note that aside from the G20 countries, there are other countries with very low volatilities such as the Qatari Riyal and the Hong Kong Dollar. However, the G20 is used as the benchmark in this study as a range indicator of individual currencies' volatility around the world.

In the next paper, we will examine the importance of having cryptocurrency stablecoins that are low in volatility for use in international business. Previously we highlighted volatility is negatively correlated to business activities. We can use a supply chain example to make this more clear.

Baldwin, Skudelny and Taglioni (2005) obtained empirical evidence of trade data between 12 European nations that indicate that the mere creation of a European Monetary Union would increase trade by 70-112% according to the regression pooled both by country and industry, and by 21-108% when allowing for sector specific coefficients (taking into account only significant estimates).

They also discovered that 'the effect of exchange rate uncertainty is negative in the European

Union, significant and robust to changes, and the marginal increase in trade as volatility falls gets progressively larger as volatility approaches zero.'

Here, we again propose that a monetary union between nations, is no different than one formed by agreements between trade and business partners to adopt and use the same currency. Speaking theoretically, within a closed system of any size that encompasses all actors involved in trade, trade can be facilitated which significantly increases the multiplier effect of an economy if invoices in be issued and closed within a matter of hours, instead of days, weeks or even months!

Because stablecoins are directly pegged to a fiat currency, it can then be cashed out into the global fiat based economy for an equivalent exchange, should there be a need to do so.

Stablecoins fulfill the purpose of fast transactions of currency, and would indeed reduce the currency volatility between international trade. However, they are not governed directly by central banks, and it is unlikely that the global financial system would accept stablecoins as the de facto medium of exchange as they are not legal, and not issued by any authority by any jurisdiction.

This sets the tone for central bank digital currencies, which would ideally function like stablecoins, pegged one to one to fiat currency, have all the features of stablecoins, and are also legal tender, as they are issued by a central bank.

However, this brings us to the next question: should all countries launch their own central bank digital currency?

There are pros and cons and a prerequisite:

The prerequisite:

Digitizing a stable underlying currency, because a central bank digital currency is pegged to the fiat currency issued by a central bank. If the currency is already volatile, as demonstrated by the Venezuelan Bolivar which experienced hyperinflation, there is no difference from holding an inflationary currency vs. a digital inflationary currency. The risks and related costs of international trade would still hamper economic growth. The nation would be better off adopting a stablecoin to be digital or fixing the core issue by using a lower volatility fiat currencies as a medium of exchange such as the Chinese Yuan or Indian Rupee.

Let's look at the Indonesian Rupiah as a candidate for the basis of creating a central bank digital currency:

Amongst the G20 fiat currencies, the Indonesian Rupiah has the fourth most stable volatility amongst all G20 fiat currencies over a 5 year period, beating conventionally stable currencies such as the British Pound, Australian Dollar and Canadian Dollar. Coupled with an unbanked population of (51% of Indonesia's 270 million people), and having a [Futures Exchange Supervisory Board \(Bappebti\) announcing new regulations on the implementation of physical markets for crypto assets in futures trading in 2019](#). Research from Deloitte shows that [Digital Finance Services \(DFS\) is the next big thing in Indonesia](#), and thus lawmakers should capitalize on creating a central bank digital currency to regulate the digital assets industry, as well as pave the way for internet, mobile penetration leading to a significantly lower unbanked population. The blend of factors could not be better for Indonesia at this very period, as there is a stable fiat currency acting as the base to bank a large unbanked population, as well as to regulate the digital assets industry which Indonesians are extremely fond of.

Pros:

- more data availability for national policy planning, economic planning and perfect taxation
- new payment options that reduce costs and speed

Cons:

- new operational risk to the central bank: cybersecurity
- new infrastructure needed to use digital currency for retail payments
- risk of not being adopted by the population or businesses

We will further examine these factors in a subsequent paper.

Conclusion

Stablecoins have proven to be as minimally volatile as USD / G20 currency pairings, and prove to be excellent stores of temporal value which facilitates trade.

International business can leverage the new technology of virtual currency to make payments, store value, and move value at the speed business needs, no longer encumbered by the slower paced legacy providers. What about the fiat currencies that show greater volatility? The central banks may want to consider that volatility is more important than digitization and should consider carefully whether a central bank digital currency would open the country up to more problems and leave the current issues unsolved.

There is a potentially simpler approach for a nation’s central banks to reduce volatility and enable more efficient trade. They could decide to either peg their currency to the USD or leave their currency and use a less volatile fiat currency, such as in order of volatility to the US Dollar, Saudi Arabian Riyal, Indian Rupee, Indonesian Rupiah, USDT (stable coin), Pound Sterling, the Euro.

For reference here is a chart of the countries that use more stable G20 currencies instead of issuing their own:

Table 2: List of countries that adopt the US Dollar, Euro or British Pound as the de facto currency.

US Dollar	United States of America, Commonwealth of Puerto Rico, Ecuador, Republic of El Salvador, Guam, the US Virgin Islands, the Democratic Republic of Timor-Leste, American Samoa, the Commonwealth of the Northern Mariana Islands, Federated States of Micronesia, Republic of Palau and the Marshall Islands
Euro	Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Portugal, Slovakia,

	<p>Slovenia and Spain</p> <p>Akrotiri and Dhekelia, Andorra, Clipperton Island , French Southern and Antarctic Lands, Monaco, Saint Barthelemy, Saint Martin, Saint Pierre and Miquelon, San Marino, Vatican City, Kosovo, Montenegro</p>
British Pound/ Sterling	<p>Great Britain, British Overseas Territories, the South Sandwich Islands, the British Antarctic Territory, Tristan de Cunha</p>

Appendix

Methodology

The data source that we have used is from investing.com, which obtains data from market makers. Although this is slightly different from direct spot market trading sources such as banks and trading platforms, we decided to use this set of data because:

- i) There is minimal deviation (a maximum deviation of $\pm 0.1 - 0.2\%$) from the daily data set, as well as the fact that arbitrage exists due to the slight difference in pricing which allows for perfect trading opportunities, thus it is natural that different sources have minimal natural deviation for price benchmarking.
- ii) The cost of obtaining 'perfect data' from banks or trading platforms directly instead of intermediaries does not justify the purchase of such data sets for the use of this paper. Thus, we settle with reasonably accurate estimates of spot market data from investing.com and other websites that either use mid market rates or market makers' datasets.

The data for cryptocurrencies (Bitcoin, Ethereum, Ripple, Bitcoin Cash, Litecoin, EOS, Binance Coin, Bitcoin SV) and stablecoins (Tether, TrueUSD, Paxos, SAI, Gemini Dollar, CircleUSD) were obtained from Coinmarketcap from September 2014 to early January 2020, while the data for G20 countries' fiat to USD pairings were obtained from Investing.com between the same period.

Each periodic daily return was calculated by obtaining the closing price of 2 consecutive days, after which a standard deviation formula took the periodic daily returns of 30 consecutive days which gave the 30 day moving volatility value of a currency.

The number of data points for each fiat currency and stablecoin pair are as below:

Table 3: Fiat currency and stablecoins' datapoint documentation

Fiat Pairs	Total number of data points	30 day standard deviation points	Data source	Rationale for deviation
GBPUSD, EURUSD, USDCAD, USDJPY, USDARS, AUDUSD, USDBRL, USDCNY,	1384	1354	Investing.com	NA - Standard stock market trading data, 5 days/ week.

USDINR, USDMXN,USDZAR, USDSAR,,USDKRW, USDTRY				
USDIDR	1384	1354	WallStreetJournal	Different source, investing.com had insufficient data (only starting from mid-2016)
USDSAR	1481	1451	investing.com	The data set reflects that from September 20, 2014 to July 04, 2015, and again from December 22, 2018 to Jan 04, 2020, Saturdays are trading days in Saudi Arabia. The Saudi Stock Exchange is open on weekends. Stock Exchanges in America, Europe, and Asia follow the typical Monday to Friday schedule. However, in the Middle East the work week typically runs from Sunday through Thursday, thus there are extra days of trading data.
USDRUB	1352	1322	investing.com	Russian holidays such as Victory Day (11 May), Orthodox Christmas Day (7 Jan) are usually not celebrated in other parts of the world, and exchanges are closed on these days when other markets are open, thus over 5

				years this accounts for about 30+ less trading days than most markets.
Stablecoins	Total dataset points	30 day standard deviation points	Source	First data point date
Tether (USDT)	1773	1743	Coinmarketcap	Feb 25- 26, 2015* consistent from March 02, 2015 onwards
TrueUSD(TUSD)	673	643	Coinmarketcap	March 06, 2018
SAI	742	712	Coinmarketcap	December 27, 2017
Paxos(PAX)	468	438	Coinmarketcap	September 27, 2018
Gemini Dollar(GUSD)	459	429	Coinmarketcap	October 06, 2018
USD Coin (USDC/Circle)	457	427	Coinmarketcap	October 08, 2018

*Due to a lack of trading volume when it kicked off

The entire data set is uploaded at:

https://drive.google.com/file/d/1OSDsyXcPPWjufdKYBT1yyVqC_4TZ8ZrV/view?usp=sharing

Table 4: Currencies of the world

A		
Afghanistan	Afghan afghani	AFN
Akrotiri and Dhekelia (UK)	European euro	EUR
Aland Islands (Finland)	European euro	EUR
Albania	Albanian lek	ALL
Algeria	Algerian dinar	DZD

American Samoa <i>(USA)</i>	United States dollar	USD
Andorra	European euro	EUR
Angola	Angolan kwanza	AOA
Anguilla <i>(UK)</i>	East Caribbean dollar	XCD
Antigua and Barbuda	East Caribbean dollar	XCD
Argentina	Argentine peso	ARS
Armenia	Armenian dram	AMD
Aruba <i>(Netherlands)</i>	Aruban florin	AWG
Ascension Island <i>(UK)</i>	Saint Helena pound	SHP
Australia	Australian dollar	AUD
Austria	European euro	EUR
Azerbaijan	Azerbaijan manat	AZN
B		
Bahamas	Bahamian dollar	BSD
Bahrain	Bahraini dinar	BHD
Bangladesh	Bangladeshi taka	BDT
Barbados	Barbadian dollar	BBD
Belarus	Belarusian ruble	BYN
Belgium	European euro	EUR
Belize	Belize dollar	BZD
Benin	West African CFA franc	XOF
Bermuda <i>(UK)</i>	Bermudian dollar	BMD

Bhutan	Bhutanese ngultrum	BTN
Bolivia	Bolivian boliviano	BOB
Bonaire <i>(Netherlands)</i>	United States dollar	USD
Bosnia and Herzegovina	Bosnia and Herzegovina convertible mark	BAM
Botswana	Botswana pula	BWP
Brazil	Brazilian real	BRL
British Indian Ocean Territory <i>(UK)</i>	United States dollar	USD
British Virgin Islands <i>(UK)</i>	United States dollar	USD
Brunei	Brunei dollar	BND
Bulgaria	Bulgarian lev	BGN
Burkina Faso	West African CFA franc	XOF
Burundi	Burundi franc	BIF
C		
Cabo Verde	Cape Verdean escudo	CVE
Cambodia	Cambodian riel	KHR
Cameroon	Central African CFA franc	XAF
Canada	Canadian dollar	CAD
Caribbean Netherlands <i>(Netherlands)</i>	United States dollar	USD
Cayman Islands <i>(UK)</i>	Cayman Islands dollar	KYD
Central African Republic	Central African CFA franc	XAF
Chad	Central African CFA franc	XAF
Chatham Islands <i>(New Zealand)</i>	New Zealand dollar	NZD

Chile	Chilean peso	CLP
China	Chinese Yuan Renminbi	CNY
Christmas Island (<i>Australia</i>)	Australian dollar	AUD
Cocos (Keeling) Islands (<i>Australia</i>)	Australian dollar	AUD
Colombia	Colombian peso	COP
Comoros	Comorian franc	KMF
Congo, Democratic Republic of the	Congolese franc	CDF
Congo, Republic of the	Central African CFA franc	XAF
Cook Islands (<i>New Zealand</i>)	Cook Islands dollar	none
Costa Rica	Costa Rican colon	CRC
Côte d'Ivoire	West African CFA franc	XOF
Croatia	Croatian kuna	HRK
Cuba	Cuban peso	CUP
Curacao (<i>Netherlands</i>)	Netherlands Antillean guilder	ANG
Cyprus	European euro	EUR
Czechia	Czech koruna	CZK
D		
Denmark	Danish krone	DKK
Djibouti	Djiboutian franc	DJF
Dominica	East Caribbean dollar	XCD
Dominican Republic	Dominican peso	DOP

E		
Ecuador	United States dollar	USD
Egypt	Egyptian pound	EGP
El Salvador	United States dollar	USD
Equatorial Guinea	Central African CFA franc	XAF
Eritrea	Eritrean nakfa	ERN
Estonia	European euro	EUR
Eswatini (formerly Swaziland)	Swazi lilangeni	SZL
Ethiopia	Ethiopian birr	ETB
F		
Falkland Islands (<i>UK</i>)	Falkland Islands pound	FKP
Faroe Islands (<i>Denmark</i>)	Faroese krona	none
Fiji	Fijian dollar	FJD
Finland	European euro	EUR
France	European euro	EUR
French Guiana (<i>France</i>)	European euro	EUR
French Polynesia (<i>France</i>)	CFP franc	XPF
G		
Gabon	Central African CFA franc	XAF
Gambia	Gambian dalasi	GMD
Georgia	Georgian lari	GEL

Germany	European euro	EUR
Ghana	Ghanaian cedi	GHS
Gibraltar <i>(UK)</i>	Gibraltar pound	GIP
Greece	European euro	EUR
Greenland <i>(Denmark)</i>	Danish krone	DKK
Grenada	East Caribbean dollar	XCD
Guadeloupe <i>(France)</i>	European euro	EUR
Guam <i>(USA)</i>	United States dollar	USD
Guatemala	Guatemalan quetzal	GTQ
Guernsey <i>(UK)</i>	Guernsey Pound	GGP
Guinea	Guinean franc	GNF
Guinea-Bissau	West African CFA franc	XOF
Guyana	Guyanese dollar	GYD
H		
Haiti	Haitian gourde	HTG
Honduras	Honduran lempira	HNL
Hong Kong <i>(China)</i>	Hong Kong dollar	HKD
Hungary	Hungarian forint	HUF
I		
Iceland	Icelandic krona	ISK
India	Indian rupee	INR

Indonesia	Indonesian rupiah	IDR
International Monetary Fund (IMF)	SDR (Special Drawing Right)	XDR
Iran	Iranian rial	IRR
Iraq	Iraqi dinar	IQD
Ireland	European euro	EUR
Isle of Man (<i>UK</i>)	Manx pound	IMP
Israel	Israeli new shekel	ILS
Italy	European euro	EUR
J		
Jamaica	Jamaican dollar	JMD
Japan	Japanese yen	JPY
Jersey (<i>UK</i>)	Jersey pound	JEP
Jordan	Jordanian dinar	JOD
K		
Kazakhstan	Kazakhstani tenge	KZT
Kenya	Kenyan shilling	KES
Kiribati	Australian dollar	AUD
Kosovo	European euro	EUR
Kuwait	Kuwaiti dinar	KWD
Kyrgyzstan	Kyrgyzstani som	KGS
L		

Laos	Lao kip	LAK
Latvia	European euro	EUR
Lebanon	Lebanese pound	LBP
Lesotho	Lesotho loti	LSL
Liberia	Liberian dollar	LRD
Libya	Libyan dinar	LYD
Liechtenstein	Swiss franc	CHF
Lithuania	European euro	EUR
Luxembourg	European euro	EUR
M		
Macau (<i>China</i>)	Macanese pataca	MOP
Madagascar	Malagasy ariary	MGA
Malawi	Malawian kwacha	MWK
Malaysia	Malaysian ringgit	MYR
Maldives	Maldivian rufiyaa	MVR
Mali	West African CFA franc	XOF
Malta	European euro	EUR
Marshall Islands	United States dollar	USD
Martinique (<i>France</i>)	European euro	EUR
Mauritania	Mauritanian ouguiya	MRU
Mauritius	Mauritian rupee	MUR
Mayotte (<i>France</i>)	European euro	EUR

Mexico	Mexican peso	MXN
Micronesia	United States dollar	USD
Moldova	Moldovan leu	MDL
Monaco	European euro	EUR
Mongolia	Mongolian tugrik	MNT
Montenegro	European euro	EUR
Montserrat (<i>UK</i>)	East Caribbean dollar	XCD
Morocco	Moroccan dirham	MAD
Mozambique	Mozambican metical	MZN
Myanmar (formerly Burma)	Myanmar kyat	MMK
N		
Namibia	Namibian dollar	NAD
Nauru	Australian dollar	AUD
Nepal	Nepalese rupee	NPR
Netherlands	European euro	EUR
New Caledonia (<i>France</i>)	CFP franc	XPF
New Zealand	New Zealand dollar	NZD
Nicaragua	Nicaraguan cordoba	NIO
Niger	West African CFA franc	XOF
Nigeria	Nigerian naira	NGN
Niue (<i>New Zealand</i>)	New Zealand dollar	NZD
Norfolk Island (<i>Australia</i>)	Australian dollar	AUD

Northern Mariana Islands <i>(USA)</i>	United States dollar	USD
North Korea	North Korean won	KPW
North Macedonia (formerly Macedonia)	Macedonian denar	MKD
Norway	Norwegian krone	NOK
O		
Oman	Omani rial	OMR
P		
Pakistan	Pakistani rupee	PKR
Palau	United States dollar	USD
Palestine	Israeli new shekel	ILS
Panama	United States dollar	USD
Papua New Guinea	Papua New Guinean kina	PGK
Paraguay	Paraguayan guarani	PYG
Peru	Peruvian sol	PEN
Philippines	Philippine peso	PHP
Pitcairn Islands <i>(UK)</i>	New Zealand dollar	NZD
Poland	Polish zloty	PLN
Portugal	European euro	EUR
Puerto Rico <i>(USA)</i>	United States dollar	USD
Q		
Qatar	Qatari riyal	QAR

R		
Reunion <i>(France)</i>	European euro	EUR
Romania	Romanian leu	RON
Russia	Russian ruble	RUB
Rwanda	Rwandan franc	RWF
S		
Saba <i>(Netherlands)</i>	United States dollar	USD
Saint Barthelemy <i>(France)</i>	European euro	EUR
Saint Helena <i>(UK)</i>	Saint Helena pound	SHP
Saint Kitts and Nevis	East Caribbean dollar	XCD
Saint Lucia	East Caribbean dollar	XCD
Saint Martin <i>(France)</i>	European euro	EUR
Saint Pierre and Miquelon <i>(France)</i>	European euro	EUR
Saint Vincent and the Grenadines	East Caribbean dollar	XCD
Samoa	Samoan tala	WST
San Marino	European euro	EUR
Sao Tome and Principe	Sao Tome and Principe dobra	STN
Saudi Arabia	Saudi Arabian riyal	SAR
Senegal	West African CFA franc	XOF
Serbia	Serbian dinar	RSD
Seychelles	Seychellois rupee	SCR

Sierra Leone	Sierra Leonean leone	SLL
Singapore	Singapore dollar	SGD
Sint Eustatius (<i>Netherlands</i>)	United States dollar	USD
Sint Maarten (<i>Netherlands</i>)	Netherlands Antillean guilder	ANG
Slovakia	European euro	EUR
Slovenia	European euro	EUR
Solomon Islands	Solomon Islands dollar	SBD
Somalia	Somali shilling	SOS
South Africa	South African rand	ZAR
South Georgia Island (<i>UK</i>)	Pound sterling	GBP
South Korea	South Korean won	KRW
South Sudan	South Sudanese pound	SSP
Spain	European euro	EUR
Sri Lanka	Sri Lankan rupee	LKR
Sudan	Sudanese pound	SDG
Suriname	Surinamese dollar	SRD
Svalbard and Jan Mayen (<i>Norway</i>)	Norwegian krone	NOK
Sweden	Swedish krona	SEK
Switzerland	Swiss franc	CHF
Syria	Syrian pound	SYP
T		
Taiwan	New Taiwan dollar	TWD

Tajikistan	Tajikistani somoni	TJS
Tanzania	Tanzanian shilling	TZS
Thailand	Thai baht	THB
Timor-Leste	United States dollar	USD
Togo	West African CFA franc	XOF
Tokelau (<i>New Zealand</i>)	New Zealand dollar	NZD
Tonga	Tongan pa'anga	TOP
Trinidad and Tobago	Trinidad and Tobago dollar	TTD
Tristan da Cunha (<i>UK</i>)	Pound sterling	GBP
Tunisia	Tunisian dinar	TND
Turkey	Turkish lira	TRY
Turkmenistan	Turkmen manat	TMT
Turks and Caicos Islands (<i>UK</i>)	United States dollar	USD
Tuvalu	Australian dollar	AUD
U		
Uganda	Ugandan shilling	UGX
Ukraine	Ukrainian hryvnia	UAH
United Arab Emirates	UAE dirham	AED
United Kingdom	Pound sterling	GBP
United States of America	United States dollar	USD
Uruguay	Uruguayan peso	UYU
US Virgin Islands (<i>USA</i>)	United States dollar	USD

Uzbekistan	Uzbekistani som	UZS
V		
Vanuatu	Vanuatu vatu	VUV
Vatican City (Holy See)	European euro	EUR
Venezuela	Venezuelan bolivar	VES
Vietnam	Vietnamese dong	VND
W		
Wake Island (USA)	United States dollar	USD
Wallis and Futuna (France)	CFP franc	XPF
Y		
Yemen	Yemeni rial	YER
Z		
Zambia	Zambian kwacha	ZMW
Zimbabwe	United States dollar	USD