Executive Summary

Bitcoin was founded as a groundbreaking value-transmission experiment with the explicit objective of separating money and state. This paper seeks to place the reader in the context present in 2021 when El Salvador became the first country to make bitcoin legal tender. It starts by explaining the cultural and technological origins behind Bitcoin, how it gave rise to other cryptoasset platforms liked Ethereum, and some of the resulting views of the future. It then zooms into El Salvador's Bitcoin Law, starting with an analysis of its text and following with an analysis of its implications, criticism, and potential. The paper closes with an overview of initiatives in the rest of Central America and questions whether the adoption of cryptoassets like Bitcoin will enable small and relatedly underdeveloped countries to leapfrog in financial innovation or rather stifle and isolate them internationally.

1. Introduction

Bitcoin and cryptoassets are becoming household names around the world. Central America is not the exception. Dreams of a global value transfer-enabled internet exist since the internet itself emerged. Are Bitcoin and other cryptoassets the missing infrastructure element to enable this?

On July 9, 2021, El Salvador became the first country to adopt Bitcoin as legal tender. How did an arcane technology that was mostly exciting for geeks alone, just 12 years after its creation get to be part of a country's official monetary policy?

The increasing adoption of Bitcoin and other cryptoassets creates a fascinating opportunity for analysis at the intersection of philosophy, sci-fi, cryptography, economics,

public policy, and law.

This paper seeks to provide context so the reader can form opinions around these and related questions. The paper initially provides a recount of the original dreams and attempts for a “money-enabled” internet and what this means. It follows with an introductory explanation of Bitcoin and Ethereum and provides context around their disruptive potential. El Salvador’s controversial decision is then analyzed in this context, followed by a regional summary of adoption.

2. Information encryption and information censorship resistance on the internet

The emergence of public key cryptography

As the use of computers started growing in the United States of America, it became evident that there was a need for privacy in cyberspace. In contrast to physical mail, an unsecured digital realm allowed anyone, including governments, to simply peek into the stream of messages to read and intercept all digital communications of an individual.

Whitfield Diffie and Martin Hellman proposed a way for individuals to securely communicate over insecure networks using a new technology called “public key cryptography” or “asymmetric cryptography”. They explained a process where each participant in a conversation created two related keys: one public and one private. The public key could be openly distributed and would allow other participants to encrypt messages specifically addressed to the intended receptor of

the message. The private key would be kept private and would then only allow the receiving party to decrypt the communications received. This arrangement had the groundbreaking potential to allow digital privacy where individuals could privately communicate without meeting in real life.

The battle for information censorship resistance

As the internet grew to general use, the government of the United States attempted to legally control this technology locally by proposing legislation to require for a copy of each individual private key to be held by the government in escrow to allow government agencies to access private communications after they had “established their authority” to do so. Internationally, the United States government classified encryption algorithms as military technology subject to export controls.

Both measures sparked the so called “Crypto Wars” where industry leaders, politicians and digital civil rights advocates successfully argued that the control measures would compromise personal privacy on the internet.

Although these debates have not completely subsided, the fact that public key cryptography was lawfully permitted to freely develop helped build the internet as we know it today. Individuals and businesses can privately communicate online instantly and for what most users represents a trivial cost

3. From censorship

resistance information to censorship resistance cash

It was not long until the quest to preserve information censorship resistance enabled by digital private communications would prompt the search for value transfer freedom as well. One of the most influential groups arising out of the so called “Crypto Wars” were the Cypherpunks. Their name arose from “cyberpunk”, a genre of hyper-urban dystopian sci-fi; and “cypher”, referring to cryptography in general. The basic ideas of the movement can be found in the Cypherpunk Manifesto by Eric Hughes. These principles inspired a series of attempts to build digital versions of cash. Most proposals described below, including Bitcoin itself were discussed in the Cypherpunk mailing list.

Several attempts were made to create a digital version of cash. Adam Back created Hashcash in 1997. Although presented as an anti-spam mechanism, Hashcash proposed the “proof-of-work” (POW) concept: a way for a participant in a network to prove that a given amount of computational power was done using a very simple proof that can be verified very quickly by the rest of participants.

Wei Dai proposed B-Money in 1998. B-Money included a distributed database of transactions among all users using the system as well as a special subset of users which kept the official records for the system, today known as “proof of stake” (POS).

In 2004, Hal Finney created Reusable Proofs of Work building upon Hashcash’s proof-of-work concept but allowing users to transfer product of the proof-of-work to other users. Also building upon the prior projects, Nick Szabo proposed Bit Gold, which shared with today’s Bitcoin a combination of proof-of-work miners to create a digital scarcity which could

be used to back other forms of electronic currency.

Satoshi Nakamoto's Bitcoin white paper

In October 2008, Satoshi Nakamoto, a still unknown person, or group, sent a paper called "Bitcoin: A Peer-to-Peer Electronic Cash System". This paper cited many of the precursor projects mentioned above and conceptually proposed the first version of what today we know as Bitcoin.

On January 3, 2009, Satoshi mined the genesis block, the initial block that gave start to the Bitcoin blockchain. Bitcoin has proven that trustless peer-to-peer value transfer is possible over the internet without the need to trust any central private or public counterparty.

In addition to trustless value transfer, Bitcoin incorporated a completely transparent minting strategy which issues new bitcoins to those miners who provide the most proof-of-work to secure the system. This results in a predictable issuance rate which is not dictated by decree of political bodies as happens with fiat currencies.

Ethereum and other public blockchains

Bitcoin's growth prompted other developers to create alternative blockchains with extended features with different security and efficiency tradeoffs. At the time of this paper's writing, Ethereum was second to Bitcoin in terms of market capitalization. Ethereum has announced a migration from proof-of-work to proof-of-stake which is expected to make it a deflationary asset.

Ethereum was envisioned to use some of concepts underlying

Bitcoin, including a distributed database of transactions, and the strategy of validating transactions in “blocks” linked among each other to guarantee cryptographical traceability, to create an infrastructure to build decentralized applications in a relatively simple way. This can be done with the creation of smart contracts, which allow individuals to transfer value not only among themselves, but also to subject such value to any conditions they specify. Contracts in the context of Ethereum should not be equated to something that should be “fulfilled” but rather as autonomous programs, with the capacity to hold information and cryptoassets, that live within the Ethereum blockchain and are awoken when a message or transaction interacts with them in the intended way.

Ethereum is just one of the alternative public blockchains to Bitcoin. Given that all public blockchain software was required to be open source as a measure to allow network participants to validate that the promised security and incentives were indeed actually implemented in the code, other public blockchains like Algorand, and Cardano. Each project sought to emphasize and improve upon some aspect of Bitcoin and Ethereum’s implementations, including enhanced transaction speed and throughput, and privacy of network participants.

Lightning and other second layer protocols

Given the distributed nature of Bitcoin and other first layer public blockchains, a debate on the viability of worldwide mass adoption spurred the creation of Layer 2 or second-layer networks. These networks bootstrap the functionalities of Layer 1 infrastructure networks to optimize for a specific quality that is not viable in the Layer 1 network.

For example, Bitcoin has very limited smart contracting capabilities, in contrast to Ethereum, so a Layer 2 solution to complement Bitcoin’s implementation is RSK. Bitcoin

transaction confirmation speed is slow compared to other centralized systems. Lightning is a second layer solution that allows for instant and very cheap Bitcoin payments. Lightning is incidentally part of El Salvador's implementation of bitcoin within the Chivo ecosystem. Ethereum on the other hand has high costs associated with on-chain transactions. Networks like Polygon build on top of Ethereum to decrease these costs for the end user.

The separation of money and state

The creation of censorship-resistance digital cash will have wide-reaching consequences we possibly can't even begin to comprehend. In 1999, Milton Friedman famously predicted that the growth of the internet would result in one of the strongest limits on government taxation powers yet. He stated the following:

"The one thing that's missing but that will soon be developed is a reliable "ecash": a method whereby on the internet, you can transfer funds from A to B without A knowing B or B knowing A."

A global implementation of such a system would effectively represent a separation of money and state, taking money away from the hands of political institutions and putting it in the distributed hands of a decentralized network.

What would this entail for the structure and sustainability of nation states? Will a globalized and transnational value transfer system result in a few stronger states, or will it challenge the very existence of the nation state? This is the most radical promise of the Cypherpunks' dream which might significantly alter the world's economic and political order in the coming decades.

The emergence of stablecoins as blockchain-based fiat alternatives

After Ethereum made it trivial for users create new cryptoassets, a new class of these emerged with the express objective of bringing the relative price stability of fiat currencies into the blockchain world. These were known as stablecoins.

There were two main types of stablecoins as of the writing of this paper: centralized stablecoins and algorithmic stablecoins. Centralized stablecoins attempted to connect fiat money to the blockchain by using Ethereum or any other public blockchain to represent centralized holdings of fiat currency held in traditional financial institutions. Tether USDT and USDC were two of the most used. USDC's operator, Circle, also recently announced an euro-denominated stablecoin known as EUROC, curiously initially issued from the United States and not from any European country. The risk of centralized stablecoins is the fact that their operator is a central point of failure. The peg with the underlying fiat currency depends on the operator's ability to effectively maintain full backing of the stablecoin with fiat reserves. This is a complicated endeavor not only because of fraud risks on the part of the operator, but also due to regulatory risks whereby governments can seize funds held by the operator which would result in the decupling of the stablecoins value with the underlying fiat currency.

Algorithmic stablecoins sought to mimic the value of an underlying fiat currency without the need of a fully centralized counterparty, replacing such a role by one or more smart contracts or with some sort of smart contract-enabled blockchain. The most longstanding algorithmic stablecoins is Maker DAO's DAI. Another formidable attempt was Terra (UST), which recently imploded when its peg to the dollar was financially attacked. Although algorithmic stablecoins

partially seek to mitigate the risk of fraud from the counterparty's operation and the seizure of funds by a government by subjecting the stablecoin's value to some transparent smart contract arrangement, the risk of malfunction of the smart contract or a financial attack on the peg do exist.

The holy grail for stablecoin proponents is to find a cryptographically secure and provable way of pegging the value of the stablecoin to an underlying fiat currency but at the same time eliminate the risk of fraud, seizure, smart contract malfunction, or financial attacks on the peg. Supporting such a use is so appealing that even Bitcoin is being modified to allow a more flexible management of other assets, including stablecoins, via the Taro proposal.

Central Bank Digital Currencies (CBDCs)

Central Bank Digital Currencies (CBDCs) are digital representations of traditional money issued and managed in some for by a central bank. CBDCs might or might not be cryptoassets running on a blockchain.

Given the increased adoption of cryptoassets and digital payment methods, Central Banks have recently accelerated the exploration and development of CBDCs. Different central banks have expressed concerns related to privacy, disintermediation of financial services providers, as well as optimism over the potential for financial inclusion these currencies might generate.

CBDCs are discussed in the context of cryptoassets because some central banks have explored their use to power the infrastructure underlying their envisioned CBDCs.

Can cryptoassets be considered money?

A frequent angle of discussion when considering the impact of cryptoassets over our society is whether these assets are considered money in the economic sense of the concept. Money is defined traditionally as an asset that fulfills three main roles: a medium of exchange, a unit of account, and a store of value.

A medium of exchange is something generally accepted by most people in exchange for any good or service. Money is in essence, the most fungible of assets. A unit of account allows people to set prices with a common yardstick. A store of value allows people to hold value intertemporally with some sort of predictable stability.

As we've seen, cryptoassets, depending on their nature, seldom fulfill these three roles in the present so the traditional economist's argument is that no cryptoasset is money in the economic sense of the word.

Two arguments against this conclusion exist. The first refers to a criticism on the definition of money itself. As Selgin argues in the recount cited above, the essential aspect of money is its acceptance as a medium of exchange. Selgin argues that we have discovered that some of the functions of money are not essential resulting in considering its quality of medium of exchange as definitive. Bitcoin maximalists –more on them below– tend to favor this criticism.

The second refers to an improper generalization concluding that the traditional definition cannot apply to any cryptoasset irrespective of its defining characteristics. Stablecoins might have the potential to replace traditional payment methods which in turn can expand the reach of existing money or replace most of it entirely.

4. Visions for future mass adoption of cryptoassets

Even assuming global mass adoption of cryptoassets, builders and theorists in the space vehemently differ on how this adoption might come about. This section seeks to provide an overview of the main camps in the discussion which will provide context for national adoption of this technology such as in El Salvador.

In the fast-evolving and nuanced space of cryptoassets innovation, it is hard to fit everyone in the same bucket. Nevertheless, these categories are my attempt to situate the reader at the current state of the debate around the time of publication of this paper. Please bear in mind these are oversimplifications which might misrepresent individual very specific positions on the matter.

4.1 Hyperbitcoinization or Bitcoin maximalism

Bitcoin maximalism i[AD1] [FE2] s the belief that a multiple competing currency environment is undesirable, and that Bitcoin will be the "winner take all" and will eventually acquire a monopoly in adoption. Bitcoin Maximalists relay mainly on Bitcoin's network effects as the main argument in favor of their position as well as a series of economic and political arguments that favor the vision espoused by Satoshi Nakamoto in his Bitcoin white paper.

Many Bitcoin maximalists predict and advocate for the inevitability of hyperbitcoinization, where Bitcoin is expected to become a decentralized alternative to central banking. The Bitcoin Standard by Saifedean Ammous is perhaps the most developed argument for this thesis. If Ammous is one

of the most prominent proponents, Michael Saylor, chairman of MicroStrategy is perhaps the most prominent practitioner investor with a strategy arising out of a probable bitcoin maximalist future.

4.2 Cryptoasset optimists

A second camp that could be called the cryptoasset optimists recognize the disruptive potential of this technology and argue that every asset will become cryptoassets. They consider cryptoassets the natural evolution of the internet but see an ecosystem of assets emerge.

Cryptoasset optimists are the intellectual heirs of Marc Andressen's Software if Eating the World which envision the internet permeating and mediating all human interactions in the short and medium term.

4.3 Federated or permissioned blockchain efficientism

A third group recognizes the potential efficiency gains in the technology but are expressly critical or consider inviable or inconvenient the complete decentralization of currency issuance and management.

They tend to favor the use of blockchains as natural evolutions of existing regulated systems and see them as enterprise tools to help governments, banks, and other regulated entities to operate more efficiently. These systems are known as permissioned or federated blockchains, in contrast to permissionless blockchains like Bitcoin or Ethereum.

They also tend to highlight the potential of permissioned blockchains as systems that can improve the speed of fiat and securities settlement, as well as the issuance of Central Bank

Digital Currencies (CBDCs). [AD3] [FE4]

5 El Salvador's adoption of Bitcoin as legal tender

On June 9, 2021, El Salvador's Legislative Assembly approved the Bitcoin Law, which among other provisions, declared Bitcoin as legal tender. This was the first time a sovereign nation declared Bitcoin as legal tender, sparking worldwide reactions both in favor and against the measure. Considering the context provided in the sections above, this section analyzes the situation in El Salvador prior to the Bitcoin Law, its intended goals, the controversy around its implementation, and its adoption as of the writing of this paper.

5.1 Brief history of El Salvador

El Salvador is a Central American country which arose out of Spain's colonization endeavors in the Americas. On September 15, 1821, as part of what was known as the realm of Guatemala, El Salvador declared its independence from Spain. After this event, El Salvador was part of the failed Central American Federal Republic which arose out of successive treaties in 1895 among Honduras, Nicaragua, and El Salvador, and in 1897 including Costa Rica and Guatemala. On February 2, 1841, El Salvador declared its independence from the Central American Federal Republic and established its own constitution.

After its independence like some of its neighbors, El Salvador

relied mostly on the export of coffee. After the 1929 Great Depression, El Salvador entered deep economic turmoil which resulted in a military coup in 1931. In 1979 another coup resulted in the election of a Constituent Assembly in 1982 to draft a new constitution. In 1984 the country held free elections which resulted in their return to democratic rule. This democratization coincided with a civil war which lasted 12 years between the right-leaning government led by the Alianza Republicana Nacionalista (ARENA) and the left-leaning Frente Farabundo Martí para la Liberación Nacional (FMLN). In 1992 both combatting parties signed the Chapultepec Peace Accords which ended the conflict but left substantial social and institutional scars. Both ARENA and FMLN alternated power until 2019 where former Mayor of San Salvador, Nayib Bukele broke with the bipartisan rule with the victory of the coalition of Gran Alianza por la Unidad Nacional (GANA) and Nuevas Ideas, his political party. Nayib Bukele remains President of El Salvador as of the writing of this paper.

5.2 Financial inclusion and remittances in El Salvador

Before the adoption of the Bitcoin Law, only 30.4% of El Salvador’s population had a transactional account that allowed them to hold money and receive and make payments. This number was substantially inferior to the Latin American and Caribbean average of 54.4%. 23.6% of Salvadoreans had made digital payments, in contrast with 45.1% of Latin Americans. These numbers contrast with internet usage numbers for Salvadoreans: 66.6% of the population having a mobile phone, 59.5% of the population using the internet regularly, and 53.6% of the population using social media actively. El Salvador was also a foreign remittance net recipient with remittances representing 24% of its GDP.

5.3 Dollarization of El Salvador

In 2001 the Monetary Integration Law was approved establishing a peg of the Salvadorean Colón (SVC) with the United States Dollar (USD) of SVC 8.75 per USD. The law mandated for all financial operations to be converted into USD and relaxed the Central Reserve Bank's monopoly the exercise of monetary policy and bank note issuance.

Two provisions of the Monetary Integration Law must be highlighted for the purposes of this paper:

"Art 2.- The contracting of monetary obligations expressed in any other currency of legal circulation abroad is allowed. Said obligations must be paid in the contracted currency, even when their payment must be made by judicial means."

"Art 3.- The dollar shall be considered unrestricted legal tender with unlimited release power for the payment of money obligations in the national territory."

Both articles considered in conjunction result in a completely dollarized economy with the sole exception of parties contractually agreeing to make payments in any other currency of legal circulation abroad.

5.4 Regulatory frameworks for cryptoassets around the world before El Salvador's Bitcoin Law

As of November of 2021, 103 countries have issued regulation applicable to cryptoassets, including in most cases both tax and anti-money laundering and counter-financing of terrorism laws (AML/CFT laws). Depending on the definition of legal tender of each country, the use of bitcoin or other cryptoassets for payments among private parties is permissible. This is certainly the fact in most countries

around the world with notable exceptions that have completely banned the use of the technology including for example the People’s Republic of China.

As of the writing of this paper, in addition to El Salvador, several other jurisdictions have experimented with accepting Bitcoin as means of payment for services or taxes or otherwise promoted the use of Bitcoin and Cryptoassets. There are several notable examples:

The city of Miami in Florida voted to accept fund raised though MiamiCoin (MIA), a cryptoasset issued as an experiment with backing for the city’s mayor.

Próspera, a Honduran Zone for Employment and Economic Development (ZEDE) in the island of Roatán announced that Bitcoin will operate as legal tender and will allow the issuance of Bitcoin bonds.

The Central African Republic adopted Bitcoin as legal tender alongside the Central African Franc and announced a friendly regime for cryptoassets in general.

The canton of Zug in Switzerland accepts bitcoin as means of payment for taxes since 2016 and has provided clarity for the incorporation of entities dedicated to cryptoasset related services.

The city of Lugano in the canton of Ticino in Switzerland, and the city of Rio de Janeiro in Brazil have both started programs to accept payments for certain public services and taxes in bitcoin as a way to promote their status as innovation hubs.

5.5 An analysis and commentary of

El Salvador’s Bitcoin Law

On June 9, 2021, El Salvador’s Legislative Assembly approved the Bitcoin Law. This law has 16 articles distributed as follows:

Article 1 defines Bitcoin as legal tender in the following terms:

“Art. 1.- This law has the objective to regulate Bitcoin as legal tender with unlimited release power for any transaction and for any reason made by natural and legal persons”.

This article expressly notes that the Monetary Integration Law regulations remain applicable, which means that the USD also remains legal tender in the country, and people may contractually express obligations in any other legal currency of legal circulation abroad.

Article 2 notes that the exchange rate of Bitcoin and USD will be freely determined by the market.

Article 3 allows every price to be expressed in Bitcoin.

Article 4 allows for all tax obligations to be paid in Bitcoin.

Article 5 exempts Bitcoin exchanges from capital gains taxes as it happens with another legal tender.

Article 6 mandates that the USD will be used as reference currency for accounting purposes.

Article 7 creates an obligation for every “economic agent” to accept Bitcoin as means of payment when whoever is paying requests to use it to purchase goods and services.

Article 8 establishes, as a complement to any private solutions that might emerge, the obligation for the government of El Salvador to provide the infrastructure to allow bitcoin

transactions, the exchange of bitcoin and USD, and the necessary training and education to the general population on the use of Bitcoin.

Article 9 allows for regulation to define limitations on the exchange of Bitcoin and USD.

Article 10 mandates the Executive Branch to create the necessary institutional structure to support the law's implementation.

Article 11 grants powers to the Central Reserve Bank and the Financial System Superintendence to issue regulation necessary for the implementation of the law.

Article 12 excludes from the obligation of accepting bitcoin as means of payment for goods and services any people who "evidently lack access to the technology which would allow the execution of bitcoin transaction" and reaffirms the government's obligation to provide the necessary training to widen access of this technology among the general population.

Article 13 states that all money obligations expressed in USD existing before the law may be paid using Bitcoin.

Article 14 states mandates the government to create a trust with the Salvadorean Development Bank (BANDESAL) to allow for the exchange of Bitcoin and USD for the general population as mandated in Article 8.

Article 15 states the special nature of this law clarifying that any general rule that contradicts the law will be considered derogated from.

Article 16 states that the law enters into force 90 days after its publication. Pursuant to this article, the law entered into force on September 7, 2021.

5.6 The scope of El Salvador's legal tender and Bitcoin as means of payment regulation

Although legal tender is not defined in the Bitcoin Law, we can conclude the scope of this concept by jointly considering the texts of the Monetary Integration law and Bitcoin Laws as follows:

Bitcoin legal tender in El Salvador allows for the payment of any tax obligations, alongside USD.

Bitcoin legal tender requires any non-exempt "economic agent" to accept Bitcoin as means of payment for goods and services if the payer so requests it, alongside the USD, except if the parties have expressly contracted the use of another currency.

Following the precedent of the Monetary Integration Law, the Bitcoin Law creates an expansive legal tender concept by allowing payers to pay for any obligations in an unrestricted way using Bitcoin, even against the will of the payee.

To give practical validity for this expansive "means of payment" requirement, the government guarantees the conversion of Bitcoin for USD.

5.7 The controversy around the Bitcoin Law adoption

There has been considerable controversy around the approval of the Bitcoin Law for several reasons relating to the way it was approved and regarding its content.

Regarding its form of approval, the Bitcoin Law was presented by President Nayib Bukele to the Legislative Assembly and approved with little debate after just a few hours of debate.

Regarding its content, critics contended that the obligation to accept Bitcoin as a means of payment was an expansive imposition of the government to use a specific payment method.

The International Monetary Fund was the most vocal international critic initially stating, among other criticisms that El Salvador should strip bitcoin of its legal tender status because *"its volatility makes it inefficient as means of payment, unit of account or store of value."* The IMF also stated that El Salvador should refrain from investing its reserve in Bitcoin, risking substantial financial stability concerns.

The Accountability for Cryptocurrency in El Salvador (ACES) Act, was introduced to the United States Senate discussion in February, 2022 requiring reporting and assessment by Federal authorities of El Salvador's implementation of Bitcoin as legal tender. It further includes similar Federal reporting and assessment to other countries that use the USD as legal tender in the event they accept cryptocurrency as legal tender. This legislation was mirrored by the House of Representatives and is currently being discussed.

The Law was announced by President Nayib Bukele at the Bitcoin 2021 conference in Wynwood as part of a message claiming that pessimism has taken over because we have forgotten that we can create our future. This announcement was enthusiastically received mainly by Bitcoin maximalists around the world.

5.8 The launch of the Chivo wallet on "Bitcoin Day"

The country's bitcoin law approval included two main initiatives: the rollout of the Chivo wallet and ecosystem, and the purchase by El Salvador of bitcoin reserves.

The launch of Chivo was scheduled for September 7, 2021, known

as “Bitcoin Day” by its enthusiasts. The launch was somewhat bumpy due to several issues with the application. Businesses were able to pick Chivo or any private alternative to accept Bitcoin as a means of payment. Chivo included the ability to automatically convert Bitcoin to USD.

Since the launch of Chivo, the government claimed strong growth in the use of Chivo. According to a recent report by the U.S. Bureau of Labor Statistics, more than 70% of new Chivo users were unbanked and over 90% did not use mobile banking. This might have been enabled by the $30 bonus given for free to every new user at launch. After spending the $30 initial bonus, 20% of Chivo wallet users have continued using the app. 4.9% of all sales are paid with Bitcoin and 88% of businesses transform their Bitcoins into USD. President Bukele claims that within the first 3 weeks, 2.1 million Salvadoreans –a third of the country’s population– were actively using the wallet.

El Salvador’s purchase of Bitcoin reserves

The country bought 400 bitcoins the day before the launch of Chivo wallet for $21 million. President Bukele has continued to announce successive purchases amid plunging prices. As of this paper’s writing, the country was estimated to hold an estimated 2,301 bitcoins.

5.9 El Salvador’s “volcano bonds” and Bitcoin City

In addition to the establishment of legal tender and the purchase of Bitcoin, President Bukele plans to build a “Bitcoin City” in the region of La Unión which would be powered by geothermal energy from a nearby volcano. The city would be initially financed by a series of Bitcoin-backed bonds. are being issued in conjunction with Blockstream and include a 5-year lock-up period where El Salvador would start

selling some of the bitcoins used as backing to give investors “additional coupons”. The bond would be issued in a Layer 2 protocol known as Liquid, a Bitcoin sidechain developed by Blockstream.

5.10 Controversy considering President Bukele’s other policies

The main controversy surrounding the implementation of Bitcoin as legal tender and related policies relates to President Nayib Bukele’s style of governing.

Despite serious institutional issues in the country before his rule, President Bukele has been seen by his critics as a threat to democracy in the country. For example, in 2020 he pushed a spending bill though the Legislative Assembly by encircling it with armed troops. Five Supreme Court judges were sacked and replaced by his supporters. He also fired the attorney general who was apparently investigating alleged corruption within his government.

The move is threatening a potential $1 billion IMF loan to the country which further pressures him to attempt to obtain alternative revenue streams like Bitcoin mining with geothermal energy.

6 An analysis of possible implications of El

Salvador’s adoption of bitcoin

The measures taken by Bukele in adopting Bitcoin as legal tender cause visceral reactions across the board. Enthusiasts are perhaps the most eager out there. Detractors are also extremely vehement.

6.1 Stuck between a rock and a hard place

Small and institutionally weak countries are having more and more access to technology stacks like Bitcoin and other cryptoassets. They are being forced to make a difficult, if not impossible decision between two extremes:

On the one hand, countries like El Salvador can choose to keep the status quo and continue the gradualist approach of fostering the development of a traditional financial sector that might or might not result in an innovative and open ecosystem. This avenue will usually result in either maintaining or slowly reducing substantial exclusions of its population from access to modern financial systems and the digital economy.

On the other hand, countries like El Salvador will have more tools at their disposal to make radical bets that will not be consider credible by the rest of the world, mainly due to the institutional weakness that characterizes these nations. Countries will be weary of risking too far out as Bukele has done depending on the relative restrictive or retaliatory practices taken by intergovernmental institutions and governments of more developed countries.

By recognizing this tradeoff, larger countries might be wise

to promote and assist in the responsible adoption of new technologies like Bitcoin and cryptoassets rather than stifle what they allow at home in the name of stability. Social media and internet access are setting the stage for the emergence of populist leaders with personality cults. Hopefully some of them will be well-intentioned visionaries, but there is no guarantee.

6.2 Quantifying the opportunity cost of “buying the dip”

Although public information on the matter is scant, as of the writing of this paper, El Salvador’s Bitcoin holdings seem to have lost at least half of their value, or about $50M. This has prompted President Bukele to publicly announce in Twitter that the country is “buying the dip”.

The relation between the country’s fiscal situation and the Bitcoin Law seems to be that of opportunity cost. On the one hand, it is clear the investments themselves are not the biggest cause of the country’s fiscal woes. According to El Salvador’s Finance Ministry, this represents about 0.5% of the country’s annual budget and even leads him to claim that Bitcoin’s price crash poses “extremely minimal” fiscal risk.

However, as of the writing of this paper, and after months of negotiations, El Salvador had failed to obtain a $1.3B financing with the International Monetary Fund, one of the most vocal critics in the country’s adoption of Bitcoin as legal tender.

Although surely not the only issue being considered by the IMF, the fact the Bitcoin Law is expressly mentioned as an increased risk by this institution in every official communication regarding the country, reveals at least a partial conditioning by the IMF of substantially limiting Bitcoin-related risks before agreeing to provide the loan.

This standoff has increased the default risk of $800M in bonds maturing in 2023 and could impact even further the country's credit rating and any ability to raise debt.

Such a situation is placing the country in the difficult situation of solely relying on tis Bitcoin bet to obtain financing. As a point of reference, for the country to obtain the equivalent of $1.3B in value from its current bitcoin holdings, each Bitcoin would have to rise in price from around $20,000 to over $560,000, a 28x increase in price.

6.3 Will the Bitcoin Law prove beneficial for currency competition in El Salvador in the future?

As mentioned above, the implementation of Bitcoin in El Salvador was initially done using Lightning, a second layer protocol built on top of Bitcoin. Although the Law declares Bitcoin as legal tender, in practice what has functioned as legal tender is Bitcoin Lightning, which could theoretically be settled "on-chain" into actual Bitcoin when needed.

We are therefore witnessing the odd legal situation where a platform has been declared as legal tender, not necessarily a specific asset. "Bitcoin" not only has resulted in the specific Lightning implementation used by Chivo and other software providers, but also Liquid, a sidechain championed by Blockstream, the company behind the country's "Volcano Bonds" is allowing to issue all sorts of assets using Bitcoin's rails.

Depending on the future interpretation of the law and the technology's further development, Bitcoin's status as legal tender in El Salvador might result in more currency competition instead of less. Assuming we see Liquid and Lightning grow as platforms allowing the issue of stablecoins

and other types of assets, we might see El Salvador's legal tender definition become quite wide. Would USD denominated stablecoins issued over Liquid and therefore part of the Bitcoin ecosystem, be consider acceptable implementations to be considered "legal tender"? Would Lightning-enabled stablecoins be considered the same?

Could El Salvador create its own CBDC or stablecoin using the Bitcoin architecture? Would such an asset also be considered legal tender? As of the writing of this paper, answers to these questions are unclear.

6.4 The optimistic view

The optimistic view for El Salvador will require two conditions:

President Bukele will have to prove that his controversial measure of institutional reform reflects on the quality of institutions in El Salvador. If this replacement of Supreme Court Judges does result in a more efficient, transparent, and fair judicial system, trust in his Bitcoin experiment might be positively impacted.

Furthermore, the faster the adoption of Bitcoin and other cryptoassets, the better El Salvador will fare before other countries catch up. El Salvador should seek to deepen its infrastructure modernization beyond its adoption of Bitcoin to drive trust in the establishment of innovative businesses in general.

6.5 The pessimistic view

The pessimistic view would come to be if President Bukele proves to be amassing power for his personal benefit exclusively. If his measures do consolidate as an authoritarian power grab, as many critics fear, he will unite

a local anti-authoritarian opposition with pro-democracy advocates and nations abroad.

A coordinated global crackdown on cryptoassets would also collaborate in isolating El Salvador and others following its footsteps as a rogue jurisdiction.

7 Central America's regional status on Bitcoin and other cryptoasset adoption

Central America is not known for having particularly innovative ecosystems. However, the size of the countries do provide some diversity on the approaches by each country. Some notable initiatives are Costa Rica's Central Bank "tolerant vigilance" policy and Panama's Crypto Bill. Guatemala and Honduras have preliminarily announced the research and piloting of their respective CBDCs, although as of the writing of this paper, other their respective announcements, no public developments are known.

7.1 Guatemala's iQuetzal and Honduras's digital Lempira

Shortly after the The Bank of Guatemala announced its intention to research and pilot the creation of a CBDC called iQuetzal. No additional public information was found as of the writing of this paper, however interest at the bank on the matter seems to have existed for years given of a first essay

on the matter in 2019 its “Notas Monetarias” publication.

After later disproven rumors that Honduras’s President Xiomara Castro de Zelaya had supported El Salvador’s decision to make Bitcoin legal tender, the Honduran Central Bank was swift to clarify their intention to continue exploring the CBDC route and reaffirmed their sole authority and autonomy on the matter.

The note only states that the “technical and conceptual” study on the matter continues.

7.2 Costa Rica’s Central Bank “tolerant vigilance” policy

Although Costa Rica’s tax authority has proposed including the purchase and sale of cryptoassets with the country’s 13% VAT as well as the capital gains with 15% of capital gains tax, its Central Bank publicly defined its stance on the matter as “tolerant vigilance”. The country’s highly interoperable network payment network operated by the Central Bank has been opened to non-banking players, some of which have incorporated cryptoassets among their offerings. Although no specific regulation exists, businesses in Costa Rica may choose to accept cryptoassets as means of payment andproviders may offer the rails to do so even with direct access to the Central Bank’s payment system.

7.3 Panama’s Crypto Bill

Panama shares with El Salvador the use of the USD as legal tender. It however has a longstanding history of not having a central bank and a constitutional provision barring forcible legal tender. The bill presented by independent congressman Gabriel Silva recognized cryptoassets in general, not only Bitcoin, as lawful and voluntary payment methods. It creates a favorable environment for exchanges and other cryptoasset and

digital economy-related platforms. As of the writing of this paper, the bill was approved by Panama’s Legislative Assembly and was partially vetoed by Panama’s President Laurentino Cortizo. The Legislative Assembly must now consider changes before resubmitting to the President.

8 Conclusion

As noted, relating to El Salvador above, small and institutionally weak countries are trapped in a vicious cycle which is not conducive to innovation and digital financial inclusion. More developed nations and international monitoring bodies do not seem to trust in the capability of these smaller nations to effectively mitigate the risks of the use of cryptoassets, be they as legal tender or as means of payment, which are two possible ways for mass adoption. This results in higher barriers to entry to use this technology in these countries than those established in some developed countries with better enforcement mechanisms.

Countries like those in Central America seem to be stuck between inert gradualism, where financial inclusion does not substantially improve due to the unintended consequences of high barriers to entry to their formal financial market, and deep distrust in them being able to pull off and mitigate the risk of radical moves in favor of financial inclusion or mass adoption of a new means of payment or legal tender. This distrust is due to the general perceived institutional weakness and perhaps aided by vested interests that could be partially disrupted by more competition.

El Salvador’s experiment, though mired with fiscal and political issues from before, has shown that the adoption of public blockchain assets like Bitcoin are not taken in good regard by legacy financial multilateral institutions and are seen with great skepticism and concern. Although the adoption of Chivo has been impressive as a platform, bitcoin payments

even for remittances are still not the majority. The separation of state and money, if it happens, will be an uphill and contradictory battle, especially if El Salvador's government fails to properly manage the experiment.

Central America is interestingly home to a wide array of financial systems as of the writing of this paper. Four of its countries have their own currency and Central Banks: Costa Rica, Nicaragua, Guatemala and Honduras. El Salvador has a Central Bank of Reserve which does not issue money but does manage the country's reserves, serves as lender of last resort, and now has anointed Bitcoin as legal tender alongside the dollar. Panama does not have a central bank at all, uses the USD as subsidiary legal tender with substantial monetary freedom and is considering cryptoassets in general as means of payment and not legal tender.

El Salvador's results in the next 5-10 years and possible steps by other countries in the region will determine whether non-state-issued crypto assets could viably become functional legal tender in countries and whether relatively poor and small countries can lead the way in financial and regulatory innovation or if they will have to remain followers of the rest of the developed world.