Brazilian Journal of Political Economy, vol. 44, nº 1, pp. 189-212, January-March/2024

El Salvador: an analysis of the monetary integration law and the bitcoin law

El Salvador: uma análise da lei de integração monetária e da lei do bitcoin

SERGIO LUIS NÁÑEZ ALONSO *
MIGUEL ÁNGEL ECHARTE FERNÁNDEZ **
DAVID SANZ BAS x
CRISTINA PÉREZ RICO xx

RESUMO: O objetivo deste artigo é analisar as duas leis monetárias mais importantes que têm sido implementadas em El Salvador, nomeadamente a Lei de Integração Monetária (MIL) e a Lei Bitcoin. Serão analisados os artigos mais importantes de ambas as leis, bem como as consequências da dolarização, e as possíveis vantagens e riscos associados à adopção da moeda de curso legal Bitcoin. Embora esta medida possa ter alguns aspectos positivos ao encorajar a inovação financeira e facilitar as remessas, o risco macroeconómico é muito elevado devido à volatilidade desta moeda criptográfica. Até agora não foram alcançados resultados positivos, uma vez que a aceitação tem sido muito baixa e tem havido uma depreciação do ativo nos últimos meses.
PALAVRAS-CHAVE: Dolarização; volatilidade; estabilidade da moeda; remessas; inflação; moeda criptográfica.

ABSTRACT: The objective of this article is to analyze the two most important monetary laws that have been implemented in El Salvador, namely the Monetary Integration Law (MIL) and the Bitcoin Law. The most important articles of both laws will be analyzed, as well as the consequences of dollarization, and the possible advantages and risks associated with the adoption of Bitcoin as legal tender. Although this measure may have some positive aspects by encouraging financial innovation and facilitating remittances, the macroeconomic risk is very high due to the volatility of this cryptocurrency. So far no positive results have been

* DEKIS Research Group, Department of Economics, Catholic University of Avila, Spain. E-mail: Sergio.nanez@ucavila.es. Orcid: https://orcid.org/0000-0001-5353-2017.

** DEKIS Research Group, Department of Economics, Catholic University of Avila, Spain. E-mail: mangel.echarte@ucavila.es. Orcid: https://orcid.org/0000-0001-6494-6506.

x LuMo Research Group, Department of Economics, Catholic University of Avila, Spain. E-mail: david.sanz@ucavila.es. Orcid: https://orcid.org/0000-0003-0983-2965.

xx Associate Professor at King Juan Carlos University, Spain. E-mail: c.p.rico@gmail.com. Orcid: https://orcid.org/0000-0002-4154-5483. Submitted: 21/June/2022; Approved: 15/December/2022.

achieved as the acceptance has been very low and there has been a depreciation of the asset in recent months.
KEYWORDS: Dollarization; volatility; currency stability; remittances; inflation; cryptocurrency.
JEL Classification: E40; E42; E44; E52; E58.

INTRODUCTION

On June 8, 2021, the Legislative Assembly of El Salvador approved the Bitcoin Law that grants this digital asset the status of legal tender, making the Central American country the first in the world to legally adopt it. This has meant great uncertainty about the evolution of the country's economy, but it has also opened the way for other countries to allow the use of bitcoin and other currencies based on blockchain technology as an official means of payment.

At the same time there are other countries that are taking totally opposite measures against the use of crypto assets such as India, Turkey, and China (Floro Soler, 2021). The latter country banned financial institutions from operating with these virtual currencies in May 2021, totally banning their use. The reason behind this decision is its commitment to its own decentralized virtual currency, the digital yuan. In this way it avoids possible competition with other consolidated digital currencies such as bitcoin.

These two positions are generating important debates worldwide about the future of fiat currencies and cryptocurrencies (Echarte et al., 2022). That is why the study of the effects of the implementation of this blockchain-based currency as a national currency in El Salvador is arousing great interest in the international community.

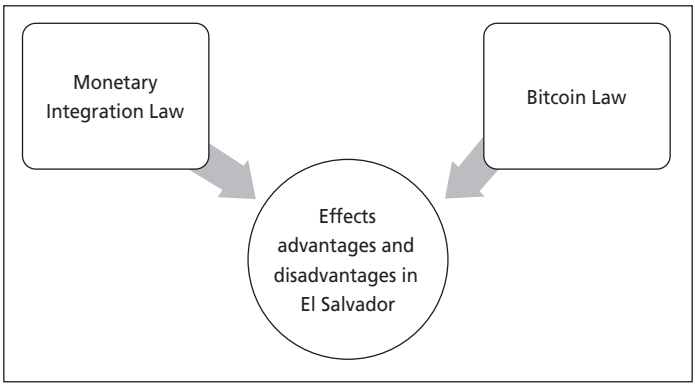
To analyze the possible effects of this measure, it is necessary to understand the economic context of the country. Among the relevant facts, it should be noted that El Salvador has been a dollarized country since 2001, when the Monetary Integration Law (MIL), approved by the Assembly at the end of 2000, came into force. This official dollarization of the economy did not take place in a context of financial crisis, as it did in Ecuador in 2000. At that time El Salvador had a fixed exchange rate system between the dollar and the colon (8.75 colons per dollar), however, interest rates in colons were much higher than those in dollars. This caused the government of Francisco Flores (Arena Party) inspired by Manuel Hinds (Minister of Finance in the 1994-1999 period) to consider that a dollarized economy would attract more foreign investment and, therefore, boost development (Fabris & Vujanović, 2017).

The objective of this article is to analyze the economic consequences of the Monetary Integration Law (MIL) and the Bitcoin Law. In the case of the MIL, more data is available as more than 20 years have passed since its approval.

MATERIALS AND METHODS

The present research belongs to the field of economic analysis of law (Auerbach, Feldstein &Feldstein, 2002; Posner, 2008; Aragón, 2018; Doménech, 2014). The macroeconomic consequences of two monetary legislations will be analyzed using as main source the laws approved by the National Assembly of El Salvador. On the other hand, different interpretations of the most relevant aspects from the economic point of view will be shown using secondary sources and data from official agencies such as the World Bank or the International Monetary Fund (IMF), used to elaborate the graphs presented. Data related to the purchases of this cryptocurrency by the government will be presented calculating the profitability or potential loss to date and the evolution of the availability of ATMs in the country.

Figure: 1 Applied analysis methodology



Source: Own elaboration based on Auerbach, Feldstein & Feldstein, 2002; Posner, 2008; Aragón, 2018; Doménech, 2014.

In order to apply the methodology described in Figure 1, we first analyze the effects derived from the law of monetary integration. For this purpose, we take as a measure of analysis interest rates and inflation (Ghalayini, 2011; Olayungbo & Ajuwon, 2015; Fabris & Vujanović, 2017); and the unfavorable aspects of this scheme are mentioned. The above serves to lay the foundation of the country's starting situation, prior to the implementation of the second measure we analyzed. In order to fulfill the main objective of the research, we study the possible consequences of the introduction of the so-called Bitcoin Law, due to the recentness of this measure and the innovation it implies in the monetary field. To do so, we take as a measure of analysis the acquisitions of this cryptoasset made by the Salvadoran government and the potential loss or gain that these investments have to date (Bouri, Shahzad & Roubaud, 2019; Kyriazis, 2020; Fantazzini & Calabrese, 2021; Fantazzini, 2022). This allows us to assess the measure from a public finance perspective. On the other hand, to analyze the possible impact on financial inclusion (Vincent & Evans, 2019; Mota Makore et al., 2023), we take as a measure the geographic distribution of Chivo ATMs across the country (Alvarez et al., 2022).

Finally, and before including a table with the advantages and disadvantages of this measure, we analyze the evolution of the bitcoin price from the approval of the law until October 2022.

RESULTS

Monetary Integration Law

On November 30, 2000, the MIL was approved by simple majority in the Legislative Assembly with the support of the government party (ARENA) and the National Concertation Party (PCN). This law was approved with the opposition of the Farabundo Martí National Liberation Front (FMNL) and without popular support (it was not submitted to consultation). As a result, some associations and parties filed appeals before the Supreme Court of Justice for unconstitutionality. The implementation of this law implied bimonetarism, that is, the coexistence of two currencies: the colón and the dollar. The result was that the foreign currency was imposed over the national currency. As Hinds (2010) indicates: "In El Salvador, the law converted all bank accounts to dollars and allowed colón banknotes to continue circulating. These, however, disappeared after a few months due to lack of demand".

The MIL has 25 articles. The first of them establishes the exchange rate between the two currencies, which maintains the one that existed before. Article 3 states that: "The dollar will be unrestricted legal tender with unlimited liberatory power for the payment of money obligations in the national territory" (Legislative Assembly, 2000). Article 4 establishes that banks are obliged to exchange colones in circulation for dollars. In other words, although both currencies were allowed, there is a clear preference for the dollar in the law, which, together with the lower demand for colones, as Hinds pointed out, caused them to go out of circulation. This is reflected in Article 5 (Legislative Assembly, 2000, p.2):

> The colón banknotes and their fractional coins issued prior to the effectiveness of the present law shall continue to be unrestricted legal tender on a permanent basis, but the institutions of the banking system shall exchange them for dollars when presented to them for any transaction. The Central Reserve Bank of El Salvador shall provide the dollars to the banks of the system, by means of the respective exchange. The exchange between dollars and colones in cash, whether it is made by the Central Reserve Bank of El Salvador to the banks of the system or by the latter to the users of the same, shall not generate any type of commission or charge. Violation of the above will be sanctioned by the Superintendence of the Financial System with a fine equivalent to one hundred times the commission or charge collected...

However, as previously mentioned, the coexistence of the two currencies was allowed, as stated in Article 7: "Salaries, wages and fees may be denominated and

paid in colones or dollars" (Legislative Assembly, 2000, p.2): The MIL substituted certain articles of the Organic Law of the Central Reserve Bank and the Banking Law to implement dollarization.

The effects of dollarization in El Salvador

Although the country dollarized its economy in 2001, which meant the loss of monetary autonomy on the part of the Central Reserve Bank, this entity continued to exist, although dedicated to other functions (banking supervision, statistics, etc.). This situation also occurred in Ecuador. However, the existence of a Central Bank is not a condition that is always met in dollarized countries. Panama is a country whose currency is the U.S. dollar and does not have this institution, although it is true that this nation-state, which emerged in 1903 after its independence from Colombia, never had its own currency (Echarte & Martínez, 2018a).

The reasons for dollarization in El Salvador did not arise from a macroeconomic crisis. As Swiston (2011, p.3) exposes:

> El Salvador's decision to make the U.S. dollar its official currency was made in the context of sound macroeconomic fundamentals. Inflation was low and stable, the economy was growing, public and external debts were manageable, and there was no turmoil in the banking system. The arguments in favor of dollarization were based on the fact that it would strengthen ties with the U.S. economy and stimulate foreign investment, trade and economic growth.

One of the main advantages of dollarization is that, by eliminating exchange rate risk, it is possible to finance long-term projects at low interest rates. According to Hinds (2010):

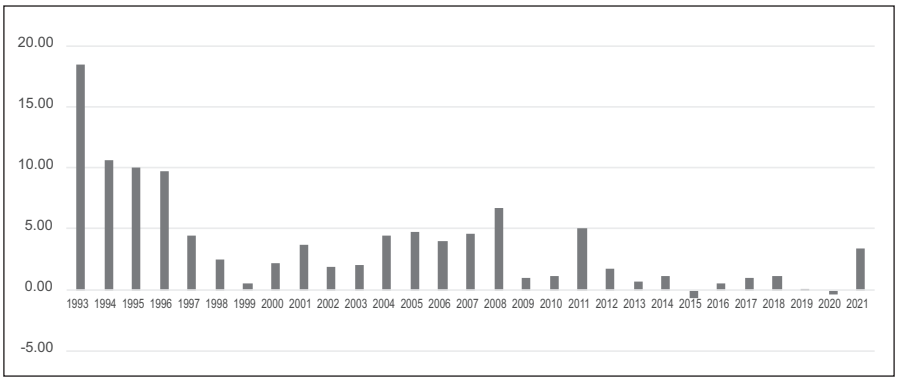
> Before dollarization, there were medium and long-term loans, but, as in other countries, they were denominated in dollars, which generated a very serious exchange risk. If the colon was devalued, the amount in colones of the dollar loans would increase proportionally, threatening serious losses to borrowers and the banks themselves. With dollarization, borrowers can take long-term loans without exposing themselves to this risk.

Specifically, interest rates fell from 20% to 6% in a very short time and inflation rates approached those of the U.S.

Some authors in the country (Gónzalez-Orellana, 2008; Glower, 2010, 2011; Arias, 2017) have spoken out against dollarization and have openly proposed a return to the local currency. According to critics, this measure has eliminated one of the most important tools of economic policy, such as the possibility of devaluing in times of crisis to promote exports and economic growth (Diallo et al., 2023).

The following graph shows the evolution of the annual general Consumer Price Index (CPI) since the end of the civil war (1980-1992) until 2021.

Figure 2: Evolution of inflation (measured by CPI, in percentages) in El Salvador



Source: Own Elaboration with data from the World Bank.

Despite the fact that the FMNL party opposed the dollarization of El Salvador's economy, when they won the elections in 2009, and during the ten years of their government (with two presidents: Mauricio Funes and Salvador Sánchez Cerén), they did not take any measures to reverse the use of the U.S. dollar as the national currency. The main reason was the high political and economic cost that such a measure would have. Something similar happened in Ecuador with the coming to power of Rafael Correa in 2007, who was very critical of dollarization, but maintained it throughout.

However, academics opposed to dollarization point out that de-dollarization would bring some advantages. As Glower (2011, p.359) points out:

> The Salvadoran government constantly repeats that the costs of de--dollarization are very high. Although it has never specified what those costs are, it should consider the benefits of de-dollarization in the calculation equation. Initially, the billions of dollars in annual remittances would go to a reinstated Central Bank, to be used productively in economic reactivation funds to overcome the critical recession the country is going through; the national development banks could be recapitalized and a program and credit policy could be established with its own funds to promote agriculture, industry, tourism and small and medium industry. Also, the Central Bank would recover its exchange and monetary capacity to lessen the growing mismatches in the fiscal and external accounts, for the good of the entire population.

As can be seen, there is an academic debate about the consequences of dollarization and it is more open than the one that may exist in Ecuador or Panama (Zalles, 2016; Echarte, 2021).

Bitcoin Law

El Salvador's President Nayib Bukele has launched a very risky initiative by accepting bitcoin as legal tender (Sandoval-Guzmán, López-Ortega, Domínguez-Rivera & Rivera-Díaz, 2020; Gorjón, 2021; Alvarez et al., 2022; Alonso et al., 2022; McCall, 2022). The motivation for being the first country to allow the use of bitcoin as an official means of payment is the subject of speculation (Zablah, 2022). Investor interest and the volume of money invested in private cryptocurrencies (which partly limit the monopoly of central banks) has led many governments to consider creating a centralized virtual currency, known as Central Bank Digital Currencies (CBDCs) (Bindseil, 2019; Ayuso & Conesa, 2020; Náñez et al., 2021a). In the fourth quarter of 2020, the first one issued by the Bahamian government, the Sand Dollar, appeared. However, there are other countries or regions that are considering doing the same (Náñez et al., 2020). China has a very advanced digital yuan project; Sweden is also in the pilot phase with the e-krona and in October 2020 the European Central Bank (ECB) issued a report analyzing the advantages and disadvantages of the creation of the digital euro. The Salvadoran government, for its part, is committed to recognize bitcoin as the country's official currency and put it on an equal footing with the dollar (Zablah, 2022). The reason for this adoption does not respond to monetary reasons, since inflation is controlled by dollarization and interest rates are low (Sandoval-Guzmán, López-Ortega, Domínguez-Rivera & Rivera-Díaz, 2020; Zablah, 2022).

Other Latin American countries do have this problem, such as Argentina or Venezuela (Echarte et al., 2018b), where many of their citizens try to take refuge in the dollar or buy cryptocurrencies. The most likely reason for this measure is based on the relationship with the U.S. The Bukele government fears the imposition of sanctions for the diversion of the use of funds intended to reduce migration to the U.S. and in this way, remittances could be sent in bitcoins, thus lowering the excessive transfer costs paid to intermediaries.

One of the country's main macroeconomic problems is the fiscal imbalance, which is financed by the issuance of public debt, which closed 2020 at 89.9% of Gross Domestic Product (GDP) (Fusades, 2021). The need for liquidity to cover its public spending projects in a context of international crisis caused by the COVID-19 pandemic (Sandoval-Guzmán, López-Ortega, Domínguez-Rivera & Rivera-Díaz, 2020), led El Salvador to ask the IMF for a loan in the amount of 1.3 billion dollars, which was rejected, while the Chinese government granted one for 500 million. This is evidence that the Salvadoran government is making a shift in geopolitical alliances.

The Bitcoin Law entered into force ninety days after its publication in the Official Gazette and consists of 16 articles. One of the most controversial issues of the law is the fact that no technical study evaluating the advantages and disadvantages of the proposed measures has been presented or submitted to consensus with the opposition (Sandoval-Guzmán, López-Ortega, Domínguez-Rivera & Rivera-Díaz, 2020). According to Fusades (2021) the law is unconstitutional since this

cryptocurrency does not comply with the characteristics of national or foreign currency referred to in Article 131 of the Constitution. The most important articles of the law will be analyzed below.

Article 1 grants legal tender to bitcoin, as it is the most consolidated cryptocurrency because it was the first to appear, as well as being the most important in terms of volume. The text reads as follows (Legislative Assembly, 2021, p.1):

> The purpose of this law is to regulate bitcoin as legal tender, unrestricted with unlimited liberatory power in any transaction and under any title that natural or legal persons, public or private, may wish to carry out. The aforementioned in the previous paragraph is without prejudice to the application of the Law of Monetary Integration.

There are many studies that analyze the characteristics of bitcoin (Baraona & Nájera, 2018; Domínguez & García, 2019) but among the most important it is possible to point out that it is a virtual currency based on blockchain technology, that the final supply will be limited to 21 million, that its value is independent of the decisions of central banks and that it is not regulated by national governments. At the moment its demand has a large speculative component (expectations of price increases in the future). Its high volatility makes it difficult for it to be a widely accepted means of exchange. All transactions in this cryptocurrency are supervised by miners, who are rewarded for solving mathematical problems based on logarithms. Mining requires a great deal of computing power and expensive equipment. It is estimated that to date most miners are concentrated in China because of the proximity to technology providers and the lower cost of electricity (Jiang et al., 2021). The high energy consumption demanded by this activity is an important factor since according to recent studies the energy consumption of bitcoin mining exceeds that of many large countries (Náñez et al., 2021b). In addition, cost is a major constraint that makes this activity unprofitable in many countries. The legalization of bitcoin in El Salvador implies the possibility of attracting investment for mining. In fact, President Bukele has ordered the public geothermal energy company (LaGeo) to develop a plan to receive these investments, which could use the energy released by the country's volcanoes.

In November 2021, a few months after the law came into force, President Bukele announced at the Feel the Bit conference the project to create a Bitcoin City in the department of La Libertad with the idea of promoting cryptocurrency mining by harnessing the geothermal energy of volcanoes (Kumar, 2022). The city will be a special zone as it will be exempt from many taxes. To finance the project, the government will issue 10-year volcano bonds, with an interest rate of 6.5%. The government expects to raise $1 billion (the same amount it was recently denied by the IMF), half of which will be used to buy bitcoins, in the hope that they will appreciate in value, and the other half to build the city. The government will grant Salvadoran citizenship to investors who buy $100,000 in these bonds (Sandoval et al., 2020).

Article 2 states that the exchange rate between the two currencies is floating, i.e., it is freely established by the market based on supply and demand. In this way it is established that in no case can the exchange rate be fixed. Article 3 establishes that the prices of both tangible and intangible products may be expressed in bitcoin, and Article 4 establishes that tax obligations may be paid in bitcoin as well as in dollars. These three articles are very important because they allow both individuals and legal entities to use only bitcoins, collecting and paying in this cryptocurrency. This would reduce the exchange rate risk, which is one of the main problems of operating in both currencies, due to the high volatility of this cryptoasset. In any case, it seems clear that the dollar will continue to be the unit of account within the country and the reference for economic operations, so we will have to wait a while to know how the process of establishing the value of the value of payment obligations to public administrations and prices in general will work.

Article 5 indicates that transactions made in bitcoin are not subject to capital gains tax, because it is considered a legal currency like the dollar. This measure avoids discouraging the use of bitcoin, because the application of the tax would mean an increase of 10% of the value to be paid in this currency.

While it is true that the supporters of bitcoin and decentralized private currencies defend these assets because they grant users greater monetary freedom and there are even authors (Ammous, 2018a, 2018b; Sanz Bas, 2020) who have assimilated these assets with the competition model of issuing banknotes without a central bank or compulsory tender laws that was once proposed by the Austrian economist Friedrich Hayek, a great advocate of monetary freedom, these advantages are exhausted when their use is imposed. That is why one of the most controversial articles is Article 7, which establishes that: "All economic agents must accept bitcoin as a form of payment when it is offered by the person acquiring a good or service" (Legislative Assembly, 2021, p.2). The controversy lies in the forced use, i.e., that a seller cannot refuse to deliver his goods or services in exchange for bitcoins (Selgin, 2021). According to Hayek (1978, p.37) this may be detrimental to the development of economic activity:

> The truth is that legal tender is simply a legal ploy to force people to accept as performance of a contract something they never intended when they signed it. In this way it becomes, in some circumstances, a factor that intensifies business uncertainty.

In order to understand the profound difficulties in complying with this imposition, the following aspects must be taken into account:

1. Low percentage of bankarization of the population.
2. Low access to the Internet. In 2018 only 33.82% of the population was a user, far below the average of OECD countries which was around 60% (Zaballos et al., 2020).
3. Low knowledge of Internet use.

This is why it is possible to conclude that El Salvador does not have the infrastructure or the necessary knowledge to use cryptocurrency at the present time, at least during the time it takes for the government to promote this technology (Fusades, 2021).

However, Article 7 has an exception, which is contained in Article 12 (Legislative Assembly, 2021, p. 2):

> Excluded from the obligation expressed in Article 7 of the present law are those who for a notorious fact and in an evident manner do not have access to the technologies that allow executing transactions in bitcoin. The State shall promote the necessary training and mechanisms so that the population can access bitcoin transactions.

However, this exception raises many doubts as to its scope as it does not specify enough, and we will have to refer to the development of the regulations.

The following article, Article 13, states that debtors will have the option of paying their payment obligations expressed in dollars in bitcoins, which implies an imposition of acceptance of this asset by creditors. This implies a limitation of the financial freedom of these agents.

Finally, Article 14 aims to reduce foreign exchange risk. To this end, it establishes a mechanism that consists of the creation of a trust fund of US$150 million in the Development Bank of El Salvador (Bandesal), financed with public resources. This will serve as a guarantee to avoid significant losses in value when exchanging one currency for another. However, this entails a significant risk for the country due to the high volatility of bitcoin. If a depreciation of this cryptocurrency is expected, economic agents could exchange them in the short term for dollars reducing the reserves of this public fund. The trust guarantees the automatic and instantaneous conversion of bitcoins to dollars, as long as the alternatives provided by the State are used, as stated in Article 8 of the law.

The following table shows the bitcoin acquisitions made by the government of El Salvador since the bitcoin law was passed. It can be seen that, due to the depreciation of this cryptocurrency in recent months, these investments carry a high macroeconomic risk for the country.

Table 1: Salvadoran government bitcoin purchases

Date	Average purchase price: average $ / ₿ that day	Amount of bitcoin	Cost historic price * amount ($)	Current value current price * amount ($)	P/L value/cost comparison	% Win/loss
Sep 06, 2021	51769.06	200	10353812	6324264	-7006256	-67.67%
Sep 06, 2021	51769.06	200	10353812	6324264	-7006256	- 67.67%
Sep 07, 2021	52677.4	150	7901610	4743198	-5390943	-68.23%
Sep 20, 2021	47249.38	150	7087407	4743198	-4576740	- 64.58%
Oct 27, 2021	60345.17	420	25344971.4	13280954.4	-18315103.80	- 72.26%
Nov 26, 2021	58935.45	100	5893545	3162132	-4219767	- 71.6%
Dec 04, 2021	48670	150	7300500	4743198	-4789833	- 65.61%
Dec 22, 2021	48934.57	21	1027625.97	664047.72	-676132.59	- 65.8%
Jan 21, 2022	36585.37	410	15000000	12964741.2	-8137510.20	-54.25%
May 09, 2022	30744	500	15372000	15810660	-7003110	-45.56%
July 01, 2022	19 000.00	80	1520000	1339022.40	-180977.60	-11.91%

Source: Own elaboration based on data (11/11/2022) from https://nayibtracker.com/.

The table shows all the purchases that the Government of El Salvador has made since it decided to make Bitcoin legal tender. With this we can observe the success or failure of the established financing policy. To do this, we have turned to the reports on purchases made. The first column shows the date of purchase. The second column shows the average purchase price of bitcoin in U.S. dollars. The third column shows the number of bitcoins that were purchased, so if we multiply the average purchase price (second column) with the number of bitcoins purchased, we obtain their value in dollars (reflected in the fourth column). In the fifth column, the current value of the investment in U.S. dollars is reflected (taking as bitcoin value that of November 11, 2022).

This allows us to calculate in column 6 the difference between the cost of bitcoins (column 4) and the current value of bitcoin (column 5). As we can see, to date, the decision to purchase bitcoin as an investment medium can be described as a failure; it yields losses on all transactions. The return on each purchase ranges from -11.91% to -72.26%.

The following table shows the total values.

Table 2. Total bitcoin purchases by the Salvadoran government (11/11/2022)

Average purchase price: average $ / ₿ that day	Amount of bitcoin	Cost historic price * amount ($)	Current value current price * amount ($)	P/L value/cost comparison	% Win/loss
$ 45.004.32	2381	$ 107.155 283.37	$ 39.852654.18	-$ 67.302.629.19	-62,81%

Source: Own elaboration based on data from Table 1.

As we can see, the accumulated losses derived from the investment in bitcoin by the government of El Salvador amount to -$67.302 629.19 or -62,81% on average.

DISCUSSION

According to consular records, 40% of the resident population of El Salvador is emigrant, of which 88% resides in the United States (Courtis et al., 2011). In 2011, the immigrant population of Salvadoran origin amounted to almost two million in the American country (Gaborit, 2017). The reasons for this diaspora are related to the possibility of improving the quality of life of individuals and families, reasons that coincide with processes of similar characteristics that have occurred in other Latin American countries such as Ecuador (Pérez, Fernández & Medrano, 2019). As a consequence, remittances have a relatively high importance in the country's GDP. In 2020 they accounted for approximately 16% of GDP, and the U.S. is by far the main origin of these current transfers (Fusades, 2021). A significant part of the country's population, around 2.5 million people, reside in the U.S. and send funds to the country of origin. According to the Central Reserve Bank, the country received US$5,918 million in family remittances in 2020, 4.8% more than the previous year. Therefore, one of the main advantages of bitcoin adoption has to do with the remittances sent by emigrants, which could be increased, especially those coming from the U.S., since the commissions paid to operating companies such as Western Union, MoneyGram, Ria Financial Services, Xoom Corporation, etc. or to financial institutions would be eliminated. This would result in significant savings for many families and a reduction in transaction costs. The infrastructure to make these shipments with bitcoins supported by the Salvadoran government is the Strike platform, with which it reached an agreement months ago.

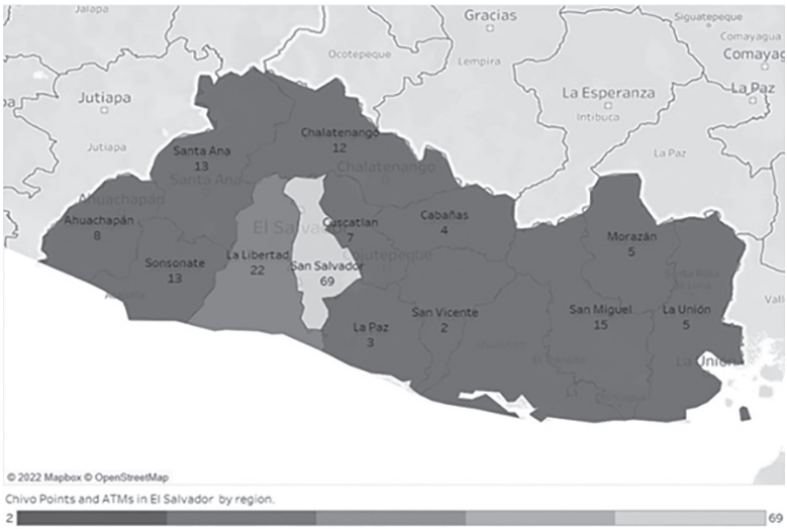
To carry out this transaction towards the widespread use of bitcoin in the economy, it has been necessary to invest in technological innovation, such as that carried out for the creation of the bitcoin wallet called Chivo. At the end of June 2021, President Bukele announced its creation. To encourage the population to use it he will hand out $30 in bitcoins to all citizens who download and make use of it (Maldonado, 2021). President Bukele made the following statement (Bukele, 2021): "These funds cannot be converted to dollars since the government's intention is that they be spent to promote the use of bitcoin as legal tender". The wallet will operate on Bitcoin's Lightning network, i.e., transactions will take place outside the blockchain. Being offchain transactions, payments will not require block confirmations and will be carried out instantaneously (Criptonoticias, 2021). As for converting dollars to bitcoin or vice versa, Bukele said it is free, not mandatory, and can be done from the app, at any time, at the market price. The use of Chivo facilitates transfers without commissions, which will allow sending and receiving remitance and money saving costs to citizens and businesses (Mariña, 2021). Bukele (2021) thus expressed some interesting issues related to possible cost savings that the country can achieve:

> And for those who ask where the Government will get the money to finance the ATMs, the workers of the Chivo points [...] I never saw them ask how we do to bring dollars from the United States, for which we pay 100% of their printed value, plus air transportation, insurance, custody, transportation, and ground security [...]. Yes, everything is absorbed by the Government. The same will be done with bitcoin, only much, much cheaper.

Despite the advantages of the goat wallet, there have been many reports of identity theft to cash in the $30 bitcoin bonus, as the application only asks for the user's ID number and date of birth. Therefore, the use of bitcoin as legal tender can reduce the demand for dollars and, therefore, all the costs associated with this that the Government of El Salvador is assuming (Náñez Alonso et al., 2023). However, it will be necessary to analyze whether the savings are greater than the new costs to be assumed. Among these are the costs associated with the creation and maintenance of the 200 Chivo points (between ATMs and branches) that are intended to be installed (Presidency of the Republic of El Salvador, 2021) including the salaries of the employees of these points.

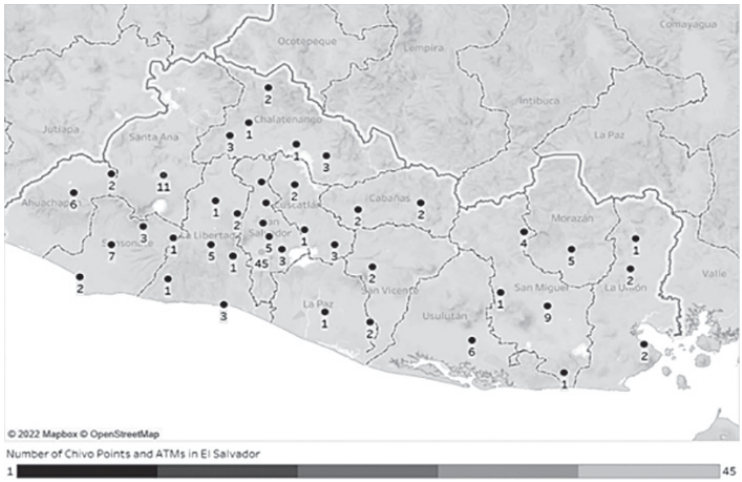
There are currently 184 Chivo ATMs in the country with the geographic distribution shown in the following maps.

Figure 3: Chivo ATM map in El Salvador



Source: Own elaboration based on data from https://chivowallet.co
(Due to lack of space, 7 points north of the capital, San Salvador, are not shown).

Figure 4: Distribution of Chivo ATMs
within each regional department



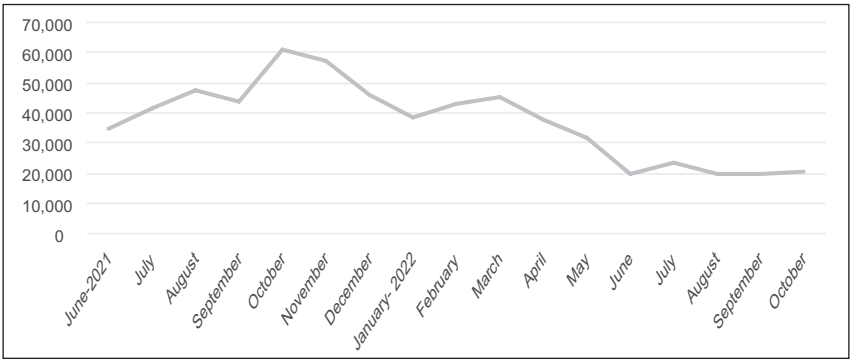
Source: Own elaboration based on data from https://chivowallet.com/
(Due to lack of space, 7 points north of the capital, San Salvador, are not shown).

If the success of bitcoin implementation is measured by the number of Chivo points planned and those currently in service, it could be said that the policy has been successful. The government pledged to install 200 points and currently has 184 (a very close figure). Moreover, the territorial distribution seems adequate, as the points on the map coincide with the most important cities in the country. Although it could be criticized here that, if one of the objectives of establishing bitcoin as legal tender is to improve financial inclusion, it is leaving aside underdeveloped areas, where financial inclusion is less guaranteed (Mota Makore et al., 2023; Almeida & Gonçalves, 2023).

If after the issuance of the analyzed law, bitcoin was to become a widely accepted means of exchange, its purchasing power would increase, benefiting the country's economic agents who had their assets denominated in this cryptocurrency, although a sudden appreciation would harm those agents who had debts in bitcoin. The government's bet is clearly based on this scenario. Another potential advantage is to attract investment for mining the cryptocurrency which could foster economic growth.

However, the move has several obvious risks. The main drawback is the high volatility of its price in the short term, heavily influenced by the movements of large investors (Fantazzini & Calabrese, 2021; Fantazzini, 2022; Gupta & Chaudhary, 2022). These price fluctuations will affect economic transactions, especially those with deferred payments (Kyriazis, 2020; Fabris & Ješić, 2023). In some periods, volatility has caused variations of around 30%-40% per month (Bouri, Shahzad & Roubaud, 2019; Agosto & Cafferata, 2020). The following graph shows the evolution of the monthly price of bitcoin from the passing of the law to the present day.

Figure 5: Evolution of bitcoin price (in dollars) June 2021-October 2022.



Source: Own Elaboration with data from
Investing.com: https://es.investing.com/crypto/bitcoin/btc-usd-historical-data.

One of the factors that is most affecting the price of cryptocurrencies in general is the collapse of some stablecoins such as the Luna / Terra pair caused by the distrust of many investors that TerraUSD would maintain parity with the dollar. This occurred in May 2022, but November saw the bankruptcy of FTX, one of the most important cryptocurrency exchanges in the world.

There is also the cost of exchanging bitcoins to dollars and vice versa. Chicago-based Athena has installed several ATMs to buy and sell the cryptocurrency and is planning to expand its network in El Salvador following the approval of the law. The cost of the currency exchange is around 5%. This cost is higher than the average for traditional remittance, which is around 2.85% (World Bank, 2021). El Salvador is one of the Latin American countries to which it is cheapest to send remittances from abroad (World Bank, 2021). However, this disadvantage would disappear if there were no currency exchange, and all transactions were carried out in bitcoin.

One of the most important risks of the use of cryptocurrencies, comes from the anonymity of transactions in this virtual currency, which poses a potential risk in the increase of money laundering operations and other criminal activities using this technology to hide the name of the participants (Albrecht et al., 2019; Butler, 2019; Chowdhury, 2019; Sanz Bas et al., 2021, Fusades, 2021; Ozili, 2022a). However, illegal transactions are conducted both through cryptocurrencies and through other means (cash, banking system, etc). There is no evidence that cryptocurrencies are more effective for these activities.

The last risk is the possibility that the population does not accept the use of bitcoin (Alonso et al., 2023; Ozili, 2022b). According to a study by Disruptiva, a center of the Francisco Gavidia University, a survey was conducted on the satisfaction of Salvadorans about the Bitcoin Law. According to this source, 53.5% of the people surveyed consider the measure as "not at all correct" and 24% as "not very correct". The poll was conducted in early July and included more than 1,200 re-

spondents. Among the results, it stands out that 46% claim not to know anything about cryptocurrencies.

The following table summarizes the main advantages and risks of bitcoin legalization:

Table 3: Advantages and risks of the Bitcoin Law

Advantages of bitcoin adoption	Risks of bitcoin adoption
Reduction of remittance fees, which may increase the amount of current transfers from the U.S. (Sparkes, 2022; Sorto Rivas, 2022; Mohammed et al., 2023)	Increased macroeconomic risk. The approval of the Bitcoin Law may harm future negotiations with the IMF due to increased country risk (Fusades, 2021)
It can foster financial innovations by promoting the financial inclusion of a significant portion of the population that is unbanked but has a cell phone. (Vincent & Evans, 2019: Alonso et al., 2022)	Environmental risk. Mining of this asset generates high electricity consumption. (Jiang et al, 2021).
It can drive the adoption of bitcoin as a medium of exchange internationally. (Sparkes, 2022)	High volatility of the digital asset, which generates commercial uncertainty and makes economic calculation difficult. Bitcoin is far from being a widely accepted medium of exchange. (De Oliveira Monteiro et al., 2019; Sorto Rivas, 2022) If there is a depreciation in the future economic agents who have saved in that asset will lose part of their wealth.
Attraction of investment for the mining of this digital asset. (Alvarez et al., 2022)	Transaction costs are added when switching from dollars to bitcoin, and vice versa. In fact, this cost is currently higher than traditional remittance. (Fusades, 2021)
If the price of bitcoin increases in the future, economic agents who have saved in this digital asset will see their wealth increase. (Fantazzini & Calabrese, 2021; Fantazzini, 2022)	May encourage money laundering activities. (Fusades, 2021)
Increase in state digital education initiatives for the general population. (Sparkes, 2022)	Disagreement of the population with the use of bitcoin as legal tender. (Alvarez et al., 2022)

Source: Own Elaboration.

CONCLUSIONS

The two laws analyzed are the ones that have had the greatest influence on monetary policy in El Salvador. They have been adopted in periods when there was no crisis of a monetary nature with the objective of boosting economic growth and attracting investment in a country that has a series of economic and social problems of great magnitude. The adoption of the dollar as the country's official currency has provided monetary stability. However, this measure has not solved all the macroeconomic problems.

The Bitcoin Law arises in a different context in which there are great financial needs, due to the serious economic situation caused by the COVID-19 pandemic. This law may have positive consequences such as increased remittances and the possible appreciation of bitcoin in the coming years, but it also has significant risks. Price volatility and the use of these assets to carry out transactions outside the law are the most important. This legislative framework supports the consolidation of bitcoin as a global currency, in contrast to the attitude of many governments, which seek to limit transactions with these assets. The most controversial measure imposed by this law is the compulsory use and acceptance of this currency in transactions carried out in the country, which is reflected in Articles 7 and 13. This would encourage competition and monetary freedom. The Monetary Integration Law brought important benefits to the country's economy: it eliminated currency risk and promoted monetary stability. The Bitcoin Law, however, entails uncertainty about its impact on the economy: it increases risk and makes economic calculation difficult. The bitcoin is a newly created currency compared to the FIAT currency. It is just over ten years old and can be considered a startup currency. Such a recent history implies uncertainty as to its sustainability and maintenance over time. A limitation in the analysis of the effects of the Bitcoin Law is the short time that has elapsed, but it can be mentioned that there have been important advances in the availability of Chivo ATMs in large areas of the country but that the macroeconomic risk is very high as a consequence of the evolution of the bitcoin price in the last year.

REFERENCES

Agosto, A., & Cafferata, A. (2020). Financial bubbles: A study of co-explosivity in the cryptocurrency market. *Risks*, *8*(2), 34. https://doi.org/10.3390/risks8020034

Albrecht, C.; Duffin, K. M.; Hawkins, S.; Morales Rocha, V. M. (2019). The use of cryptocurrencies in the money laundering process. Journal of Money Laundering Control, (2019), 22(2), 210–216. https://doi.org/10.1108/jmlc-12-2017-0074

Almeida, José, and Tiago Cruz Gonçalves. 2023. A Decade of Cryptocurrency Investment Literature: A Cluster-Based Systematic Analysis. *International Journal of Financial Studies* 11(2):71. doi: 10.3390/ijfs11020071.

Alonso, S. N., Fernández, M. A. E., Vázquez, J. J., & Szymla, W. (2022). CBDC y DEFI en el Caribe, Sudamérica y Centroamérica: análisis de la situación. In *Digitalización de empresas y economía: tendencias actuales* (pp. 282-306). Dykinson.

Alonso, Sergio Luis Náñez, Javier Jorge-Vázquez, Pablo Arroyo Rodríguez, and Beatriz María Sastre Hernández. 2023. "Gender Gap in the Ownership and Use of Cryptocurrencies: Empirical Evidence from Spain." *Journal of Open Innovation: Technology, Market, and Complexity* 9(3):100103. doi: 10.1016/j.joitmc.2023.100103.

Alvarez, F., Argente, D., & Van Patten, D. (2022). Are cryptocurrencies currencies? Bitcoin as legal tender in El Salvador. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.4094160

Ammous, S. (2018a). El patrón Bitcoin: La alternativa descentralizada a los bancos centrales, 1st. Ed. Deusto: Madrid, España.

Ammous, S. (2018b). Can cryptocurrencies fulfil the functions of money? *The Quarterly Review of Economics and Finance*, *70*, 38–51. https://doi.org/10.1016/j.qref.2018.05.010

Aragón, N. Q. (2018). Análisis económico del derecho. Dykinson. http://dx.doi.org/10.2307/j.ctv6gqx9r

Arias, S. (2017). Regreso del colón a El Salvador y Derrumbe de imperialismo del dólar, 1st ed.; Asociación para el desarrollo económico y social de El Salvador: El Salvador, El Salvador.

Asamblea Legislativa. (2000). Ley de Integración Monetaria. El Salvador. https://www.asamblea.gob.sv/sites/default/files/documents/decretos/171117_072919515_archivo_doc umento_legislativo.pdf

Asamblea Legislativa. (2021). Ley Bitcoin. El Salvador. https://www.asamblea.gob.sv/sites/default/files/documents/decretos/E0B1DD6E-D839-486E-ACF4- A24C3B62866E.pdf

Auerbach, A. J., Feldstein, M., & Feldstein, M. S. (2002). Handbook of Public Economics. North Holland.

Ayuso, J., & Conesa, J. C. (2020). Una introducción al debate actual sobre la moneda digital de banco central (CBDC) (An Introduction to the Current Debate on Central Bank Digital Currency (CBDC)). SSRN Electronic Journal. https://doi.org/10.2139/ssrn.3617558

Baraona Pohl, E.; Najera Reyes, C. El peso de Bitcoin. ARQ, (2018),98, 32–43. https://doi.org/10.4067/s0717-69962018000100032

Bindseil, U. (2019). CBDC – Financial system implications and control. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.3385283

Bukele, N. (2021, June 28). Aclarando la desinformación que están tratando de esparcir acerca de la LeyBitcoin de El Salvador [Twitter]. https://twitter.com/nayibbukele/status/1409590114238353411

Butler, S. Criminal use of cryptocurrencies: A great new threat or is cash still king? Journal of Cyber Policy, (2019), 4(3), 326–345. https://doi.org/10.1080/23738871.2019.1680720

Chowdhury, N. (2019). Crime, criminals and cryptocurrencies. In Inside Blockchain, Bitcoin, and Cryptocurrencies (pp. 295–316). Auerbach Publications. http://dx.doi.org/10.1201/9780429325533-18

Coinmap. Avalaible online: https://coinmap.org/view/#/world/-24.20688962/35.68359375/2 (accessed on 27 December 2021)

Courtis, C.; Ferrer, M.; Vono de Vilhena, D.; Canales Cerón, A. I. (2011). Migración internacional en América Latina y el Caribe: nuevas tendencias, nuevos enfoques. CEPAL. https://repositorio.cepal.org/handle/11362/35288

Criptonoticias. (2021, June 29). Bukele revela cómo funcionará Chivo, la wallet salvadoreña de bitcoin. CriptoNoticias-Noticias de Bitcoin, Ethereum y Criptomonedas. https://www.criptonoticias.com/comunidad/adopcion/bukele-revela-como-funcionara-chivo-wallet- salvadorena-bitcoin/

Datos históricos BTC/USD Bitfinex. Available online: https://es.investing.com/crypto/bitcoin/btc-usd-historical-data (accessed on 25 December 2021)

De Oliveira Monteiro, A. H., de Souza, A. D., Batista, B. G., & Zaparoli, M. (2019). Market prediction in criptocurrency. *Proceedings of the XV Brazilian Symposium on Information Systems*. http://dx.doi.org/10.1145/3330204.3330272

Diallo, Oumar, Steve Loris Gui-Diby, and Patrick A. Imam. 2023. "Do Monetary Policy Outcomes Promote Stability in Fragile Settings?" *Applied Economics* 1–17. doi: 10.1080/00036846.2023.2168612.

Doménech, G. (2014). Por qué y cómo hacer análisis económico del derecho. Revista de Administración Pública, 195, 99-133.

Domínguez Jurado, J. M.; García Ruiz, R. (2019). Blockchain y las criptomonedas: El caso bitcoin. Oikonomics, 10, 58–73. https://doi.org/10.7238/o.n10.1813

Echarte Fernández, M. A.; Martínez Hernández, M. (2018a). Análisis de los efectos de la dolarización espontánea y oficial en Hispanoamérica: La perspectiva keynesiana y liberal del sistema monetario. Revista Lasallista de Investigación 15(2), 22-48. https://doi.org/10.22507/rli.v15n2a3

Echarte Fernández, M. Á., Martínez Hernández, M., & Zambrano, O. (2018b). Un análisis de la crisis económica de Venezuela desde los postulados de la Escuela Austríaca de Economía. Revista Lasallista de Investigación, 15(2), 68–82. https://doi.org/10.22507/rli.v15n2a5

Echarte, M. A. (2021). Experiencias de dolarización en América Latina: un análisis desde el enfoque de la escuela austríaca de economía. Ecuador, un país dolarizado: pasado, presente y futuro. USFQ Press e Instituto Ecuatoriano de Economía Política.

Echarte Fernández, M. Á., Náñez Alonso, S. L., Reier Forradellas, R., & Jorge-Vázquez, J. (2022). From the Great Recession to the COVID-19 Pandemic: The risk of expansionary monetary policies. Risks, 10(2), 23. https://doi.org/10.3390/risks10020023

Fabris, N., & Ješić, M. (2023). Are gold and bitcoin a safe haven for European indices? *Journal of Central Banking Theory and Practice*, *12*(1), 27–44. https://doi.org/10.2478/jcbtp-2023-0002

Fabris, N., & Vujanović, N. (2017). The impact of financial dollarization on inflation targeting: Empirical evidence from Serbia. *Journal of Central Banking Theory and Practice*, *6*(2), 23–43. https://doi.org/10.1515/jcbtp-2017-0011

Fantazzini, D., & Calabrese, R. (2021). Crypto exchanges and credit risk: Modeling and forecasting the probability of closure. *Journal of Risk and Financial Management*, *14*(11), 516. https://doi.org/10.3390/jrfm14110516

Fantazzini, D. (2022). Crypto-Coins and credit risk: Modelling and forecasting their probability of death. *Journal of Risk and Financial Management*, *15*(7), 304. https://doi.org/10.3390/jrfm15070304

Floro Soler, R. (2021). Bitcoin y la desnacionalización del dinero: ¿patrón monetario o burbuja especulativa? Level of Thesis, Colegio Universitario de Estudios Financieros, Spain. https://biblioteca.cunef.edu/files/documentos/TFM%20Rodrigo%20Martin%20Floro%20Soler.pdf

Fusades. (2021). Ley Bitcoin: una ley que genera incertidumbre para los salvadoreños. Fundación Salvadoreña para el Desarrollo Económico y Social.

Gaborit, M.; Zetino, M.; Brioso, L.; García, J. J. (2017). Internados en el laberinto: El Salvador y su migración Irregular. Estudios Centroamericanos, 72(749), 133-164.

Ghalayini, L. (2011). The Impact of Dollarization on the Efficiency of Monetary in Lebanon: Interaction between Dollarization and Inflation. *Middle Eastern Finance and Economics*, *14*, 128–139.

Glower, C. (2010) Ensayos: la Economía Política de la Dolarización en El Salvador, 1st ed.; Imprenta Ricaldone.

Glower, C. Ante el fracaso: la desdolarización, ECA estudios centroamericanos, (2011), 66(726), http://www2.uca.edu.sv/upload_w/20/file/726/3-Carlos-Glower.pdf

González-Orellana, M. (2008). El Salvador: remesas, dolarización y crecimientos. Centro de Investigaciones en Ciencias y Humanidades, Universidad Dr. José Matías Delgado, El Salvador.

Gorjón Rivas, S. (2021). El papel de los criptoactivos como moneda de curso legal: el ejemplo de El Salvador. Boletín económico/Banco de España [Artículos], n. 4, 2021.

Gupta, H., & Chaudhary, R. (2022). An Empirical Study of Volatility in Cryptocurrency Market. *Journal of Risk and Financial Management*, *15*(11), 513. https://doi.org/10.3390/jrfm15110513

Hayek, F. [1978], (1996). La desnacionalización del dinero. Ediciones Folio.

Hinds, M. (2010). Los beneficios de la dolarización en El Salvador. El Cato Institute. https://www.elcato.org/los-beneficios-de-la-dolarizacion-en-el-salvador

Jiang, S.; Li, Y.; Lu, Q.; Hong, Y.; Guan, D.; Xiong, Y.; Wang, S. (2021). Policy assessments for the carbon emission flows and sustainability of Bitcoin blockchain operation in China. Nature Communications, 12(1). https://doi.org/10.1038/s41467-021-22256-3

Kumar, S. (2022). Review of geothermal energy as an alternate energy source for bitcoin mining. *Journal of Economics and Economic Education Research*, *23*(1), 1–12.

Kyriazis, N. A. (2020). Is bitcoin similar to gold? An integrated overview of empirical findings. *Journal of Risk and Financial Management*, *13*(5), 88. https://doi.org/10.3390/jrfm13050088

Maldonado, J. (2021, June 28). Chivo, la wallet de Bitcoin de El Salvador que donará $30 dólares a cada usuario. Bit2Me News. https://news.bit2me.com/chivo-la-futura-wallet-de-bitcoin-de-el-salvador

Mariña, E. (2021, July 5). Nayib Bukele aclara el uso de la Wallet Chivo. Territorio Bitcoin, Información Independiente de Bitcoin Blockchain y Fintech En España Desde 2014. https://www.territoriobitcoin.com/nayib-bukele-aclara-el-uso-de-la-wallet-chivo/

McCall, B. M. (2022). How El Salvador Has Changed US Law by a Bit: The Consequences for the UCC of Bitcoin Becoming Legal Tender. Oklahoma Law Review, 74(3), 313.

Mohammed, M. A., De-Pablos-Heredero, C., & Montes Botella, J. L. (2023). Exploring the Factors Affecting Countries' Adoption of Blockchain-Enabled Central Bank Digital Currencies. *Future Internet*, *15*(10), 321. https://doi.org/10.3390/fi15100321

Mota Makore, Shelton T., Patrick C. Osode, and Nombulelo Lubisi. 2023. "Facilitating Financial Inclusion Through the Development of a Decentralised Cryptocurrencies' Regulatory Regime in South Africa, Zimbabwe and Botswana." Pp. 57–83 in *Ius Gentium: Comparative Perspectives on Law and Justice*. Cham: Springer International Publishing.

Náñez Alonso, S.L.; Echarte Fernández, M.A.; Sanz Bas, D.; Kaczmarek, J. (2020). Reasons fostering or discouraging the implementation of central bank-backed digital currency: A review, Economies, 8(2), 41. https://doi.org/10.3390/economies8020041

Náñez Alonso, S. L., Jorge-Vazquez, J., & Reier Forradellas, R. F. (2021a). Central banks digital currency: Detection of optimal countries for the implementation of a CBDC and the implication for payment industry open innovation. Journal of Open Innovation: Technology, Market, and Complexity, 7(1), 72. https://doi.org/10.3390/joitmc7010072

Náñez Alonso, S.L.; Jorge-Vázquez, J.; Echarte Fernández, M.A.; Reier Forradellas, R.F. (2021b) Cryptocurrency mining from an economic and environmental perspective. Analysis of the most and least sustainable countries. Energies, 14(14), 4254. https://doi.org/10.3390/en14144254

Náñez Alonso, Sergio Luis, Miguel Ángel Echarte Fernández, Konrad Kolegowicz, David Sanz-Bas, and Javier Jorge-Vázquez. 2023. "¿Qué Impulsa La Adopción de CBDC o Bitcoin? Evidencia Derivada de La Experiencia Del Caribe, Centroamérica y Sudamérica." *Ensayos de Economía* 33(63). doi: https://doi.org/10.15446/ede.v33n63.105413.

Olayungbo, D., & Ajuwon, K. (2015). Dollarization, inflation and interest rate in Nigeria. *Journal of Applied Statistics*, *6*(1), 241–261.

Ozili, Peterson K. 2022a. "Central Bank Digital Currency Research around the World: A Review of Literature." *Journal of Money Laundering Control* 26(2):215–26. doi: 10.1108/jmlc-11-2021-0126.

Ozili, Peterson K. 2022b. "Decentralized Finance Research and Developments around the World." *Journal of Banking and Financial Technology* 6(2):117–33. doi: 10.1007/s42786-022-00044-x.

Pérez,C; Fernández, C.; Medrano, M.L. (2019). Influencia española en el tejido empresarial de Guayaquil y el sector cultural de Cuenca (1900-1960). Revista Chakiñan de Ciencias Sociales y Humanidades, (9), 57-71.

Posner, R.A. (2008). El Análisis Económico del Derecho. Fondo de Cultura Económica USA.

Presidencia de la República de El Salvador. (2021, June 28). Presidente Nayib Bukele aclara cómo se usará el bono que dará el Gobierno con la wallet Chivo. Presidencia de La República de El Salvador. https://www.presidencia.gob.sv/presidente-nayib-bukele-aclara-como-se-usara-el-bono--que-dara-el- gobierno-con-la-wallet-chivo/

Sandoval-Guzmán, K. M., López-Ortega, M. I., Domínguez-Rivera, P. E., & Rivera-Díaz, N. E. (2020). Perspectivas sobre utilización de criptomonedas para el financiamiento del endeudamiento público de la República de El Salvador. Revista Científica Multidisciplinaria de la Universidad de El Salvador. Revista Minerva, 3(2), 92-105.

Sanz Bas, D. Hayek and the cryptocurrency revolution. (2020).Iberian Journal of the History of Economic Thought, 7(1), 15–28. https://doi.org/10.5209/ijhe.69403

Sanz Bas, D; Del Rosal, C, Náñez Alonso, S. L y Echarte Fernández, M.A. (2021). Cryptocurrencies and fraudulent transactions: Risks, practices, and legislation for their prevention in Spain. Laws

Selgin, G. (2021). La ley Bitcoin: una falsa libertad para elegir la moneda. El Cato Institute. https://www.elcato.org/la-ley-de-bitcoin-una-falsa-libertad-para-elegir-la-moneda

Sorto Rivas, F. (2022). Situación económica en el marco de la adopción del Bitcoin como moneda de curso legal en El Salvador. *AKADEMOS*, *1*(36–37), 7–17. https://doi.org/10.5377/akademos.v1i36-37.14944

Sparkes, M. (2022). El Salvador revamps bitcoin system. *New Scientist*, *253*(3373), 8. https://doi.org/10.1016/s0262-4079(22)00215-9

Swiston A. (2011). Official dollarization as a monetary regime: Its effects on El Salvador. IMF Working Papers 11(129), 1. https://doi.org/10.5089/9781455258390.001

Vincent, O., & Evans, O. (2019). Can cryptocurrency, mobile phones, and internet herald sustainable financial sector development in emerging markets? *Journal of Transnational Management*, *24*(3), 259–279. https://doi.org/10.1080/15475778.2019.1633170

World Bank. Avalaible online: https://remittanceprices.worldbank.org/es/corridor/United-States/El-Salvador (accessed on 25 December 2021)

World Bank. https://datos.bancomundial.org/indicator/FP.CPI.TOTL.Z

Zaballos, A. G; Iglesias, E.; Cave, M.; Elbittar, A.; Guerrero, R.; Mariscal, E. Webb, W. (2020). El impacto de la infraestructura digital en las consecuencias de la Covid-19 y en la mitigación de efectos futuros. http://rfd.org.ec/biblioteca/pdfs/LG-254.pdf

Zablah, N. R. (2022). Los apóstoles del bitcoin que conquistaron El Salvador. Nueva Sociedad, (300). Retrieved from https://www.proquest.com/openview/482cd985971112686ffe5227d7975b01/1?pq-origsite=gscholar&cbl=27984.

Zalles, F. (2016). All you need is dollars. La Recuperación del Ecuador. http://www.unamericano.org/