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The Rise and Fall of Bitcoin as Legal Tender: An Analysis of El Salvador's Experiment

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Abstract

El Salvador's adoption of Bitcoin as legal tender in 2021 represented a bold but ultimately flawed experiment in national cryptocurrency integration. This paper critically examines the key challenges that led to the policy's failure, including public rejection, technological deficiencies, market volatility, and international financial pressure. Despite government incentives, Bitcoin adoption remained minimal, with security issues in the Chivo wallet further eroding trust. The collapse of cryptocurrency markets in 2022 exposed the country's economic vulnerability, forcing El Salvador to scale back its Bitcoin strategy under IMF loan conditions. The findings highlight critical lessons for other nations considering similar policies, emphasizing the need for phased implementation, robust financial infrastructure, and regulatory clarity. Future research should explore alternative digital currency models, particularly Central Bank Digital Currencies (CBDCs), and the socio-economic implications of large-scale cryptocurrency adoption.

Keywords: *Bitcoin adoption, El salvador, Cryptocurrency policy, Financial stability, Digital currency, IMF loan*

1. Introduction

In September 2021, El Salvador became the first country in the world to adopt Bitcoin as legal tender, marking a bold and controversial shift in monetary policy (Krause, 2024). This unprecedented move, championed by President Nayib Bukele, was framed as an effort to promote financial inclusion, attract foreign investment, and reduce remittance costs (Alfaro *et al.*, 2022). The policy positioned the Central American nation at the forefront of cryptocurrency adoption, drawing significant global attention and sparking debates over the viability of digital assets as national currencies (Howson, 2025). However, by early 2025, El Salvador significantly curtailed its Bitcoin experiment, amending its laws to make Bitcoin acceptance voluntary rather than mandatory for

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businesses—a shift largely driven by economic realities and pressure from international institutions such as the International Monetary Fund (IMF) (Digital Watch Observatory, 2025).

This article examines the key factors that contributed to the apparent failure of El Salvador's Bitcoin adoption, including public resistance, technological shortcomings, market volatility, and international financial constraints. At the same time, it recognizes some of the experiment's successes, such as increased tourism and Bitcoin accumulation in national reserves. By analyzing these dynamics, the article highlights the broader lessons for policymakers considering cryptocurrency integration into national financial systems.

2. Background

Prior to its Bitcoin experiment, El Salvador's macroeconomic landscape was marked by persistent fiscal vulnerabilities (The Economist, 2025). By 2020, public debt stood at approximately 60% of GDP, with 59% denominated in U.S. dollars—the country's official currency since 2001 (Alfaro *et al.*, 2022; Coface, 2025). Debt servicing consumed nearly a quarter of public spending, exacerbating fiscal deficits that averaged 5% of GDP annually. External obligations included $800 mn and $601 mn bond repayments due in 2027 and 2029, respectively, amid constrained foreign reserves (Howson, 2025).

In response to these financial challenges, President Nayib Bukele's administration pursued blockchain-based financial innovation as a means of economic revitalization. A central initiative in this strategy was the 2021 announcement of the "Volcano Bond"—a $1 bn Bitcoin-backed sovereign debt instrument intended to fund infrastructure projects and Bitcoin acquisitions (Wirtz, 2023). Originally proposed with a 6.5% yield over 10 years, the bonds sought to finance Bitcoin City, a special economic zone envisioned as a tax-free hub powered by geothermal energy from the Conchagua volcano (Carreres, 2024; Brilliant Source Energy, 2024).

The integration of geothermal energy into El Salvador's Bitcoin mining operations sought to address environmental criticisms associated with cryptocurrency mining. The state-owned LaGeo facility allocated 1.5 MW of volcanic energy to mining in 2021, generating approximately 474 BTC ($46 mn) by 2024 through collaborations with major mining pools such as Foundry USA and Binance (Shanawaz, 2024; Nawrocki, 2024). Government officials framed this initiative as a model of sustainable development, with Energy Director Daniel Álvarez emphasizing that geothermal Bitcoin mining eliminated reliance on fossil fuels (Bitbo, 2024).

Beyond its technical aspects, Bukele's Bitcoin strategy was positioned as a mechanism for financial inclusion and foreign investment. By 2024, the government had accumulated 5,787 BTC (valued at $376 mn) in reserves and introduced incentive programs such as a $1 mn Bitcoin "Freedom Visa" designed to attract high-net-worth individuals seeking citizenship (Carreres, 2024). However, the policy encountered significant opposition from the International Monetary Fund, which raised concerns over macroeconomic stability, increased financial risks, and the potential negative impact on El Salvador's access to international financing (Wells Fargo Securities, 2022).

As Bitcoin adoption continued to evolve, El Salvador's experience became a case study in the intersection of digital assets and sovereign finance. While Bukele's policies attracted cryptocurrency proponents, traditional financial institutions remained skeptical about their long-term viability, warning of heightened financial instability and increased dependence on volatile digital assets (Alfaro *et al.*, 2022; Howson, 2025).

3. Reasons for Policy Failure

3.1. Public Opposition

El Salvador's Bitcoin policy faced sustained public resistance, with 70% of citizens opposing the law when it was passed in 2021 (NewsroomPanama.com, 2025). By 2024, despite government incentives like the $30 Chivo wallet sign-up bonus, 92% of Salvadorans still refrained from using Bitcoin in transactions (Wirtz, 2023; Dig.watch, 2025). The primary reasons for this reluctance included widespread distrust in cryptocurrency's stability and limited digital literacy among the unbanked population, which comprised approximately 70% of citizens.

3.2. Technological Shortcomings

The state-backed Chivo wallet, a cornerstone of Bitcoin adoption, suffered from systemic failures. Users reported technical glitches, identity theft vulnerabilities, and high transaction fees shortly after its 2021 launch (PYMNTS.com, 2021). Security concerns escalated in 2024 when hackers leaked Chivo's source code and VPN credentials, exposing the personal data of 5.1 million citizens (Sriram, 2024). The wallet's incompatibility with third-party applications further hindered adoption, leading 87% of users to abandon it within months (Alvarez *et al.*, 2022).

3.3. Market Volatility

Bitcoin's extreme volatility undermined its viability as a national currency. As shown in Figure 1, in 2022, Bitcoin's price plummeted by 66%, wiping out $60 mn from El Salvador's reserves and leaving the government's holdings at a $16 mn loss by late 2023 (Cointelegraph, 2023; CoinDesk, 2023). Businesses were particularly hesitant to accept Bitcoin, fearing that sudden value fluctuations could erode profits (Dig.watch, 2025). The government's dollar-cost averaging strategy—purchasing Bitcoin regularly regardless of price fluctuations—failed to mitigate losses, as reserves remained underwater until mid-year 2024 despite ongoing acquisitions and price appreciation.

Figure 1: Bitcoin (BTC) Price Performance

Source: Yahoo Finance

As shown in Table 1, during the time of El Salvador's experiment, Bitcoin demonstrated a higher Compound Annual Growth Rate (CAGR) of 18.27% compared to the S&P 500 at 8.26%, crude oil at 13.65%, and gold at 13.11%. However, this higher return comes with significantly elevated risk, evidenced by Bitcoin's annualized

Table 1: Sample Size for the Study

Metrics	BTC	SPX	USO	GLD
Weekly Return	1.12%	0.18%	0.35%	0.26%
Std Dev	10.40%	2.28%	4.57%	1.90%
CAGR	18.27%	8.26%	13.65%	13.11%
Annualized Std Dev	75.00%	16.44%	32.97%	13.73%
Sharpe Ratio	0.22	0.38	0.35	0.81

standard deviation of 75%, dwarfing the volatility of the other assets. Consequently, despite its impressive annual return, BTC's risk-adjusted return, as measured by the Sharpe ratio, is lower than that of the stocks and gold during the period. This indicates that the Bitcoin investment was not as well compensated for the risk taken compared to traditional assets. It should be noted that all assets generated moderate to strong returns during the period.

The correlation coefficient of the weekly returns of the various assets are presented in Table 2. Bitcoin's correlation with the S&P 500, crude oil, and gold from September 2021 to February 2025 was 0.204, -0.086, and 0.090, respectively, indicating its largely independent price movements. This low correlation suggests that Bitcoin could offer diversification benefits within a portfolio, but its high volatility needs to be carefully managed. Other notable relationships include a negative correlation between the S&P 500 and crude oil (-0.243) and a weak correlation between the S&P 500 and gold (0.183).

Table 2: Return Correlation (8/21-2/25)

	BTC	SPX	USO	GLD
BTC	1.000			
SPX	0.204	1.000		
USO	-0.086	-0.243	1.000	
GLD	0.090	0.183	-0.055	1.000

The 0.204 correlation between Bitcoin and the S&P 500 is constant. Figure 2 displays the 12-week rolling return correlation between BTC and SPX from September 2021 to February 2025, revealing a fluctuating relationship that ranges from positive to negative correlations. Notably, the correlation shows two periods of both strong positive and negative trends, indicating that the relationship between crypto and stocks is dynamic and not consistently aligned over time.

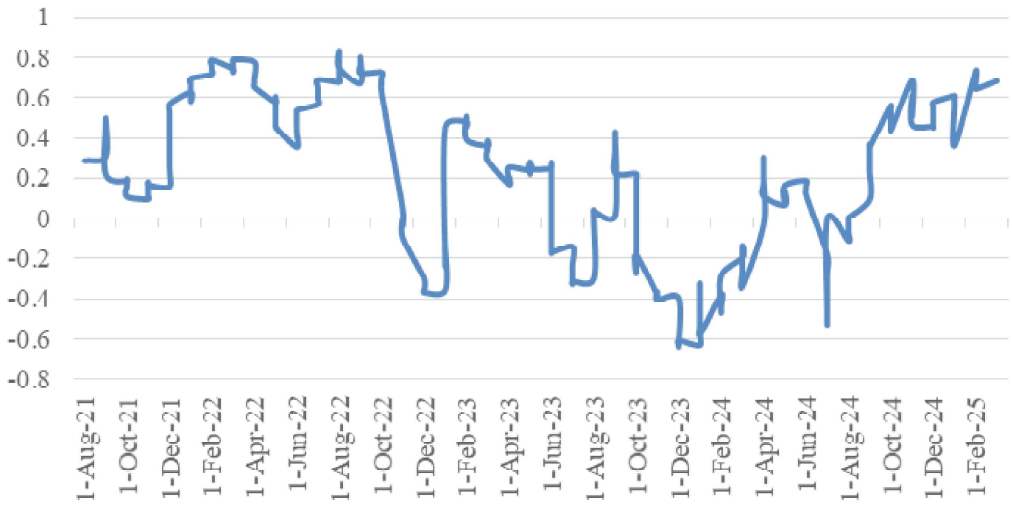

Figure 2: 12-Week Rolling Return Correlation of BTC and SPX (September 2021-February 2025)

Source: Yahoo Finance

3.4. International Pressure

The IMF, U.N. Institute for Water, Environment and Health, and the World Bank opposed El Salvador's decision to adopt Bitcoin as legal tender in 2021, citing concerns over financial instability and environmental risks associated with crypto mining (UNU-INWEH, 2023). In December 2024, the IMF imposed policy revisions as a condition for a $1.4 bn loan, compelling El Salvador to eliminate mandatory Bitcoin acceptance requirements

(Cointelegraph, 2024; Wirtz, 2023). While the policy reversal unlocked $3 bn in additional multilateral financing for the country, it represented a strategic retreat from President Bukele's initial crypto ambitions.

3.5. Regulatory and Business Challenges

Despite government efforts to integrate Bitcoin into the economy, only 1.3% of El Salvador's $7 bn annual remittances utilized the cryptocurrency by 2023, with the vast majority of businesses opting for cash or U.S. dollars instead (CoinDesk, 2023). A 2024 audit revealed that 89% of merchants disregarded Bitcoin acceptance mandates, citing technical barriers and complex tax reporting requirements (Dig.watch, 2025). Additionally, the absence of a clear regulatory framework for dispute resolution discouraged further adoption, leaving businesses vulnerable to fraud and operational uncertainties (PYMNTS.com, 2021).

4. Mixed Outcomes

4.1. Tourism Boost

El Salvador's Bitcoin adoption generated some expected tourism growth, with arrivals increasing by 22% in 2024 to 3.9 mn visitors—a surge Santander US Capital Markets LLC (2025) attributes to global media coverage and "crypto-novelty tourism." Approximately 65% of U.S. tourists reported Bitcoin usage as a primary motivator for visiting, drawn by unique experiences like Bitcoin-only beachfront rentals and blockchain-themed tours (BitcoinWorld, 2025). The tourism sector contributed 11% to GDP in 2024, surpassing regional competitors such as Costa Rica (8.5%) and Guatemala (6.7%). Improved security, including a 98% reduction in homicides since 2015, further enhanced El Salvador's appeal, though analysts note Bitcoin's role in rebranding the nation as a tech-forward destination drove most gains (Archway Finance, 2025).

4.2. Accumulated Bitcoin Reserves

The government maintained its Bitcoin accumulation strategy despite market volatility, increasing reserves to 6,055 BTC ($618 mn) by February 2025 (Ainvest, 2025). During the El Salvador experience, the government deployed a dollar-cost averaging approach that created valuation fluctuations and fiscal uncertainty. For example, reserves swung between a $16 mn net loss in late 2023 and a $45 mn surplus in early 2025 (Crypto Rover, 2025). Geothermal-powered mining operations generated 474 BTC ($46 mn) between 2021–2024, partially offsetting acquisition costs (Shanawaz, 2024). While proponents argue reserves could hedge against dollar inflation, critics highlight risks from Bitcoin's 66% annualized volatility (IMF, 2025).

5. Critical Analysis

5.1. Flawed Implementation Strategy

El Salvador's decision to adopt Bitcoin as legal tender at the peak of the 2021 cryptocurrency bull market significantly heightened the country's economic vulnerability when prices dropped by 66% in 2022 (PwC, 2021; Tasca, 2024). The government's reliance on a dollar-cost averaging strategy—continuing to buy Bitcoin regardless of price fluctuations—was criticized by the International Monetary Fund for undermining fiscal stability and exposing public finances to speculative risk (IMF, 2025). By prioritizing market enthusiasm over long-term economic sustainability, El Salvador failed to account for the inherent volatility of cryptocurrency markets, which frequently experience prolonged corrections following speculative surges.

5.2. Infrastructure and Adoption Barriers

Despite government efforts to encourage Bitcoin adoption, significant structural barriers hindered its widespread use. Digital literacy remained limited, particularly among the 70% of the population that lacked access to traditional banking services, while smartphone penetration stood at less than 50%, restricting the feasibility of mobile-based crypto transactions (Borovets, 2025; Latin American Post, 2024). The Chivo wallet, designed to facilitate Bitcoin transactions and financial inclusion, suffered from systemic technical failures, frequent security breaches, and poor interoperability with non-custodial wallets (Zaslowsky, 2024). By 2024, only 20% of businesses had integrated Bitcoin payments, citing concerns over volatility, regulatory uncertainty, and the complexities of tax reporting (DeFi Planet, 2025). These challenges highlighted the disconnect between

the government's top-down policy implementation and the practical readiness of businesses and consumers to adopt digital currency.

5.3. Financial and Sovereign Risks

El Salvador's Bitcoin experiment also introduced significant financial and sovereign risks. The country's 2025 IMF loan agreement, valued at $1.4 bn, imposed conditions that directly contradicted the government's initial cryptocurrency strategy, including the removal of mandatory Bitcoin acceptance laws and a ban on settling taxes with cryptocurrency. Additionally, El Salvador's debt-to-GDP ratio stood at 60%, with heavy reliance on external borrowing amplifying fiscal vulnerabilities. Bitcoin reserves further contributed to financial instability, as their fluctuating valuation introduced an unpredictable element into national budget planning. The government's geothermal Bitcoin mining initiative, while reducing operational energy costs, yielded only 474 BTC ($46 mn) over three years—insufficient to counterbalance the $592 mn exposure of state-owned reserves to market volatility (Shanawaz, 2024). These challenges underscored the risks of aligning national economic policy with speculative assets, highlighting the tension between innovation and financial prudence.

6. Key Issues and Lessons Learned

6.1. Challenges That Led to Failure

- **Public Rejection:** Despite government incentives, including a $30 sign-up bonus for the Chivo wallet, 92% of Salvadorans avoided Bitcoin transactions by 2024 (NewsroomPanama.com, 2025). Public distrust stemmed from concerns over Bitcoin's volatility, lack of understanding, and a general skepticism toward digital currencies. In 2021, only 15% of the population expressed confidence in Bitcoin, indicating deep-seated reluctance to adopt it as a viable payment method.
- **Technical Failures:** The Chivo wallet, central to El Salvador's Bitcoin strategy, faced severe technical challenges from its launch. These included system crashes, transaction errors, and security vulnerabilities, which undermined public confidence (Nyarunda, 2022). In 2024, a major cybersecurity breach compromised the personal data of 5.1 mn citizens, further eroding trust in the system and discouraging widespread adoption (Spectrum Search, 2024).
- **Market Risk:** The 2022 cryptocurrency crash significantly devalued El Salvador's Bitcoin holdings, wiping out approximately $60 mn in reserves. This extreme price volatility reinforced public skepticism and discouraged businesses from accepting Bitcoin as a stable means of exchange. The government's Bitcoin reserve strategy failed to protect against market downturns, exposing the national economy to speculative risks.
- **International Pressure:** The IMF and the World Bank consistently opposed El Salvador's Bitcoin policy, citing concerns over fiscal instability and environmental impact. In 2025, the IMF conditioned a $1.4 bn loan on scaling back Bitcoin's legal tender status, forcing the government to amend its policy and effectively abandon its initial ambitions.
- **Limited Adoption:** Despite legal mandates requiring businesses to accept Bitcoin, most enterprises continued to favor cash or U.S. dollars. By 2024, only 504 tourist establishments across the country accepted Bitcoin, illustrating the disconnect between policy initiatives and practical implementation (Valdez, 2025).

6.2. What Worked

- **Increased Tourism and Global Attention:** El Salvador's Bitcoin adoption boosted tourism. The country's branding as the "Bitcoin nation" attracted cryptocurrency enthusiasts and generated investment interest in Bitcoin-related ventures.
- **Accumulation of Bitcoin Reserves:** Despite market volatility, El Salvador continued to accumulate Bitcoin, reaching 6,055 BTC ($618 mn) by February 2025. While highly speculative, this reserve accumulation positioned the country to potentially benefit from long-term price appreciation if Bitcoin's value increases over time.

6.3. What Didn't Work

- **Financial Inclusion Goals Remained Unmet:** A key goal of Bitcoin adoption was to enhance financial inclusion by providing banking services to the unbanked population. However, core barriers—including the dominance of the informal economy and low digital literacy—remained unaddressed. The initiative failed to significantly improve financial accessibility, as noted by The Economist (2025).
- **Bitcoin Remittances Failed to Replace Traditional Methods:** Despite expectations that Bitcoin would reduce remittance costs and improve efficiency, only 1.3% of El Salvador's $7 bn annual remittances were conducted in Bitcoin by 2023. Most Salvadorans continued to rely on conventional remittance channels, indicating that Bitcoin failed to deliver the anticipated benefits in cross-border payments.

7. Conclusion

El Salvador's attempt to integrate Bitcoin as legal tender ultimately failed due to a combination of public rejection, technical challenges, market volatility, and international opposition. Despite government efforts, including financial incentives and legal mandates, most Salvadorans refused to use Bitcoin, with adoption rates remaining very low. The Chivo wallet, intended to facilitate transactions, was plagued by security vulnerabilities and technical malfunctions, further undermining trust. Additionally, Bitcoin's extreme price fluctuations eroded financial stability, and the country's reliance on it led to significant economic losses, particularly during the 2022 market crash. Facing pressure from institutions like the IMF and World Bank, El Salvador was ultimately forced to scale back its Bitcoin policies in exchange for financial assistance.

The failure of this initiative underscores broader concerns about national cryptocurrency adoption, particularly in developing economies with limited financial infrastructure and regulatory uncertainty. While some countries, such as the Czech Republic, are considering Bitcoin as part of their reserve strategy, most nations remain cautious about full-scale adoption. The lessons from El Salvador's experience suggest that future digital currency initiatives should prioritize phased implementation, regulatory clarity, and robust financial infrastructure. Furthermore, global coordination, as emphasized in the G20 Crypto-Asset Policy Implementation Roadmap, will be crucial in ensuring that digital currency policies align with financial stability goals.

Future research should explore alternative approaches to digital currency integration, particularly the role of Central Bank Digital Currencies (CBDCs) in enhancing financial inclusion without the risks associated with volatile cryptocurrencies. Comparative studies of successful and unsuccessful digital currency policies could offer insights into best practices for governments considering similar initiatives. Additionally, further investigation into the socio-economic impact of Bitcoin adoption, including its effects on remittances and financial literacy, could provide valuable data for policymakers. By learning from El Salvador's challenges, future digital currency policies can be designed with greater caution, adaptability, and public engagement, ensuring a more sustainable and effective implementation.

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