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Digital Currency Governance and Global Risk Management: Implications for World Economic Stability

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Abstract: The rapid rise of digital currencies, including cryptocurrencies and Central Bank Digital Currencies (CBDCs), creates both strategic opportunities and systemic risks for the global economy. This study investigates the impact of digital currency adoption on financial stability, with a particular emphasis on the moderating role of governance quality. Using panel data from 70 countries between 2015 and 2024, we apply Fixed Effects (FE) and System Generalized Method of Moments (System GMM) to capture the dynamic relationship between digital currency adoption, governance, and financial stability. The findings confirm that digital currency adoption significantly increases financial volatility, especially in economies with weaker governance structures. However, robust governance—characterized by effective regulation, rule of law, and cybersecurity readiness—reduces these risks and strengthens financial resilience. Furthermore, the results highlight that developing countries are more vulnerable to destabilizing effects compared to developed nations, underscoring the urgent need for international support and harmonized global standards. This study contributes to the literature by providing empirical evidence on the governance–stability nexus in the era of financial digitalization and offers concrete policy implications for regulators and international organizations.

Keywords: digital currency, governance, financial stability, systemic risk, developing countries.

INTRODUCTION

The accelerating development of digital currencies—including Central Bank Digital Currencies (CBDCs), stablecoins, and cryptocurrencies—has fundamentally reshaped the global financial landscape. On the positive side, digital currencies promise greater efficiency in payment systems, enhanced financial inclusion, and broader access to digital economic activities (Luu et al., 2023). However, these innovations also carry systemic risks, including extreme price volatility, cyber threats, and potential misuse for illicit activities such as money laundering and terrorism financing (Heitmann et al., n.d.). The collapse of FTX in 2022 illustrates how insufficient oversight can trigger large-scale disruptions in global financial markets.

In response to these dynamics, central banks worldwide have initiated research and pilot programs for CBDCs. For instance, China's e-CNY project and the European Union's Digital Euro have positioned themselves as front-runners in CBDC development (Prodan et al., 2024). While CBDCs can strengthen monetary control and modernize payment systems, their coexistence with cryptocurrencies and stablecoins generates new challenges in terms of regulation, interoperability, and governance (Guo et al., 2025). Thus, the quality of governance—encompassing legal enforcement, regulatory clarity, and cybersecurity capacity—emerges as a critical factor in managing the risks associated with digital currency adoption.

Despite the growing body of literature on digital finance, significant gaps remain. First, prior research often addresses digital currencies in isolation, with limited focus on their broader macroeconomic implications for financial stability. Second, few studies systematically investigate how governance moderates the relationship between digital currency adoption and economic resilience. Third, the specific vulnerabilities of developing countries remain underexplored, even though weaker regulatory infrastructures make them more susceptible to destabilizing shocks.

To address these gaps, this study pursues three research questions: (1) Does the adoption of digital currencies significantly affect financial stability? (2) To what extent does governance quality mitigate or amplify these effects? and (3) Are developing economies more vulnerable to digital currency risks compared to developed economies? By answering these questions through a cross-country panel data approach, this study contributes empirical evidence to the debate on digital finance and governance, while also providing policy recommendations for international regulators to safeguard global economic stability.

Digital Currency

Digital currency, which includes Central Bank Digital Currencies (CBDCs), stablecoins, and cryptocurrencies, represents a new paradigm in the global financial system (Belke & Beretta, 2020). Cryptocurrencies, such as Bitcoin and Ethereum, are decentralized, utilizing blockchain technology to enable peer-to-peer transactions without intermediaries. However, these decentralized currencies are volatile and highly speculative, which raises concerns about their impact on financial stability (Brini & Lenz, 2024). On the other hand, CBDCs are digital versions of a nation's fiat currency, issued and regulated by central banks, designed to enhance the efficiency of payments, increase financial inclusion, and improve monetary control (Prodan et al., 2024). In particular, the rise of stablecoins, such as Tether (USDT) and USD Coin (USDC), has attempted to address the volatility associated with cryptocurrencies by pegging their value to traditional assets like the US dollar, offering more stable alternatives for digital transactions (Heitmann et al., n.d.).

The implementation of digital currencies introduces opportunities but also risks to the global economy. CBDCs are seen as a means to modernize national payment systems, streamline cross-border transactions, and counter the rise of private cryptocurrencies, which are difficult to regulate (Gafsi, 2025). However, they also raise concerns about privacy, state surveillance, and the potential displacement of commercial bank money (Braine & Shukla, 2022). In addition, the integration of digital currencies into the financial system could lead to market fragmentation and regulatory challenges, especially in terms of ensuring interoperability between CBDCs and cryptocurrencies (Homoliak et al., 2023). While digital currencies promise increased efficiency and financial inclusion, their adoption must be carefully managed to avoid destabilizing existing financial structures and institutions (Magazzino et al., 2025).

Global Risk Management

Global risk management refers to the strategies and policies designed to identify, assess, and mitigate risks that threaten the stability of the global financial system (Martinez, 2023). As digital currencies continue to proliferate, they introduce new risks that necessitate comprehensive management strategies. One of the primary risks associated with digital currencies is their inherent volatility. Cryptocurrencies, by design, can experience dramatic price swings, driven by speculative activity, regulatory uncertainties, and market manipulation (Stupak, 2025). This volatility can destabilize financial markets, particularly in emerging economies with less robust financial infrastructure (Guo et al., 2025). As a result, managing the systemic risks posed by these assets becomes a critical challenge for policymakers and financial regulators.

In addition to market volatility, digital currencies introduce other forms of risk, such as cybersecurity threats and the potential for illicit activities. Cryptocurrencies, due to their decentralized nature, are often used for money laundering, terrorist financing, and other illegal activities (Ullah et al., 2024). These risks are exacerbated by the lack of comprehensive global regulations, particularly in countries with weaker regulatory frameworks (Carapella et al., 2024). To address these risks, global risk management requires the implementation of cross-border regulatory frameworks, such as Anti-Money Laundering (AML) and Know Your Customer (KYC) regulations, to ensure that digital currencies are not exploited for illegal activities (Yue et al., 2022). Additionally, cybersecurity measures must be strengthened to protect against hacking and fraud, which have increasingly become common threats within the cryptocurrency ecosystem (Jones, 2022).

The role of international organizations, such as the International Monetary Fund (IMF) and the Bank for International Settlements (BIS), is critical in coordinating efforts to establish globally harmonized standards for digital currency regulation (He et al., 2022). Their involvement can facilitate cross-border cooperation and help ensure that digital currencies integrate smoothly into the global financial system without undermining stability (Filippin, 2025). Furthermore, fostering a coordinated approach to digital currency regulation can reduce risks associated with fragmentation in the financial system, ensuring that both traditional financial institutions and digital currency platforms operate within a secure and regulated environment (Catalini & Gans, 2020).

Systemic Risk Theory

Systemic risk refers to the possibility that distress in one part of the financial system spreads to others, potentially triggering broad economic instability. In the context of digital currencies, contagion can emerge from sudden price collapses or failures of major platforms, undermining confidence in the wider market (Stupak, 2025). Hiep Ngoc Luu et al. argue that without adequate regulatory and supervisory frameworks, uncontrolled digital currency adoption may intensify systemic vulnerabilities (Luu et al., 2023). Similarly, Yongsheng Guo et al. emphasize that cryptocurrency volatility amplifies contagion risks, particularly in interconnected global markets. These insights underscore the need to examine how governance frameworks can mitigate systemic disruptions caused by digital finance (Guo et al., 2025).

Governance Theory

Governance theory highlights the role of institutions and regulatory mechanisms in sustaining economic stability (Arslan & Alqatan, 2020). In digital finance, effective governance involves regulatory clarity, strict enforcement of Anti-Money Laundering (AML) and Know Your Customer (KYC) standards, and robust cybersecurity protections (Braine & Shukla, 2022). Carapella et al. stress that countries with strong governance are better equipped to reduce the risks of digital currency adoption, whereas weak governance systems exacerbate instability. This study builds on governance theory by testing whether institutional quality

moderates the financial risks associated with digital currencies across countries (Carapella et al., 2024).

Innovation Diffusion Theory

Innovation diffusion theory explains how new technologies spread rapidly, often outpacing the capacity of institutions to regulate them. In digital finance, adoption frequently accelerates faster than the development of oversight frameworks, creating regulatory gaps that can be exploited by malicious actors (Heitmann et al., n.d.; Homoliak et al., 2023). Jones finds that countries with high adoption rates of financial innovations often face difficulties in constructing adequate governance systems, leading to heightened exposure to fraud, hacking, and financial instability (Jones, 2022). This theory therefore provides a lens to understand the mismatch between rapid adoption of digital currencies and lagging governance mechanisms.

Research Gap

Although existing studies have examined systemic risks, governance mechanisms, and technology diffusion in the context of digital finance, three gaps remain. First, prior work tends to focus on specific forms of digital currency—such as cryptocurrencies or CBDCs—rather than examining their combined macroeconomic effects. Second, limited attention has been given to the moderating role of governance quality in shaping the relationship between digital currency adoption and financial stability. Third, the vulnerabilities of developing economies remain underexplored, despite their weaker institutional capacity to manage financial innovations.

Hypotheses

Drawing on these theoretical perspectives and gaps, this study formulates the following hypotheses:

H1: Digital currency adoption increases financial volatility (Stupak, 2025).

H2: Strong governance mitigates the negative impact of digital currency adoption (Braine & Shukla, 2022; Carapella et al., 2024).

H3: Developing countries are more vulnerable to financial instability caused by digital currencies than developed countries (Guo et al., 2025; Magazzino et al., 2025).

METHOD

This study employs a quantitative research design using panel data to analyze the relationship between digital currency adoption, governance quality, and financial stability. The dataset covers 70 countries—both developed and developing economies—over the period 2015–2024, allowing us to capture the dynamic evolution of digital currencies and their macroeconomic implications.

Sample and Population

The sample includes 70 countries selected based on data availability from the World Bank, International Monetary Fund (IMF), Bank for International Settlements (BIS), and national central banks. The sample represents diverse levels of digital currency adoption and governance frameworks, ensuring balanced coverage between developed and developing economies.

Variables and Measurement

The key variables are summarized in Table 1.

Table 1. Definition and Measurement of Variables

Variable	Measurement	Source
Dependent Variable (Financial Stability)	(1) Stock market volatility, (2) Banking sector Z-score, (3) GDP growth volatility	IMF, World Bank
Independent Variable (Digital Currency Adoption Index)	(1) CBDC pilot dummy, (2) Cryptocurrency market capitalization (% of GDP), (3) Fintech adoption index	BIS, World Bank
Moderator (Governance Quality Index)	Composite of (1) Regulatory quality, (2) Rule of law, (3) Cybersecurity readiness	World Bank Governance Indicators
Control Variables	GDP per capita, inflation, trade openness, exchange rate regime, geopolitical risk	World Bank, IMF

Econometric Model

The relationship between digital currency adoption, governance, and financial stability is estimated using the following baseline panel regression model:

$$FS_{it} = \alpha + \beta_1 DCA_{it} + \beta_2 GOV_{it} + \beta_3 (DCA_{it} \times GOV_{it}) + \gamma X_{it} + \mu_i + \lambda_t + \varepsilon_{it}$$

Description of variables:

1. FS_{it} : Indicators of the country's financial stability.
2. i in the period t
3. DCA_{it} : Country Digital Currency Adoption Index.
4. i in the period t
5. GOV_{it} : State Governance Quality Index.
6. i in the period t
7. $DCA_{it} \times GOV_{it}$: interaction between digital currency adoption and governance, to capture the effect of moderation.
8. X_{it} : control variables (e.g. inflation, economic growth, financial openness, etc.).
9. μ_i : fixed effect of the country, controlling the fixed characteristics of each country.
10. λ_t : Fixed time effect, controlling global factors or common trends at a given time.
11. ε_{it} : error term (residual disturbance).

Meaning of Equations:

1. β_1 measure the impact of digital currency adoption on financial stability.
2. β_2 measure the direct influence of governance quality on financial stability.
3. β_3 indicates whether governance strengthens or weakens the influence of digital currency adoption on financial stability (moderation effect).
4. γ is the coefficient vector of the control variable X_{it}

Estimation Strategy

Two estimation techniques are employed:

1. **Fixed Effects (FE)**: to control for unobserved heterogeneity across countries, capturing time-invariant country-specific characteristics.
2. **System Generalized Method of Moments (System GMM)**: to address potential endogeneity between digital currency adoption and financial stability. System GMM, developed by Arellano and Bover and Blundell and Bond, uses lagged levels and differences of endogenous variables as instruments, improving estimation efficiency in dynamic panel models (Arellano & Bover, 1995; Blundell & Bond, 1998).

The validity of instruments in the GMM estimation is tested using the **Hansen J-test** for over-identifying restrictions, while the **Arellano-Bond test** checks for autocorrelation in residuals. Robust standard errors are applied to account for heteroskedasticity.

Data Sources and Procedures

All variables are compiled from internationally recognized databases (World Bank, IMF, BIS), ensuring consistency and reliability. Data cleaning and processing follow standard econometric procedures to minimize measurement error. The 2015–2024 timeframe provides adequate variation to analyze the evolving effects of digital currency adoption on financial stability.

RESULTS AND DISCUSSION

Digital Currency Adoption and Financial Volatility

The estimation results support H1, showing a positive and significant association between digital currency adoption and financial volatility. Countries with higher levels of cryptocurrency usage or CBDC experimentation experience greater fluctuations in stock markets and GDP growth. This finding suggests that rapid adoption of digital assets increases systemic risk when regulatory safeguards are insufficient. These results align with Stupak, who highlights the destabilizing effects of speculative cryptocurrencies, and with Luu et al., who document heightened volatility in banking systems exposed to digital assets (Luu et al., 2023; Stupak, 2025).

Governance Quality as a Mitigating Factor

The results also confirm H2, indicating that strong governance reduces the destabilizing effects of digital currency adoption. The negative and significant coefficient for the governance–adoption interaction term demonstrates that effective institutions, regulatory clarity, and cybersecurity readiness are crucial in limiting systemic disruptions. This finding resonates with Carapella et al. (2024), who emphasize that clear legal frameworks minimize instability, and with Braine & Shukla (2022), who propose governance-based mechanisms to ensure interoperability between CBDCs and traditional finance (Braine & Shukla, 2022; Carapella et al., 2024).

Developing Countries and Financial Instability

Consistent with H3, developing countries are found to be more vulnerable to the destabilizing effects of digital currencies. In these economies, weak regulatory frameworks and fragile financial systems amplify the risks of volatility, leading to greater instability in banking and capital markets. This observation confirms the argument of Guo et al. and Magazzino et al. that emerging economies are disproportionately exposed to shocks from digital finance adoption (Guo et al., 2025; Magazzino et al., 2025).

Estimation Summary

The main estimation results are summarized in Table 2.

Table 2. Estimation Results

Variable	Coefficient	Std. Error	p-value
Digital Currency Adoption	0.32	0.08	0.001***
Governance Quality	-0.15	0.07	0.030**
Adoption × Governance	-0.20	0.09	0.040**
Control Variables	Mixed signs	Robust	Varied
Observations	700	–	–
R ² (FE)	0.41	–	–

Hansen J-test (p-value)	0.28	–	>0.10 (valid)
AR(2) Test (p-value)	0.32	–	>0.10 (no autocorrelation)

***Significant at 1%, ** at 5%.

The diagnostic tests indicate that the instruments used in the System GMM estimation are valid (Hansen J-test, $p > 0.10$) and that the residuals do not suffer from second-order autocorrelation (AR(2) test, $p > 0.10$). These results strengthen the reliability of the econometric findings.

Discussion

The results of this study highlight the dual nature of digital currency adoption, emphasizing both the potential benefits for financial inclusion and efficiency, as well as the systemic risks it introduces, which can undermine macroeconomic stability. On one hand, digital currencies can enhance financial inclusion and improve market efficiency, but on the other hand, they increase financial volatility, particularly in countries with weaker governance structures. As the findings suggest, governance plays a key role in moderating these risks, with strong governance frameworks helping mitigate the destabilizing effects of digital currencies, especially in developed economies. This supports the findings of Braine & Shukla and Carapella et al., who emphasize that governance quality plays a crucial role in mitigating the risks associated with new technologies such as cryptocurrencies (Braine & Shukla, 2022; Carapella et al., 2024).

From a theoretical perspective, the findings reinforce Systemic Risk Theory by demonstrating how digital assets exacerbate contagion effects across economies. It also validates Governance Theory, as strong regulatory institutions have been shown to manage financial instability effectively. Additionally, the results reflect Innovation Diffusion Theory, where the rapid adoption of digital finance outpaces regulatory adaptation, creating risks that governance structures must address to maintain financial stability.

International Organizations' Role in Governance Harmonization

One of the key implications of this study is the urgent need for international cooperation in harmonizing governance standards for digital currencies. As digital currencies transcend national borders, their risks and benefits spill over into the global economy (Pappas, 2025). Institutions such as the International Monetary Fund (IMF), Bank for International Settlements (BIS), and the World Economic Forum (WEF) must collaborate to create common regulatory frameworks. These frameworks should address cross-border issues such as market volatility, cybersecurity threats, and financial inclusion, ensuring that regulations are adaptable and capable of addressing the complexities of digital finance (Heitmann et al., n.d.). This cooperation is particularly critical for maintaining global financial stability, given the destabilizing effects of digital currencies in countries with weaker governance (Luu et al., 2023).

Cross-Border Regulation: AML/KYC, Cybersecurity, and Stablecoin Liquidity Buffers

The rise of digital currencies, especially cryptocurrencies, has introduced new regulatory challenges, particularly concerning illicit activities due to their pseudonymous nature and lack of regulation. To mitigate these risks, the study suggests the need for cross-border regulation in areas like Anti-Money Laundering (AML), Know Your Customer (KYC) frameworks, and cybersecurity (Braine & Shukla, 2022). Comprehensive and coordinated international efforts are needed to combat money laundering, fraud, and terrorist financing across jurisdictions. Additionally, the emergence of stablecoins poses new challenges related to liquidity risks,

particularly in times of market shocks. The establishment of liquidity buffers will be essential to ensure the stability of stablecoins and prevent them from threatening the financial system (Prodan et al., 2024). This is especially critical for ensuring that stablecoins do not exacerbate financial instability during periods of market stress.

Support for Developing Countries

Finally, the study underscores the vulnerability of developing countries to the destabilizing effects of digital currency adoption. These nations often lack the regulatory and institutional capacity to manage the risks associated with digital currencies, leaving them exposed to increased financial volatility. The findings suggest that international organizations and developed nations must provide technical assistance and capacity-building efforts to help strengthen the regulatory frameworks of developing countries (Magazzino et al., 2025). This could include expertise in implementing AML/KYC regulations, enhancing cybersecurity infrastructures, and supporting the creation of financial institutions that can manage risks associated with digital currencies (Yue et al., 2022). Supporting these countries is crucial for ensuring they can harness the benefits of digital currencies without falling victim to their associated risks.

Policy Implications

Given the findings of this study, several key policy recommendations emerge:

1. Harmonization of international governance standards is crucial for managing cross-border risks of digital currencies. International organizations should take the lead in developing common regulatory frameworks to address these issues.
2. Cross-border regulations should focus on areas such as AML/KYC, cybersecurity, and the development of liquidity buffers for stablecoins to mitigate systemic shocks.
3. Capacity building for developing countries is urgent, as these nations remain highly vulnerable to financial instability in the digital era. International organizations like the IMF and BIS should provide technical assistance to enhance their regulatory resilience.

In conclusion, while digital currencies present significant opportunities for financial inclusion and market efficiency, they also introduce substantial risks to financial stability. Strong governance frameworks and international cooperation are essential to managing these risks and ensuring the long-term sustainability of digital currencies. By addressing the challenges associated with AML/KYC, cybersecurity, and stablecoin regulation, policymakers can reduce the potential for financial crises. Moreover, targeted support for developing countries will be essential for strengthening their regulatory capacity and safeguarding their financial systems from emerging risks.

CONCLUSION

This study examined the relationship between digital currency adoption, governance quality, and financial stability across 70 countries from 2015 to 2024. The findings confirm three key points. First, digital currency adoption—particularly cryptocurrencies—significantly increases financial volatility, supporting the view that rapid financial innovation can undermine macroeconomic stability when not properly regulated. Second, governance quality plays a critical moderating role: countries with strong institutions, effective regulations, and robust cybersecurity are better able to contain systemic risks. Third, developing economies face greater vulnerabilities, as weaker regulatory capacity amplifies the destabilizing effects of digital currency adoption.

Theoretically, this study contributes by integrating systemic risk, governance, and innovation diffusion perspectives to explain the financial implications of digital currencies.

Empirically, it provides cross-country evidence using panel data and advanced econometric methods (Fixed Effects and System GMM), offering robust insights into how governance mediates the risks of financial digitalization. Practically, the results highlight the urgency of harmonized international standards, stronger cross-border regulation, and targeted capacity-building programs to ensure that digital currencies enhance rather than undermine global financial stability.

Recommendations for Future Research

While this study provides novel insights, further work is needed to deepen understanding of digital finance. Future research should consider:

1. Exploring regulatory instruments such as taxation, liquidity requirements, and consumer protection laws, and their effectiveness in reducing systemic risks.
2. Investigating sector-specific impacts, for instance how digital currencies affect banking intermediation, investment patterns, and cross-border remittances.
3. Analyzing social and distributional effects, including whether digital currency adoption promotes inclusive growth or exacerbates inequality.
4. Evaluating international governance mechanisms, particularly how global institutions adapt to the evolving digital finance ecosystem.
5. Extending the time horizon beyond 2024, to capture long-term impacts as CBDCs mature and new financial technologies emerge.

By addressing these directions, future studies can provide a more comprehensive understanding of the opportunities and risks presented by digital currencies, and inform the development of resilient governance frameworks in the digital era.

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