INTERNATIONAL JOURNAL OF ECONOMICS AND FINANCE STUDIES
Vol: 16 **No:** 03 **Year:** 2024 **ISSN:** 1309-8055 (Online) (**pp.** 335-350) **Doi:** 10.34109/ijefs.202416316
Received: 11.05.2024 | **Accepted:** 10.10.2024 | **Published Online:** 30.10.2024

-RESEARCH ARTICLE-

THE ROLE OF FINANCIAL CAPABILITY AND REGULATION ON THE FINTECH- FINANCIAL INCLUSION-FINANCIAL STABILITY NEXUS IN SUB-SAHARAN AFRICA

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─Abstract─

In the banking sector, financial technology (FinTech) has become a transformative force, reshaping the delivery and utilisation of financial services. This study applied the System Generalised Method of Moments (GMM) to examine how regulation and financial capability influence the relationship between financial stability, financial inclusion, and FinTech in Sub-Saharan Africa over the periods 2011, 2014, 2017, and 2021. The results revealed that although FinTech negatively affects financial stability, financial capability helps to counteract this adverse impact. Additionally, the research demonstrated that financial inclusion enhances financial stability, with regulation playing a moderating role. From a policy standpoint, it is crucial for regulators to establish frameworks that balance the promotion of innovation with the preservation of financial stability. To accomplish this, FinTech firms must navigate the intricate regulatory landscape governing financial technology, ensuring that advancements in the sector do not compromise digital security.

Keywords: FinTech, Financial Stability, Financial Inclusion, Financial Capability, Regulation

Citation (APA): Chinoda, T., Kapingura, F. M. (2024). The Role of Financial Capability and Regulation on the Fintech- Financial Inclusion-Financial Stability Nexus in Sub-Saharan Africa. *International Journal of Economics and Finance Studies*, 16(03), 335-350. doi: 10.34109/ijefs.202416316

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INTRODUCTION

Globally, FinTechs have grown rapidly. In 2023, FinTech investment worldwide reached $113.7 billion, up 122.9% from 2008, according to KPMG's biannual study. In Africa, FinTech enterprises expanded 125.2% between 2017 and 2023, matching KPMG's growth trend. Despite these advances, just 55% of African adults have a bank account, compared to 71% in wealthy nations (Ndung'u & Oguso, 2023). The development of the banking industry affects financial stability, capital funding, and other sectors, presenting problems and opportunities for banks and their customers (Bobbo et al., 2024; Nan et al., 2021). Given these characteristics, its impact on financial resiliency and banking performance must be assessed. Africa's financial landscape is changing due to FinTech. New technology in the region could change banking industry competition. FinTech unbundles the value chain to improve efficiency, but it also creates new vulnerabilities and dangers. FinTech is also innovating infrastructure and agriculture, promoting financial inclusion.

By optimising financial system efficiency, it has the potential to enhance financial inclusion by lowering cross-border transaction costs and addressing information asymmetries. For instance, if new technologies comply with regulatory standards to mitigate money laundering and terrorist financing, they could ease restrictions on correspondent banking relationships. Moreover, although existing distributed ledger technologies face challenges such as scalability constraints and high energy consumption, future advancements could improve payment system security, transparency, and efficiency in Africa, ultimately reducing trading expenses. A careful balance must be maintained between the potential benefits of FinTech innovations and the additional risks they introduce. From a regulatory perspective, financial technology could serve as a transformative tool for fostering inclusive economic growth, particularly in Africa, where financial inclusion remains lower than in many other regions. Nonetheless, emerging business models and technologies also present new risks that necessitate the establishment of robust regulatory frameworks.

Contemporary FinTech developments have led to significant shifts in data collection, processing, and analysis, introducing alternative distribution channels and relationship models that challenge traditional financial practices. However, while FinTech has generated substantial enthusiasm, concerns persist regarding its potential risks to financial stability and vulnerable populations. The manner in which these risks permeate the financial system and their broader implications remain unclear, posing challenges for regulators and supervisory authorities (CGAP - Consultative Group to Assist the Poor, 2022; World Bank, 2022). FinTech firms promise to increase financial inclusion, but their benefits are often assumed rather than evaluated. Financial inclusion is understudied despite FinTech research (Lagna & Ravishankar, 2022). Empirical studies on FinTech-driven financial inclusion focus on specific nations or regions

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(Banna et al., 2020; Banna et al., 2021). Vukovic et al. (2024) explore whether BRICS FinTech development enhanced financial stability and inclusion between 2015 and 2022. The study demonstrates that FinTech permanently affects financial inclusion in several BRICS countries differently. The analysis does not indicate FinTech harms financial stability. The study did not evaluate how financial literacy, and regulatory systems mitigate these effects.

In Kenya, financial service innovations are being introduced through a "regulatory sandbox" approach, in which certain regulations are temporarily relaxed during the testing phase of new technologies. Once the regulatory body evaluates the innovation's impact, these measures may be reintroduced, modified, or removed. This strategy has played a crucial role in the growth of Kenya's mobile money sector, contributing significantly to poverty reduction and increased financial inclusion (Abor et al, 2022). However, regulators must closely monitor financial products and service providers to mitigate risks such as illicit financial activities, inadequate consumer protection, and financial instability. If specific innovations are found to have adverse effects, regulatory restrictions must be swiftly reinstated. Following an extensive literature review, de Sant'Anna and Figueiredo (2024) recommend further research into the advantages and disadvantages of FinTech innovation with respect to financial stability and inclusion. To bridge these gaps, the study presents a conceptual framework, as illustrated in Figure 1.

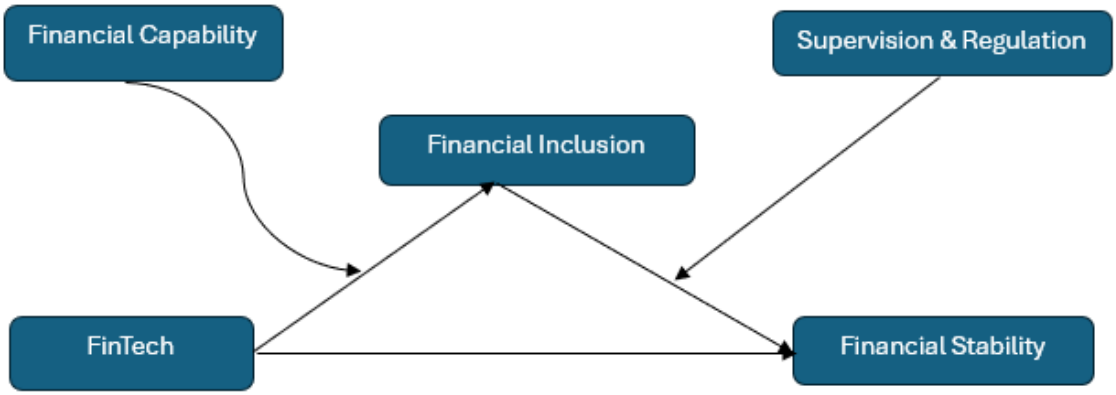

Figure 1: Conceptual Framework
Source: Computation by the Author

This study should help financial service providers, users, and lawmakers. It raises government investment, lowers bank and FinTech intermediation costs, and helps economically disadvantaged groups acquire money. Two key additions are made in the study. This paper solves this research gap by discussing how financial technology and inclusion affect financial stability. Second, it examines how financial capabilities and legislation affect financial stability, inclusion, and FinTech, advancing knowledge.

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Section 2 discusses relevant literature, Section 3 details the research methodology, Section 4 examines findings and implications, and Section 5 concludes.

LITERATURE REVIEW

Theoretical Framework

This study is based on three theoretical frameworks: institutional theory, innovation diffusion theory, and regulatory theory. Regulatory theory explains the objectives, processes, and outcomes of regulation, analysing how regulatory bodies develop policies to ensure fair competition, market stability, and consumer protection
As outlined by (Fung et al., 2020), innovation diffusion theory examines how technological innovations spread, providing a foundation for understanding the adoption, adaptation, and application of FinTech solutions within diverse regulatory environments. Institutional theory, on the other hand, explores how institutional structures, values, and practices influence regulatory responses, while political, economic, and social factors shape regulatory frameworks (Banna et al., 2020). This complexity underscores the challenge of generalising findings from studies conducted in specific contexts, as regulations must continually evolve to keep pace with rapid technological advancements.

FinTech and Financial Stability

Limited research has been conducted on the impact of FinTech growth on banking stability (Daud et al., 2022). The "innovation-growth" and "innovation-fragility" perspectives suggest that FinTech may either strengthen or destabilise financial systems. The traditional "innovation-growth" perspective posits that financial innovations enhance service quality (Wang et al., 2021), facilitate risk-sharing (Allen et al, 2025), improve resource allocation efficiency and optimise market functionality (Grinblatt & Longstaff, 2000). Conversely, the "innovation-fragility" viewpoint argues that FinTech and other financial innovations may amplify market volatility, procyclicality, and contagion effects, increasing systemic risk. This could undermine financial stability and potentially lead to crises similar to the 2008 subprime mortgage collapse (Fung et al., 2020). The rapid expansion of FinTech has driven banks to innovate and strengthen risk management practices, thereby boosting profitability and stabilising financial systems (Wang et al., 2021). Proponents of the "innovation-growth" perspective, including Koranteng and You (2024), Daud et al. (2022), and Safiullah and Paramati (2024), provide empirical evidence supporting FinTech's positive impact on bank stability through methodologies such as spatial models, dynamic panel system GMM, and pooled ordinary least squares.

However, the "innovation-fragility" perspective claims that financial advances might increase significant institutions' leverage and systemic risk (Lee et al., 2021). Nguyen

(2022), Khan et al. (2023), Vučinić (2020), and Pantielieieva et al. (2020) found that FinTech hurts financial stability. Fung et al. (2020) found using a fixed-effects regression model that FinTech stabilises emerging financial systems but risks developed markets. Sikalao-Lekobane (2024) found a nonlinear association between FinTech and financial stability using basic linear and quadratic regression analysis. The findings suggest that FinTech initially stabilises financial stability, but excessive growth may destabilise it. Thus, national and bank-specific factors affect FinTech's impact on financial stability.

FinTech and Financial Inclusion

FinTech allows rural areas to use digital banking services without bank branches (Yang & Zhang, 2022; Zetzsche et al., 2021). FinTech aids technologically advanced and underprivileged communities by cutting financial service costs. However, FinTech and financial inclusion research is inconclusive. Amnas et al. (2024) used partial least squares modelling to find a positive relationship between FinTech adoption and financial inclusion, while (Aleemi et al., 2023) used panel regression analysis to find a nonlinear positive effect.

Financial Stability and Financial Inclusion

Guo et al. (2024) used instrumental variable panel quantile regression analysis on Chinese commercial banks and found conflicting results, suggesting financial inclusion might boost or hurt stability. Barik and Pradhan (2021) found a negative Granger causality test and system GMM relationship. Using global vector autoregression, Vukovic et al. (2024) explored how FinTech affects stability and financial inclusion in BRICS economies. Their findings imply FinTech promotes financial inclusion, but its long-term effects vary between BRICS nations. They found no proof that FinTech threatens financial stability, underscoring the stability-inclusion nexus argument.

FinTech, Regulation, Financial Inclusion, and Financial Stability

Market failure theory suggests that market mechanisms alone cannot fully regulate the economy, contradicting classical economic assumptions. This theory underscores the necessity of financial regulation for both FinTech firms and traditional financial institutions. Information asymmetry and externalities pose risks to conventional commercial banks (Kamasa et al., 2023), reinforcing the need for regulatory oversight to maintain financial stability. While cloud computing and big data analytics have somewhat mitigated information asymmetry, FinTech firms continue to face monopolistic challenges and externalities (Risman et al., 2021). Financial fragility theory further justifies the need for prudent financial regulation to prevent unchecked FinTech expansion and excessive competition with traditional banks.

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Proper regulatory frameworks can mitigate FinTech-induced disruptions while preserving market stability (Kamasa et al., 2023). Unregulated FinTech growth increases financial stability risks (Danisman & Tarazi, 2020). Regulatory policies influence market entry and the adoption of technology-driven business models (Feyen et al., 2023). Excessive regulatory constraints may discourage FinTech innovation, inadvertently favouring incumbent institutions (González-Páramo, 2022). According to Feyen et al. (2023), regulators must ensure equitable, transparent, and accessible financial infrastructure. When multiple institutions facilitate financial inclusion outside traditional banking systems, regulatory complexities intensify (Sreenu, 2025).

Financial Capability, FinTech, Financial Inclusion, and Stability

Limited financial capability prevents individuals from optimally utilising financial services, exposing them to risks such as predatory lending, excessive debt, fraudulent mobile applications, and hidden fees (de Sant'Anna & Figueiredo, 2024). Although these risks are not new, they may be exacerbated by increased accessibility and usage of modern financial technologies (Demirgüç-Kunt et al., 2022). However, research on financial capability, particularly its impact on financial inclusion among low-income populations, remains scarce (Mahmood et al., 2022). The presence of financial capability may significantly influence the FinTech-financial inclusion relationship, potentially moderating its effects at the household level.

Research Contribution and Questions

This unique study examines financial inclusion, FinTech, and stability in SSA, considering financial capability and regulatory frameworks. Research questions for the study include:

- How does FinTech affect financial stability and inclusion?
- How do financial capabilities and regulations impact FinTech, financial stability, and financial inclusion?

This study contributes to the discussion on financial inclusion, FinTech, and banking stability, which is crucial for developing economies' economic growth.

RESEARCH METHODOLOGY

This study used the two-step system generalised method of moments (S-GMM), a robust panel data estimation technique, to examine how financial capability and regulation affect the relationship between financial technology, financial inclusion, and financial stability in SSA. This method is better than ordinary least squares, which fails

to handle panel estimate endogeneity. (Saha, 2024) noted that S-GMM handles endogeneity and dynamic interactions well. The study employed the following system GMM equations:

$$\ln Zscore_{i,t} = \sum_{k=1}^{p} \omega_k \ln Zscore_{i,t-k} + \omega_1 FinTech_{i,t} + \omega_2 FII_{i,t} + \omega_3 \aleph_{i,t} + \varepsilon_{it} \ldots\ldots\ldots\ldots\ldots(1)$$

$$\ln Zscore_{i,t} = \sum_{k=1}^{p} \omega_k \ln Zscore_{i,t-k} + \omega_1 FinTech_{i,t} + \omega_2 FII_{i,t} + \omega_3 FinTech_{i,t} * Cap + \omega_4 \aleph_{i,t} + \varepsilon_{it} \ldots\ldots\ldots\ldots\ldots(2)$$

$$\ln Zscore_{i,t} = \sum_{k=1}^{p} \omega_k \ln Zscore_{i,t-k} + \omega_1 FinTech_{i,t} + \omega_2 FII_{i,t} + \omega_3 FII_{i,t} * Reg + \omega_4 \aleph_{i,t} + \varepsilon_{it} \ldots\ldots\ldots\ldots\ldots(3)$$

Where:

FinTech is the financial technology.
FI is the financial inclusion.

lnzsc denotes financial stability, FinTech $*$
Reg is the interplay between fintech and regulation.

FI$*$ Reg $_{it}$ denotes the interaction between financial inclusion and regulation.
β signifies the independent variables long run coefficients.
$\varepsilon_{i,t}$ is the error term where t and i denotes the respective time and country.

Secondary data was sourced from databases including the International Monetary Fund (IMF), Global Financial Development (GFD), and World Governance Indicators (WGI). Owing to data constraints, a sample of eighteen countries was selected for analysis across the years 2011, 2014, 2017, and 2021. Except for regulation, which contained negative values, all data were subjected to a natural logarithmic transformation to enhance comparability in the analysis. The study conceptualises financial stability as the dependent variable, represented by country-level Z-Score data, which indicates the likelihood of a country's banking system default, following (Banna et al., 2020; Nguyen & Du, 2022). Additionally, financial inclusion and FinTech were examined as the two predictor variables. FinTech was measured using the proportion of individuals utilising mobile phones to pay bills, in line with (Asongu, 2023).

According to Khera et al. (2022), ATMs and commercial bank branches per capita are widely used financial inclusion proxies. Moderate variables included financial capability and regulation. Koop and Jordana, (2022) measured regulation and supervision using regulatory quality. In alignment with Bialowolski et al. (2023), bank account ownership—representing the percentage of individuals aged 15 years and above who hold a bank account—served as the proxy for financial capability. The SSA region was selected due to its high levels of FinTech adoption alongside relatively low levels of financial inclusion compared to other regions, as highlighted by (Mashamba

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& Gani, 2023). The sample comprised Benin, Cameroon, Guinea, Burkina Faso, Ghana, Liberia, Kenya, Malawi, Mauritius, Mali, Nigeria, Namibia, Senegal, Togo, Tanzania, South Africa, Zimbabwe, and Zambia—countries that provided the necessary data for the study. Table 1 presents the variables alongside their respective data sources. The analysis began with descriptive statistics and correlation analysis before applying the S-GMM to assess the relationships among the variables.

RESEARCH FINDINGS

The variables' descriptive statistics are shown in Table 1, showing trends and variations. The average Z-Score was 14.49. Only 6.5% of adults in Sub-Saharan Africa (SSA) paid bills with mobile devices, indicating low FinTech adoption. The standard deviation of 7.34% implies FinTech acceptance and integration vary widely. Financial inclusion was limited to 15 ATMs and six bank branches per 100,000 adults. The region had a bad regulatory system with an average regulatory quality of -0.49. An average score of 0.42 indicated moderate financial capability.

Table 1: Descriptive Statistics

Definition of Variables	Obs.	Mean	St. Dev	Min	Max	Source
Panel A: Financial Stability						
Z-Score (zsc)	72	14.49	6.06	3.38	30.03	GFDI
Panel B: FinTech Variables						
Use of Mobile Phones to Pay Bills	72	6.47	7.34	0.14	37.10	IMF
Panel C: Financial Inclusion Variables						
ATMs Per Population	72	14.15	19.24	1.01	72.95	IMF
Branches Per Population	72	5.97	4.51	1.09	22.47	IMF
Panel D: Supervision and Regulation Variable						
Regulatory Quality (reg)	72	-0.49	0.58	-1.89	1.20	WGI
Panel E: Financial Capabilities Variable						
Account ownership with a service provider of mobile-money-service (% of population ages 15+)	72	41.47	22.91	3.69	90.53	IMF

Source: Author's Computation

A correlation matrix was used to examine variable correlations, as shown in Table 2. Multicollinearity was not a problem because all variables correlated positively, and no correlation coefficient exceeded 0.85. Regressing Model (1) with S-GMM, we examined the relationship between financial stability, FinTech, and financial inclusion. In the first column of Table 3, FinTech negatively and statistically significantly affects financial stability. In contrast, financial inclusion—measured by ATM availability—exerts a positive and significant influence on bank stability.

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Table 2: Correlation Analysis

	lncap	lnfintech	lnzsc	lnatms	lnbranch	Reg
lncap	1.00					
lnfintech	0.598*	1.00				
lnzsc	0.112	0.09	1.00			
lnATMs	0.695*	0.21	0.37*	1.00		
lnbranch	0.585*	0.11	0.14	0.77*	1.00	
reg	0.379*	-0.01	0.40*	0,64*	0.54*	1.00*

** denotes significance at 5% level*
Source: Author's Computation

The study also integrated financial capability and its interaction with FinTech (lncap*lnFinTech) to determine whether financial capability moderate the FinTech-financial inclusion-stability nexus using Equation (ii). The outcome shown in the second column of Table 3 reveals an insignificant effect of financial capability, however when moderated with FinTech the coefficient becomes positive and significant. The study also integrated regulatory quality and the interaction term of regulation and financial inclusion (reg*lnATMs) into the model to determine the direct effect of regulation and the moderating role of regulation using Equation (iii). The results are shown in the third and fourth of Table 3. The regulatory quality coefficient was negative and not significant whilst the coefficient of the interaction term (reg*lnATMs) was observed to be negative and significant at 5%.

DISCUSSION

FinTech, Financial Inclusion and Stability

The data show that FinTech negatively impacts financial institution stability. At 1% significance, FinTech's estimated coefficient is -0.137, which is significantly negative. A 1% increase in FinTech reduces financial stability by 0.137, showing that financial technology destabilises the region. These findings support the "innovation-fragility" notion that FinTech may enhance market volatility, procyclicality, and contagion, jeopardising financial system stability. The findings support Nguyen (2022) and Fung et al. (2020) findings that FinTech harms financial stability. They contradict Daud et al. (2022) and Cheng and Qu (2020), who claimed FinTech expansion improves financial stability. Some academics may have overlooked financial system variations between established and emerging economies, which may explain this gap.

The paper uses FinTech theory, particularly Murinde et al. (2022) to explain how FinTech adoption hurts bank stability. FinTech first upsets financial operations, creating new obstacles. FinTech integration generally requires major changes to banks' processes, infrastructure, and staff. Disruptions can affect Z-scores, raise risks, and inefficiency if not managed. Second, FinTech adoption may affect credit risk

management unintentionally. FinTech-enabled loan processing may increase loan volumes and nonperforming loans, weakening banks' financial health and lowering Z-scores. When integrating FinTech technologies, banks may struggle with regulatory frameworks, compliance, and risk mitigation. Regulators can fine, damage reputation, and raise credit risk. Additionally, FinTech adoption raises data security and privacy concerns. Infringements on customer privacy and trust can lower Z-scores and ruin reputations, raising loan default rates. The quadratic coefficient of FinTech is positive, implying a U-shaped relationship between FinTech and financial stability in the long run. Further, ATMs per population show that financial inclusion considerably improves financial stability. Financial stability rises 0.344% each 1% of financial inclusion. Koudalo and Toure (2023) found a similar tendency in the same location. They contrast Hua et al. (2023), who found an inverted U-shaped connection between financial inclusion and stability.

Financial Capability, FinTech-Financial Inclusion-Stability Nexus

Financial stability depends on more than finances. Financial capability and FinTech benefits. Integrating financial skills with FinTech can decrease its negative effects on financial stability. Financial competence improves FinTech's impact on financial inclusion in SSA because people with financial knowledge, skills, understanding, and rights and obligations utilise FinTech responsibly and sustainably. This confirms that financial competency reduces information asymmetry and stabilises finances (Cheng & Qu, 2020; Li et al., 2022).

Table 3: The Effect of Financial Capability and Regulation on FinTech-Financial Inclusion Nexus Results

Variable	(1)		(2)		(3)		(4)	
lnzscore	**Coeff.**	**Prob.**	**Coeff.**	**Prob.**	**Coeff.**	**Prob.**	**Coeff.**	**Prob**
L.lnzscore	**0.714**	**0.001***	**0.693**	**0.001***	**0.586***	**0.000***	**0.612**	**0.001***
lnFinTech	-0.137	0.000*	-0.489	0.000*	-0.131	0.000*	-0.134	0.000*
(lnFinTech)^2	0.035	0.011*	0.010	0.460	0.036	0.007*	0.034	0.007*
lnatms	0.344	0.002*	0.349	0.001*	0.366	0.000*	0.225	0.025*
lncap			0.050	0.467	-	-	-	-
lncap*lnfintech	-	-	0.102	0.001*	-	-	-	-
reg	-	-	-	-	-0.484	0.342	-0.371	0.229
Reg*lnatms	-	-	=	-	-	-	-0.306	0.005*
Cons.	1.836	0.000*	1.769	0.000	1.884	0.000*	2.299	0.000*
No of groups		18		18		18		18
Arellano-Bond test [AR(1) in first differences]: z = -3.28 Prob > z = 0.000								
Arellano-Bond test [AR(2) in first differences]: z = 0.118 Prob > z = 0.796 Hansen test [overid. Restrictions]: chi2(70) = 69.58 Prob > chi2 = 0.237								

Source: Computation from the Author

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Regulation and the FinTech-Financial Inclusion-Financial Stability Nexus

The coefficient of the interaction term (reg*lnATMs) was observed to be negative and significant at 5%, signalling that increased regulation can reduce the positive effects of increased financial inclusion on bank stability in SSA. In other words, excessive regulation can drag the positive linkage between stability of financial institutions and inclusion. Comparing the coefficient of lnATMs and lnATMs*Reg, it shows a less salient influence of inclusion on banks solidity under strong supervision and regulation in line with (Hua et al., 2023).

IMPLICATIONS OF THE STUDY

This paper examines how regulation and financial capabilities affect FinTech, financial stability, and financial inclusion, adding to the knowledge empirically and theoretically. It emphasises SSA, which lags in financial inclusion despite significant technological advances. The findings emphasise the necessity to incorporate financial inclusion—a key step towards financial stability—into FinTech-era financial stability theories. The study also emphasises the importance of using robust financial technology to boost economic growth and financial inclusion while balancing stability and regulation to eliminate banking access inequities.

CONCLUSION

This study explores how financial capabilities and regulation affect SSA financial technology, stability, and inclusion. The findings show that FinTech hurts financial stability, but financial capacity can alleviate it. The study also found that financial inclusion improves financial stability and regulation moderates it. But overregulation might impair the relationship between financial inclusion and stability. Financial knowledge, skills, understanding, and awareness of rights and obligations in SSA can encourage ethical and sustainable FinTech use among financially underprivileged communities, amplifying FinTech's impact on financial inclusion.

LIMITATIONS

This study utilises a single variable to represent financial capability, whereas future research should incorporate multiple indicators, such as financial literacy, to provide a more comprehensive measure. Additionally, alternative methodologies could be employed in future studies to determine whether the findings remain consistent across different analytical approaches.

CONFLICT OF INTEREST

This manuscript's authorship does not present any conflicts of interest.

REFERENCES

Abor, J. Y., Quartey, P., Ahmad, A. H., & Opoku-Afari, M. (2022). FinTech and the future of banks and financial services in Africa. In *The economics of banking and finance in Africa: developments in Africa's financial systems* (pp. 135-180). Cham: Springer International Publishing.

Allen, F., Carletti, E., & Gu, X. (2025). The Various Roles of Banks in Financial Systems. *The Oxford Handbook of Banking*, 21.

Aleemi, A. R., Javaid, F., & Hafeez, S. S. (2023). Finclusion: The nexus of Fintech and financial inclusion against banks' market power. *Heliyon*, *9*(12). https://doi.org/10.1016/j.heliyon.2023.e22551

Amenu-Tekaa, K. S. (2022). Financial sector regulatory and supervisory framework in Ghana-the pre and post 2017 banking crisis. *International Journal of Economics, Commerce and Management*, *1* *0*(1), 1-29.

Amnas, M. B., Selvam, M., & Parayitam, S. (2024). FinTech and financial inclusion: Exploring the mediating role of digital financial literacy and the moderating influence of perceived regulatory support. *Journal of Risk and Financial Management*, *17*(3), 108. https://doi.org/10.3390/jrfm17030108

Asongu, S. A. (2023). The relevance of fintechs in gender financial inclusion in Sub-Saharan Africa. *Development Finance Agenda (DEFA)*, *8*(4), 10-11. https://hdl.handle.net/10520/ejc-defa_v8_n4_a4

Banna, H., Hassan, M. K., & Alam, M. R. (2020). Digital financial inclusion, Islamic banking stability and sustainable economic growth. *Islamic perspective for sustainable financial system*, *20*(1), 131-152. https://doi.org/10.26650/B/SS10.2020.017.07

Banna, H., Hassan, M. K., & Rashid, M. (2021). Fintech-based financial inclusion and bank risk-taking: Evidence from OIC countries. *Journal of International Financial Markets, Institutions and Money*, *75*, 101447. https://doi.org/10.1016/j.intfin.2021.101447

Barik, R., & Pradhan, A. K. (2021). Does financial inclusion affect financial stability: evidence from BRICS nations? *The journal of developing areas*, *55*(1). https://doi.org/10.1353/jda.2021.0023

Bialowolski, P., Xiao, J. J., & Weziak-Bialowolska, D. (2023). National culture and financial capability: A global perspective. *Social Indicators Research*, *170*(3), 877-891. https://doi.org/10.1007/s11205-023-03221-7

Bobbo, A., Fankem, G. S. G., & Yeyouomo, A. K. (2024). Determinants of FinTech development: Evidence from Sub-Saharan African Countries. *Journal of Financial Services Research*, 1-39. https://doi.org/10.1007/s10693-024-004279

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CGAP - Consultative Group to Assist the Poor. (2022). *Fintech and the Future of Banking Topics*. https://www.cgap.org/topics/collections/fintech-future-of-banking

Cheng, M., & Qu, Y. (2020). Does bank FinTech reduce credit risk? Evidence from China. *Pacific-Basin Finance Journal*, *63*, 101398. https://doi.org/10.1016/j.pacfin.2020.101398

Danisman, G. O., & Tarazi, A. (2020). Financial inclusion and bank stability: Evidence from Europe. *The European Journal of Finance*, *26*(18), 1842-1855. https://doi.org/10.1080/1351847X.2020.1782958

Daud, S. N. M., Khalid, A., & Azman-Saini, W. (2022). FinTech and financial stability: Threat or opportunity? *Finance Research Letters*, *47*, 102667. https://doi.org/10.1016/j.frl.2021.102667

Demirgüç-Kunt, A., Klapper, L., Singer, D., & Ansar, S. (2022). *The Global Findex Database 2021: Financial inclusion, digital payments, and resilience in the age of COVID-19*. World Bank Publications.

de Sant'Anna, D. M., & Figueiredo, P. N. (2024). Fintech innovation: Is it beneficial or detrimental to financial inclusion and financial stability? A systematic literature review and research directions. *Emerging Markets Review*, 101140. https://doi.org/10.1016/j.ememar.2024.101140

Feyen, E., Natarajan, H., & Saal, M. (2023). *Fintech and the future of finance: Market and policy implications*. World Bank Publications. https://doi.org/10.1596/978-1-4648-1914-8

Fung, D. W., Lee, W. Y., Yeh, J. J., & Yuen, F. L. (2020). Friend or foe: The divergent effects of FinTech on financial stability. *Emerging Markets Review*, *45*, 100727. https://doi.org/10.1016/j.ememar.2020.100727

González-Páramo, J. M. (2022). Regulating and supervising BigTech in finance. In *Central Banks and Supervisory Architecture in Europe* (pp. 181-193). Edward Elgar Publishing.

Grinblatt, M., & Longstaff, F. A. (2000). Financial innovation and the role of derivative securities: An empirical analysis of the Treasury STRIPS program. *the Journal of Finance*, *55*(3), 1415-1436. https://doi.org/10.1111/0022-1082.00252

Guo, P., Cheng, M., & Shen, Y. (2024). FinTech adoption and bank risk-taking: evidence from China. *Applied Economics Letters*, *31*(7), 594-602. https://doi.org/10.1080/13504851.2022.2140755

Hua, X., Bi, J., & Shi, H. (2023). The appropriate level of financial inclusion: The perspective of financial stability. *China Economic Quarterly International*, *3*(3), 167-178. https://doi.org/10.1016/j.ceqi.2023.08.001

Kamasa, K., Ankrah, D., Tetteh, A., & Bonuedi, I. (2023). How Germane is Banking Regulation and Supervision to Financial Sector Stability in Emerging Economies? Empirical Evidence from Ghana. *African Journal of Economic Review*, *11*(4), 66-84. https://www.ajol.info/index.php/ajer/article/view/256585

Khan, H. H., Khan, S., & Ghafoor, A. (2023). Fintech adoption, the regulatory environment and bank stability: An empirical investigation from GCC economies. *Borsa Istanbul Review*, *23*(6), 1263-1281. https://doi.org/10.1016/j.bir.2023.10.010

Khera, P., Ng, S., Ogawa, S., & Sahay, R. (2022). Measuring digital financial inclusion in emerging market and developing economies: A new index. *Asian Economic Policy Review*, *17*(2), 213-230. https://doi.org/10.1111/aepr.12377

Koop, C., & Jordana, J. (2022). Regulatory independence and the quality of regulation. In *Handbook of regulatory authorities* (pp. 211-226). Edward Elgar Publishing.

Koranteng, B., & You, K. (2024). Fintech and financial stability: Evidence from spatial analysis for 25 countries. *Journal of International Financial Markets, Institutions and Money*, *93*, 102002. https://doi.org/10.1016/j.intfin.2024.102002

Koudalo, Y. M., & Toure, M. (2023). Does financial inclusion promote financial stability? Evidence from Africa. *Cogent Economics & Finance*, *11*(2), 2225327. https://doi.org/10.1080/23322039.2023.2225327

Lagna, A., & Ravishankar, M. (2022). Making the world a better place with fintech research. *Information Systems Journal*, *32*(1), 61-102. https://doi.org/10.1111/isj.12333

Lee, C. C., Li, X., Yu, C. H., & Zhao, J. (2021). Does fintech innovation improve bank efficiency? Evidence from China's banking industry. *International Review of Economics & Finance*, *74*, 468- 483. https://doi.org/10.1016/j.iref.2021.03.009

Li, C., He, S., Tian, Y., Sun, S., & Ning, L. (2022). Does the bank's FinTech innovation reduce its risk-taking? Evidence from China's banking industry. *Journal of Innovation & Knowledge*, *7*(3), 100219. https://doi.org/10.1016/j.jik.2022.100219

Mahmood, S., Shuhui, W., Aslam, S., & Ahmed, T. (2022). The financial inclusion development and its impacts on disposable income. *Sage Open*, *12*(2), 21582440221093369.

Mashamba, T., & Gani, S. (2023). Fintech, bank funding, and economic growth in Sub-Saharan Africa. *Cogent Economics & Finance*, *11*(1), 2225916. https://doi.org/10.1080/23322039.2023.2225916

Murinde, V., Rizopoulos, E., & Zachariadis, M. (2022). The impact of the FinTech revolution on the future of banking: Opportunities and risks. *International review of financial analysis*, *81*, 102103. https://doi.org/10.1016/j.irfa.2022.102103

Nan, W., Zhu, X., & Lynne Markus, M. (2021). What we know and don't know about the socioeconomic impacts of mobile money in Sub-Saharan Africa: A systematic literature review. *The Electronic Journal of Information Systems in Developing Countries*, *87*(2), e12155. https://doi.org/10.1002/isd2.12155

Ndung'u, N., & Oguso, A. (2023). Digital technology and innovation in Africa: leapfrogging in finance. In *Technological Leapfrogging and Innovation in Africa* (pp. 89-111). Edward Elgar Publishing. https://doi.org/10.4337/9781800370395.00013

Nguyen, Q. K. (2022). The effect of FinTech development on financial stability in an emerging market: The role of market discipline. *Research in Globalization*, *5*, 100105. https://doi.org/10.1016/j.resglo.2022.100105

Nguyen, T. D., & Du, Q. L. T. (2022). The effect of financial inclusion on bank stability: Evidence from ASEAN. *Cogent Economics & Finance*, *10*(1), 2040126. https://doi.org/10.1080/23322039.2022.2040126

Pantielieieva, N., Khutorna, M., Lytvynenko, O., & Potapenko, L. (2020). FinTech, RegTech and traditional financial intermediation: Trends and threats for financial stability. In *Data-Centric Business and Applications: Evolvements in Business Information Processing and Management (Volume 3)* (pp. 1-21). Springer. https://doi.org/10.1007/978-3-030-35649-1_1

Risman, A., Mulyana, B., Silvatika, B., & Sulaeman, A. (2021). The effect of digital finance on financial stability. *Management Science Letters*, *11*(7), 1979- 1984. http://doi.org/ 10.5267/j.msl.2021.3.012

Saha, S. K. (2024). Does the impact of the foreign direct investment on labor *Economy*, *15*(2), 8588-8620. https://doi.org/10.1007/s13132-023-01444-0

Safiullah, M., & Paramati, S. R. (2024). The impact of FinTech firms on bank financial stability. *Electronic Commerce Research*, *24*(1), 453-475. https://doi.org/10.1007/s10660-022-09595-z

Sikalao-Lekobane, O. L. (2024). Does FinTech credit enhance or disrupt financial stability? *International Review of Economics & Finance*, *96*, 103489. https://doi.org/10.1016/j.iref.2024.103489

Sreenu, N. (2025). How Does Fintech Affect the Development of the Digital Economy? Evidence from India. *Journal of the Knowledge Economy*, 1-34.

Vives, X. (2019). Digital disruption in banking. *Annual Review of Financial Economics*, *11*(1), 243-272. https://doi.org/10.1146/annurev-financial-100719-120854

Vuković, D. B., Hassan, M. K., Kwakye, B., Febtinugraini, A., & Shakib, M. (2024). Does fintech matter for financial inclusion and financial stability in BRICS markets?. *Emerging Markets Review*, *61*, 101164. https://doi.org/10.1016/j.ememar.2024.101164

Vučinić, M. (2020). Fintech and financial stability potential influence of FinTech on financial stability, risks and benefits. *Journal of Central Banking Theory and Practice*, *9*(2), 43-66. https://doi.org/10.2478/jcbtp-2020-0013

Wang, Y., Xiuping, S., & Zhang, Q. (2021). Can fintech improve the efficiency of commercial banks?—An analysis based on big data. *Research in international business and finance*, *55*, 101338. https://doi.org/10.1016/j.ribaf.2020.101338

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World Bank. (2022). Regulation and supervision of Fintech: Considerations for EMDE policymakers. In: Fintech and the Future of Finance Flagship Technical Note. . *World Bank Group, Washington.* https://documents1.worldbank.org/curated/en/099735204212215248/pdf/P173006033b45702d09522066cbc8338dcb.pdf

Yang, T., & Zhang, X. (2022). FinTech adoption and financial inclusion: Evidence from household consumption in China. *Journal of Banking & Finance*, *145*, 106668. https://doi.org/10.1016/j.jbankfin.2022.106668

Zetzsche, D. A., Veidt, R., Buckley, R., & Arner, D. (2021). Sustainability, FinTech and Financial Inclusion. *European Business Organization Law Review*, *21*(1). https://doi.org/10.1007/s40804-020-00183-y