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FINANCIAL INCLUSION AND DIGITAL COMMERCE: TRANSFORMING ECONOMIC GROWTH IN EMERGING MARKETS

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Abstract

Financial inclusion and digital commerce are increasingly being recognised as important elements of economic transformation in emerging markets. However, in markets with limited digital skills, infrastructure and institutions, the joint effects on economic growth are uncertain. This study uses a panel data set of 101 emerging economies from 2011 to 2024 to examine impacts of digital commerce and financial inclusion on economic growth, both independently and collectively. Study makes use of information from World Development Indicators and the Global Findex Database. Pooled OLS, two-way fixed effects estimation, country-clustered standard errors, robustness tests with GDP per capita growth, and an alternate sample that does not include 2022 are all used in the analysis. It finds that financial inclusion and digital commerce have insignificant direct effects on GDP growth. But their interaction is negative and significant (coefficients between -14.222 and -18.656). This means that digital-financial growth does not translate into growth unless complemented with high-quality institutions, digital infrastructure, financial literacy, and productive economic activities. The research concludes that developing countries need to move from "digital finance for access" to holistic approaches to transform inclusion and digital commerce into economic participation.

Keywords: Financial inclusion; Digital commerce; Economic growth; Emerging markets; Digital finance

1. Introduction

Through financial inclusion and digital commerce, the economic landscape of emerging markets has been profoundly altered by the growing ubiquity of digital technologies. Financial inclusion, or having access to worthwhile and reasonably priced financial services, has long been recognised as a crucial factor in promoting economic expansion, reducing poverty, and strengthening institutions. Simultaneously, the emergence of digital commerce, made possible by mobile connectivity, online platforms, and financial technology (fintech) innovations, has sped the process by which economic systems are being digitised. This convergence is one of a broader global movement towards digitally mediated economic activity where digital platforms and technologies are emerging as the critical infrastructure that defines access to markets, services and economic opportunities. But technological change is not value-neutral; it is more likely to change the labor markets and employment opportunities, and

institutional arrangements in a non-uniform manner (Acemoglu and Restrepo, 2019).

The relationship between digital commerce and financial inclusion in developing nations with structural bottlenecks (such as poor institutional frameworks, inequality, infrastructure gaps and so on) is exciting and challenging. Programs for financial inclusion have increased dramatically in recent years, which are supported by fintech innovations that reduce the cost of financial services. It has led to a more stable financial system in emerging markets (Ahamed and Mallick, 2019). Simultaneously, the emergence of digital platforms has resulted in new patterns of trade and small and medium enterprises being able to reach bigger markets and even global value chains. The fintech industry (digital payments, peer-to-peer lending and mobile banking) is crucial in connecting the formal financial system and the unbanked (Allen et al., 2021). These, in turn, have implications for digital-financial driven growth.

Although this is an optimistic story, there is emerging evidence that association between economic inclusion, digital commerce, and economic growth is complicated and can be non-linear. Digital financial services can, on the one hand, aid in expanding access, but on the other hand, they can bring about new types of disparity and systemic risk unless they are backed by proper regulatory frameworks and institutional infrastructure. As an example, the growth of fintech has caused concerns about sustainability, regulations, and inequality in the distribution of benefits among various layers of society (Arner et al., 2019). Besides, the spread of mobile banking and digital financial instruments, despite being linked with the enhanced welfare outcomes, might not necessarily be accompanied by the inclusive growth, especially in the settings with low financial literacy and digital inequalities (Asongu and Odhiambo, 2019). These patterns show how digital commerce and financial inclusion affect economic performance should be critically analyzed, as well as their complex effect on each other.

The problem that this paper seeks to address stems from the notion that financial inclusion and digital commerce simultaneously expanding will always have a positive impact on the economy. Although both are separately linked with development, their joint effects may have unintended consequences, especially in emerging markets where institutional and technological readiness and uptake are not uniform. Previous studies have demonstrated that digital financial inclusion can have complex effects on banking sector stability, implying that the digital transformation without regulatory adjustments may create potential risks (Banna & Alam, 2021). Likewise, fintech-based access to finance, although increasing access to finance, may also increase inequality if access is not supported by the ability to effectively use the finance (Beck, 2020). The interplay between these two areas - economic inclusion and digital commerce - thus needs to be examined to ascertain whether they are complementary to each other in promoting economic growth, or whether they may have adverse consequences on growth in certain circumstances.

The study focuses on the emerging markets, where the dynamics between digitalisation and economic development are the most pronounced. The study will use panel data among countries to explain the diversity of these economies, but will adjust the macroeconomic variables such as inflation, trade openness, and population growth. However, there are limitations of the study. To start with, the combination of indices of financial inclusion and digital commerce may fail to reflect finer-grained disparities in access and utilization. Second, The availability of data limits the investigation in different countries and over time which might limit the generalisability of the results. Third, the research does not establish causal relationships, in spite of using advanced econometric methods, such as the fixed effects models, which paves the way for further research based on experimental or quasi-experimental research designs.

The merit of this study is that it has had an impact on the ongoing discussion on digital revolution and economic growth. Findings of economic inclusion and digital commerce that the study is built upon gives us a nuanced understanding of the integration of digital and economic activities, rather than the traditional notion of positive impacts. This is especially important to policy makers in developing economies who are beginning to focus on digital financial ecosystems to stimulate development. It is essential to understand when and how these approaches might or might not work in order to inform policy to drive inclusive growth. Finally, the study is also resonated by interdisciplinary concerns about the social effects of technology including equity and access issues and institutional changes.

The following Objective serve as the research's compass:

- To examine individual effects of economic inclusion and digital commerce on economic growth in emerging markets.
- To analyze interaction effect between economic inclusion and digital commerce and its implications for economic performance.

- To provide policy-relevant insights into how digital-financial integration can be supported by institutional capacity, digital infrastructure, financial literacy, and productive use to promote inclusive and sustainable economic growth.

2. Literature Review

The connections between economic inclusion, digital finance, and economic growth have been extensively studied in recent years, particularly in developing and emerging markets. Now regarded as a critical component of inclusive development, economic inclusion enables businesses and households to access formal financial services, reduces their exposure to risks and enables them to engage in economic activities. Early theoretical approaches highlight the importance of inclusive finance for long-term development in terms of improving capital allocation and achieving balanced growth (Corrado & Corrado, 2017). This perspective is supported by empirical evidence that demonstrates a link between access to financial services and poverty reduction and greater economic activity, particularly in economically disadvantaged areas (Erlando et al., 2020).

Recent research has built on this perspective by including the impact of digital technologies, such as fintech, in promoting financial access. The use of fintech has reduced transaction costs and enhanced access, thereby overcoming some of the barriers to financial inclusion. This has allowed for greater access to credit, savings and payment services, especially among the poor (Bollaert et al., 2021). The use of digital financial services has been found to increase household consumption by enabling households to conduct financial transactions more efficiently and increasing their liquidity, thereby stimulating economic growth (Li et al., 2020). This suggests that digital finance contributes to improving the avenues for financial growth and inclusion.

However, Growth and financial inclusion have a complicated relationship. Numerous studies highlight how important institutional and threshold issues are to the success of financial inclusion initiatives. For example, financial inclusiveness may only be conducive to growth above a certain level of financial development, suggesting non-linear effects (Nizam et al., 2020). Furthermore, a large size of the shadow economy may reduce the positive effects of financial inclusion since informal economic activities constrain the role of the formal financial sector (Younas et al., 2022). These insights indicate that the structure and institutions are important in determining the impact of economic inclusion.

The fact that digital technologies are used also contributes to the complexity. It has been determined that the primary factor accelerating economic growth is digital economic inclusion particularly whereby well established institutions and governance exist. The results of the recent studies in Sub-Saharan Africa indicate that the institutional quality is a significant determinant of the growth-enhancing effect of digital financial inclusion, which implies that the relevant regulatory and governance frameworks are needed (Chinoda & Kapingura, 2024). Similarly, the digital financial services have also been identified to promote inclusive finance by promoting access and efficiency, especially in the emerging markets such as China (Hasan et al., 2022). Findings of these research studies indicate how digital technologies contribute towards enhancing financial inclusion. Nevertheless, the digital financial services development is not a risk-free endeavor. The fast development of digital financial services, particularly in times of economic shocks, like the COVID-19 pandemic has led to cybersecurity, regulatory and access to digital infrastructure questions (Agur et al., 2020). Such risks may negate the digital financial inclusion advantages in regards to economic growth, especially in technologically disadvantaged areas. Moreover, the digital divide can also establish and maintain disparities, in particular, between urban and rural locations, as there is evidence of ongoing disparities in the distribution of income related to financial inclusion (Huang and Zhang, 2020).

Another form of technology-led development is the use of information and communication technologies (ICT) to enhance financial inclusion. ICT based financial services (mobile banking and microfinance) have been essential in enhancing access to financial services and alleviating poverty in developing countries (Mushtaq & Bruneau, 2019). These assist in reaching out to financial markets and providing financial services in a better way and hence enhancing economic inclusion. Their influence, however, depends on their effective adoption and utilization which is associated with education, infrastructure and digital skills.

Even more recently, significance of taking into implications of digital financial inclusion on sustainability and development has been brought to the fore. Digital financial inclusion has the potential to contribute to an environmentally sustainable development, by improving the distribution of resources and effective consumption (Ozturk & Ullah, 2022). Moreover, digital technologies in financial systems have been linked with some macroeconomic variables,

including the economic resilience and performance (Daud, 2023). These observations imply the multi-faceted impact of digital financial inclusion on economic growth that extends past the financial and economic determinants to social and environmental determinants.

Studies on connections between financial inclusion, digital commerce, and economic growth are still lacking, despite the rising body of literature. While connection between each of the elements and economic growth has been well studied, little is known about how the two interact. The current research tends to assume that financial inclusion and digital finance interact favourably, with no trade-offs or adverse effects. Knowing how financial inclusion and digital commerce interact to produce economic results is crucial given the convergence of financial and digital systems, especially in emerging nations with institutional agendas and structural diversity.

3. Methodology

3.1 Research Design and Analytical Framework

The purpose of this quantitative empirical study is to look into the relationship between financial inclusion, digital commerce, and economic growth in emerging markets. The research paper takes the panel data design in order to examine both inter-country and temporal variations. The objective will be to evaluate how financial inclusion, as well as digital commerce, affects the economic growth and whether the interaction between the two variables has positive or negative consequences.

The framework is constructed on the conventional growth regression model, adding the measurement of financial inclusion and digital commerce. Another important aspect of the model is the interaction term between the two variables, which enables us to identify the interaction effects that cannot be separated using their respective coefficients. This follows the recent research that has noted that digital financial systems are holistic.

3.2 Data Sources and Sample Selection

The empirical analysis draws on two key sources of data: the World Bank's Global Findex Database and the World Development Indicators (WDI). The Global Findex dataset contains detailed financial inclusion indicators, such as account ownership and digital payment adoption, and the WDI dataset contains macroeconomic variables such as GDP growth, inflation, trade openness and population (World Bank, 2025; World Bank, 2024).

The analysis is limited to emerging market countries, categorised by World Bank as low-income, lower-middle-income and upper-middle-income economies. The sample does not include high-income economies to focus on countries where financial inclusion and digitalisation are still in the early stages.

Our analysis uses several waves of survey data between 2011 and 2024, resulting in an unbalanced panel. The final sample used for the main regression includes 101 countries and 424 observations. It also includes a smaller sample, omitting the year 2022, due to its smaller sample size.

3.3 Variable Construction

3.3.1 Dependent Variables

The main dependent variable is GDP growth (annual percentage) as it represents economic performance. For robustness, GDP per capita growth is also used, which accounts for population growth. Both measures are winsorized at the 1st and 99th percentiles to reduce the effects of outliers.

3.3.2 Key Independent Variables

Economic inclusion is measured by accounts (proportion of adults with access to formal financial services). E-commerce is proxied by digital payments, which reflect the level of electronic payments in an economy.

To improve model stability and interpretability, both variables are mean-centered prior to constructing the interaction term. The interaction between financial inclusion and digital commerce is defined as:

$$FI\_DC_{it} = (FI_{it} - \bar{FI}) \times (DC_{it} - \bar{DC}) \quad (1)$$

This approach leads to a more accurate assessment of joint effects and avoids multicollinearity.

3.3.3 Control Variables

The regression model includes the usual macroeconomic controls to control for differences in country structure. Inflation is used to represent macroeconomic stability, trade as a share of GDP is used to control for openness, and the natural logarithm of population is used to control for size. In addition, the variables are winsorized, if needed, to control for outlying observations.

3.4 Data Preprocessing and Cleaning

The data is prepared in various stages to avoid inconsistencies. We select only country-level observations representing observations for the general population from the Global Findex dataset. The data are merged by country code and year to form a panel.

Variables with high levels of missing values, especially the early years of digital indicators, are

removed from the main analysis. The regression data has no missing values for the main variables. The macroeconomic indicators are winsorized to reduce the effect of outliers, and mean-centering is used to handle potential multicollinearity in interaction models. Variance inflation factor tests indicate that multicollinearity is not present.

3.5 Econometric Specification

The empirical analysis proceeds through a sequence of regression models. The baseline specification is expressed as:

$$Growth_{it} = \beta_0 + \beta_1 FI_{it} + \epsilon_{it} \quad (2)$$

This is extended to include digital commerce:

$$Growth_{it} = \beta_0 + \beta_1 FI_{it} + \beta_2 DC_{it} + \epsilon_{it} \quad (3)$$

The model is further expanded by incorporating control variables:

$$Growth_{it} = \beta_0 + \beta_1 FI_{it} + \beta_2 DC_{it} + \beta_3 X_{it} + \epsilon_{it} \quad (4)$$

where X_{it} represents inflation, trade openness, and population.

To capture joint effects, the interaction term is introduced:

$$Growth_{it} = \beta_0 + \beta_1 FI_{it} + \beta_2 DC_{it} + \beta_3 (FI \times DC)_{it} + \beta_4 X_{it} + \epsilon_{it} \quad (5)$$

To control for unobserved heterogeneity, the final specification employs a two-way fixed effects model:

$$Growth_{it} = \beta_0 + \beta_1 FI_{it} + \beta_2 DC_{it} + \beta_3 (FI \times DC)_{it} + \beta_4 X_{it} + \mu_i + \lambda_t + \epsilon_{it} \quad (6)$$

where μ_i captures country-specific effects and λ_t captures time-specific effects. Standard errors are clustered at country level to address heteroskedasticity and serial correlation.

3.6 Robustness Checks

A range of robustness tests are performed to check empirical results. The study is also conducted with GDP per capita as dependent variable to rule out possibility of spurious results due to aggregate growth. A sample without the year 2022 is also estimated to eliminate potential bias due to the small sample size for 2022.

The stability of the interaction term across various specifications supports the robustness of the interaction effect. These tests enhance the credibility of the results and the empirical approach.

4. Results

4.1 Descriptive Statistics

Descriptive statistics of key variables employed in empirical analysis, as displayed in Table 1, demonstrate that the GDP growth rate is 4.50 on average and the GDP per capita growth is 2.99. This suggests that the growth of aggregate output is greater than the growth of the populations of the sampled emerging markets. With a mean score of 0.439, financial inclusion index indicates a moderate level of access to formal financial services. By comparison, digital commerce proxy mean is 0.161, which implies that the use of digital transactions is not as well-developed as financial access.

There is a lot of dispersion in inflation with a mean of 7.57 and it has a high maximum value, which proves the fact that there is some macroeconomic instability in certain emerging markets. The mean of trade openness is 73.16 of GDP and log population is 16.63. These descriptive findings indicate that there is high variation in the countries and this justifies the employment of panel regression methods.

Table 1: Descriptive Statistics of Financial Inclusion, Digital Commerce, and Macroeconomic Variables in Emerging Markets (2011–2024).

Variable	Mean	Std. Dev.	Min	Max
GDP Growth (%)	4.50	3.98	-26.56	32.49
GDP per Capita Growth (%)	2.99	4.10	-28.27	30.40
Financial Inclusion Index	0.439	0.235	0.015	0.983
Digital Commerce Proxy	0.161	0.119	0.003	0.672
Inflation (%)	7.57	15.53	-12.30	219.88
Trade (% of GDP)	73.16	32.00	17.40	183.15
Log Population	16.63	1.53	12.76	21.10

4.2 Trends in Financial Inclusion and Digital Commerce

Trend in movement of economic inclusion and digital commerce throughout the study period shows an evident positive trend as shown in Figure 1. Economic inclusion increases to around 0.55 in 2024, as compared to 0.29 in 2011, whereas the digital commerce also grows to 0.27 in the same

year, as compared to 0.10. This trend indicates that the emerging markets have been enjoying stable advancements in terms of financial access and adoption of digital transactions.

The two indicators decrease in 2022, and this is expected due to the few observations between waves. That is why another model of robustness without taking into account 2022 is estimated further in the analysis.

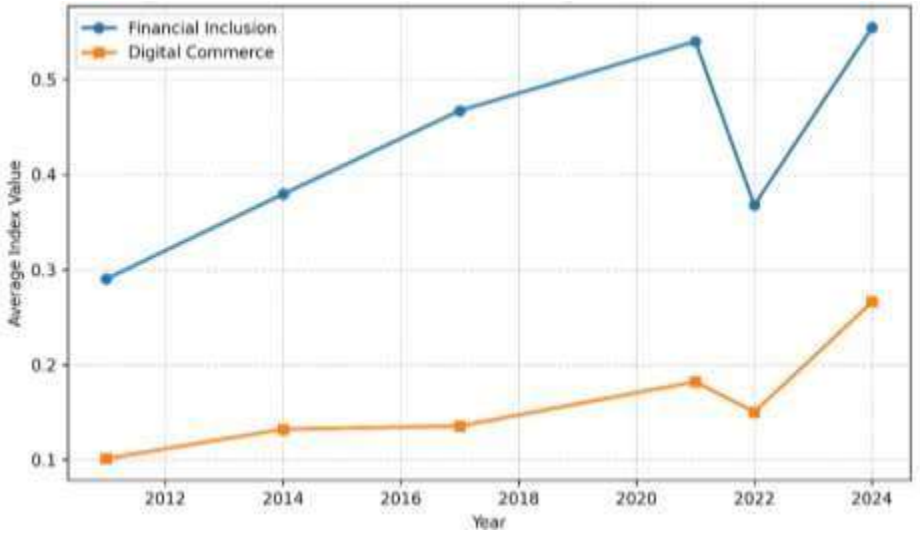

Figure 1: Trends in Financial Inclusion and Digital Commerce (2011–2024).

4.3 Correlation Analysis

Financial inclusion and digital commerce are positively connected at 0.647, according to the correlation matrix shown in Table 2, suggesting that nations with more financial inclusion also typically have higher levels of digital transaction adoption. Nevertheless, relationships between GDP growth and two primary explaining variables are quite low, and GDP growth has a correlation of 0.035 with financial inclusion and 0.027 with digital commerce.

This tendency implies that the economic growth cannot be explained by simple bivariate relationships. It also justifies the use of regression models with control variables, interactive effects and country year fixed effects.

Table 2: Pairwise Correlation Matrix of Financial Inclusion, Digital Commerce, and Macroeconomic Variables.

Variable	GDP Growth	FI Index	DC Proxy	Inflation	Trade
GDP Growth	1.000	0.035	0.027	-0.096	-0.026
FI Index	0.035	1.000	0.647	0.028	0.227
DC Proxy	0.027	0.647	1.000	-0.013	0.101
Inflation	-0.096	0.028	-0.013	1.000	-0.136
Trade	-0.026	0.227	0.101	-0.136	1.000

4.4 Baseline and Interaction Regression Results

The pooled OLS estimates, shown in Table 3, show that in Models 1 and 2, financial inclusion and digital commerce have positive but statistically insignificant coefficients. When Model 3 is considered including inflation, trade openness and population the coefficient of digital commerce turns negative but is not significant. This explain that immediate impacts of financial inclusion and digital business are not strong in pooled specifications.

The interaction term between digital commerce and financial inclusion is included in Model 4. At the 5% level, the two-tailed coefficient of interaction is significant and negative. This result implies that the effects of e-commerce and financial inclusion may not always be growth enhancing. Instead, the results are diminishing marginal returns, or a structural impediment, when both systems expand simultaneously without the necessary institutional and infrastructural support.

Table 3: Pooled OLS Estimates of the Impact of Economic Inclusion and Digital Commerce on Economic Growth in Emerging Markets.

Variable	Model 1	Model 2	Model 3	Model 4
Financial Inclusion	0.487	0.421	0.622	0.257

	(0.677)	(0.902)	(0.940)	(0.898)
Digital Commerce	Not included	0.202	-0.458	1.596
		(1.552)	(1.580)	(1.720)
FI × DC	Not included	Not included	Not included	-14.222**
				(5.576)
Inflation	Not included	Not included	-0.040	-0.041
			(0.032)	(0.031)
Trade (% of GDP)	Not included	Not included	-0.000	0.003
			(0.006)	(0.006)
Log Population	Not included	Not included	0.210*	0.266**
			(0.109)	(0.110)
Observations	424	424	424	424
R-squared	0.001	0.001	0.020	0.034

Note: Robust standard errors are reported in parentheses. * p < 0.10, ** p < 0.05, *** p < 0.01.

4.5 Fixed Effects and Robustness Results

Model 5 incorporates both country and year fixed effects, according to the fixed effects and robustness models presented in Table 4. With the R-squared value increasing to 0.505, the explanatory power is greatly increased. This indicates that characteristics peculiar to each nation and historical period—which cannot be observed—are important in explaining growth disparities among developing economies.

In the fixed effects model, digital commerce and financial inclusion have positive coefficients but are not statistically significant. At five percent, the interaction term's value remains negative and statistically significant. The study's primary empirical finding is this. This implies that while digital commerce and financial inclusion may have growth-promoting impacts in emerging nations when considered independently, their combined growth effects may have smaller marginal effects on growth.

Model 6 does not include 2022 to ensure that it accounts for the small number of observations in 2022. The interaction coefficient is negative and significant with the value of -18.089. GDP per capita growth is substitute dependent variable in model 7. With a coefficient of -18.656, the interaction term is likewise substantial and negative. These findings support the fact that the primary finding is stable to both sample adjustment and alternative measure of growth.

Table 4: Fixed Effects and Robustness Estimates of Economic Inclusion, Digital Commerce, and Economic Growth.

Variable	**Model 5: FE GDP Growth**	**Model 6: FE Excluding 2022**	**Model 7: FE GDP per Capita Growth**
Financial Inclusion	3.419	3.660	1.931
	(3.373)	(3.410)	(3.349)
Digital Commerce	2.666	2.852	3.073
	(3.497)	(3.560)	(3.587)
FI × DC	-17.759**	-18.089**	-18.656**
	(7.264)	(7.285)	(7.397)
Inflation	-0.060	-0.056	-0.059*
	(0.043)	(0.044)	(0.035)
Trade (% of GDP)	0.018	0.017	0.015
	(0.024)	(0.024)	(0.025)
Log Population	-4.963	-5.286	-6.051*
	(3.740)	(3.636)	(3.507)
Country Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Observations	424	411	424
R-squared	0.505	0.505	0.560

Note: Country-clustered standard errors are reported in parentheses. * p < 0.10, ** p < 0.05, *** p < 0.01.

4.6 Visual Evidence from Scatter Plots

The connection between GDP growth and economic inclusion, as illustrated in Figure 2, shows that the fitted line is slightly upward, although the data points are widely dispersed. This is a visual confirmation of the regression results in which financial inclusion by itself is not statistically significant in the primary models.

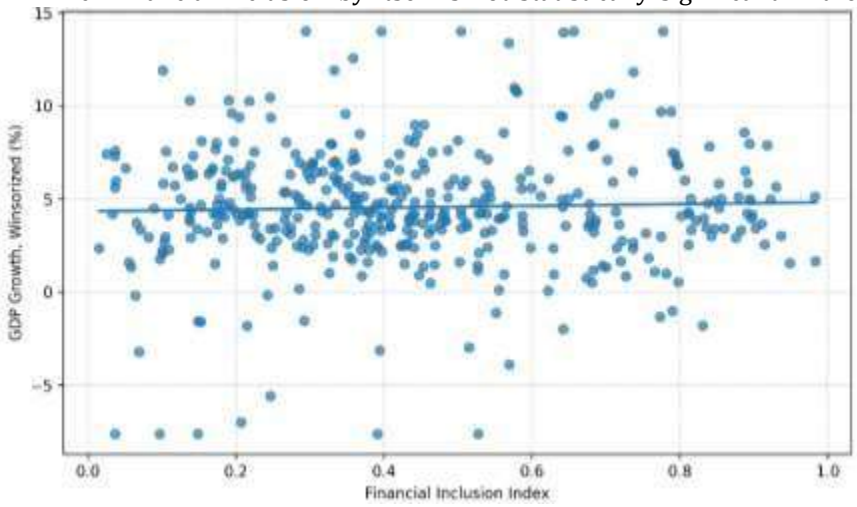

Figure 2: Economic Inclusion and Economic Growth.

Figure 3 correlation between GDP growth and digital commerce shows that the fitted line is almost flat. This suggests that there is no meaningful connection between economic growth and digital commerce in the integrated visual representation and helps to lend credence to the evidence of regression that digital commerce is not enough to account growth variance across emerging markets.

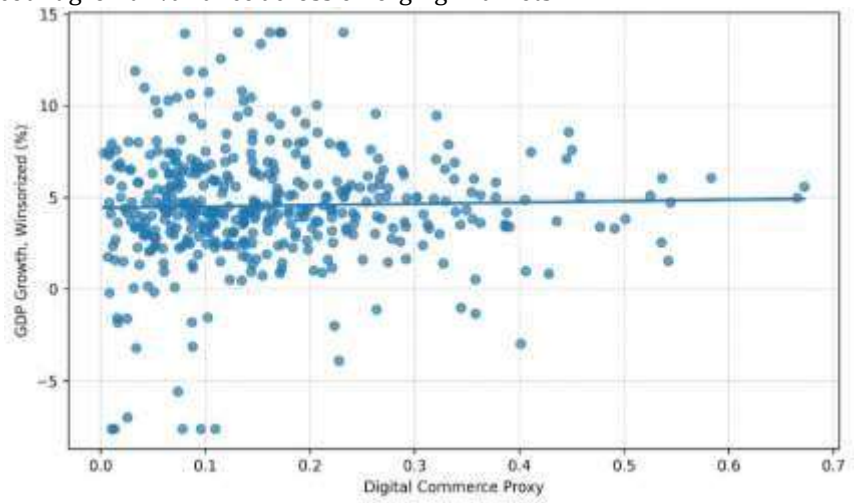

Figure 3: Digital Commerce and Economic Growth.

4.7 Interaction Effect

Interaction effect between financial inclusion and digital commerce, as visualized in Figure 4, compares the predicted growth relationship at low and high levels of digital commerce. The slope of financial inclusion is steeper at lower levels of digital commerce and is flatter at higher levels of digital commerce. This visual trend is in line with negative coefficient of interaction as reported in the regression results.

The outcome of the interaction is not to be taken as a testimony of fact that digital commerce is a harmful process. Instead, it indicates that the growth advantages of financial inclusion can undermine as digital commerce grows in the absence of corresponding infrastructure, regulatory, digital literacy, institutional capacity and productive utilization of financial technologies. In nascent economies, fast digitization can thus have disproportionate or slow growth impacts unless underpinned by more general development factors.

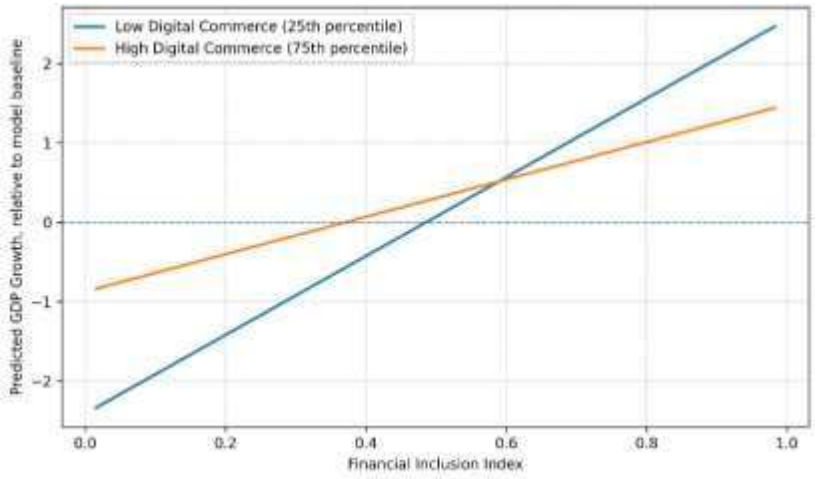

Figure 4: Interaction Effect of Economic Inclusion and Digital Commerce on Growth.

In general, the findings point to the fact that economic inclusion and digital commerce cannot be viewed as drivers of growth that are universally reinforcing. Rather, they have a contextual effect, and the integration of aligned policy frameworks is necessary to make digital financial growth lead to sustainable economic growth.

Discussion

The results show that financial inclusion and online trading have been growing consistently in the emerging markets, yet their contribution to growth is minimal. Financial inclusion improved by approximately 0.29 in 2011, to 0.55 in 2024 and digital commerce improved by approximately 0.10 to 0.27 in 2011 to 2024. Nevertheless, the results of the pooled OLS reveal the weak direct effects. The positive but statistically non-significant coefficients of financial inclusion are between 0.421 and 0.622, with a digital commerce shifting to negative in Model 3 (-0.458). This implies that financial services and digital payments alone cannot deliver good growth results.

The most important result is that there is a negative and statistically significant interaction between financial inclusion and digital commerce. In pooled interaction model, the coefficient is -14.222 and yet in the fixed effects models, the coefficient is negative and varies between -17.759 to -18.656. It implies that there are declining marginal growth impacts on the joint growth of financial inclusion and digital commerce. The outcome does not mean that online trading is bad. Instead, it implies that as the digital commerce grows and lacks adequate institutional support, digital infrastructure, Financial literacy and efficient use of financial services, positive growth effect of financial services could become undermined.

This observation is in line with other research studies that highlight that financial inclusion is non-linear. Nizam et al. (2020) claim that it takes some degree of development before financial inclusion can contribute to growth. Likewise, Beck (2020) observes that fintech has the potential to both make opportunities and risks, particularly when it is not accompanied by effective use. The current research confirms this opinion and demonstrates that financial inclusion and digital commerce do not necessarily go hand in hand. Their engagement is based on the wider structural and institutional circumstances.

The findings also can be considered as confirming previous findings of positive impacts of digital finance. Daud (2023) discovers that digital financial inclusion correlates with economic growth, and Li et al. (2020) demonstrate that digital finance may enhance household consumption, by enhancing liquidity. The variation can be due to the fact that this is a country-level panel study with 101 emerging economies and institutional capacity, infrastructure and digital preparedness differ greatly. The effects of positive household- or firm-levels may not be directly translated to the macroeconomic growth.

The results also contribute to institutional arguments of the literature. Chinoda and Kapingura (2024) demonstrate that the effect of digital financial inclusion on the growth depends on governance and institutions. This is one of the reasons why the interaction effect of this study is negative. In locations where the regulatory framework, cybersecurity, consumer protection, and digital infrastructure are ineffective, the growth of digital finance can lead to higher transactions without causing a commensurate rise in productivity or investment.

Policy implications are apparent. The number of people who own accounts or have switched to digital payments should not be considered as end goals by governments. The policies should be

geared towards meaningful use of financial services. This needs to invest in the digital infrastructure, financial literacy, the SME digital capability, consumer protection, and consistent regulatory frameworks. Digital commerce and financial inclusion can only aid growth in the context of connection to productive economic activity.

There are limitations of the study. It employs country level aggregate indicators, which can obscure disparities between genders, income groups, rural, and types of firms. The digital payment indicators are designed to measure digital commerce, but does not necessarily capture e-commerce sites or online market activity. Data is also not readily available in 2022. Finally, the fixed effects increase the validity but the research does not establish a high causality.

Future research should use micro or firm level data to examine practice of digital financial services by individuals and firms. It may be possible to test other moderators of institutional quality, digital literacy, infrastructure and inequality. Overall, findings suggest that financial inclusion and digital commerce can be transformative but their growth will depend on if emerging markets are able to build the institutional and technology infrastructure to convert access into economic productivity.

Conclusion

The study applied panel data of 101 countries from 2011-2024 to analyse the link between financial inclusion, digital commerce and economic growth in developing countries. The study shows that even though financial inclusion and digital commerce have increased, the impact of these variables on GDP growth is small and not significant in most cases. The most important is the consistently negative and significant interaction term, and the coefficients are -14.222 to -18.656 which means that their co-expansion may lead to diminishing marginal growth effects rather than increasing effects. This implies that only financial inclusion and digital commerce cannot be deployed to boost economic growth without strong institutions, digital infrastructure, financial literacy and appropriate usage of services. The results suggest policy implications that need to move towards a system of usage-based and productivity-based payments for access, such as improved regulation of fintech, digital literacy and infrastructure, and digitalisation of small and medium enterprises. The limitations are that data used in the study is country level and proxies for digital commerce which may not be the case for micro level. The study needs to be extended to the firm and household level to better understand impact of the digital financial system on inclusive and sustainable growth, and the moderating role of institutional quality, inequality and technical readiness.

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