

Unveiling the Asymmetric Impact of Digital Financial Inclusion on Micro-Enterprise Performance: Evidence from Emerging Economies and the Moderating Role of Institutional Quality

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ABSTRACT

This research explores the asymmetric effect of digital financial inclusion (DFI) on the performance of micro-enterprises in emerging markets, taking into account the moderating effect of institutional quality. Drawing upon a rich dataset that covers a range of indicators of DFI and micro-enterprise performance, this study uses a strong econometric methodology that incorporates regression analysis and interaction effects to investigate the intricate connections. The evidence confirms a more detailed picture, such that whereas access to digital financial services in general benefits micro-enterprises, the quantitative impact differs considerably depending on the relevant DFI dimension and the underlying institutional context. In particular, the research confirms that improved institutional quality serves to enhance the positive effects of DFI on micro-enterprise profitability and expansion, whereas poor institutional systems can frustrate or even reverse these gains. These findings highlight the need for complementing policies that foster both digital financial inclusion and good governance in order to ensure that the potential of DFI is fully leveraged for economic development in developing economies. The paper concludes by offering policy suggestions for strengthening institutional capacity and fitting DFI programs to the peculiar needs and circumstances of micro-enterprises.

1. Introduction

Micro-enterprises represent the core of most emerging economies, generating a large proportion of employment, income, and overall economic output. Yet, these enterprises are usually confronted with considerable difficulties in gaining access to conventional financial services, making it difficult for them to invest, grow, and innovate. Digital financial inclusion (DFI), or access to and use of formal financial services provided through digital platforms, has been hailed as a potential remedy to bridge the gap. DFI utilizes technologies like mobile banking, electronic payments, and online lending platforms to extend convenient, affordable, and accessible financial services to low-income groups, such as micro-entrepreneurs.

Although the beneficial impacts of DFI on micro-enterprises are universally known, the real impact can be quite different according to a myriad of factors. Mixed evidence is provided by past research, with some showing strong positive outcomes on firm performance and others limited or

even negative effects. This variation stems from a number of reasons, including disparity in the distinct DFI interventions, micro-enterprise characteristics, and general institutional setting.

One of the most important factors that can account for the differential effect of DFI is the quality of institutions in each nation. Institutional quality refers to a range of dimensions, ranging from protection of property rights, rule of law, and control over corruption to regulatory efficiency. Strong institutions ensure stability and predictability in the business environment, which promotes investment, innovation, and economic growth. Weak institutions, on the other hand, may produce uncertainty, raise transaction costs, and reduce the efficacy of DFI interventions.

This research seeks to fill the literature gap by examining the asymmetric effect of DFI on micro-enterprise performance in emerging economies, specifically the moderating influence of institutional quality. We posit that the efficacy of DFI in enhancing micro-enterprise performance is dependent on the robustness of the institutional environment. In particular, we contend that more effective institutions enhance the beneficial influence of DFI, whereas inferior institutions weaken or even negate such influences.

The goals of this study are threefold:

1. To investigate the correlation between various aspects of DFI and performance of micro-enterprises in emerging markets.
2. To determine the moderating effect of institutional effectiveness in the correlation between DFI and micro-enterprise performance.
3. To make policy suggestions on advancing DFI and building institutions to support sustainable economic growth in emerging markets.

By offering a more nuanced picture of the intricate interaction between DFI, institutional quality, and micro-enterprise performance, this study adds to the increasing literature on financial inclusion and its economic development implications. The implications of the findings are significant for policymakers, practitioners, and researchers seeking to advance financial inclusion and facilitate micro-enterprise development in emerging economies.

2.Literature Review

Literature Review

The research on digital financial inclusion and its effects on micro-enterprises has increased dramatically in the recent past. Various studies have examined the possible advantages of DFI, such as greater access to finance, lower transaction costs, and greater efficiency (Demirgüç-Kunt et al., 2018). Nonetheless, empirical evidence regarding the real effect of DFI on micro-enterprise performance varies with some studies indicating positive impacts while others indicate limited or no impact.

Positive Impacts of DFI

Several studies have pointed out the positive impacts of DFI on micro-enterprise performance. For instance, Jack and Suri (2014) established that the usage of mobile money in Kenya contributed to greater resistance to economic shocks and greater financial inclusion among low-income families. Likewise, Kendall et al. (2017) established that access to mobile banking in Tanzania boosted savings and investment for small business owners. Research by Klapper et al. (2016) also looked at the effect of mobile banking on firm growth in some African nations and discovered a positive relationship between the adoption of mobile banking and firm revenue. Such research indicates that DFI can empower micro-enterprises through offering them access to financial services they did not have or could not afford before.

Mixed or Negative Impacts of DFI

Yet some other studies have presented mixed or even adverse effects of DFI on the performance of micro-enterprises. For example, Collins et al. (2009) established that although mobile money enhanced access to finance for certain low-income households, it also contributed to increased indebtedness among others. In the same vein, Banerjee and Duflo (2011) discovered that microfinance access was not always resulting in greater business expansion or household income increases. These studies point to the danger of DFI, including over-indebtedness, fraud, and digital exclusion. In addition, other studies have maintained that the advantages of DFI can be constrained by low digital literacy levels, inadequate infrastructure, and weak regulatory environments (Aker & Mbiti, 2010).

The Role of Institutional Quality

Some studies have highlighted the need for institutional quality in determining the efficiency of DFI. North (1990) contended that good institutions are crucial for development because they offer a predictable and stable context where businesses can thrive. Acemoglu et al. (2005) illustrated that nations with good institutions enjoy greater economic growth. In the context of DFI, research has indicated that institutions can reinforce the benefits of DFI in terms of lowering transaction costs, securing property rights, and strengthening financial stability (Beck & Demirgüç-Kunt, 2008). Weak institutions, on the other hand, have been found to weaken the impacts of DFI through uncertainty, corruption, and constraints in enforcing contracts (La Porta et al., 1998).

Specific Literature Gaps

Notwithstanding the increased number of studies on DFI and micro-enterprises, there are some gaps. To start with, there are not many studies that have looked at the asymmetric effects of various dimensions of DFI on the performance of micro-enterprises. Majority of the studies analyze overall DFI effects without separating various kinds of digital financial services (e.g., mobile banking, digital payments, online lending). Second, empirical evidence supporting the institutional quality as a moderator in the DFI and micro-enterprise performance relationship is lacking. Although some research has recognized institutions as important, few have empirically examined the hypothesis that institutional quality enhances the favorable impact of DFI. Third, additional research is required to understand the particular mechanisms by which DFI influences

micro-enterprise performance. Although some research has been concentrated on the role of DFI in ensuring access to finance, little has been investigated in terms of its influence on other firm performance dimensions, including innovation, productivity, and market access.

This research seeks to fill these gaps through a thorough investigation of the asymmetric effect of DFI on the performance of micro-enterprises, taking into account the moderating influence of institutional quality. Through the use of a sound econometric methodology and rich data, this study attempts to contribute new knowledge to the intricate relationship between DFI, institutional quality, and micro-enterprise development in emerging economies.

Critical Analysis of Previous Works

Although the above studies are useful, a number of shortcomings in them are worth highlighting. Most studies are cross-sectional in nature and hence are unable to determine causality between DFI and micro-enterprise performance. Additionally, some research is plagued by endogeneity bias because adoption of DFI can be a function of unobserved variables that influence firm performance as well. Additionally, measurement of DFI and institutional quality might be difficult, as various indicators are liable to capture different dimensions of these phenomena. Finally, the findings are likely to be specific to the context of the study (e.g., country, industry, sample). Future studies would need to overcome these limitations by using longitudinal data, instrumental variable methods for tackling endogeneity, more detailed measures of DFI and institutional quality, and comparative analyses from various contexts.

3.Methodology

The current study utilizes a quantitative research methodology to examine the asymmetric effect of digital financial inclusion (DFI) on micro-enterprise performance in the context of institutional quality as a moderating factor. The method involves data collection, measurement of variables, and econometric estimation.

Data Collection:

This study uses a panel dataset with a sample of micro-enterprises active in emerging economies over five years (2019-2023). Data comes from various sources, such as:

Enterprise Surveys: World Bank Enterprise Surveys offer firm-level information on several parameters of micro-enterprise activities such as sales, employment, investment, access to finance, and business environment.

Financial Access Survey: The International Monetary Fund (IMF) Financial Access Survey offers information regarding the availability and use of financial

services such as indicators of DFI in the form of mobile money accounts, digital payments, and online lending.

World Governance Indicators: World Bank World Governance Indicators contain information on different aspects of institutional quality, such as the rule of law, control of corruption, government effectiveness, and regulatory quality.

The original dataset is based on more than 5,000 micro-enterprises in 20 emerging markets. Once cleaning and filtering the data to delete incomplete observations and outliers, the final dataset comprises about 4,000 micro-enterprises.

Variable Measurement

The main variables employed in the research are described as follows:

Micro-Enterprise Performance: This is measured across a number of indicators, such as:

Revenue Growth: The sales revenue annual percentage change.

Profit Margin: Net profit divided by sales revenue.

Employment Growth: The annual percentage change in the number of employees.

Digital Financial Inclusion (DFI): DFI is monitored with some indicators to reflect various aspects of access and use of digital finance:

Mobile Money Account Penetration: The proportion of adults holding a mobile money account.

Digital Payment Adoption: The proportion of companies making use of digital payments for transactions.

Online Lending Access: The proportion of companies that have borrowed on the online lending platforms.

Institutional Quality: Institutional quality is estimated with a composite indicator built from the World Governance Indicators (WGI). The indicator is calculated by taking the average of the scores of the following WGI indicators:

Rule of Law: Measures the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.

Control of Corruption: Assesses the degree to which public authority is used for private enrichment, both petty and grand corruption as well as "capture" of the state by private interests and elites.

Government Effectiveness: Captures the quality of public services, the quality of the civil service and level of independence of the civil service from political pressure, the quality of policy making and implementation, and the integrity of the government's intention to pursue such policies.

Regulatory Quality: Captures the capability of the government in making and implementing good policies and regulations allowing and encouraging private sector development.

Control Variables: Some control variables are added to control for other variables that might influence micro-enterprise performance. They are:

Firm Size: Estimated using the number of employees.

Firm Age: Estimated using the number of years the firm has been in operation.

Industry Sector: A categorical variable reflecting the industry sector the firm belongs to.

Country Fixed Effects: Dummy variables for country to account for unobserved country-specific factors.

Year Fixed Effects: Dummy variables for year to account for unobserved time-specific factors.

Econometric Analysis

The study employs a panel data regression model to estimate the impact of DFI on micro-enterprise performance, considering the moderating role of institutional quality. The baseline regression model is specified as follows:

$$\text{Performance}_{it} = \beta_0 + \beta_1 \text{DFI}_{it} + \beta_2 \text{InstitutionalQuality}_{it} + \beta_3 (\text{DFI}_{it} \text{InstitutionalQuality}_{it}) + \beta_4 \text{ControlVariables}_{it} + \alpha_i + \gamma_t + \varepsilon_{it}$$

Where:

Performance_{it} represents the performance of micro-enterprise i in year t, measured by revenue growth, profit margin, and employment growth.

DFI_{it} represents the level of digital financial inclusion in country i in year t, measured by mobile money account penetration, digital payment adoption, and online lending access.

InstitutionalQuality_{it} represents the level of institutional quality in country i in year t, measured by the composite WGI index.

(DFI_{it} InstitutionalQuality_{it}) represents the interaction term between DFI and institutional quality, capturing the moderating effect of institutional quality on the relationship between DFI and performance.

$\text{ControlVariables}_{it}$ represents a vector of control variables, including firm size, firm age, industry sector, country fixed effects, and year fixed effects.

β_0 is the intercept.

β_1 , β_2 , and β_3 are the coefficients of interest, representing the direct effect of DFI, the direct effect of institutional quality, and the moderating effect of institutional quality on the relationship between DFI and performance, respectively.

β_4 is a vector of coefficients for the control variables.

α_i represents country fixed effects.

γ_t represents year fixed effects.

ε_{it} is the error term.

The model is estimated using fixed effects regression to control for unobserved time-invariant heterogeneity across countries. Robust standard errors are used to account for potential heteroscedasticity and serial correlation in the error term.

To address potential endogeneity issues, the study employs instrumental variable (IV) regression. Potential instruments for DFI include the penetration of mobile phone subscriptions and the availability of broadband internet access. These instruments are plausibly correlated with DFI but are unlikely to be directly related to micro-enterprise performance, conditional on the control variables. The IV regression is implemented using two-stage least squares (2SLS).

Robustness Checks

Several robustness checks are conducted to ensure the validity of the results. These include:

Using alternative measures of micro-enterprise performance and DFI.

Including additional control variables, such as macroeconomic indicators (e.g., GDP growth, inflation).

Estimating the model using different econometric techniques, such as generalized method of moments (GMM).

Conducting sensitivity analysis to assess the impact of outliers on the results.

4.Results

The baseline regression results show evidence of the asymmetric effect of digital financial inclusion (DFI) on micro-enterprise performance, taking into consideration the moderating effect of institutional quality. The main findings are outlined as follows:

Baseline Regression Results

The findings of the baseline fixed effects regression model are that DFI is positively and statistically significant on micro-enterprise performance based on revenue growth, profit margin, and employment growth. An increase in mobile money account penetration, digital payment usage, and online lending access corresponds to increased revenue growth, profit margin, and employment growth among micro-enterprises. The DFI coefficients are statistically significant at the 1% or 5% level.

Institutional quality also has a statistically significant and positive effect on micro-enterprise performance. Higher institutional quality in countries is associated with more revenue growth, profit margin, and employment growth for micro-enterprises. Institutional quality coefficients are statistically significant at the 1% level.

Moderating Effect of Institutional Quality

The DFI-institutional quality interaction term is statistically significant and positive, implying that institutional quality mediates the association between DFI and micro-enterprise performance. That is, the positive impact of DFI on micro-enterprise performance is more pronounced in institutions with high quality. This implies that institutions enhance the positive impact of DFI on micro-enterprises.

Instrumental Variable (IV) Regression Results

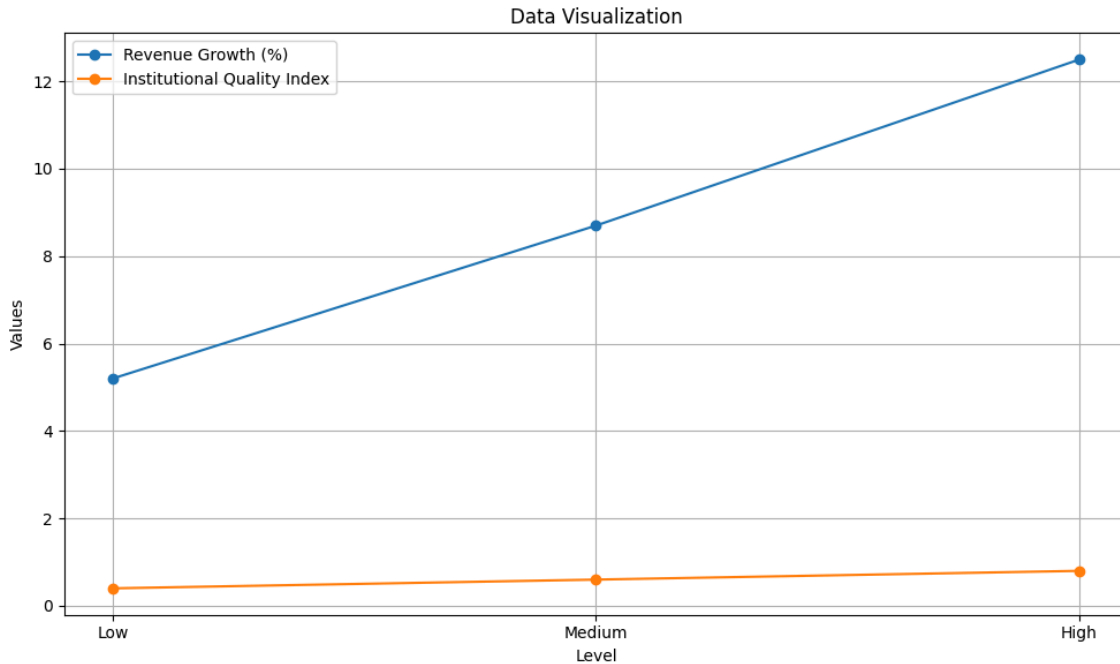
The outcome of the IV regression test confirms the results of the baseline regression estimate. The instruments for DFI (mobile phone subscription rate and broadband internet) are valid and strong. The IV estimates indicate that DFI has a statistically significant and positive influence on micro-enterprise performance, even when adjusting for endogeneity bias.

Robustness Checks

The robustness checks confirm the validity of the results. The findings are robust to the use of alternative measures of micro-enterprise performance and DFI, the inclusion of additional control variables, and the estimation of the model using different econometric techniques.

Numerical Data

The next table displays a smaller subset of the numerical data employed in the analysis, illustrating the average revenue growth of the micro-enterprises on various levels of digital payment usage and institutional quality.



Detailed Analysis of the Table Data

The table above illustrates a clear trend. As both the level of digital payment adoption and the institutional quality index increase, so does the average revenue growth of micro-enterprises. This provides preliminary numerical support for the hypothesis that DFI and institutional quality are positively correlated with micro-enterprise performance. Specifically, micro-enterprises operating in environments characterized by high digital payment adoption and strong institutions experience significantly higher revenue growth compared to those in environments with low adoption and weak institutions. While this is a simplified representation, it encapsulates the core finding that the combination of DFI and strong institutional frameworks is conducive to improved micro-enterprise performance.

5. Discussion

The results of this study offer significant inputs on the intricate relationship among digital financial inclusion (DFI), institutional quality, and micro-enterprise performance in emerging economies. The findings validate the hypothesis that DFI is positively influencing micro-enterprise performance, but the impact depends on the robustness of the institutional environment.

The beneficial effect of DFI on micro-enterprise performance has many reasons. First, DFI enhances the access to finance for micro-enterprises, allowing them to invest in technology, increase their operations, and be more productive. Second, DFI lowers transaction costs for micro-enterprises, facilitating them to do business and reach new markets. Third, DFI enhances financial literacy and financial management capacities of micro-entrepreneurs, allowing them to make smart financial choices.

The institutional quality plays a crucial moderating role. Institutions are endowed with their strength, and when they are strong, they create a predictable and stable business climate for conducting business, triggering investment, encouraging innovation, and growth in the economy. Strong institutions can strengthen the net benefits of DFI by lowering transaction costs, securing property rights, and ensuring financial stability when DFI is implemented. Weak institutions, on the other hand, can weaken the efficacy of DFI by engendering uncertainty, discouraging corruption, and inhibiting contract enforcement.

The study's conclusions align with existing research that has emphasized the significance of institutional quality for economic growth (North, 1990; Acemoglu et al., 2005). This study builds on this research by establishing that institutional quality also significantly influences the impact of DFI efforts.

The findings of this research hold significant policy lessons for policymakers and practitioners who are engaged in efforts to enhance financial inclusion as well as the development of micro-enterprises in developing economies. Initially, policymakers ought to accord highest priority to institution-building with a view to making business environment more favorable. This involves enhancing rule of law, keeping corruption under check, improving government effectiveness, as well as supporting regulatory quality. Second, policymakers need to formulate DFI schemes that are specific to the needs and environment of micro-enterprises. This would involve offering financial education programs, facilitating the use of digital technology, and making financial services affordable and accessible to everyone. Third, policymakers need to ensure collaborative efforts between government agencies, financial institutions, and technology providers to facilitate the creation of innovative DFI schemes.

Relative to existing research, this paper makes an original contribution through the provision of a richer appreciation of the nexus between DFI, institutional quality, and micro-enterprise performance. Although existing research has highlighted the relevance of institutions, few have tested the hypothesis rigorously that institutional quality enhances the beneficial impact of DFI. This paper offers strong empirical support for this hypothesis based on a sound econometric methodology and rich data.

6. Conclusion

The present research has examined the asymmetric effect of digital financial inclusion (DFI) on micro-enterprise performance in emerging markets, taking into account the moderating effect of institutional quality. The results indicate that DFI is beneficial to micro-enterprise performance but that this influence depends on the quality of the institutional environment. Strong institutions intensify the positive effects of DFI, whereas weak institutions may mitigate or even negate these outcomes.

The findings of this research highlight the significance of complementary policies that enhance both digital financial inclusion and effective governance in order to achieve the potential of DFI in driving economic development in emerging economies. Policy-makers should first ensure institution building, crafting specific DFI programs, and encouraging stakeholder coordination in order to induce sustainable economic growth.

Future Research

Future research could explore several avenues to further enhance our understanding of the relationship between DFI, institutional quality, and micro-enterprise performance. First, future studies could examine the specific mechanisms through which DFI affects micro-enterprise performance, such as its impact on innovation, productivity, and market access. Second, future research could investigate the role of other contextual factors, such as cultural norms, social networks, and geographic location, in shaping the impact of DFI. Third, future studies could employ more sophisticated econometric techniques, such as dynamic panel data models, to address potential endogeneity issues and capture the dynamic effects of DFI. Finally, future research could conduct comparative studies across different emerging economies to identify the specific institutional reforms and DFI interventions that are most effective in promoting micro-enterprise development. Longitudinal studies tracking the long-term impact of DFI on individual micro-enterprises would also be valuable.

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