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Monetary policy efficiency, institutional quality, and financial inclusion in developing countries

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ABSTRACT

This paper aims to assess how the efficiency of monetary policy and institutional quality affect financial inclusion in 41 developing countries for the period 2010–2023. The study utilizes annual data, employs panel dynamic data analysis, and applies the generalized method of moments (GMM) to ensure the accuracy of the results. This study's findings indicate that monetary policy and institutional quality are essential for the financial sector's integration process. The GMM study indicates that monetary policy efficacy, institutional quality, and central bank interest rates positively influence financial inclusion. Consequently, it is essential to refine monetary policies and develop strong institutions to augment access to financial services. The inverse link between exchange rates, inflation, and financial inclusion indicates that macroeconomic instability significantly endangers financial systems. We identify growth and money supply as the main factors that affect financial inclusion, as they positively impact financial inclusion. These results, therefore, suggest that for countries to enhance financial inclusion, there is a need to ensure stability in the economy as well as an adequate money supply in the system. Our results also contribute to the maintenance of sustainable and balanced economic development as well as equal access to financial resources in developing countries.

Contribution/ Originality: This research enhances the current literature on financial inclusion by creating a novel FI index covering the period from 2010 to 2023 for 41 developing nations. Furthermore, we employ the panel GMM approach to examine the influence of MPE, INS, and CBR on FI in developing economies.

1. INTRODUCTION

The issue of financial inclusion (FI) has emerged as a major concern, especially in developing nations, as it prevents people from availing themselves of financial services (Lenka & Bairwa, 2016). These services are important in the growth of the economy since they enable people to store as well as move their financial resources in the right manner. The expansion of banking, credit, and insurance services can enhance societal well-being and improve their resilience to economic hardships. FI can be defined as the process of ensuring that all people have simple and equal access to appropriate financial services. FI refers to the inclusion of individuals and firms in the financial systems that include credit, savings, payments, and other financial transactions (Preziuso, Koefer, & Ehrenhard, 2023). According

to Omar and Inaba (2020), financial inclusion (FI) is a worldwide concern for developing nations, as the majority of people do not have access to formal financial systems.

FI endeavors to ensure that people have access to fundamental financial services such as loans, savings, payments, and transactions, hence facilitating societal and entrepreneurial progress (Preziuso et al., 2023). According to Omar and Inaba (2020), FI is one of the most pressing issues in the contemporary world and has special relevance for developing nations where a significant part of the population has no access to formal financial institutions. The current literature on FI reveals that the topic is crucial and highlights the positive effects of it on various socio-economic issues such as poverty, economic growth, policy, and financial system stability (Arshad et al., 2021; Nsiah & Tweneboah, 2023; Ozili, 2023). FI helps optimize the distribution of such funds to the targeted poor and reduces the cost of social support systems. Furthermore, FI provides financial institutions, particularly banks, with a stable source of cheap and reliable funds for the advancement of loans (Al-Chahadah, Refae, & Qasim, 2020). FI improves the management of resources for government interventions intended for the poor and also lowers the costs of social support. Furthermore, FI gives banks the chance to access affordable and dependable funding sources to support their banking operations (Al-Chahadah et al., 2020).

Central banks set and implement monetary policy (MP) to control the financial system, ensuring the sustainability of financial institutions, particularly banks. The objectives of monetary policy are to maintain the stability of the macroeconomy, including prices and the soundness of the financial system (Suhendra & Anwar, 2021). A central bank impacts the real economy by regulating MP tools, including the policy interest rate. An efficient MP generates a minimal output gap and a low inflation bias (Cecchetti, Flores-Lagunes, & Krause, 2006; Cecchetti & Krause, 2002; Purwanda & Rochana, 2017). Numerous studies have explored the effects of MP on FI, yet only a handful have explored the influence of monetary policy efficiency (MPE) on FI (Malmendier, Nagel, & Yan, 2021; Nair & Anand, 2020).

In analyzing the influence of MPE on FI, we broaden our empirical investigation to assess the influence of institutional determinants on these processes. Institutions are frameworks or constraints that influence the interactions between individuals or groups within social, political, or economic spheres (Geels, 2020). Proponents of neo-institutional theory contend that institutions are crucial because they promote equitable competition in financial markets, offer a structure for economic incentives, and enhance the efficient utilization and allocation of resources. Consequently, they exert a direct influence on the evolution of financial markets (Acemoglu, Johnson, & Robinson, 2005; Adams & Kastrinaki, 2022). Abaidoo and Agyapong (2022) assert that legal and financial theory underpins the connection between the legal system and the advancement of the financial sector. The influence of institutional quality (INS) on FI is a topic of significant discussion and investigation.

The prior research on the link between MPE, INS, and FI has several important limitations. Most studies on MP concentrate on developed economies, neglecting the structural and external stability issues in developing nations. Moreover, research often utilizes a broad, imprecise definition of institutions, neglecting to consider the crucial role of informal institutions in these environments. Furthermore, studies on financial inclusion rely on aggregate data, which fails to distinguish between different population groups, solely concentrates on credit inclusion, and ignores other factors like savings and digital payments. Additionally, the lack of attention to the relationship between MPE, INS, and FI has led to the development of scattered findings.

While prior research has explored the unique effects of MP on FI, INS on FI, and central bank interest rates on FI individually, there is a lack of studies that analyze their joint impacts, especially in developing economies. Moreover, the financial inclusion (FI) literature has not adequately addressed the problem of endogeneity in these models, where explanatory variables may correlate with error terms. This study aims to fill in the gaps by discussing these aspects and using the panel Generalized Method of Moments (GMM) method to examine how MPE and INS affect financial inclusion in the real world. This approach helps to resolve the issue of endogeneity. It will

also assist policymakers in gaining a deeper understanding of how they can enhance financial inclusion through improved monetary policies and strong institutions.

This research enhances the current literature on financial inclusion in two key ways. Initially, we create a novel FI index covering the period from 2010 to 2023 for 41 developing nations. This index integrates essential aspects of FI, offering a composite and comparable metric while alleviating the impact of correlations among its constituents. Secondly, we employ the panel GMM approach to examine the influence of MPE, INS, and central bank interest rates on FI in developing economies. In the models, we address endogeneity by applying the panel GMM approach and discuss the interactions of these variables.

The rest of this study is as follows: Section 2 reviews the pertinent literature, whereas Section 3 delineates the dataset and outlines the technique and model. Section 4 presents the empirical findings, and the conclusion is in Section 5.

2. LITERATURE REVIEW

Ozili (2023) conducted an empirical analysis of the influence of MP on FI in the emerging market economies using panel fixed effect estimates. Ozili (2023) presents that MP has a strong negative impact on FI. The analysis reveals that interest rates positively influence FI, whereas financial access has a negative cross-simulation effect. However, Ozili (2023) does not sufficiently address digital financial innovations and institutional heterogeneity. Oanh (2023) employed this work to examine the correlation between FI, MP, and financial stability. Their results show that inflation, FI, money supply, and gross domestic product (GDP) have a strong negative impact on financial stability. Nsiah and Tweneboah (2023) analyzed the correlation between INS and FI using data collected from 32 African countries from 2004 to 2020. They found that INS has a positive effect on FI. Van, Nguyen, Nguyen, and Vo (2022) collected data on the relationship between INS and FI from 19 countries in the Asia-Pacific region between 2004 and 2020. Anwar, Suhendra, Ginanjar, Purwanda, and Kholishoh (2022) employed the panel GMM to assess MPE, the development of the financial markets, and stability in developing countries. The result reveals that the MPE has a positive influence on financial stability. Even though Ozili (2023); Nsiah and Tweneboah (2023); Van et al. (2022); and Anwar et al. (2022) offer important findings on the interconnection between MP, INS, and FI, they do not address the role of MPE and the endogeneity issues appropriately, thus highlighting the importance of conducting more cohesive and methodologically sound research in order to provide policy recommendations that are relevant to various economic and institutional environments.

Saraswati, Maski, Kaluge, and Sakti (2020) examine the influence of MP on FI. They used a vector error-correcting model to assess the link between the effectiveness of the MP and FI in Indonesia. The study further revealed that there is a positive connection between the effectiveness of the MP and FI. Arshad et al. (2021) measured the connection between FI and the effectiveness of MP using the SVAR model for developed and developing economies. They conclude that there is a reverse relationship between FI and the effectiveness of the MP. The money supply, GDP, interest rates for loans, and the exchange rates greatly improve the outcomes of the MP. Evans (2016) assesses the effect of FI on the success of MP in Africa with data collected from the years 2005 to 2014. The results reveal that there is a long-run connection between FI and the effectiveness of the MP. MP effectiveness responds positively to positive FI shocks, whereas positive money supply shocks have a temporary positive impact. These studies indicate that FI can make MP more effective. However, the studies could be better if they used more cross-country analysis and applied dynamic panel data techniques to help reduce endogeneity issues and get results that are more useful in the global setting.

Omar and Inaba (2020) employed panel data analysis to assess FI, poverty, and income inequality in emerging economies. This study reveals that inflation and GDP have a significant positive influence on FI. The study by Anarfo, Abor, Osei, and Gyeke-Dako (2019) on the relationship between MP and FI in Sub-Saharan Africa also used the panel vector autoregressive (VAR) approach. This study has a significant impact on the establishment of financial inclusion.

MP, inflation, and GDP play a crucial role in enhancing exchange rates, which in turn enhances the effectiveness of MP, thereby increasing FI in Africa. Klapper, El-Zoghbi, and Hess (2016) study on the role of FI for the attainment of sustainable development goals; however, their analysis is based on qualitative evidence and is rather vague, which hampers the generation of practical recommendations for policymakers. Zins and Weill (2016) focus on Africa's FI drivers, which include income, education, and physical access to financial institutions. However, those studies fail to examine how institutions affect the relationship between MP and FI. These papers acknowledge the importance of financial inclusion, but they could benefit from incorporating INS to scrutinize financial systems.

3. DATA AND METHODOLOGY

3.1. Data

The dependent variable of this study is financial inclusion. The study considers monetary policy efficiency, institutional quality, central bank interest rates, inflation, GDP per capita growth, exchange rates, and money supply as independent variables. This study was undertaken in 41 developing nations from 2010 to 2023. This study is conducted for the period 2010–2023, a very crucial period that has been characterized by many important events, such as the global economic recovery from the post-2008 financial crisis, the pandemic of COVID-19, and increasing global financial integration, all of which have had a great impact on the MPE and FI of developing economies. The independent variables in this study include MPE, INS, central bank interest rates, inflation, economic growth, exchange rates, and money supply, which are all vital in determining FI. MPE and INS are the major factors that explain the level of FI, while central bank interest rates, inflation, and money supply are the monetary variables that help us understand the general monetary environment. We use these variables to capture contextual factors, such as economic development and currency rates, that may influence financial access and stability.

The FI index quantifies the inclusivity of a nation's financial sector. We develop it as a multidimensional index that encapsulates information on diverse facets of FI, encompassing banking penetration, accessibility of banking services, and utilization of the banking system. The financial inclusion index (FII) consolidates data on these aspects into a singular metric that spans from 0 to 1, with 0 signifying total financial exclusion and 1 denoting total financial inclusion within an economy.

The primary independent variable utilized is MPE, determined by fluctuations in inflation and optimal output. Meanwhile, inefficiency refers to the extent of performance deviation from the objective of the inflation-output variability border. Efficiency is a strategy to minimize losses associated with the implementation of monetary policy. Evaluating the disparity between actual policy and efficiency limits can gauge central bank policy (Purwanda & Rochana, 2017). Moreover, the approach deems MPE efficient when it yields minimal output gap and reduces inflation volatility. The MPE positively influences financial inclusion, consistent with the findings of Evans (2016), Saraswati et al. (2020), and Arshad et al. (2021). Consequently, the study suggested that MPE positively influenced financial inclusion.

The next independent variable is INS. The Heritage Foundation developed a 0–100 scale to gather data on the economic independence of countries, which we use to describe institutions. Scholars such as Moellman and Tarabar (2022) and Van et al. (2022) have extensively used this institutional metric for institutional analysis. We suppose the influence of institutions using the aggregate index on financial inclusion, referencing research by Van et al. (2022) and Nsiah and Tweneboah (2023). Consequently, we suggested that INS has a positive impact on FI.

The central bank establishes interest rates to achieve monetary policy goals, utilizing data from World Development Indicator (WDI) datasets. Ozili (2023) and Oanh (2023) demonstrated the beneficial impact of the central bank rate (CBR) on financial inclusion. Consequently, the CBR positively influenced financial inclusion. The incorporation of macroeconomic data into economic analysis is essential. Inflation can significantly influence the financial inclusion behaviors exhibited by financial institutions in their decision-making. Therefore, financial institutions should incorporate modifications to the consumer price index as a criterion to effectively manage the

effects of price volatility. Arshad et al. (2021); Omar and Inaba (2020); and Anarfo et al. (2019) demonstrated that inflation adversely impacts financial inclusion.

We incorporate economic growth as a determining factor of financial inclusion, using the findings of Qasim (2022) and Kim (2016). We assert that economic growth positively influences financial inclusion. Subsequently, we incorporate the exchange rate into our model. Enebeli-Uzor and Mukhtar (2023) and Komala and Widodo (2022) reported that the currency rate adversely affects financial inclusion. Ultimately, we incorporate the money supply into the model. Nsiah and Tweneboah (2023) and Jungo, Madaleno, and Botelho (2022) demonstrated the beneficial impact of money supply on FI.

Table 1 presents the variable sources.

Table 1. Variable sources.

Variable's name	Abbreviation	Sources	Period
Financial inclusion	FI	Authors calculation	2010 - 2023
Monetary policy efficiency	MPE	Purwanda and Rochana (2017) and Anwar et al. (2022)	2010 - 2023
Institutional quality	INS	Heritage foundation	2010 - 2023
Central bank interest rate	CBR	The World Bank	2010 - 2023
Inflation	INF	The World Bank	2010 - 2023
Economic growth	EG	The World Bank	2010 - 2023
Exchange rate	ER	The World Bank	2010 - 2023
Money supply	MS	The World Bank	2010 - 2023

3.2. Econometrics Methodology

Evans (2016), Saraswati et al. (2020), and Arshad et al. (2021) assessed the influence of MPE on FI in Equation 1. Equation 2 examines the impact of INS on FI, as analyzed by Van et al. (2022) and Nsiah and Tweneboah (2023). Equation 3 examines the impact of CBR on FI, as analyzed by Ozili (2023) and Oanh (2023). We ultimately employed Equation 4 to assess the distinct impacts of MPE, INS, and CBR on FI. The models additionally included inflation, economic growth, exchange rates, and money supply as control variables influencing FI.

Since period t of FI is affected by FI t-1, the model dynamics addresses the endogeneity issues in the following estimation:

$$FI_{it} = \alpha_0 + \beta_1 FI_{it-1} + \beta_2 MPE_{it} + \beta_3 INF_{it} + \beta_4 EG_{it} + \beta_5 ER_{it} + \beta_6 MS_{it} + \varepsilon_{it} \quad (1)$$

$$FI_{it} = \alpha_0 + \beta_1 FI_{it-1} + \beta_2 INS_{it} + \beta_3 INF_{it} + \beta_4 EG_{it} + \beta_5 ER_{it} + \beta_6 MS_{it} + \varepsilon_{it} \quad (2)$$

$$FI_{it} = \alpha_0 + \beta_1 FI_{it-1} + \beta_2 CBR_{it} + \beta_3 INF_{it} + \beta_4 EG_{it} + \beta_5 ER_{it} + \beta_6 MS_{it} + \varepsilon_{it} \quad (3)$$

$$FI_{it} = \alpha_0 + \beta_1 FI_{it-1} + \beta_2 MPE_{it} + \beta_3 INS_{it} + \beta_4 CBR_{it} + \beta_5 INF_{it} + \beta_6 EG_{it} + \beta_7 ER_{it} + \beta_8 MS_{it} + \varepsilon_{it} \quad (4)$$

The variables FI, MPE, INS, CBR, INF, EG, ER, and MS stand for financial inclusion, monetary policy efficiency, institutional quality, central bank policy rate, inflation, economic growth, exchange rate, and money supply, respectively.

An empirical study on financial inclusion supports several arguments in favor of a dynamic model. Even though lagged dependent variable coefficients are not the main focus of the inquiry, including them in the model helps recover consistent estimates for other parameters. Adding dynamics to the model also helps to avoid problems with endogeneity that might come up when looking at the connection between MPE and FI. We conducted an endogeneity study to evaluate the robustness of the panel ordinary least squares (POLS) model results using the Durbin-Wu-Hausman test. Dynamic panel data estimation, as defined by Blundell and Bond (1998) and Arellano and Bond (1991), was the optimal solution in the model. The study applies the Generalized Method of Moments (GMM) with a dynamic panel data technique to deal with endogeneity issues, allow for the dynamic nature of financial inclusion, and obtain consistent and stable estimations of the effects of these variables in developing countries.

Table 2. POLS estimation results.

Variables	Dependent variable: *Financial inclusion* (FI)			
	Model 1	**Model 2**	**Model 3**	**Model 4**
FI (-1)	0.9622***	0.9612***	0.9626***	0.9585***
	(0.0109)	(0.0115)	(0.0108)	(0.0119)
MPE	0.0001			0.0001
	(0.0001)			(0.0001)
INS		0.0001		0.0001
		(0.0002)		(0.0002)
CBR			0.0001	0.0001
			(0.0004)	(0.0004)
INF	0.0001	0.0001	0.0001	0.0001
	(0.0002)	(0.0002)	(0.0002)	(0.0002)
EG	-0.0008***	-0.0008***	-0.0008***	-0.0008***
	(0.0002)	(0.0002)	(0.0002)	(0.0002)
ER	0.0008	0.0008	0.0008	0.0008
	(0.0005)	(0.0005)	(0.0005)	(0.0005)
MS	0.0002***	0.0002***	0.0002***	0.0002***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
R^2	0.9752	0.9749	0.9758	0.9748
No. of countries	41	41	41	41
No. of sample	533	533	533	533

Note: The symbols *** indicate that the probability is less than 1%, respectively.

4. RESULTS

4.1. Estimation Result POLS

Table 2 presents the results of POLS estimation, indicating that lag 1 financial inclusion has a positive significance for financial inclusion. An improvement in financial inclusion during the previous period will enhance it in the current period. MPE, institutional quality, and the CBR positively influence financial inclusion, although their impact is not significant. Inflation and exchange rates have a positive influence on financial inclusion. Economic growth has a negative and significant impact on financial inclusion. The money supply significantly and favorably affects financial inclusion.

Table 3. FE estimation.

Variables	Dependent variable: *Financial inclusion* (FI)			
	Model 1	**Model 2**	**Model 3**	**Model 4**
FI (-1)	0.6672***	0.6686***	0.6697***	0.6661***
	(0.0299)	(0.0299)	(0.0299)	(0.0299)
MPE	0.0001			0.0001
	(0.0001)			(0.0001)
INS		0.0005		0.0005
		(0.0005)		(0.0005)
CBR			0.0002	0.0001
			(0.0005)	(0.0005)
INF	0.0001	0.0001	0.0001	0.0001
	(0.0002)	(0.0002)	(0.0002)	(0.0003)
EG	-0.0007**	-0.0008***	-0.0008***	-0.0008***
	(0.0003)	(0.0003)	(0.0003)	(0.0003)
ER	0.0002	0.0035	0.0018	0.0024
	(0.0065)	(0.0066)	(0.0069)	(0.0069)
MS	0.0012***	0.0012***	0.0012***	0.0012***
	(0.0002)	(0.0002)	(0.0002)	(0.0002)
R^2	0.9617	0.9624	0.9626	0.9627
No. of countries	41	41	41	41
No. of sample	533	533	533	533

Note: The symbols *** indicate that the probability is less than 1%, respectively.

4.2. Estimation Result Panel Fixed Effect (FE)

Table 3 displays the results of the individual country FE estimation. Financial inclusion in Lag 1 has a statistically significant positive influence on financial inclusion.

This evidence indicates that an increase in FI in the prior period will lead to a similar rise in FI in the current period. The factors of MPE, institutional quality, and the central bank policy rate demonstrate a negative effect on financial inclusion; however, this effect is not statistically significant. Inflation and currency rates exert a negligible effect on financial inclusion, offering a favorable yet insignificant influence. Economic growth negatively affects financial inclusion. The money supply substantially and positively influences financial inclusion.

4.3. Endogeneity Test

The findings of the Durbin-Wu-Hausman (DWH) test are displayed in Table 4. The panel data test concludes that an endogeneity issue exists in all four estimated models. Consequently, a generalized method of moments modeling is employed to tackle the problem of endogeneity.

Table 4. Endogeneity test.

Variables	Model 1	Model 2	Model 3	Model 4
DWH test	15.84*** (0.0001)	16.16*** (0.0001)	16.10*** (0.0001)	17.01*** (0.0001)
No. of countries	41	41	41	41
No. of sample	574	1,986	1,986	1,986

Note: Symbols *** is Prob. < 1%.

4.4. Panel GMM Estimation

The results of the panel system GMM estimation are shown in Table 5. They show that previous financial inclusion has a big positive effect on current financial inclusion. This study validates the pro-cyclicality of finance and demonstrates the persistence of financial inclusion practices. Moreover, MPE has a positive and considerable impact on FI. This evidence suggests that a more efficient monetary policy results in greater financial inclusion.

Table 5. Panel system GMM estimation.

Variables	Dependent variable: *Financial inclusion* (FI)			
	Model 1	Model 2	Model 3	Model 4
FI (-1)	0.2532*** (0.0091)	0.3057*** (0.0077)	0.2409*** (0.0051)	0.2722*** (0.0149)
MPE	0.0001*** (0.0000)			0.0001*** (0.0000)
INS		0.0014*** (0.0002)		0.0013*** (0.0002)
CBR			0.0003*** (0.0001)	0.0004*** (0.0001)
INF	-0.0002*** (0.0000)	-0.0003*** (0.0000)	-0.0001*** (0.0000)	-0.0004*** (0.0000)
EG	0.0006*** (0.0001)	0.0011*** (0.0001)	0.0007*** (0.0001)	0.0007*** (0.0001)
ER	-0.0065*** (0.0009)	-0.0042*** (0.0010)	-0.0081*** (0.0006)	-0.0061*** (0.0011)
MS	0.0012*** (0.0001)	0.0009*** (0.0001)	0.0013*** (0.0001)	0.0013*** (0.0001)
(p-value) AR (1)	0.0317	0.0307	0.0338	0.0310
(p-value) AR (2)	0.5078	0.4520	0.4636	0.4499
Sargan test (p-value)	0.4474	0.4207	0.4630	0.4300
No. of countries	41	41	41	41
No. of sample	451	451	451	451

Note: The symbols *** indicate that the probability is less than 1%, respectively.

MPE has a positive and significant influence on FI in Models 1 and 3, thus underlining the importance of effective monetary policies in increasing the inclusiveness of the financial systems. Models 2 and 4 also reveal a

positive connection between INS and FI, underscoring the role of strong institutions in fostering trust and enhancing the inclusivity of financial systems. Furthermore, CBR has a positive and significant link with FI in Models 3 and 4, which suggests that appropriate and well-controlled rates may boost the motivation of financial institutions to increase their coverage. However, all the models consistently show a negative and significant connection with INF, demonstrating that high inflation leads to a loss of real value in savings and hinders the accessibility of affordable financial services. EG has a positive and significant influence on FI since increased growth leads to more people and firms interfacing with the financial systems. We observe that ER negatively impacts financial inclusion, suggesting that currency fluctuations undermine the trust in financial systems. The MS has a positive and significant influence on FI in all the models; the evidence suggests that increased liquidity enhances FI since it improves the accessibility of financial services. The diagnostic tests also indicate that the models are strong. The AR(1) and AR(2) tests reveal that there is no second-order autocorrelation, and the Sargan test proves that the instruments are valid. These findings serve as a reminder to policymakers about the importance of maintaining inflation stability, enhancing institutional frameworks, promoting economic growth, and ensuring monetary stability to improve financial inclusion.

5. DISCUSSION

Our findings suggest that MPE positively influences FI, indicating a correlation between more effective monetary policy and an increase in it. Goldsmith (1959) and Gurley and Shaw (1967) posit the finance-growth theory, which argues that individuals struggle to access financial goods due to their payment capabilities, leading to income inequality and enduring imbalances that ultimately impede bank access. This study is in line with Arshad et al. (2021), Oanh (2023), Saraswati et al. (2020), and Evans (2016), which show that improvements in the effectiveness of monetary policy enhance financial inclusion. MPE refers to the ability of cross-correlation that indicates monetary policy, as in delivering monetary policy; its intended efficiency impact increases, so the economy achieves financial inclusion. This is due to an increase in the number of individuals participating in the formal savings and investment system, which in turn increases the sensitivity of monetary policy. Well-crafted and well-implemented monetary policy measures are effective in promoting economic stability, maintaining inflation targets, and supporting growth. This may help create an environment that is conducive to the growth of financial services, spur investment, and encourage more people to engage with the formal financial systems.

The findings of this study show that institutional quality has a positive influence on financial inclusion (FI). This implies that a higher quality institution leads to a higher level of FI. From a non-interventionist perspective, a proper government is one that has the right regulations, a good taxation system, and a high degree of marketization. FI encourages economic entities, particularly small and medium enterprises (SMEs) and low-income households, to participate. The existence of financial services, such as the ability to deposit or borrow, also impacts the efficiency of the institutions. This suggests that financial inclusion improves institutional quality, thereby lessening the need for regulations to maintain the integrity of these activities. Three major types of institutional quality exist: the economic, the cultural, and the political. The findings of this study align with the findings of Nsiah and Tweneboah (2023) and Van et al. (2022), who have established that strong institutions contribute to enhancing financial inclusion.

The next key variable is CBR, which indicates that an increase in CBR results in increased financial inclusion. This outcome aligns with the interest rate channel of MP, as proposed by Bernanke (2020). The interest rate channel of monetary policy posits that an increase in policy rates encourages individuals to save more and seek out banking services for this purpose. Additionally, higher interest rates can assist banks in increasing their revenues from deposits and loans. Higher capital can help to increase the banks' ability and willingness to reach out to the unserved areas, thus increasing the level of FI. The present research is in line with Ozili (2023), Oanh (2023), Salisu (2022), Qasim (2022), and Jungo et al. (2022) which found that an increase in the MP interest rates leads to an increase in FI through

increasing the number of depositors and that interest rates have a positive influence on FI. This leads to the expansion of bank branches, thereby enhancing the provision of financial services within society.

According to the results, a decrease in inflation leads to an improvement in financial inclusion. The findings of this study are consistent with the works of Arshad et al. (2021), Omar and Inaba (2020), and Anarfo et al. (2019), where the authors agree that inflation reduction and financial inclusion are crucial. The results also show that economic growth has a positive influence on FI; hence, when the economy is growing, the financial inclusion index also increases. According to Qasim (2022) and Kim (2016), increased economic growth leads to improved financial inclusion. High economic growth implies an increase in income and general economic development, which results in more people and households engaging in financial services, including savings, loans, and insurance.

The exchange rate exerts a detrimental impact on financial inclusion, indicating that depreciation of the exchange rate results in a decline in FI. The adverse impact of exchange rate fluctuations on financial inclusion stems from currency depreciation, which results in elevated prices and thus reduces the number of individuals engaging with financial institutions. We confirm the previous research by Enebeli-Uzor and Mukhtar (2023) and Komala and Widodo (2022), demonstrating a negative correlation between exchange rate and financial inclusion. Our analysis indicates that the money supply positively influences financial inclusion. An augmentation in the MS results in enhanced FI. This study confirms the findings of Nsiah and Tweneboah (2023) and Jungo et al. (2022) that the money supply significantly boosts financial inclusion. An expansion of the money supply facilitates greater access to financial services for saving funds.

6. CONCLUSION

The impact of MPE, INS, and CBR on FI has garnered significant interest from researchers and policymakers, particularly in developing nations. As a result, researchers have conducted numerous studies to explore the effects of MPE and institutional factors on financial inclusion. However, the current literature has largely overlooked the impact of MP on FI. In order to show how governments can improve comprehensive finance, this paper looks into how monetary policy efficiency, institutional quality, and central bank policy rates affect financial inclusion. We establish a novel indicator of financial inclusion for 41 developing nations. We address the endogeneity issue in the model by examining the impacts of monetary policy efficiency, institutional quality, and the central bank's policy rate on financial inclusion by conducting a panel system GMM regression. We can summarize the principal conclusions of our investigation as follows. Initially, the MPE enhances FI in emerging countries. Our empirical findings validate the positive correlation between MPE and financial inclusion. The impact of institutional quality on financial inclusion is both positive and significant. Third, we observe that the CBR positively influences FI, indicating that an increase in the CBR leads to an enhancement in FI.

The findings of this paper have led to the emergence of policy implications. Given the role of central banks in emerging markets and developing economies, they should embrace inflation targeting as a tool to control prices, thereby enhancing confidence in the financial systems. The efficiency of monetary policy through competitive financial systems and low transaction costs is crucial. Additionally, central banks should create sophisticated forecasting models that incorporate features of emerging market systems, including the informal sector and dollarized economies. In a similar vein, governments must strive to improve the quality of their institutions by bolstering the independence of the judiciary and introducing new laws. To enhance financial inclusion, policymakers should focus on encouraging the growth and deregulation of new development players, including the financial markets. This involves the digital liberalization of banking services for financial institutions and other fintech companies. Tax incentives and subsidies can encourage the private sector to invest in infrastructure. It is also crucial for development to enhance financial literacy in rural areas, enabling individuals and small businesses to benefit from financial inclusion.

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