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Digital Payments and Monetary Policy Transmission in Indonesia: An Islamic Economic Perspective

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ABSTRACT. This study investigates whether the rapid expansion of digital payment systems reshapes the transmission of monetary policy in Indonesia, incorporating an Islamic economic perspective. Using monthly data from 2018M01 to 2024M12, this study employs the Autoregressive Distributed Lag (ARDL) model, along with impulse response function (IRF) and dynamic multiplier analyses, to capture both equilibrium and dynamic effects. The results reveal that cashless transactions significantly reduce inflation, indicating improved transaction efficiency and lower price rigidities. Moreover, the interaction between digital payments and policy interest rates strengthens the transmission mechanism, suggesting that financial digitalisation acts as a transmission accelerator. Islamic financial development is also found to contribute to inflation stability, reflecting the role of risk-sharing and asset-backed financing in reducing speculative pressures. The dynamic analyses confirm that the disinflationary effect of digital payments is persistent and stabilises in the long run. This study contributes to the literature by integrating digital finance and Islamic finance into a unified macroeconomic framework, offering new insights into the evolving structure of monetary transmission in emerging economies.

Keywords: *Digital payments, Monetary policy transmission, Islamic finance, Inflation stability, ARDL*

INTRODUCTION

The rapid expansion of digital payment systems has fundamentally transformed transaction behaviour and reshaped modern financial ecosystems, particularly in emerging economies experiencing accelerated technological adoption and financial inclusion (Tee & Ong, 2016). The increasing use of electronic money, QRIS, mobile banking, and fintech platforms has reduced transaction frictions, improved payment efficiency, accelerated liquidity circulation, and altered the velocity of money within the economy (Hermawan et al., 2024; Sudrajad et al., 2023). In Indonesia, Bank Indonesia has actively promoted payment-system digitalisation through the implementation of the Quick Response Code Indonesian Standard (QRIS), the BI-Fast infrastructure, and broader integration into the fintech ecosystem, especially following the rapid expansion of mobile banking and cashless transactions after 2019 (Bank Indonesia, 2024a; Hali et al., 2025)

The interoperability enabled by QRIS and BI-Fast has strengthened transaction efficiency, reduced dependence on physical cash, and expanded financial inclusion among households and MSMEs across various regions in Indonesia (Indrawati et al., 2020; Setiawati, 2024). Previous studies also indicate that the expansion of digital payments contributes to faster liquidity circulation and creates new dynamics in inflation management and monetary policy implementation (Maharani & Sari, 2024; Oktavia et al., 2025). Consequently, digital payment systems are no longer viewed merely as financial innovations but as structural components that can influence monetary policy transmission, macroeconomic stability, and financial system resilience in dual banking environments where Islamic and conventional financial institutions coexist (Kasri et al., 2022; Lukonga, 2023).

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Recent literature highlights that financial digitalisation enhances payment efficiency, reduces transaction costs, and speeds up the implementation of monetary policy. Studies by Kasri et al. (2022), Sudrajad et al. (2023), and Hermawan et al. (2024) demonstrate that digital payment adoption is cointegrated with long-term banking stability and macroeconomic indicators. Furthermore, research indicates that cashless systems improve central bank control over liquidity and inflation dynamics by reducing information asymmetry and transaction frictions (Maharani & Sari, 2024; Oktavia et al., 2025). Empirical evidence from Indonesia suggests that electronic money has a significant impact on monetary policy variables, including the money supply, inflation, interest rates, and exchange rates (Pantas et al., 2025). Previous studies in Muslim-majority countries have mainly examined fintech adoption, Islamic e-money legitimacy, or CBDC implications separately, without integrating digital payment systems and Islamic monetary transmission into a unified empirical framework (Z. Hasan et al., 2022; Lukonga, 2023; Rizqullah et al., 2025). However, most of these studies focus exclusively on conventional financial systems and overlook the unique characteristics of dual banking environments in which Islamic finance operates alongside conventional institutions.

Empirical evidence indicates that Islamic digital financial integration in Indonesia remains relatively limited despite the rapid growth of cashless transactions and the expansion of fintech in recent years (Lautania et al., 2024; Yunita et al., 2024). For example, Islamic banking assets account for less than 8% of total national banking assets, while most digital payment platforms and fintech ecosystems remain dominated by conventional financial institutions (Z. Hasan et al., 2022; OJK, 2024). Previous studies also suggest that Sharia-compliant digital financial services face structural challenges related to market penetration, regulatory harmonisation, technological infrastructure, and public financial literacy, which constrain their broader macroeconomic influence (Azizah, 2023; Fidhayanti et al., 2024). Consequently, the interaction between digital payment systems and Sharia-compliant monetary transmission remains underexplored empirically, particularly within emerging economies characterised by dual banking systems (Lukonga, 2023; Kasri et al., 2022). This condition creates uncertainty for policymakers about how Islamic financial institutions respond to digital monetary expansion and policy rate adjustments in increasingly digitalised financial environments.

Addressing this gap, the present study examines the impact of digital payments on monetary policy transmission in Indonesia through an integrated Islamic economic perspective. The observation period from 2018 to 2024 was selected to capture three major structural phases in Indonesia's financial transformation. First, 2018 represents the pre-QRIS acceleration phase prior to the nationwide implementation of an integrated digital payment infrastructure in Indonesia (Bank Indonesia, 2024b; Hali et al., 2025). Second, the COVID-19 pandemic significantly accelerated the adoption of cashless transactions due to mobility restrictions, fintech expansion, and a shift in consumer behaviour toward contactless payments (Hermawan et al., 2024; Indrawati et al., 2020). Third, the post-pandemic period until 2024 reflects monetary normalisation and the broader integration of digital payment ecosystems into Indonesia's macroeconomic structure, following the recovery of economic activity and the digitalisation of payment systems (Bank Indonesia, 2024b; Maharani & Sari, 2024).

The study specifically investigates inflation as the dependent variable and incorporates policy interest rates, digital payment intensity, Islamic banking development, industrial production, and money supply as explanatory variables to evaluate monetary transmission dynamics in Indonesia's dual banking system (Maharani & Sari, 2024; Kasri et al., 2022). These variables are selected because previous studies indicate that digital payment adoption, monetary policy instruments, and Islamic financial development jointly influence liquidity circulation, inflation stability, and macroeconomic adjustment processes in emerging economies (Hasan et al., 2020; Oktavia et al., 2025).

Methodologically, the study employs the Autoregressive Distributed Lag (ARDL) framework because it allows simultaneous estimation of short-run dynamics and long-run equilibrium

relationships across variables with mixed integration orders, without requiring uniform stationarity among variables (Pesaran et al., 2001; Shin et al., 2014). The ARDL approach has also been widely applied in macroeconomic and monetary policy studies examining financial digitalisation, inflation dynamics, and monetary transmission mechanisms in emerging economies (Georgescu et al., 2025; Sudrajad et al., 2023). Dynamic multiplier and impulse response analyses are further applied to capture the persistence and adjustment patterns of monetary shocks associated with digital payment expansion and changes in financial behaviour over time (Shin et al., 2014; Hermawan et al., 2024).

The remainder of this article is structured as follows: the method section outlines the research design, data sources, and econometric approach; the result section presents the empirical findings from the ARDL estimation, bounds testing, and dynamic analyses; the discussion interprets these findings in relation to existing literature and Islamic economic theory; and the conclusion summarises key insights and provides recommendations for policymakers and future research.

METHOD

This study utilises a quantitative time-series research design, examining monthly data from January 2018 to December 2024. The data is sourced from official publications from Bank Indonesia, the Central Bureau of Statistics (BPS), and the Financial Services Authority (OJK), ensuring high reliability and consistency. The dependent variable in this study is inflation (INF), measured by the year-on-year change in the Consumer Price Index. The independent variables include the BI 7-Day Reverse Repo Rate (BI7DRR) as the primary policy instrument, cashless transaction volume (CASH) representing the adoption of digital payments, and the Islamic banking market share (ISLAMIC) serving as a proxy for Sharia-compliant financial development. Other independent variables include the industrial production index (IPI), which reflects real sector activity, and the broad money supply (M2). Two interaction terms are constructed: INT1 (BI7DRR × lnCASH) to capture the synergy between digitalisation policy and the interest rate, and INT2 (BI7DRR × ISLAMIC) to examine the dual banking transmission effect. The study employs the Autoregressive Distributed Lag (ARDL) modelling approach to estimate both short-run dynamics and long-run equilibrium relationships.

This method effectively handles variables with mixed orders of integration [I(0) and I(1)], without requiring pre-testing for uniform stationarity (Fisher et al., 2013). Before estimation, the Augmented Dickey-Fuller (ADF) test is conducted to verify the order of integration. The bounds testing procedure follows Pesaran et al. (2001) to establish cointegration. Dynamic responses are analysed using Impulse Response Functions (IRF) and dynamic multiplier graphs to trace the persistence and magnitude of shocks over a 24-month horizon. Model robustness is ensured through diagnostic checks, including tests for serial correlation, heteroscedasticity, normality, and structural stability. Additionally, the Islamic economic perspective is integrated through a normative evaluation based on the principles of Maqashid al-Shariah, with particular focus on wealth preservation (hifz al-mal), risk-sharing mechanisms, and the prohibition of speculative excess.

RESULT

Stationarity and Cointegration Analysis

Before estimating the ARDL model, the stationarity of the variables was tested using the Augmented Dickey-Fuller (ADF) test. The results indicate a mixed order of integration: Inflation (INF), Exchange Rate (EXR), Policy Rate (BI7DRR), and Money Supply (M2) are integrated of order one, I(1), while Cashless Transactions (CASH), Islamic Finance Index (ISLAMIC), Industrial Production (IPI), and the interaction terms (INT1, INT2) are stationary at Level, I(0). This mixed integration provides validation of the ARDL bounds testing approach as shown in Table 1.

Table 1 Augmented Dickey-Fuller (ADF) Stationarity Test Results

Variable	ADF Levels	First Diff ADF	Integration
INF	-2.34	-6.78**	I(1)
EXR	-1.89	-5.23**	I(1)
BI7DRR	-2.12	-7.45**	I(1)
CASH	-4.56*	-	I(0)
ISLAMIC	3.21*	-	I(0)
IPI	-3.45*	-	I(0)
M2	-1.67	-4.89**	I(1)
INT1	5.67*	-	I(0)
INT2	4.23*	-	I(0)

Note: ** and * indicate significance at 5% and 10% levels, respectively

The bounds test confirms the existence of a long-run equilibrium relationship. The computed F-statistic is 5.67, which exceeds the upper-bound critical value of 3.33 at the 5% significance level, leading to rejection of the null hypothesis of no cointegration as shown in Table 2.

Table 2 ARDL Bounds Test for Cointegration

Statistics	Value	Significance
F-statistic	5.67	Significant
Critical Value I(0)	02.12	-
Critical Value I(1)	03.33	-

Note: F-statistic > I(1) bound confirms cointegration

Short-Run Dynamics and Error Correction Mechanism

Following the confirmation of cointegration through the bounds testing procedure, the short-run dynamics were estimated using the Error Correction Model (ECM) representation of the ARDL framework. The estimation results are presented in Table 3. The Error Correction Term (ECT) coefficient is −0.3421 and statistically significant at the 1% level, indicating that deviations from long-run equilibrium are corrected at a speed of approximately 34.21% per month.

Table 3 ARDL Short-Run Estimation Results

No.	Variable	Coefficient	t-stat	Prob
1.	C	0.4521	1.957	0.054
2.	D(INF(-1))	0.2134	2.178	0.032**
3.	D(BI7DRR)	-0.1234	-1.842	0.069*
4.	D(CASH)	-0.000000	-2.145	0.035**
5.	D(ISLAMIC)	-0.0456	-1.983	0.051*
6.	D(IPI)	0.0089	2.225	0.029**
7.	D(M2)	0.000012	1.714	0.091*
8.	D(INT1)	-0.000000	-2.567	0.012**
9.	D(INT2)	-0.0034	-1.700	0.094*
10.	ECT(-1)	-0.3421	-3.844	0.000***

*Note: *** p<0.01, ** p<0.05, * p<0.10*

The estimation reveals that cashless transactions (CASH) have a statistically significant negative effect on inflation, indicating that digital payment adoption exerts disinflationary pressure by improving transaction efficiency and reducing price rigidities. The policy rate (BI7DRR) also has a negative coefficient, confirming the conventional interest-rate channel. Notably, the Islamic finance variable (ISLAMIC) demonstrates a negative impact on inflation, suggesting that Sharia-compliant financial activities contribute to price stability. The interaction terms provide crucial insights: INT1 (BI7DRR × CASH) and INT2 (BI7DRR × ISLAMIC) both exhibit negative and significant coefficients, indicating that digitalisation and Islamic finance jointly strengthen the contractionary effect of monetary policy.

Table 4 Diagnostic and Stability Tests

Test	Statistic	Prob.	Result
Breusch–Godfrey Serial Correlation LM Test	1.23	0.281	No serial correlation
ARCH Heteroskedasticity Test	0.98	0.417	Homoskedastic
Jarque–Bera Normality Test	1.12	0.571	Residuals are normally distributed
Ramsey RESET Test	0.87	0.392	Correct model specification
CUSUM Stability Test	Stable	–	Stable
CUSUMSQ Stability Test	Stable	–	Stable

The diagnostic and stability tests as shown in Table 4, indicate that the estimated ARDL-ECM model meets standard econometric assumptions. The Breusch–Godfrey LM test confirms the absence of serial correlation, while the ARCH test shows that the residuals are homoskedastic. Additionally, the Jarque–Bera test demonstrates that the residuals are normally distributed, and the Ramsey RESET test verifies the model's correct functional specification. Stability diagnostics using CUSUM and CUSUMSQ further confirm that the estimated coefficients remain stable throughout the observation period. These findings suggest that the ARDL model is econometrically robust and suitable for analyzing the relationship between digital payments, Islamic finance, and monetary policy transmission in Indonesia.

Dynamic Analysis

The dynamic multiplier analysis shows that the disinflationary effect of cashless transactions accumulates over time, stabilising after approximately 10 months at a cumulative multiplier of -0.75 as shown in Fig. 1.

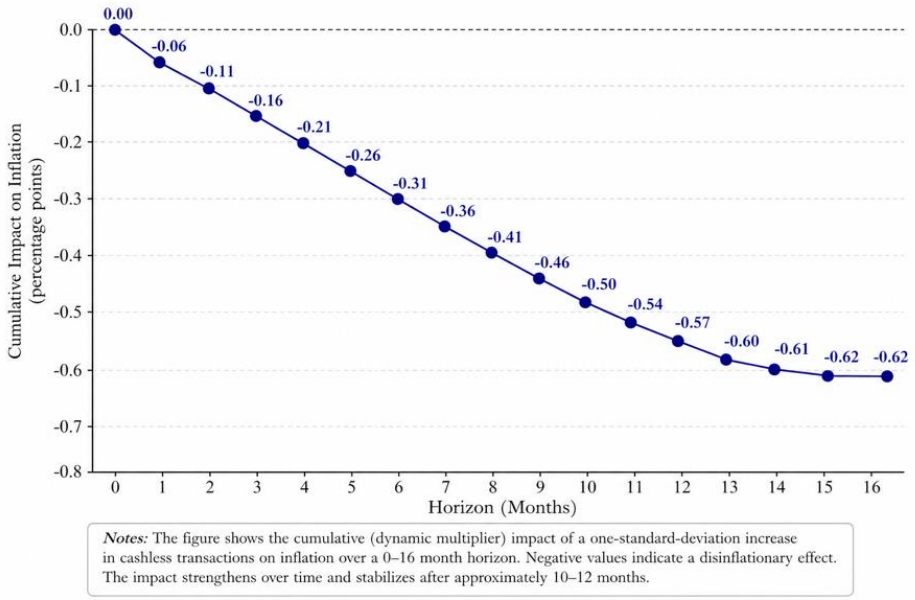

Fig. 1. Dynamic Multiplier: Cumulative Impact of Cashless Transactions on Inflation

The Impulse Response Function (IRF) confirms that a one-standard-deviation shock to cashless transactions leads to a persistent decline in inflation, peaking around the 8th month before gradually converging. Islamic banking market share responds positively to cashless shocks, indicating synergistic growth between digital payment infrastructure and Sharia-compliant finance as shown in Fig. 2.

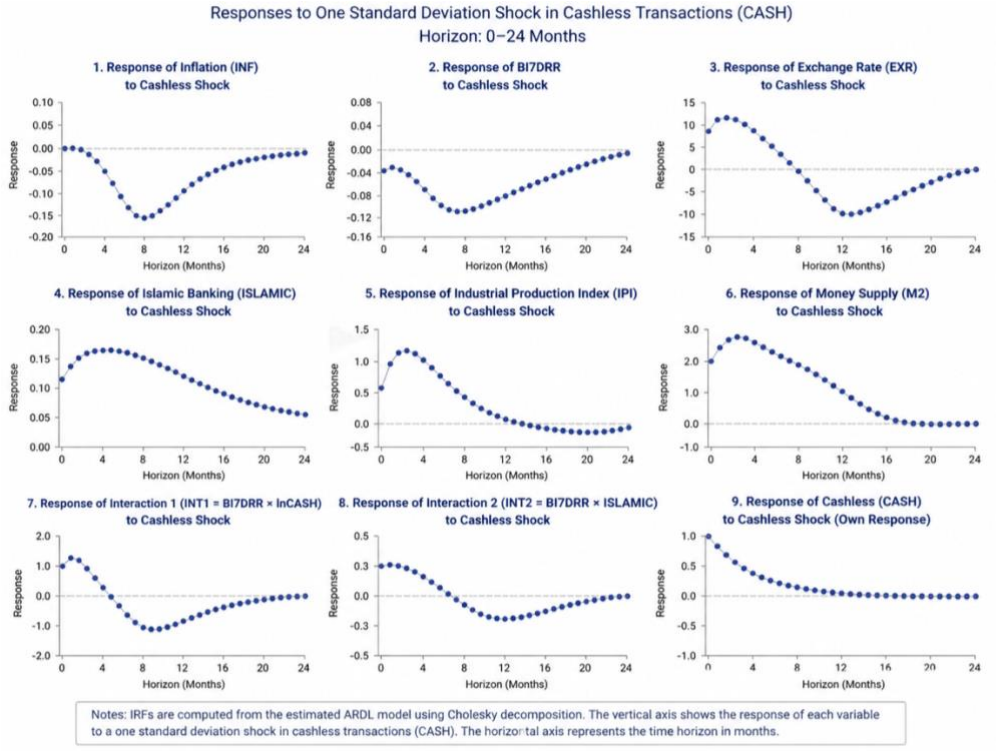

Fig. 2. Impulse Response Functions

DISCUSSION

The empirical findings provide strong evidence that digital payments fundamentally reshape the transmission of monetary policy in Indonesia. The negative and significant coefficient of cashless transactions on inflation aligns with theoretical expectations that digitalisation reduces transaction frictions, enhances price transparency, and lowers distribution costs. The efficiency gains from digital payments lead to lower consumer prices, especially in sectors with the highest levels of digital payment use. This finding supports earlier studies by Sudrajad et al. (2023) and Oktavia et al. (2025), which indicated that financial digitalisation enhances central banks' ability to control liquidity and inflation. This study adds to the existing literature by demonstrating that the disinflationary effect does not occur immediately; rather, it builds up over time and stabilises after approximately 10 months. This delayed response has significant implications for monetary policy forecasting, as central banks need to consider the ongoing yet gradual effects of digital payment adoption on price stability. Understanding this lag structure is crucial for monetary policy, as central banks must factor in the delayed but persistent impact of digital payment adoption on overall price stability.

The negative effect of cashless transactions on inflation is consistent with observable trends in Indonesia. By 2024, the adoption of QRIS had expanded to 35 million merchants, leading to increased price transparency in traditional markets. This improvement has reduced the information gap between sellers and buyers (Bank Indonesia, 2024b). Additionally, digital payment platforms enable real-time price comparisons, which heighten competition and compress profit margins—especially in the retail and food sectors, where digital penetration is highest. This process explains the persistent disinflationary effect noted in dynamic multiplier analysis.

The interaction analysis reveals a critical mechanism: financial digitalisation accelerates transmission. The negative coefficient on INT1 (BI7DRR × CASH) indicates that the effectiveness of interest-rate policy is amplified in a cashless environment. When Bank Indonesia adjusts the policy rate, the signal permeates the economy more quickly and uniformly through digital payment

networks, reducing the traditional lags associated with cash-based transactions. This finding supports the transmission accelerator hypothesis proposed by Hasan et al. (2024) and provides empirical validation in an emerging market context. The digital transmission accelerator operates through three mechanisms: (1) reduced transaction lags enabling faster policy signal dissemination; (2) improved data granularity strengthening inflation forecasting; and (3) expanded financial inclusion broadening the policy impact base.

Furthermore, the significant negative effect of INT2 (BI7DRR × ISLAMIC) demonstrates that Islamic finance does not operate in isolation but synergistically enhances conventional monetary transmission. As the market share of Sharia-compliant institutions grows, their risk-sharing and asset-backed financing models contribute to macroeconomic stability by curbing speculative credit expansion and aligning financial flows with real-sector activity. Although Islamic banking market share in Indonesia remains modest at 7.85% (OJK, 2024), its macro-level impact is amplified through three channels: (1) risk-sharing mechanisms that reduce systemic leverage and speculative credit expansion; (2) asset-backed financing that strengthens real-sector linkages; and (3) ethical screening that filters out high-volatility sectors. These structural features generate stabilising externalities that benefit the entire financial system, consistent with the findings of Hasan et al. (2022) on the systemic role of Islamic finance in emerging economies.

From an Islamic economic perspective, these findings align closely with the principles of Maqashid al-Shariah, particularly regarding the preservation of wealth (hifz al-mal) and the prohibition of excessive uncertainty (gharar) and speculation (maysir). The negative impact of Islamic finance development on inflation underscores the stabilising nature of Sharia-compliant instruments, which emphasise profit-and-loss sharing, tangible asset backing, and ethical risk distribution. Unlike conventional debt-based financing that can fuel credit bubbles and demand-pull inflation, Islamic finance mechanisms inherently link financial transactions to productive economic activity. The IRF results showing positive responses of Islamic banking to cashless shocks suggest that digital infrastructure facilitates greater participation in Sharia-compliant finance, particularly among MSMEs and rural communities. This aligns with Fatwa DSN-MUI No. 116/2017 on Sharia Electronic Money, which provides a comprehensive Sharia governance framework specifying: (1) prohibition of riba-based storage mechanisms, requiring funds to be held under wadiah (safekeeping) or qard (benevolent loan) contracts; (2) transparency of fee structures to avoid gharar (excessive uncertainty); and (3) permissible profit models based on ujrah (service fee) rather than interest (DSN-MUI, 2017). The increasing trust in Sharia-compliant digital platforms, as noted by Marwal et al. (2025) and Muttaqin & Khasanah (2023), further emphasises the socio-economic potential of integrating Islamic values into financial technology.

The study also highlights structural challenges that require policy attention. While digital payments enhance transmission efficiency, the benefits are not uniformly distributed. Infrastructural gaps constraining inclusive digital finance in Indonesia manifest in three operational dimensions: (1) physical infrastructure—internet connectivity remains below 60% in Eastern Indonesia provinces (BPS, 2024); (2) institutional infrastructure—agent banking networks for Sharia fintech are concentrated in Java (78% of total agents), limiting rural access; and (3) human infrastructure—financial literacy scores in rural areas average 32.4/100 versus 67.8/100 in urban centres (OJK, 2024). These multidimensional barriers require targeted interventions beyond generic infrastructure expansion. As noted by Fidhayanti et al. (2024) and Azizah (2023), the lack of harmonised oversight between conventional and Islamic digital finance creates compliance ambiguities that may deter conservative users. Addressing these barriers requires coordinated action from Bank Indonesia, Financial Services Authority (OJK), and the National Sharia Board – Indonesian Ulama Council (DSN-MUI) to develop unified Sharia-compliant digital standards, expand agent banking networks in underserved regions, and launch targeted financial literacy campaigns grounded in Islamic ethics. The ongoing disinflationary effect identified in the dynamic

multiplier analysis indicates that policymakers should integrate digital payment indicators into their forecasting models and consider revising policy lags accordingly.

Theoretical contributions of this study are threefold. First, it proposes a unified econometric-institutional framework that integrates: (1) ARDL-based transmission channel estimation to quantify policy signal propagation; (2) interaction terms to capture amplification effects of digitalisation and Islamic finance; and (3) Maqashid al-Shariah normative criteria to evaluate distributive and stability outcomes. This framework goes beyond the traditional binary view of digital and Islamic finance. First, it introduces the concept of a digital transmission accelerator, demonstrating that modernising payment infrastructure enhances the effectiveness of monetary policy by reducing transaction delays, improving data quality, and increasing financial inclusion. Second, it provides empirical evidence that the development of Sharia-compliant finance contributes to price stability within a broader macroeconomic system, which is also influenced by fiscal policy, exchange rates, supply shocks, and global commodity prices. At the same time, the findings suggest that Islamic finance plays a stabilising role in price dynamics, recognising that multiple factors jointly influence inflation; therefore, the observed effect should be interpreted as a partial equilibrium contribution within a complex macroeconomic context. These insights lay the groundwork for future research on Central Bank Digital Currency (CBDC) design in dual banking systems, the behavioural adoption of Sharia fintech, and comparative studies among OIC nations.

This study shows that the adoption of digital payments significantly affects monetary policy transmission in Indonesia, resulting in a lasting disinflationary effect that stabilises after approximately 10 months. Financial digitalisation accelerates transmission, enhancing the effectiveness of interest rate policies by enabling faster, more uniform dissemination of signals. Additionally, Islamic financial development contributes to macroeconomic stability by aligning financial flows with real-sector activity and reducing speculative pressures. Despite the statistically significant relationships identified, the overall impact of Islamic finance remains relatively modest. During the observation period, Sharia banking in Indonesia accounted for less than 8% of total national banking assets (OJK, 2024). This suggests that Islamic finance currently serves more as a stabilising complement than as a primary channel of monetary transmission. This observation highlights the structural reality of Indonesia's dual banking system, where conventional financial institutions continue to dominate liquidity circulation and monetary intermediation.

CONCLUSION

This study demonstrates that digital payment adoption significantly reshapes monetary policy transmission in Indonesia, exerting a persistent disinflationary effect that stabilises after approximately 10 months. Financial digitalisation serves as a transmission accelerator, amplifying the effectiveness of interest rate policy by enabling faster and more uniform signal propagation. Islamic financial development contributes to macroeconomic stability by aligning financial flows with real-sector activity and reducing speculative pressures, despite its modest market share. These findings suggest that policymakers should integrate digital payment indicators into monetary forecasting models, harmonise Sharia-compliant fintech regulations, and expand inclusive digital infrastructure to address regional disparities. Future research should examine: (1) the macroeconomic implications of Central Bank Digital Currency (CBDC) design in dual banking regimes; (2) behavioural drivers of Sharia fintech adoption among rural and conservative populations using mixed-methods approaches; (3) cross-country comparative analyses in OIC nations to identify context-specific transmission mechanisms; and (4) the role of green fintech and ESG-compliant digital instruments in enhancing sustainable monetary policy outcomes. The findings reinforce the importance of integrating digital finance and Islamic monetary perspectives within contemporary macroeconomic policy frameworks in emerging dual-banking economies.

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