

Digital Payments, Monetary Conditions, and Household Consumption: Evidence from Indonesia

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Keywords:	Abstract
QRIS; Inflation; BI-Rate, Velocity of Money; Household Consumption; ARDL	The rapid expansion of digital payments in Indonesia has generated growing interest in understanding how payment digitalization and monetary conditions are associated with household consumption. This study aims to examine the short- and long-run relationships among Quick Response Code Indonesian Standard (QRIS) transactions, inflation, Bank Indonesia's policy interest rate (BI-Rate), the velocity of money, and household consumption. A quantitative approach was employed using 48 monthly observations from January 2022 to December 2025, obtained from Bank Indonesia and Statistics Indonesia (BPS). Annual household consumption and nominal gross domestic product (GDP) data were disaggregated into monthly series using the Denton temporal disaggregation method. The data were analyzed using an autoregressive distributed lag (ARDL) model, bounds testing, and an error correction model (ECM) in EViews. The results indicate that QRIS transactions and the velocity of money exhibit positive and statistically significant relationships with household consumption in both the short and long run. Inflation exhibits a positive and statistically significant long-run relationship but is not statistically significant in the short run. The BI-Rate is not statistically significant in the long run, although positive relationships are observed at specific short-run lags. The bounds test supports the existence of a cointegrating relationship, with an estimated speed of adjustment of approximately 22.2% per month. These findings suggest that payment digitalization and the velocity of money are consistently associated with household consumption, whereas the relationships between monetary conditions and consumption vary across time horizons. The study highlights the importance of coordinating digital payment development with monetary policies aimed at sustaining household purchasing power.

INTRODUCTION

Household consumption is a key component of the economy, as it reflects household expenditures on goods and services and accounts for a substantial share of gross domestic product (GDP). Changes in household consumption can influence aggregate demand, production activities, and economic growth (Keynes, 1936; Mankiw, 2021). Globally, household consumption has consistently accounted for more than 50% of world GDP during the 2015–2024 period, although its share fluctuated, declining from 56.75% in 2015 to 54.91% in 2021 before increasing to 56.59% in 2024.

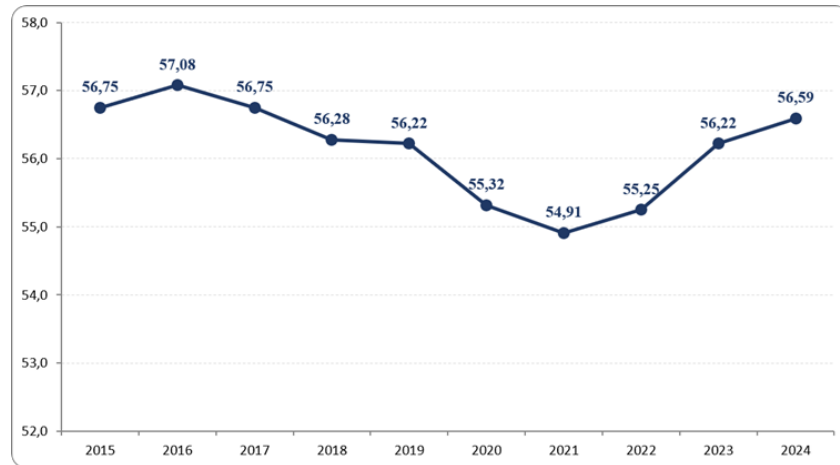


Figure 1. Contribution of Household Consumption to World GDP in 2015–2024
Source: World Bank, processed by the author (2026)

In Indonesia, household consumption consistently accounts for more than 50% of gross domestic product (GDP). The value of household consumption increased from IDR 10,203,336.10 billion in 2022 to IDR 12,861,278.84 billion in 2025, with a relatively stable annual growth rate of approximately 7–9%. The substantial contribution of household consumption to GDP underscores the importance of further examining its dynamics, particularly the factors influencing household consumption decisions and expenditures.

Theoretically, household consumption is influenced by various factors. Keynes (1936) identified disposable income as a primary determinant of consumption, while Friedman (1957), through the permanent income hypothesis, emphasized the importance of long-term income expectations. Similarly, Modigliani and Brumberg (1954), through the life-cycle hypothesis, explained that households consider their income and wealth over their lifetimes when making consumption decisions. Beyond income, consumption decisions are also associated with price levels, interest rates, and the transaction costs of holding and using money (Baumol, 1952; Mankiw, 2021; Tobin, 1956).

In Indonesia, the acceleration of digital payment adoption is reflected in the implementation of the Quick Response Code Indonesian Standard (QRIS), a national QR code-based payment standard that enables interoperability among payment service providers, as outlined in the Indonesia Payment Systems Blueprint 2025 (Bank Indonesia, 2019). The value of QRIS transactions increased substantially, from approximately IDR 4.4 trillion at the beginning of 2022 to more than IDR 169 trillion by the end of 2025, exhibiting considerably faster growth than household consumption. These contrasting growth patterns underscore the importance of empirically examining the relationship between QRIS transaction growth and household consumption.

In addition to digital payments, inflation and Bank Indonesia's policy interest rate (BI-Rate) are monetary variables relevant to household consumption. Changes in price levels affect the purchasing power of household income (Mankiw, 2021), while changes in interest rates influence decisions regarding the allocation of income between consumption and savings (Mankiw, 2021;

Mishkin, 2022; Oni et al., 2024; Staal, 2023). Nazir and Mir (2025) and Sinha (2023) demonstrated that inflationary pressures can reduce household consumption by weakening purchasing power, whereas Funke et al. (2023) and Kozlov (2023) showed that changes in interest rates affect consumption through gradual monetary policy transmission mechanisms. During the study period, the BI-Rate increased from 3.50% in 2022 to 6.25% in 2024 before declining in 2025, while household consumption continued to increase gradually. These developments highlight the need for further empirical examination of the relationship between the BI-Rate and household consumption.

Within the framework of the quantity theory of money, expressed by the equation $MV = PY$, the velocity of money represents the frequency with which money circulates to support economic transactions over a given period (Fisher, 1911). The development of digital payment systems has the potential to reduce transaction barriers and increase the frequency of monetary transactions. Ocansey et al. (2024) demonstrated that the use of mobile money and digital banking services positively affects the velocity of money, while Zulfa and Syahnur (2025) found that electronic money usage in Indonesia positively influences the velocity of money. An increase in the velocity of money may be associated with greater economic transaction activity, including household consumption.

Although numerous studies have examined the relationships among digital payments, monetary conditions, and household consumption, research integrating QRIS transactions, inflation, the BI-Rate, and the velocity of money into a single empirical model using monthly macroeconomic data remains relatively limited, particularly in Indonesia. Existing QRIS research has predominantly focused on microeconomic aspects, such as technology adoption and user behavior, whereas studies examining its relationship with macroeconomic indicators remain less extensive. This study addresses this research gap by examining the short- and long-run relationships between QRIS transaction values, inflation, the BI-Rate, the velocity of money, and national household consumption using monthly data from January 2022 to December 2025.

Based on these considerations, this study addresses four research questions: (1) How are QRIS transactions associated with household consumption in Indonesia? (2) What is the relationship between inflation and household consumption? (3) How is the BI-Rate associated with household consumption? and (4) What is the relationship between the velocity of money and household consumption in Indonesia? Accordingly, this study aims to examine the short- and long-run relationships between QRIS transactions, inflation, the BI-Rate, the velocity of money, and household consumption at the national level.

This study is expected to contribute theoretically by reassessing the relevance of the quantity theory of money in the context of payment system digitalization. It also seeks to provide practical insights for Bank Indonesia in evaluating digital payment system policies, for the government in formulating inflation management strategies integrated with digital economic development, and for the banking sector in understanding household consumption patterns in an increasingly digitalized economy.

Monetary theory explains that monetary policy influences economic activity indirectly through several transmission mechanisms, including the interest rate and monetary channels (Mishkin, 2022; Warjiyo, 2004). Through the interest rate channel, changes in policy interest rates influence bank lending and deposit rates, borrowing costs, and household consumption decisions. Higher interest rates generally increase borrowing costs and encourage savings, potentially reducing current consumption, whereas lower interest rates tend to stimulate consumption and investment (Mishkin, 2022).

Through the monetary channel, the quantity theory of money, as formulated by Fisher (1911), describes the relationship $MV = PY$, where M represents the money supply, V denotes the velocity of money, P represents the general price level, and Y denotes real output. This identity indicates that the product of the money supply and its velocity equals nominal output. In the digital era, payment innovations such as QRIS may reduce transaction frictions and facilitate more frequent monetary transactions without necessarily requiring an increase in the money supply. This theoretical framework provides a basis for examining how payment digitalization and monetary conditions are associated with household consumption through changes in the velocity of money.

A fundamental theoretical explanation of household consumption is provided by Keynes (1936), who proposed that consumption (C) depends on disposable income (Y_d), as expressed by the consumption function $C = a + bY_d$, where a represents autonomous consumption and b denotes the marginal propensity to consume. Subsequent theoretical developments suggest that consumption decisions depend not only on current income but also on expected future income and accumulated wealth. Friedman (1957), through the permanent income hypothesis, emphasized the role of long-term income expectations, while Modigliani and Brumberg (1954), through the life-cycle hypothesis, explained that households allocate consumption and savings based on expected lifetime resources. Beyond income and wealth, household consumption is also influenced by interest rates, inflation, expectations, preferences, access to credit, and demographic and social characteristics (Mankiw, 2021; Varian & Melitz, 2024; Williamson, 2022).

Household consumption generally responds to changes in economic conditions through a gradual process of dynamic adjustment rather than instantaneously (Gohar et al., 2023; Habanabakize, 2021). Accordingly, this study focuses on QRIS transaction values as an indicator of payment digitalization, inflation and the BI-Rate as indicators of monetary conditions, and the velocity of money as an indicator of monetary circulation intensity. These variables are selected in accordance with the quantity theory of money and monetary policy transmission mechanisms, which provide the principal theoretical foundations of this study.

QRIS is Indonesia's national QR code-based payment standard, established by Bank Indonesia to promote interoperability among payment service providers as part of the Indonesia Payment Systems Blueprint 2025 (Bank Indonesia, 2019). Technically, QRIS supports two primary transaction modes: Merchant Presented Mode (MPM) and Customer Presented Mode (CPM), which facilitate payment transactions between consumers and merchants through participating payment service providers. From an economic perspective, the transition from

conventional to digital payment instruments can improve the efficiency of money as a medium of exchange by reducing transaction frictions and associated costs (Mankiw, 2021).

Several studies have demonstrated that successful QRIS adoption is influenced by perceived usefulness and perceived ease of use (Ramayanti, 2024), as well as trust and perceived attractiveness (Bachri et al., 2025). Within a macroeconomic framework, QRIS standardization may contribute to greater transaction efficiency and potentially increase the velocity of money by reducing payment-related frictions (Ocansey et al., 2024; Zulfa & Syahnur, 2025). These developments may subsequently be associated with changes in household consumption behavior and expenditure patterns (Jiang et al., 2024).

Inflation refers to a sustained increase in the general price level of goods and services, which reduces the purchasing power of money (Priyono & Ismail, 2016). Various empirical studies have demonstrated that higher inflation is generally associated with lower household consumption because of its adverse effects on real purchasing power (Nazir & Mir, 2025; Sinha, 2023). However, other studies suggest that the relationship between inflation and consumption is conditional and may differ between the short and long run, depending on economic conditions and household responses to price changes (Batrancea, 2021; Mensah & Siaw, 2022).

The velocity of money measures the frequency with which a unit of money is used to purchase domestically produced final goods and services within a given period (Fisher, 1911). In this study, the income velocity of money is calculated as the ratio of nominal gross domestic product (GDP) to the broad money supply (M2), consistent with the quantity theory of money. The expansion of digital payment systems may reduce transaction barriers and increase the efficiency of monetary circulation, as indicated by Ocansey et al. (2024) and Zulfa and Syahnur (2025). Badrawani (2025) identified the velocity of money as a potential transmission mechanism linking digital payment development with consumption and broader economic activity. Nevertheless, empirical studies specifically examining the relationship between the velocity of money and household consumption remain relatively limited compared with research focusing on inflation and interest rates (Anwar et al., 2024; Hermawan et al., 2024).

Previous research examining the relationship between digital payment systems and household consumption generally indicates a positive association (Hou et al., 2021; Li et al., 2023; Zhao et al., 2022). Hu et al. (2024) found that mobile payments increase household consumption, particularly hedonic consumption, by improving transaction convenience and efficiency. Agarwal et al. (2024) provided causal evidence that digital payment adoption increases household expenditure by reducing transaction costs, while Faridah et al. (2026) demonstrated that QRIS implementation contributes to increased household consumption in Indonesia. However, Apeti (2023) found that mobile money plays a more prominent role in stabilizing consumption than in directly increasing consumption levels. Meanwhile, He et al. (2024) and Kahveci and Gurgur (2025) demonstrated that digital payment adoption can stimulate household spending through improved convenience, security, and transaction speed.

This study aims to examine the short- and long-run relationships among QRIS transaction values, inflation, Bank Indonesia's policy interest rate (BI-Rate), the velocity of money, and

household consumption in Indonesia using monthly data from January 2022 to December 2025. Specifically, it seeks to estimate the relationships between each explanatory variable and household consumption using the autoregressive distributed lag (ARDL) approach, determine whether a long-run equilibrium relationship exists among these variables, and assess the speed at which household consumption adjusts toward its long-run equilibrium following short-run deviations.

This study is expected to contribute theoretically by providing empirical evidence regarding the relevance of the quantity theory of money and monetary policy transmission mechanisms in the context of digital payment adoption in Indonesia. By integrating QRIS transaction values, inflation, the BI-Rate, and the velocity of money within a unified analytical framework, the study advances understanding of household consumption dynamics across different time horizons. From a practical perspective, the findings may inform Bank Indonesia's evaluation of digital payment development and interest rate transmission, support government efforts to coordinate inflation management with digital economy policies, and assist banks and payment service providers in understanding consumption patterns associated with digital transactions. Furthermore, this study may serve as a reference for future research examining the relationships among digital payments, monetary conditions, and household consumption in emerging economies.

METHOD

Research and Data Design

This study employed a quantitative explanatory research design to examine the relationships between Quick Response Code Indonesian Standard (QRIS) transactions, inflation, Bank Indonesia's policy interest rate (BI-Rate), the velocity of money, and household consumption (Sekaran & Bougie, 2020). The analysis used monthly time-series data from January 2022 to December 2025, comprising 48 observations. This period was selected to capture the acceleration of QRIS adoption following the COVID-19 pandemic and the normalization of monetary policy through BI-Rate adjustments.

The autoregressive distributed lag (ARDL) model was employed to estimate short- and long-run relationships among the variables, allowing for a combination of variables integrated of order zero, $I(0)$, and order one, $I(1)$ (Pesaran et al., 2001). Cointegration was assessed using the ARDL bounds testing approach, with small-sample critical values proposed by Narayan (2005) considered appropriate for the 48 observations.

Definition and Operation of Variables

Table 1. Definition and Operation of Variables

Variable	Dimensions	Indicator	Measurement	Scale
Household Consumption (Y)	Household consumption expenditure	Value of household consumption expenditure	Household consumption value (Rp billion)	Ratio
QRIS (X1)	QRIS transaction activity	Nominal value of QRIS transactions	QRIS transaction value (Rp)	Ratio
Inflation (X2)	Changes in consumer price levels	Inflation by CPI	Inflation rate (%) YoY	Ratio
BI-Rate (X3)	Monetary policy interest rates	BI7DRR / BI-Rate	BI-Rate (%)	Ratio
Velocity of Money (X4)	Money circulation speed	Income velocity by M2	Nominal GDP/M2	Ratio

Source: Data processed by the author (2026)

Household consumption and QRIS are transformed in the form of natural logarithms to stabilize variance and facilitate the interpretation of elasticity. Inflation is measured using year-on-year changes in the Consumer Price Index (CPI), while the velocity of money is calculated based on the ratio between nominal GDP and money supply in a broad sense (M2), according to the money quantity theory approach.

Populations, Samples, and Data Sources

The population of this study is the overall historical data related to research variables in Indonesia sourced from official institutions. The research sample is in the form of monthly data for the period January 2022 to December 2025 so that 48 observations were obtained for each variable. Data on inflation, BI-Rate, money supply (M2), nominal GDP, and household consumption were obtained from official publications of Bank Indonesia and the Central Statistics Agency (BPS), while QRIS transaction value data was obtained through an official data request to the Payment System Management Department (DPSP) of Bank Indonesia.

Table 2. Characteristics of Research Data

Data/Variables	Data Source	Initial Frequency	Frequency of Analysis	Remarks
Household Consumption	BPS	Annual	Monthly	Interpolated by the Denton method
Nominal GDP	BPS	Annual	Monthly	Interpolated by the Denton method; the basis of the calculation of the velocity of money
QRIS Transaction Value	DPSP Bank Indonesia	Monthly	Monthly	Obtained through official data request
Inflation	BPS	Monthly	Monthly	Official publication data
BI-Rate	Bank Indonesia	Monthly	Monthly	Official publication data
Money Supply (M2)	Bank Indonesia	Monthly	Monthly	Basis for calculating velocity of money

Source: Data processed by the author (2026)

Household consumption and nominal GDP data published in annual frequency are first transformed into monthly data using the Denton method, which is a temporal disaggregation approach that is able to maintain consistency with the aggregate value in the original period (Denton, 1971; International Monetary Fund [IMF], 2017). The velocity of money is then calculated by the researcher using the ratio between nominal GDP and M2 in accordance with the concept of Quantity Theory of Money.

Data Analysis Models and Methods

The data analysis method consists of descriptive analysis and inferential analysis. Descriptive analysis is used to describe the characteristics of household consumption, QRIS, inflation, BI-Rate, and velocity of money data, including average, median, maximum, minimum, and standard deviation values (Ghozali, 2021). Inferential analysis uses the Autoregressive Distributed Lag (ARDL) approach to test the influence of QRIS, inflation, BI-Rate, and velocity of money on household consumption, with an empirical model formulated as follows:

$$\text{CONSUMPTION}_t = \beta_0 + \beta_1 \text{QRIS}_t + \beta_2 \text{INFLATION}_t + \beta_3 \text{BI-RATE}_t + \beta_4 \text{VOM}_t + \varepsilon_t$$

The ARDL analysis stage begins with a stationarity test using the Augmented Dickey-Fuller (ADF) Test to ensure that there are no variables integrated in order I(2) (Dickey & Fuller, 1981; Pesaran et al., 2001). Next, optimal lag is determined using Automatic ARDL Lag Selection on EViews based on the Akaike Information Criterion (AIC). The selected ARDL model is then tested using the Bounds Test to determine the presence of cointegration, referring to the critical value of Narayan (2005) which is appropriate for small samples. If there is cointegration, the analysis is continued with the Long Run Form to estimate the long-term relationship and the Error Correction Model (ECM) to estimate the short-term relationship as well as the adjustment mechanism towards long-term equilibrium (Engle & Granger, 1987; Pesaran et al., 2001).

Diagnostic tests were conducted to validate that the ARDL model met the basic assumptions of econometrics (BLUE), including residual normality tests using Jarque-Bera, autocorrelation tests using the Breusch-Godfrey Serial Correlation LM Test, heteroscedasticity tests using the ARCH LM Test, and parameter stability tests using the Cumulative Sum of Recursive Residuals (CUSUM) and Cumulative Sum of Squares of Recursive Residuals (CUSUMSQ) (Brown et al., 1975). Decision-making on all diagnostic tests used a significance level of 5 percent. The entire data processing and analysis process was carried out with the help of EViews software.

Hypothesis Testing

Hypothesis testing the direct influence of QRIS, inflation, BI-Rate, and velocity of money on household consumption was carried out based on the results of the Long Run Form and Error Correction Model (ECM) estimates. The zero (H_0) hypothesis in each relationship states that there is no independent variable influence on household consumption, while the alternative hypothesis (H_1) states that there is a significant influence. The hypothesis is accepted if the probability value of the coefficient is smaller than the set significance level ($\alpha = 0.01$; 0.05; or 0.10) and the direction of the coefficient is in accordance with the hypothesis formulated.

RESULTS AND DISCUSSION

Descriptive Statistics

Descriptive analysis was carried out on household consumption, QRIS transactions, inflation, BI-Rate, and velocity of money during the period January 2022 to December 2025. The results of descriptive statistics are presented in Table 3.

Table 3. Descriptive Statistics of Research Variables

Statistics	Consumption (Rp)	QRIS (Rp)	Inflation (%)	BI-Rate (%)	VoM
Red	963 T	50 T	3,03	5,30	0,20
Median	999 T	32 T	2,74	5,75	0,21
Maximum	1,340 T	170 T	5,95	6,25	0,26
Minimum	504 T	4.4 T	-0,09	3,50	0,12
Std. Dev.	149 T	46.2 T	1,39	0,92	0,03
Observations	48	48	48	48	48

Source: EViews Data Processing Results (2026)

Household consumption averaged IDR 963 trillion, with a low value of IDR 504.17 trillion in January 2022 and a high value of IDR 1,336.21 trillion in December 2025, reflecting a gradual upward trend. The transaction value of QRIS averaged around IDR 50.1 trillion with a standard deviation of IDR 46.2 trillion, increasing from around IDR 4.47 trillion in January 2022 to IDR 169.67 trillion in December 2025, much faster than the growth of household consumption. Inflation averaged 3.03 percent with a high value of 5.95 percent in September 2022 (related to subsidized fuel price adjustments) and a low value of -0.09 percent in February 2025. The BI-Rate averaged 5.30 percent, increasing from 3.50 percent in early 2022 to 6.25 percent in April 2024 as

a pre-emptive policy response to global risks. The velocity of money has an average of 0.20 with relatively smaller variations compared to other variables.

Stationariness Test

The stationarity test was carried out using the Augmented Dickey-Fuller (ADF) Test to ensure that there are no variables integrated in order I (2), as a prerequisite for the use of the ARDL method (Pesaran et al., 2001). The test results are presented in Table 4.

Table 4. Dickey-Fuller Augmented Stationariness Test Results

Variable	Testing Rate	ADF Statistics	Prob.	Integration Order
Consumption	Level	-4,052	0,003	I(0)
QRIS	Level	-1,085	0,714	Not Stationary
	First Difference	-6,984	0,000	I(1)
Inflation	Level	-1,265	0,638	Not Stationary
	First Difference	-5,937	0,000	I(1)
BI-Rate	Level	-2,520	0,117	Not Stationary
	First Difference	-3,088	0,034	I(1)
Velocity of Money	Level	-4,226	0,002	I(0)

Source: EViews Data Processing Results (2026)

Household consumption and velocity of money have been stationary at the level level, while QRIS, inflation, and BI-Rate are only stationary after the first difference, so they are integrated into I(1). The composition of variables I(0) and I(1) without variable I(2) meets the main prerequisites for the application of the ARDL model, so that the analysis can be continued to the stage of determining optimal lag.

Optimal Lag Selection and ARDL Model Estimation

The selection of the optimal lag is carried out automatically using Automatic ARDL Lag Selection on EViews based on the Akaike Information Criterion (AIC) criteria with a maximum limit of 4 lags. The selection results produced the best model ARDL (1,2,1,3,2) after evaluating 2,500 model combinations, with an AIC value of -7,211 and the number of effective observations of 45 observations (period April 2022 to December 2025).

The estimation results showed that the model had a very high explanatory ability, with an R-squared value of 0.998 and an Adjusted R-squared of 0.997, and an F-statistic of 1,125,039 with a probability of 0.000, which shows that QRIS, inflation, BI-Rate, and velocity of money together have a significant effect on household consumption. The results of the estimated ARDL coefficient are presented in Table 5.

Table 5. ARDL Model Estimation Results (1,2,1,3,2)

Variable	Coefficients	Probability
CONSUMPTION (-1)	0,777	0,000
QRIS	0,703	0,000
QRIS (-1)	-0,729	0,000
QRIS (-2)	0,061	0,295
INFLATION	0,003	0,329
INFLATION (-1)	0,004	0,158
BI_RATE	-0,006	0,488
BI_RATE (-1)	-0,001	0,950
BI_RATE (-2)	0,003	0,822
BI_RATE (-3)	-0,018	0,037
VOM	1,365	0,001
VOM (-1)	-0,386	0,367
VOM (-2)	-0,460	0,140
C	1,916	0,087

Source: EViews Data Processing Results (2026)

Cointegration Test (Bounds Test)

The cointegration test using the Bounds Test was carried out to determine the existence of a long-term equilibrium relationship between QRIS, inflation, BI-Rate, velocity of money, and household consumption (Pesaran et al., 2001). The test results are presented in Table 6.

Table 6. Results of the F-Bounds Test Cointegration Test

Description	Value
Model ARDL	ARDL (1,2,1,3,2)
Number of effective observations	45
F-Bounds Statistic	23,894
Critical Value I(0) (Lower Limit) 5%	2,85
Critical Value I(1) (Upper Limit) 5%	3,905
Verdict	Subtract H0 (there is cointegration)

Source: EViews Data Processing Results (2026)

The F-Bounds Statistic value of 23.894 is greater than the critical value of the upper limit I(1) at a significance level of 5 percent of 3.905, so H0 is rejected. Thus, there is a cointegration (long-term) relationship between QRIS, inflation, BI-Rate, velocity of money, and household consumption, so that the analysis can be continued on the Long Run Form estimate.

Estimating the Long Run Form

Table 7. Results of Long Run Form Estimation (Household Consumption)

Variable	Coefficients	t-Statistic	Probability	Remarks
QRIS	0,160	4,307	0,0002	Significant***
Inflation	0,031	3,220	0,003	Significant***
BI-Rate	-0,099	-1,608	0,118	Insignificant
Velocity of Money	2,330	2,374	0,024	Significant**
Constant	8,612	11,234	0,000	Significant***

Source: EViews Data Processing Results (2026). Description: * significant 10%; ** significant 5%; significant 1%.

$$\text{CONSUMPTION} = 8,612 + 0.160 \text{ QRIS} + 0.031 \text{ INFLATION} - 0.099 \text{ BI-RATE} + 2,330 \text{ VOM}$$

In the long term, QRIS has a positive and significant effect on household consumption (coefficient 0.160; $p = 0.0002$). Since both variables are transformed in natural logarithms, the coefficient can be interpreted as elasticity: an increase in QRIS transactions of 1 percent is related to an increase in household consumption of about 0.160 percent, *ceteris paribus*. These results support the first hypothesis (H1 accepted).

Inflation showed a positive and significant coefficient (0.031; $p = 0.0030$). The positive direction is different from the hypothetical negative direction, so H2 is accepted in terms of significance but the direction of the relationship requires further explanation as discussed in Subchapter 4.7. The velocity of money has a positive and significant effect (2.330; $p = 0.0240$), supporting H4. The BI-Rate shows a negative coefficient (-0.099) according to the hypothetical direction, but it is not significant ($p = 0.1180$) at the level of 1 percent, 5 percent, or 10 percent, so H3 has not been supported by data in the long term.

Short-Term Relationship Estimation (Error Correction Model)

The results of ECM estimation are used to see the short-term relationship between QRIS, inflation, BI-Rate, and velocity of money to household consumption, as presented in Table 8.

Table 8. Results of Estimated Short-Term Relationship (ECM) of Household Consumption

Variable	Coefficients	t-Statistic	Probability	Verdict
D(QRIS)	0,703	16,301	0,000	Significant***
D(QRIS(-1))	-0,061	-1,595	0,121	Insignificant
D(INFLATION)	0,003	1,223	0,230	Insignificant
D(BI_RATE)	-0,006	-0,938	0,356	Insignificant
D(BI_RATE(-1))	0,015	2,163	0,038	Significant**
D(BI_RATE(-2))	0,018	2,577	0,015	Significant**
D(VOM)	1,365	6,176	0,000	Significant***
D(VOM(-1))	0,460	2,287	0,029	Significant**
CointEq(-1)	-0,222	-12,903	0,000	Significant***

Source: EViews Data Processing Results (2026)

In the short term, QRIS has a positive and significant effect on the current period (coefficient 0.703; $p = 0.000$), but the effect of the first lag is not significant, suggesting that the effect of QRIS is mainly seen in the current period. Inflation has not shown a significant effect in the short term ($p = 0.230$). The BI-Rate has not been significant in the current period, but it has become significant and positive in the first lag ($p = 0.038$) and the second lag ($p = 0.015$), indicating a transmission time lag of about one to two months. The velocity of money has a positive and significant effect in the current period (1.365; $p = 0.000$) and remains significant in the first lag (0.460; $p = 0.029$). The Term Correction Error Coefficient or CointEq(-1) of -0.222 is negative and significant at the level of 1 percent, indicating that about 22.2 percent of deviations from the long-term balance are corrected monthly, with an estimated adjustment time of about 4–5 months towards a long-term balance.

Model Diagnostic Test

Diagnostic tests were performed to validate that the ARDL model met the basic assumptions of econometrics (BLUE). The results of normality, autocorrelation, and heteroscedasticity tests are presented in Table 9.

Table 9. ARDL Model Diagnostic Test Results

Diagnostic Tests	Statistics	Probability	Verdict
Normality (Jarque-Bera)	3,076	0,215	Normally distributed residual
Autocorrelation (Breusch-Godfrey LM)	F = 0.082	0,922	No autocorrelation
Heteroscedasticity (ARCH LM)	F = 1.183	0,283	No heteroscedasticity

Source: EViews Data Processing Results (2026)

The Jarque-Bera probability value of 0.215 (>0.05) indicates that the residual model is normally distributed. The probability value of the Breusch-Godfrey LM Test of 0.922 (>0.05)

indicates that the residual does not experience autocorrelation. The probability value of the ARCH LM Test of 0.283 (>0.05) indicates that the residual does not experience heteroscedasticity. Thus, the ARDL model used has fulfilled all basic assumptions of econometrics.

The parameter stability test was carried out using the CUSUM and CUSUM of Squares (CUSUMSQ) graphs. The test results are shown in Figure 2 and Figure 3.

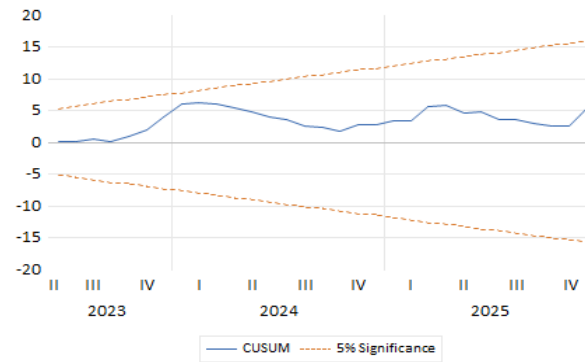


Figure 2. CUSUM Graph
Source: EViews Data Processing Results (2026)

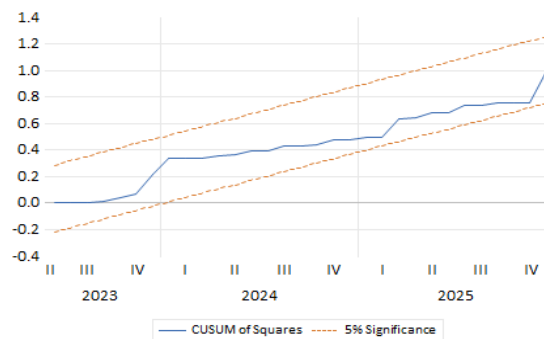


Figure 3. CUSUM Chart of Squares (CUSUMSQ)
Source: EViews Data Processing Results (2026)

The CUSUM and CUSUMSQ statistical lines were within the critical limit at a significance level of 5 percent during the observation period, indicating that the model parameters were stable and did not undergo structural breaks that could affect the estimation results.

The Effect of QRIS on Household Consumption. The results of the study show that QRIS has a positive effect on household consumption both in the short and long term, so H1 is accepted. This finding is in line with Keynes' Consumption Theory which explains that people's ability to realize spending is also determined by the ease of transactions. QRIS improves the efficiency of the payment system through interoperability between payment service providers so as to reduce transaction costs and encourage people to make consumption decisions more easily. These results are consistent with Jiang et al. (2024) and Kahveci and Gurgur (2025) who show that payment digitalization encourages increased consumption through efficiency and ease of transactions. In

the context of Indonesia, the rapid expansion of the QRIS ecosystem in 2022–2025, including in the MSME sector, strengthens the efficiency of the payment system while supporting the increase in household consumption as the largest component of GDP.

The Effect of Inflation on Household Consumption. Inflation has a positive and significant effect on household consumption in the long term, while in the short term the effect has not been seen. This positive direction is different from the hypothesized negative direction. This finding can still be explained through Keynes' Theory of Consumption: inflation does not affect consumption directly, but through changes in real purchasing power. As long as price increases are not followed by a significant decrease in real income, households tend to maintain their consumption. During the 2022–2025 period, inflation will take place simultaneously with the post-pandemic economic recovery, which is marked by increased consumption activity and improved employment conditions, so that the increase in inflation reflects an increase in aggregate demand (demand-pull inflation) rather than a decline in welfare. The stabilization policies of the Government and Bank Indonesia, such as controlling food inflation and energy subsidies through TPIP-TPID, have helped maintain people's purchasing power so that consumption continues to grow despite rising prices.

The Effect of BI-Rate on Household Consumption. The third hypothesis (H3) that states that the BI-Rate has a negative effect on household consumption is rejected. In the long term, the direction of the BI-Rate coefficient is negative according to the hypothesis, but it is not statistically significant. In the short term, the effect of the BI-Rate is only seen in the first and second lags in a positive direction, indicating a time lag in monetary policy transmission (Mishkin, 2022) which is consistent with Funke et al. (2023) and Kozlov (2023). The positive direction of the lag does not mean that the BI-Rate increase leads to an increase in consumption, but rather illustrates that during the 2022–2025 period, the BI-Rate increase took place at the same time as the post-pandemic economic recovery process so that household consumption continued to grow despite the increase in policy interest rates.

The Effect of Velocity of Money on Household Consumption. The velocity of money has a positive and significant effect on household consumption both in the short and long term, so H4 is accepted. This finding is in line with the quantity theory of money (Fisher, 1911) through the equation $MV = PY$: the more active the money supply and reused in economic activities, the higher the intensity of transactions related to household consumption. In the context of Indonesia 2022–2025, this relationship takes place simultaneously with the post-pandemic economic recovery and the wider use of digital payment systems that allow funds to move between economic actors more quickly and efficiently. Research that specifically examines the influence of velocity of money on household consumption is still relatively limited, so this finding provides additional empirical evidence that expands the use of the concept of velocity of money from monetary dynamics indicators to relevant variables in explaining household consumption.

Overall, the results show that QRIS and velocity of money have a consistent relationship with household consumption, both in the short and long term, while inflation shows more influence in the long term and the influence of the BI-Rate is only seen after a few periods. These findings

confirm that changes in the digital payment system and monetary conditions are not always directly followed by changes in household consumption, but involve a dynamic adjustment process with a correction rate of around 22.2 percent per month towards a long-term equilibrium.

CONCLUSION

Based on the autoregressive distributed lag (ARDL) analysis of monthly data from Indonesia for the 2022–2025 period, this study concluded that Quick Response Code Indonesian Standard (QRIS) transactions had a positive and statistically significant relationship with household consumption in both the short and long run, supporting H1. Inflation exhibited a positive and statistically significant long-run relationship but was insignificant in the short run. Thus, H2 was partially supported, although the observed direction differed from the hypothesized relationship. Bank Indonesia's policy interest rate (BI-Rate) showed no statistically significant long-run relationship with household consumption, although positive and significant relationships were observed at the first and second short-run lags. Therefore, H3 was not supported. Meanwhile, the velocity of money exhibited a positive and statistically significant relationship with household consumption in both the short and long run, supporting H4. The ARDL bounds test provided evidence of cointegration among the variables, while the error correction coefficient of -0.222 indicated that approximately 22.2% of deviations from the long-run equilibrium were corrected each month. These findings suggested that payment digitalization through QRIS and the velocity of money were consistently associated with household consumption, whereas the relationships involving inflation and monetary policy interest rates varied across time horizons and did not always align with theoretical expectations. These patterns may have reflected the economic adjustments occurring during the post-pandemic recovery period. Accordingly, Bank Indonesia should continue strengthening the QRIS ecosystem to facilitate household transactions while improving the effectiveness of monetary policy transmission. The government should also coordinate inflation management with digital economy development to support household purchasing power.

This study was limited by its relatively short observation period, restricted set of explanatory variables, and reliance on nationally aggregated data. Future research should extend the observation period, incorporate additional determinants of household consumption, such as disposable income and exchange rates, and examine provincial-level data to capture regional heterogeneity. Furthermore, subsequent studies could assess the robustness of the findings using alternative econometric approaches, such as the nonlinear autoregressive distributed lag (NARDL) model, to investigate potential asymmetric relationships among digital payments, monetary conditions, and household consumption.

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