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The Impact of E-Money Usage on the Velocity of Money in Malaysia

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Abstract: The rapid adoption of e-money in Malaysia has significantly transformed the landscape of financial transactions. As consumers and businesses increasingly prefer digital payment methods, questions arise about how these shifts affect fundamental monetary dynamics, particularly the velocity of money. This paper investigates the theoretical and conceptual relationship between e-money usage and the velocity of money in Malaysia, proposing that e-money impacts money velocity through two primary channels: transaction efficiency and monetary substitution. A conceptual framework is developed to guide future empirical research and inform policymakers on the evolving role of digital financial instruments.

Keywords: *E-money adoption, Velocity of money, Digital payments, Transaction efficiency, Monetary substitution*

1. Introduction and Background

The rise of electronic money (e-money) has marked a significant transformation in how modern economies manage, store, and circulate money. E-money is defined as a digital substitute for cash that facilitates instant payments and has become an essential component of modern payment systems (Bank for International Settlements [BIS], 2021). In Malaysia, the adoption of e-money has accelerated rapidly over the past decade, driven by the widespread use of smartphones, increased internet penetration, and strategic initiatives by both Bank Negara Malaysia (BNM) and private sector participants to promote cashless transactions (BNM, 2022; Lim & Habibullah, 2021).

As of 2023, BNM reported over 9 billion e-money transactions, with a total transaction value exceeding RM60 billion, reflecting a year-on-year growth of more than 25 percent (BNM, 2023). The surge is largely attributed to the growing popularity of e-wallets, mobile banking applications, and contactless payment cards, which have become integral to Malaysia's retail payment landscape. Prominent platforms such as Touch 'n Go eWallet, Boost, and GrabPay dominate the market, while government-led initiatives like eBeliaRahmah and e-Tunai Rakyat have further encouraged consumer adoption (Yusof & Lau, 2023).

This digital transformation is consistent with global trends. In China, the use of digital payment systems such as WeChat Pay and Alipay has achieved near-total integration into daily life, processing more than 300 billion transactions annually, valued at over ¥1,200 trillion (Zhou, Chen, & Wang, 2020; Yang, Li, & Zhu, 2022). Similarly, Sweden has emerged as a pioneer in the move toward a cashless society, with over 95 percent of retail transactions conducted electronically (European Central Bank [ECB], 2019). Singapore, Malaysia's closest regional comparator, recorded over S$35 billion in e-money transactions in 2023, facilitated through PayNow and SGQR interoperability frameworks that link banks and fintech payment providers (Indrawati, 2020).

Despite these global developments, the macroeconomic implications of widespread e-money usage, particularly its effect on monetary aggregates such as the velocity of money, remain underexplored in emerging economies like Malaysia. The velocity of money, traditionally defined as the ratio of nominal GDP to the money supply (typically M1 or M2), reflects the frequency at which money circulates within the economy (Rahim & Wong, 2022; Kumar & Sharma, 2021). Classical monetary theory suggests that this measure is influenced by factors such as interest rates, income growth, and inflation expectations. However, with the increasing adoption of digital payment instruments, the traditional relationship between money supply and economic activity may be undergoing a structural transformation (Lim & Habibullah, 2021; BIS, 2021).

Preliminary observations from BNM (2023) indicate that, despite the surge in e-money usage, the velocity of M1 in Malaysia has exhibited a declining trend, falling from approximately 2.1 in 2013 to 1.5 in 2022. This pattern mirrors the experiences of other economies undergoing digital payment expansion, such as India and China (Kumar & Sharma, 2021; Zhou et al., 2020). The coexistence of rising digital payment volumes and

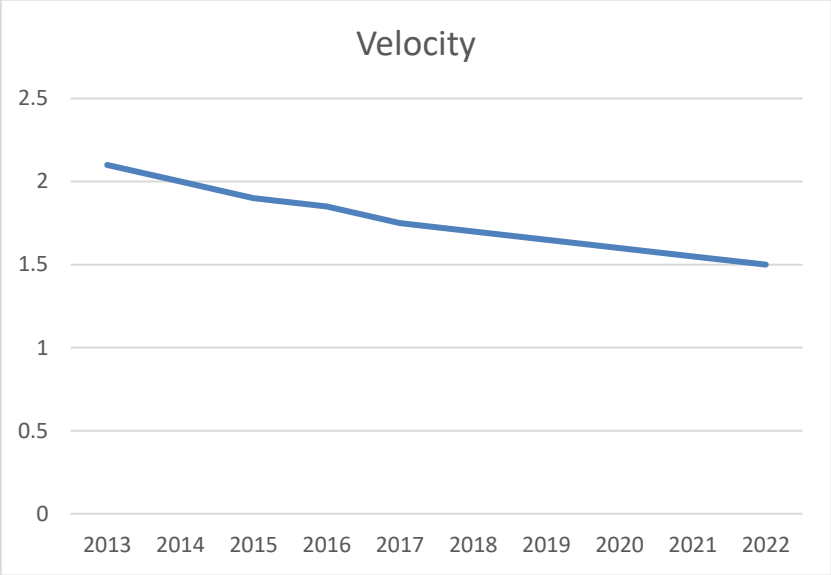
declining money velocity presents a paradox: does the expansion of e-money reduce the demand for traditional money holdings thereby lowering observed velocity or does it instead facilitate faster transactions that are not fully captured by conventional monetary aggregates?

Motivated by these emerging trends, this study seeks to conceptually examine the influence of e-money on the velocity of money in Malaysia. By focusing on a Southeast Asian context, the research contributes to addressing a critical gap in the literature, as the intersection between digital financial innovation and monetary theory remains relatively underexplored in developing and semi-developed economies (Yusof & Lau, 2023; Rahim & Wong, 2022).

Figure 1 illustrates the declining trend in Malaysia's M1 velocity, raising key questions about how digital payment adoption may be reshaping the mechanisms of money circulation within the economy.

Figure 1: Velocity of M1 Money Supply in Malaysia (2013–2022)

Year	Velocity
2013	2.10
2014	2.00
2015	1.90
2016	1.85
2017	1.75
2018	1.70
2019	1.65
2020	1.60
2021	1.55
2022	1.50



Source: Global Monetary Reports

Problem Statement

The increasing adoption of electronic money (e-money) has redefined the financial landscape in Malaysia, carrying far-reaching implications for monetary policy, financial behaviour, and the structure of the money supply, as consumers and businesses increasingly shift toward digital payments using e-wallets, QR codes, and online banking platforms (Bank Negara Malaysia [BNM], 2022; Yusof & Lau, 2023). This transformation has been accelerated by rapid technological diffusion, supportive regulatory frameworks, and private-sector innovation in payment systems (Bank for International Settlements [BIS], 2021). Consequently, the traditional understanding of how money circulates in the economy long grounded in conventional aggregates such as M1 and M2, is being fundamentally challenged (Lim & Habibullah, 2021; Rahim & Wong, 2022).

Historically, the velocity of money, especially when measured using the M1 aggregate (cash and demand deposits), has served as a vital indicator of economic activity and the effectiveness of monetary policy (Kumar & Sharma, 2021). A higher velocity typically suggests that each unit of currency is being used in multiple transactions over a given period, signalling a healthy level of economic activity and liquidity circulation (Mbiti & Weil, 2015). However, in Malaysia, a paradoxical trend has emerged: despite the surge in e-money transactions, the velocity of M1 has steadily declined, dropping from 2.1 in 2013 to 1.5 in 2022, according to data from Bank Negara Malaysia (2023).

This declining trend is not unique to Malaysia. Similar patterns have been observed in both developed and developing economies, prompting questions about whether conventional measures of money velocity remain

valid in an increasingly digital economy (Zhou, Chen, & Wang, 2020; Yang, Li, & Zhu, 2022). The introduction and expansion of e-money bring at least two major disruptive effects to monetary measurement and theory.

i. Transaction Efficiency Effect: E-money enables instantaneous and frictionless transactions, theoretically capable of increasing the effective velocity of money as digital payments circulate faster through the economy (Indrawati, 2020; BIS, 2021).

ii. Substitution Effect: At the same time, e-money can replace traditional forms of money included in M1 or M2, such as cash and demand deposits, thereby distorting the monetary base used to calculate velocity and potentially leading to a statistical underestimation of actual money circulation (Lim & Habibullah, 2021; Rahim & Wong, 2022).

Despite these critical implications, existing research in the Malaysian context has yet to provide a comprehensive conceptual and empirical understanding of how e-money influences money velocity. Most prior studies focus on financial inclusion, digital banking adoption, or consumer behaviour (Yusof & Lau, 2023), while few examine the macroeconomic impact of digital payments from a monetary theory perspective (Lim & Habibullah, 2021).

This lack of conceptual clarity presents challenges for policymakers. If the velocity of money is being structurally altered by digital finance, traditional monetary indicators and tools—such as interest rate policy, inflation targeting, and reserve requirements—may lose their predictive accuracy or require methodological recalibration (BNM, 2022; BIS, 2021). Therefore, this study aims to fill a critical gap in the literature by conceptually analyzing how the increasing use of e-money influences the velocity of money in Malaysia, clarifying whether digital payments are contributing to a structural shift in monetary circulation or whether existing measures must be redefined to account for new, digital forms of money.

Research Objectives

The primary objective of this study is to examine the impact of e-money usage on the velocity of money in Malaysia. The specific objectives are:

- To examine the conceptual relationship between e-money usage and the velocity of money in Malaysia.
- To identify the mechanisms through which e-money may affect the circulation of money.
- To develop a conceptual framework that supports future empirical testing.

2. Literature Review

The literature on electronic money (e-money) and the velocity of money spans both traditional monetary theory and contemporary digital finance. This section reviews the theoretical underpinnings, empirical findings, and research gaps in the context of Malaysia and comparable economies.

Classical and Modern Views on Money Velocity

The velocity of money has traditionally been explained using the Quantity Theory of Money, expressed as $MV = PY$, where M is the money supply, V is velocity, P is the price level, and Y is real output. Classical economists viewed velocity as relatively stable in the long run, influenced mainly by institutional and behavioural factors. However, in the modern economy, velocity is increasingly volatile and sensitive to changes in technology and payment methods.

Digitalization and Payment Behavior

The adoption of digital payment systems has altered how money is held and transacted. According to Bech and Garratt (2017), innovations such as e-wallets, prepaid cards, and mobile money create a parallel system that functions similarly to traditional money but is not always included in standard monetary aggregates. This raises concerns about the accuracy of measuring money velocity in digital economies.

Rogoff (2016) argues that the move toward a cashless society reduces the demand for physical currency, impacting how central banks manage monetary aggregates. In countries like Sweden, where over 95 percent of payments are digital, the declining velocity of M1 and M2 is partly attributed to the substitution of cash with

digital alternatives.

Empirical Evidence from Global and Regional Studies

Empirical studies around the world have produced diverse and sometimes contradictory insights into the effects of e-money on the velocity of money, reflecting variations in financial development, consumer behaviour, and regulatory environments. Zhou et al. (2020), in their study on China, found that the adoption of e-money significantly enhanced transaction speed and initially increased the velocity of money. However, as consumers began to store funds in digital wallets for longer periods, transforming them into quasi-savings instruments, the overall velocity declined. This highlights the dual nature of e-money as both a transaction facilitator and a substitute for traditional money holdings.

In India, Kumar and Sharma (2021) analyzed the impact of digital payment platforms such as Unified Payments Interface (UPI) and Paytm on money velocity following demonetization. They observed a temporary increase in money velocity due to a surge in electronic transactions, followed by stabilization as the economy adjusted to the new digital payment norms. The authors argue that the inclusion of e-money balances in monetary aggregates is crucial for accurate analysis of monetary policy transmission.

Similarly, a study by the European Central Bank (ECB, 2019) on the Eurozone indicated that while contactless and mobile payments were rising rapidly, they had a limited measurable impact on the velocity of M1 and M2 due to their relatively small share in total transaction volume. However, in countries such as Sweden and the Netherlands, where digital payments dominate, structural changes in money demand are evident, leading to a consistent decline in the velocity of money.

In Nigeria, Okonkwo, Ume, and Eze (2022) found that increased mobile money usage in rural areas led to a marginal increase in transaction velocity due to improved financial access. Nevertheless, regulatory and interoperability challenges prevented the full realization of efficiency gains from digital payments.

In Kenya, Jack and Suri (2011) examined the introduction of M-PESA and found that mobile money substantially increased the frequency and speed of person-to-person transactions, thereby enhancing monetary circulation. Their findings indicate that mobile payment systems can raise the velocity of money in economies with previously limited financial inclusion. Likewise, Mbiti and Weil (2015) demonstrated that M-PESA improved transaction efficiency and reduced liquidity constraints, indirectly supporting higher money turnover. However, as users increasingly held balances in mobile wallets for convenience or safety, the longer holding periods slightly reduced measured velocity.

Other cross-country studies further illustrate that e-money's impact on velocity depends on its classification in monetary aggregates. Indrawati (2020) argued that excluding e-money from narrow aggregates such as M1 leads to a statistical underestimation of actual velocity, as electronic balances circulate outside formal banking channels. Yang, Li, and Zhu (2022) also found that central bank digital currency (CBDC) initiatives can affect money velocity differently depending on whether they substitute cash or deposits.

During the COVID-19 pandemic, the Bank for International Settlements (BIS, 2021) reported that payment digitalization accelerated sharply worldwide. However, despite the surge in contactless and remote payments, cash holdings also increased during periods of uncertainty, leading to mixed effects on overall money velocity. This finding underscores the importance of accounting for behavioural factors such as precautionary savings and liquidity preference, when analyzing e-money's macroeconomic implications.

Overall, the empirical literature suggests that e-money's influence on velocity is dynamic and context-specific. Short-run increases in transaction speed and efficiency are common, but long-run effects depend on whether e-money functions primarily as a means of payment or as a store of value. In advanced economies, where digital payments are already dominant, velocity may decline due to increased preference for holding digital balances (ECB, 2019; Indrawati, 2020). Conversely, in developing economies such as Kenya and Nigeria, the expansion of e-money and mobile payments has improved access and marginally increased money velocity (Jack & Suri, 2011; Okonkwo et al., 2022).

Specific Findings from Malaysia

In the Malaysian context, Lim and Habibullah (2021) conducted a comprehensive time-series analysis using quarterly data from 2008 to 2020 to investigate the dynamic relationship between e-money transactions and the velocity of M1. Their findings revealed a negative relationship between the number of e-money transactions and the velocity of money, indicating a substitution effect whereby increased use of digital payment instruments reduces the dependence on cash and demand deposits. This suggests that as consumers increasingly adopt e-money for daily transactions, the traditional concept of money turnover within the M1 aggregate becomes less representative of actual economic activity.

Similarly, Bank Negara Malaysia (BNM, 2022) has highlighted in its Annual Report that while e-money usage surged particularly during the COVID-19 pandemic period (2020–2021), the measured velocity of money continued to decline. This phenomenon underscores a structural shift in Malaysia's payment ecosystem, where conventional monetary indicators, such as M1 velocity, may no longer fully capture the flow and circulation of digital money within the economy. The BNM report also noted that e-money transaction volumes surpassed RM50 billion in 2021, largely driven by mobile wallet adoption and contactless payment mechanisms (BNM, 2022).

Further empirical evidence is provided by Rahim and Wong (2022), who analyzed monthly e-wallet transaction data from 2015 to 2021 using a vector error correction model (VECM). Their results revealed that the expansion of e-money usage was significantly associated with reductions in currency in circulation, implying that e-money acts more as a substitute rather than a complement to cash. This finding reinforces the notion that e-money adoption may dampen the traditional money velocity, as consumers retain less physical currency while relying more on digital balances for payment activities.

Additionally, Yusof and Lau (2023) observed that digital financial inclusion, particularly through government-endorsed e-wallet programs such as eBeliaRahmah, has accelerated the use of electronic payment systems even among rural and lower-income users. This increased adoption, however, may lead to a more stable but slower monetary circulation, as transactions occur within closed-loop digital systems managed by private intermediaries rather than through the broader banking system.

Despite these developments, empirical studies on the macroeconomic implications of e-money in Malaysia remain limited in both scope and number. Most research to date has focused on micro-level usage patterns, consumer behavior, or payment system efficiency, leaving a notable gap in understanding how e-money affects broader monetary aggregates and the overall velocity of money. Thus, the present study seeks to bridge this gap by providing a systemic analysis of e-money's impact on money circulation in Malaysia's evolving digital monetary ecosystem.

Gaps in Literature

Most existing studies either:

- Focus on the financial inclusion and technological adoption aspects of e-money, or
- Examine money velocity from a purely macroeconomic perspective without considering digital money's structural effects.
- There is a noticeable gap in integrated studies that examine how e-money redefines the functional role and measurement of money in emerging economies like Malaysia. Specifically, little has been done to disentangle the transactional and substitutional effects of e-money on money velocity.

This study contributes to filling this gap by proposing a conceptual framework that links e-money usage with money velocity through two primary channels: improved transaction efficiency and changes in monetary composition.

Conceptual Framework

Based on the reviewed literature and theoretical considerations, this study posits that e-money usage influences the velocity of money through two primary channels: **transaction efficiency** and **monetary substitution**. These channels help to conceptualize the mechanisms through which digital payment innovations alter the circulation and measurement of money in an economy.

Transaction Efficiency Channel
E-money introduces speed, convenience, and accessibility to the transaction process. Digital platforms like mobile wallets, QR codes, and instant transfer systems enable individuals and businesses to complete transactions more rapidly than traditional cash or card methods. As a result, money may change hands more frequently within the same time frame, thereby potentially increasing the **velocity of money**.
Key attributes supporting this effect:

- Real-time transfers (e.g., DuitNow, FPX)
- Increased transaction frequency and volume
- Seamless integration with retail and service platforms

Hypothesis: Increased e-money adoption leads to higher transaction frequency, which could raise the effective velocity of money.

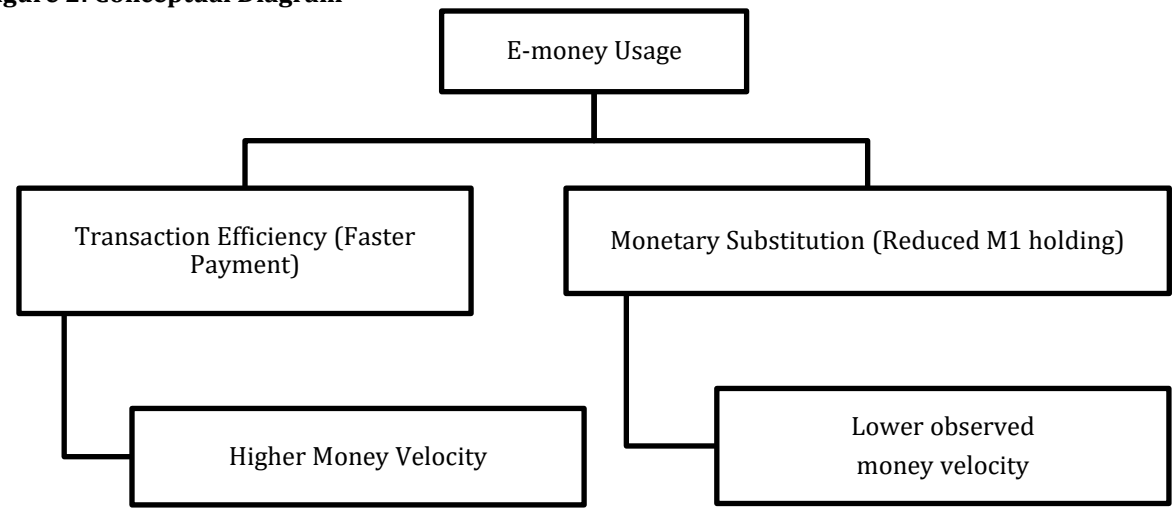
Substitution Channel
On the other hand, e-money may act as a substitute for physical cash and demand deposits, which are components of M1. When consumers and firms store value in e-wallets or prepaid instruments not classified under M1 or M2, it leads to a reduction in the traditional money base used in velocity calculations. This could artificially depress the measured velocity of money, even if actual economic activity remains high or increases.

Key attributes supporting this effect:

- Reduction in physical currency demand
- Increased holding of prepaid balances not captured in M1
- Emergence of shadow monetary aggregates not tracked by central banks

Hypothesis: Higher e-money usage displaces conventional money holdings, resulting in lower observed velocity despite unchanged or increased real money usage.

Figure 2: Conceptual Diagram



This dual-channel framework explains why the relationship between e-money and money velocity may appear contradictory in empirical data. The net effect depends on the relative strength of both channels and how e-money is accounted for in monetary statistics. This framework will guide the development of hypotheses and the interpretation of findings in the later stages of this research.

3. Methodology

Research Design
A quantitative research design using time-series econometric analysis can be used to investigate the relationship between e-money usage and the velocity of money in Malaysia. The design is appropriate due to

the nature of the data and the aim of identifying both short-run and long-run relationships.

Data Collection

The secondary data can be obtained from the following sources:

- Bank Negara Malaysia (BNM): Monthly and quarterly reports on e-money transactions, monetary aggregates (M1, M2), and currency in circulation.
- Department of Statistics Malaysia (DOSM): Macroeconomic indicators such as GDP and inflation.
- World Bank and IMF databases: For global and regional comparison indicators.

The time frame of analysis spans from 2012 to the most recent available year, allowing for the observation of pre- and post-pandemic effects.

Variables and Measurement

Variables	Proxy/Measurement	Source
Velocity of Money (V)	GDP / M1 or M2	DOSM, BNM
E-Money Usage (EM)	Total e-money transaction value and volume	BNM
GDP	Real Gross Domestic Product (Quarterly)	DOSM
Inflation	Consumer Price Index (CPI)	DOSM, World Bank
Interest Rate	Overnight Policy Rate (OPR)	BNM

Econometric Model

To evaluate the effect of e-money on the velocity of money, the study will use:

Model 1: Baseline Regression

$Vt = \beta_0 + \beta_1 EM_t + \beta_2 RGDP_t + \beta_3 INF_t + \beta_4 INT_t + \varepsilon_t$

Where:

V_t: Velocity of Money at time

EM_t: E-money usage at the time

$RGDP_t$: Real GDP

INFt: Inflation rate

INT_t: Interest rate

Expected signs and economic intuition

β_1: e-money usage

Short run: Positive. Studies in Indonesia using ARDL show that increased EM initially increases velocity, i.e., people spend faster as they use EM in daily transactions.

Long run: Negative. Over time, widespread EM reduces the need for traditional money holdings, lengthening money's turnover interval.

β_2: real GDP ($RGDP_t$)

Typically positive. As output grows, people transact more, accelerating money circulation. (Many velocity models confirm this)

β_3: inflation rate (INF_t)

Could be either:

Positive if high inflation leads to rapid spending before money loses value.

Negative if prices distort real balances and reduce transactions.

Empirical results vary: some find negative in the short run, and negligible in the long run.

β_4: interest rate (INT_t)

Short run: Likely negative higher rates incentivize saving, reducing circulation.

Long run: Often positive higher opportunity cost of holding money eventually boosts velocity

Model 2: ARDL (Auto-Regressive Distributed Lag) Approach

The ARDL framework handles variables of mixed integration orders (I(0) or I(1)) without requiring pre-testing for uniform stationarity, and it's robust for small samples typical in macroeconomic country-level studies. It effectively separates short-run dynamics from long-run equilibrium, making it ideal to assess how

e-money (EM) usage impacts velocity both immediately and over time. The steps are as follows:

Stationarity Testing
The analysis will start with the use of unit-root tests like ADF or PP on all variables: Velocity (V_t), E-money (EM_t), Real GDP ($RGDP_t$), Inflation (INF_t), Interest Rate (INT_t). Ensure none are I (2), since ARDL requires series to be I(0) or I (1).

ARDL Model Specification
The next step is to choose an optimal lag order via information criteria (AIC/BIC). The general form of the model:

$$V_t = \alpha_0 + \sum_{i=1}^{p} \alpha_i V_{t-i} + \sum_{j=0}^{q_1} \beta_j EM_{t-j} + \sum_{k=0}^{q_2} \gamma_k RGDP_{t-k} + \sum_{l=0}^{q_3} \delta_l INF_{t-l} + \sum_{m=0}^{q_4} \theta_m INT_{t-m} + u_t$$

Bounds Test for Cointegration
Next, Pesaran, Shin & Smith's bounds testing approach is to be applied. An F-statistic above the upper critical bound confirms long-run cointegration.

Error Correction Model (ECM)
If cointegration is confirmed, derive the ECM:

$$\Delta V_t = \phi_0 + \sum \phi_{V,i} \Delta V_{t-i} + \sum \phi_{EM,j} \Delta EM_{t-j} + \cdots + \lambda(V_{t-1} - \psi_1 EM_{t-1} - \cdots) + \varepsilon_t$$

Where:

- Δ: denotes first differences (short-run).
- λ: error correction term (should be negative & significant).
- ψ: long-run coefficients.

4. Expected Results

Component	Insight
Short-run coefficients ϕEM	Captures the immediate effect of e-money usage on velocity. Expected positive if EM accelerates spending.
Long-run coefficients ψEM	Indicates structural effect. It could be negative if EM shifts away from cash, reducing circulation.
Error correction term λ	Measures the speed of return to equilibrium after a shock.
Other variables	Provide context on GDP, inflation, and interest rate effects in both horizons.

Policy Implications
The findings of this study have significant policy implications for monetary authorities, particularly Bank Negara Malaysia, and other stakeholders in the financial system. As the use of e-money continues to grow, understanding its impact on the velocity of money becomes crucial for effective monetary policy formulation.
Firstly, if the study confirms that e-money increases the velocity of money through improved transaction efficiency, it suggests that monetary authorities must revise traditional assumptions about money circulation. In such a scenario, central banks may need to re-evaluate how monetary aggregates are measured and

interpreted, especially as digital transactions can cause shifts in demand for different forms of money. This could lead to a reconsideration of which monetary aggregates (e.g., M1, M2) are most relevant for policy targeting in a digitized economy.

Secondly, if the substitution effect of e-money leads to a decline in the velocity of traditional monetary aggregates (such as cash and demand deposits), monetary authorities might need to broaden the scope of aggregates to include digital monetary instruments. This redefinition would help capture the true liquidity in the financial system and avoid underestimation of monetary circulation. Doing so would ensure that monetary policy remains responsive to real economic conditions, preventing lags or misalignments in policy transmission.

Thirdly, insights into how e-money usage affects velocity can guide financial regulation and inclusion strategies. For example, if increased digital transactions contribute to faster money turnover in previously underbanked populations, financial inclusion efforts should focus on expanding digital infrastructure and ensuring interoperability between e-money platforms. This can enhance economic participation and contribute to more effective fiscal stimulus delivery during economic downturns.

Additionally, changes in money velocity influenced by digital finance trends may affect inflation dynamics and monetary control. If e-money reduces velocity or alters it unpredictably, the central bank may face difficulties in gauging the effectiveness of interest rate changes or liquidity injections. Policymakers would need to develop real-time monitoring tools and more granular monetary indicators to better track digital money flows.

Finally, there are broader implications for regional integration and harmonization. As Malaysia continues to expand its digital economy and considers cross-border e-money interoperability (e.g., QR code standards for ASEAN), understanding the implications for money velocity and financial stability becomes even more vital. Coordinated regional research and regulatory collaboration could enhance the resilience and effectiveness of monetary policies in the face of digital transformation.

In summary, this study provides timely evidence that can help Malaysian policymakers adapt to the evolving digital financial landscape by revising measurement tools, enhancing regulatory frameworks, and ensuring that monetary policy remains effective and inclusive in an increasingly digitalized economy.

5. Conclusion

This study investigates the impact of e-money usage on the velocity of money in Malaysia, a timely inquiry given the country's rapid digital transformation in the financial sector. The research draws from established monetary theory, evolving payment technologies, and global empirical evidence to explore how the growing use of e-money is reshaping money circulation patterns and macroeconomic dynamics.

Through an in-depth literature review, the study identifies two principal channels through which e-money influences the velocity of money: the transaction efficiency channel, where e-money accelerates the speed of transactions, and the substitution channel, where e-money potentially replaces traditional monetary forms such as cash and demand deposits. The proposed conceptual framework captures these dual effects and offers a foundation for further empirical investigation.

The methodological approach suggested is the time-series econometric analysis using data from Bank Negara Malaysia, the Department of Statistics Malaysia, and international sources. Variables such as GDP, inflation, interest rates, and e-money transaction values are integrated into ARDL and multiple regression models to evaluate both short-term fluctuations and long-term trends. Diagnostic and robustness checks ensure the validity of the results.

The findings of this study are expected to contribute to both academic literature and practical policymaking. They will offer insights into how digital payment behavior is altering the structure of monetary aggregates and affecting the flow of money in the economy. Specifically, the results can inform Bank Negara Malaysia's monetary policy tools, guide regulatory frameworks for digital finance, and support financial inclusion

strategies.

In conclusion, as Malaysia continues its digital financial transformation. Policymakers, financial institutions, and researchers must understand the broader macroeconomic implications of e-money. This study underscores the importance of revising traditional monetary measurement tools, adapting regulatory approaches, and enhancing data collection frameworks to keep pace with technological change. Future research should continue to explore these dynamics with more granular, real-time data and extend the analysis to regional or cross-border digital financial interactions.

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