The Dual-Monetary Policy and Growth of The Real Sector (A Study Case in Indonesia and Malaysia)

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Abstract: Within a dual banking system, monetary policy is implemented under a regulatory framework. In addition to maintaining price stability, monetary policy aims to influence real economic activity through its transmission mechanism. This mechanism is subject to change due to various financial sector phenomena. The study aims to analyze the relationship between dual-monetary system mechanisms, encompassing conventional interest rates and Islamic returns, and the real sector in Indonesia and Malaysia from 2010 to 2019. Utilizing the Vector Error Correction Model (VECM), the study reveals that in Indonesia, conventional monetary policy significantly impacts the real sector in the short term, while Islamic monetary policy exhibits a stronger long-term influence. Similarly, in Malaysia, Islamic monetary policy demonstrates greater effectiveness in influencing the real sector compared to its conventional counterpart. IRF analysis indicates that Islamic monetary policy demonstrates greater stability than the conventional model in both countries. Furthermore, FEVD analysis suggests that the implementation of a dual-monetary policy, incorporating both conventional and Islamic models, promotes real sector growth in Indonesia. Conversely, in Malaysia, a dual-monetary policy relying solely on the conventional model appears to hinder real sector growth. Overall, Islamic monetary policy in Malaysia proves more effective in stimulating the real sector.

Introduction

In the mechanism of money circulation, a trend of money concentration, or money whirlpool, can impede the growth of the real sector. It occurs in line with the massive growth of the financial sector, signaled by the invention of innovative services and products. "Certain sub-sectors of finance, including banking, capital markets, insurance, pawn brokerage, and derivatives, are deviating from their primary function of financial intermediation. This results in the internal circulation of funds within the financial sector, with only a limited proportion flowing into the real sector (Juhro et al. 2018).

In the meantime, the real sector plays a vital role in a nation's economy. The real sector does not only improve economic growth but also maximizes employment absorption, thereby facilitating equitable development distribution (Azis and Rusland 2009). In Indonesia and Malaysia, a depiction of

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economic growth is presented in the level of Gross Domestic Product (GDP) per capita, as illustrated in Figure 1. Based on the Figure, Malaysia's economy experienced a substantial decline in 2001. A further significant drop occurred in 2009, nearly mirroring the second and third lowest points. Nevertheless, Malaysia rebounded, achieving a stable economic condition in the following years, and its growth exceeded that of Indonesia.
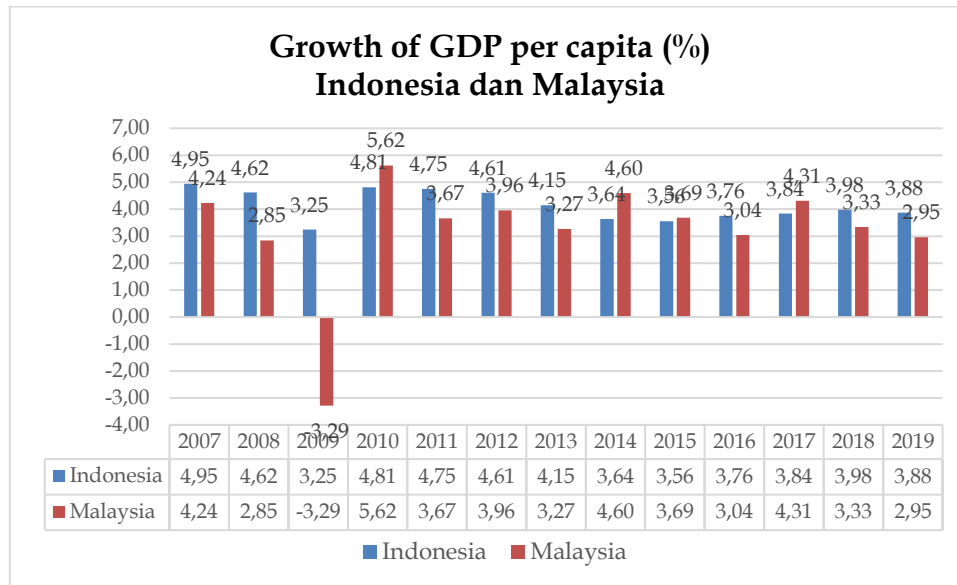

Growth of GDP per capita (%)
Indonesia dan Malaysia

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Indonesia	4,95	4,62	3,25	4,81	4,75	4,61	4,15	3,64	3,56	3,76	3,84	3,98	3,88
Malaysia	4,24	2,85	-3,29	5,62	3,67	3,96	3,27	4,60	3,69	3,04	4,31	3,33	2,95

Figure 1. Growth of GDP Per Capita in Indonesia and Malaysia
Source: World Bank, 2020

A key strategy employed by central banks to stabilize the real sector is the implementation of effective monetary policy. Monetary policy, employed by central banks, regulates the money supply and inflation to achieve output stability and maximize employment. (Mishkin 2019). The central bank, commonly, uses the instrument of monetary policy, where its application is currently under a dual-monetary system (conventional and Islamic), as mandated by relevant laws and regulations governing Sharia banking.

The market share of Sharia banks in Indonesia and Malaysia has increased since the introduction of the dual-monetary system. However, the implementation of Islamic monetary policy continues to diverge from conventional policy (Ismal 2011). In Indonesia, monetary policy remains heavily reliant on the conventional system (Ascarya 2012). Similarly, Malaysia is experiencing a slow development of its Islamic monetary system, largely due to the dominance of interest-based transmission of conventional monetary (Yungucu and Saiti 2016). Such circumstances arise because the monetary systems of both countries have not fully transitioned away from interest rate dependence. Furthermore, Fahim Khan argues that contemporary Muslim economists have yet to implement a truly interest-free monetary policy (Zulkhibri, Abdul Manap, and Muneeza 2019).

Figure **2. Market Share of Sharia Banks in Indonesia and Malaysia**
Source: The Financial Services Authority (OJK) and Bank Negara Malaysia, where the number was calculated by the researcher.

Prior studies have extensively explored the monetary system and its effects on the real sector, with some studies specifically addressing the dual-monetary system. However, findings have been inconsistent. However, the findings of previous studies have been varied and inconsistent, including Ramadhan & Beik (2013), Widodo (2018), Yuliadi et al. (2016), and Noviasari (2017), revealing that Islamic monetary policy exhibits greater stability than the conventional policy. The literature presents contrasting findings regarding the effect of Islamic monetary policy, Octaviani & Al Arif (2018), Ascarya (2012), and Ponziani & Mariyanti (2020) conclude that its impact is long-term, whereas Sukmana & Kassim (2010), and Herianingrum & Syapriatama (2016) demonstrate a short-term impact. Furthermore, it has been argued that the economic responses to conventional and Islamic monetary policies are essentially analogous (Zulkhibri 2018).

A discrepancy exists in both theoretical and empirical findings regarding the relationship between monetary policy and real sector performance. Furthermore, previous research reveals a gap in understanding this relationship. This study therefore aims to analyze the impact of dual-monetary system implementation on the real sector in Indonesia and Malaysia. Specifically, it will investigate whether conventional or Islamic monetary policies yield more positive effects on real sector growth in each country. The research findings are expected to offer new insights for central banks in developing monetary instruments that enhance economic stability. Specifically, the study is different from previous studies as it incorporates Malaysia into the analysis of the impacts of the dual-monetary policy on the real sector, and it develops the studies conducted by Octavian & Al Arif, 2018; Ramadhan & Beik, 2013; Septindo et al., 2016; Yuliadi et al., 2016; and Sukmana & Kassim (2010). The underlying reason for comparing Indonesia and Malaysia is that both countries are countries implementing dual-monetary policies in controlling economic stability, and both countries provide special concern in developing the real sector from the aspect of entity fund distribution. Based on this comparison, each country can hopefully have mutual reflection related to the implementation of monetary policy, particularly in developing the real sector.

Literature Review and Hypothesis Development

Real Sector
The real Sector is a productive sector or tangible sector in the economy, directly impacting the public's economic activity. The existence of the real sector can influence all of the public's economic activities and is generally considered a key indicator of a country's economic growth.

In Economics, the state of the real sector is typically depicted with aggregate output (Mishkin 2019). Aggregate output refers to the total production of goods and services within a country. Shortly, it can

be said that the activity of the real sector involves a production process, characterized by continuous improvement, from ideas to producing a product, product development, and production process until distribution to the consumer. Indeed, such activity includes employment, thus the more developing the real sector, the wider the working opportunity. Hence, the rate of unemployment can be reduced to a reasonable level.

Conventional Monetary Policy
A central bank is the most vital player in a state's financial system, acting as an authorized institution taking responsibility for monetary policy. All forms of activity conducted by the central bank will influence interest rate, total of credits, and money supply, where three of them will provide a direct impact on not only the money market but also output and inflation (Mishkin 2019).

The monetary policy stipulated by the central bank has the main objective of obtaining price stability. Another objective includes fostering high employment, output stability, economic growth, the stability of the financial market, interest rate, and foreign exchange market (Ascarya 2002; Mishkin 2019). In terms of the stabilization of overall economic activities, Mishkin (2019) assumed that economic activity can only be supported by output. Then, the purpose of monetary policy can be further described that decision-makers of the monetary policy intend to achieve the potential level of aggregate output.

To realize effective monetary policy, decision-makers must take into account the timing and the economic impact of their decisions. This requires a thorough understanding of the transmission of the monetary policy, such as the mechanism by which the economy can be influenced through the monetary policy (Mishkin 2019). Particularly, the central bank implements monetary policy through a range of transmission channels, such as interest rate, credit, exchange value, asset price, and expectation. The channels are the so-called transmission of the monetary policy (Ascarya 2002).

Monetary instruments in determining the monetary policy can be classified into 2 types, direct instrument[1] and indirect instrument[2] (Ascarya 2002). The most frequently used instrument in Indonesia is the interest rate or BI rate in the Open Market Operation, applied in the form of Certificates of Bank Indonesia (SBI). It demonstrates that the monetary policy in Indonesia is heavily reliant on policy regarding a stipulation of interest rate.

Similarly, Malaysia also applies key monetary instruments, such as the stipulation of interest rates (McCauley 2006). Malaysia, via *Bank Negara Malaysia* (BNM), employs interest rates in implementing the Overnight Policy Rate (OPR). OPR is an interest rate set by BNM for interbank lending (Wulandari 2019). However, differences exist in the implementation of monetary policy between countries. These disparities stem from variations in the efficiency of financial system transmission and the degree of economic openness. A key distinction between Indonesia and Malaysia lies in their monetary policy strategies. In this case, Indonesia uses the Inflation Targeting Framework (ITF)[3], and this policy will continuously be developed in line with a dynamic economy. (Ascarya 2012; Wulandari 2019). ITF is a selected strategy, in accordance with firm awareness, that the main purpose of the monetary policy is to achieve long-term price stability.

Malaysia diverges from Indonesia and other nations in its approach to inflation stability. Unlike those employing an Inflation Targeting Framework (ITF), Malaysia utilizes an Inflation Anchoring Framework (IAF). This decision stems from the assessment that an ITF is ill-suited to the specific characteristics of Malaysia's economy, namely its small, open nature and substantial financial market

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[1] Typically, direct instrument consists of interest rate controlling and ceiling, credit program/special credit from the central bank.

[2] The indirect instrument comprises of three main forms, such as Open Market Operation (OPT), reserve requirement, and a short-term funding or discount facility.

[3] Mishkin (2019) highlighted that ITF includes some elements, such as: 1) notification to public about inflation target in nominal, 2) institutional commitment that price stability is the main and long-term objective of the monetary policy, 3) Inclusive information on variables used as approach in decision making of the monetary policy, 4) Transparency increasing on strategy of the monetary policy through communication with public and market about plan and purpose of decision-makers of the monetary policy, and 5) Accountability improvement of the central bank in achieving its inflation target.

As a small and open economy, Malaysia is compelled to adopt a pragmatic and flexible approach. Consequently, it implements inflation-adjusted financing (IAF) without adhering to a rigid inflation target.

Despite sharing a common objective, such as inflation control, the disparate monetary policy frameworks employed by the two countries have yielded divergent inflation outcomes. In 2010, Indonesia's inflation rate stood at 5.13%, subsequently decreasing to 3.03% by 2019. Conversely, Malaysia's inflation rate was 1.62% in 2010, declining to 0.66% in 2019. The following graphic illustrates the inflation rates over the past decade, revealing that Malaysia consistently maintained a lower inflation rate compared to Indonesia.
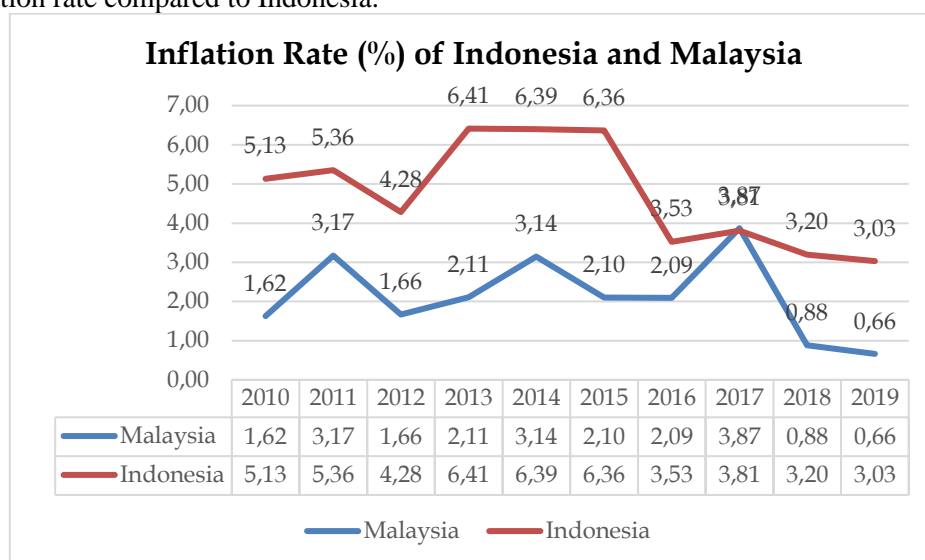
Inflation Rate (%) of Indonesia and Malaysia

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Malaysia	1,62	3,17	1,66	2,11	3,14	2,10	2,09	3,87	0,88	0,66
Indonesia	5,13	5,36	4,28	6,41	6,39	6,36	3,53	3,81	3,20	3,03

Figure **3. Comparison of Inflation Rate in Indonesia and Malaysia**
Source: World Bank, 2020

Islamic Monetary Policy
An investigation of the dual-monetary policy presents a persistent challenge. This is due to the necessity of first defining the role of Sharia banks within the monetary policy transmission mechanism, given their distinct business model. The role of Sharia banks within monetary policy remains a subject of considerable debate. While they function as financial intermediaries, similar to conventional commercial banks, their distinct prohibition of interest and unique business models contribute to this ongoing discussion. (Caporale et al. 2019)

The historical development of monetary policy began with the separation of monetary and fiscal authority and progressed alongside the growth of central banks from their initial function as banks of circulation.[4] Due to the issuance of fiat currency, which inherently lacks intrinsic value, central banks assumed the role of maintaining currency stability by managing the money supply to mitigate inflationary pressures. This function of the central bank, acting as the monetary authority, was not required when intrinsically valued currency, such as the gold Dinar and silver Dirham, was used under the Islamic Caliphate, which ended in 1924 (Islahi 1996).

The emergence of the Islamic monetary system, including its policy framework and transmission mechanisms, was driven by the growth of Islamic economic systems, primarily within Muslim-majority countries. This occurred amidst the prevailing dominance of conventional economic systems reliant on fiat currency and central banking. A key figure in the development of contemporary Islamic economics was Muhammad Umer Chapra, in his book entitled *"Towards a Just Monetary System"* published in 1985 (Chapra 1985).

A key distinction between the Islamic and conventional economic systems lies in their foundational principles. The Islamic system, guided by its ethical framework, cannot accommodate conventional regulatory models that incorporate interest (riba) and speculative activities (Wahyudi 2013).

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[4] Circulation bank is a bank issuing *fiat* money or paper money.

Henceforth, Islamic principles can be applied to the economic system by stockholders or the government. The key actors in this economic system should be responsible for creating justice in the economic system by adhering to Islamic values and norms, specifically by eliminating interest in both monetary and banking systems (Mansur 2013).

The distinction between conventional and Islamic financial systems lies in their principles and objectives. From an Islamic perspective, as articulated by Umer Chapra, monetary growth is defined not as surplus accumulation, but as the attainment of sufficiency. Consequently, the reliance on interest rates in conventional monetary policy is strongly contested as incompatible with this objective. Umer Chapra, thus, proposed a free-interest-rate monetary system, known as the Islamic monetary system (Chapra 1983, 1985, 2000). He and other researchers set forth that the Islamic monetary system has different purposes from the conventional monetary policy, where a fair and equal wealth distribution must be established in order to achieve socio-economic conditions (Abdullah 2016; Chapra 1983, 1985; Ismal 2011).

Islamic monetary policy, in its implementation, extends beyond conventional instruments such as open market operations, reserve requirement ratios, and discount facilities. It also integrates social objectives to foster societal welfare (Mansur 2013). Therefore, Islamic monetary policy seeks to influence the real sector, not solely the financial sector, through monetary control. This stems from Islam's broader economic objectives, which encompass not only inflation management but also equitable wealth distribution.

In many cases, the underlying framework of many contemporary Sharia financial institutions closely aligns with that of conventional institutions, resulting in substantial similarities between Islamic and conventional monetary policy instruments. (Ascarya 2012). However, due to variations in the operational principles of these instruments, the transmission mechanism of Islamic monetary policy may differ from, or resemble, that of conventional monetary policy. Chapra (1983, 1985, 2000) did not explicitly address the transmission mechanisms of Islamic monetary policy. However, empirical study in this area focuses on analyzing the impacts and characteristics of such transmission.

Within the Islamic financial system, the monetary policy transmission mechanism plays a critical role in fostering real sector growth. This is achieved through Sharia banks, facilitating the distribution of funds for business sustainability via productive financing. For the purpose of productive business, Sharia Bank uses *akad* (agreement) of profit-sharing (*Mudharabah* and *Musyarakah*). Whereas, for the consumptive purpose, this bank uses *akad* (agreement) of credit (*Murabahah* and *Istishna'*) and, also, *Ijarah* or leasing. The depiction of financing composition based on this *akad* (agreement) is presented in Figure 4. Based on the figure, it demonstrates that profit-sharing financing constitutes a significantly smaller proportion of overall financing compared to that allocated for consumptive purposes, despite its role in promoting real sector growth(Octaviani 2017).

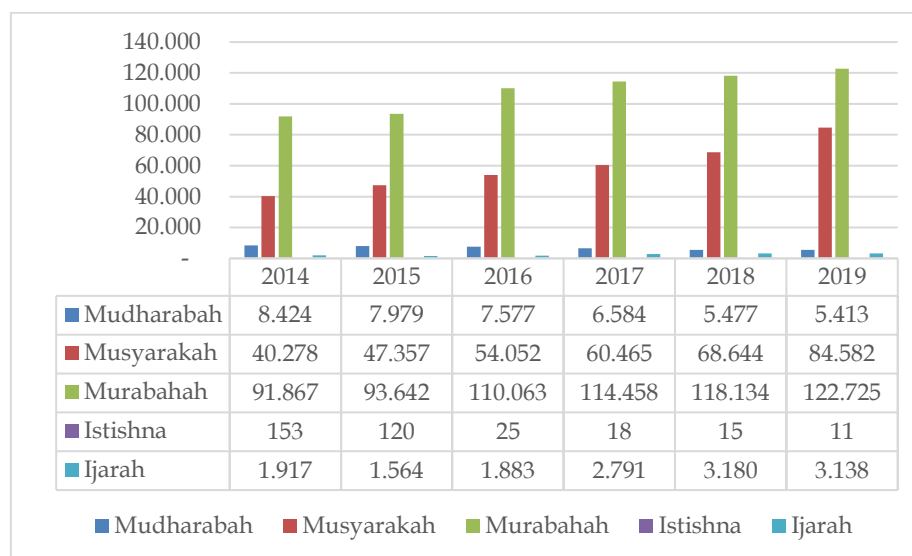|	2014	2015	2016	2017	2018	2019
■ Mudharabah	8.424	7.979	7.577	6.584	5.477	5.413
■ Musyarakah	40.278	47.357	54.052	60.465	68.644	84.582
■ Murabahah	91.867	93.642	110.063	114.458	118.134	122.725
■ Istishna	153	120	25	18	15	11
■ Ijarah	1.917	1.564	1.883	2.791	3.180	3.138

Figure **4. Financing Composition of Sharia Bank of Indonesia based on *Akad* (Agreement)**

Source: The Financial Services Authority, 2019

In comparison, Malaysia has applied the dual banking system for more than 30 years since the stipulation of Laws on Islamic banks in 1983. Since then, the market share of Sharia banks has exhibited substantial growth, increasing from approximately 7% in 2007 to nearly 30% in 2019. Figure 5 demonstrates the financing composition of Sharia banks in Malaysia. In its development, the financing composition in Malaysia is also dominated by *Murabahah*, *Bai Bithaman Ajil,* and *Ijarah Thumma Al-*Bai. Conversely, financing under the *Mudharabah* agreement (*Akad*) constitutes the smallest portion of the total financing. The prevalent use of mark-ups and instruments akin to credit in Sharia financing practices suggests a practical resemblance between Sharia banks and conventional financial institutions. (Zulkhibri 2018).
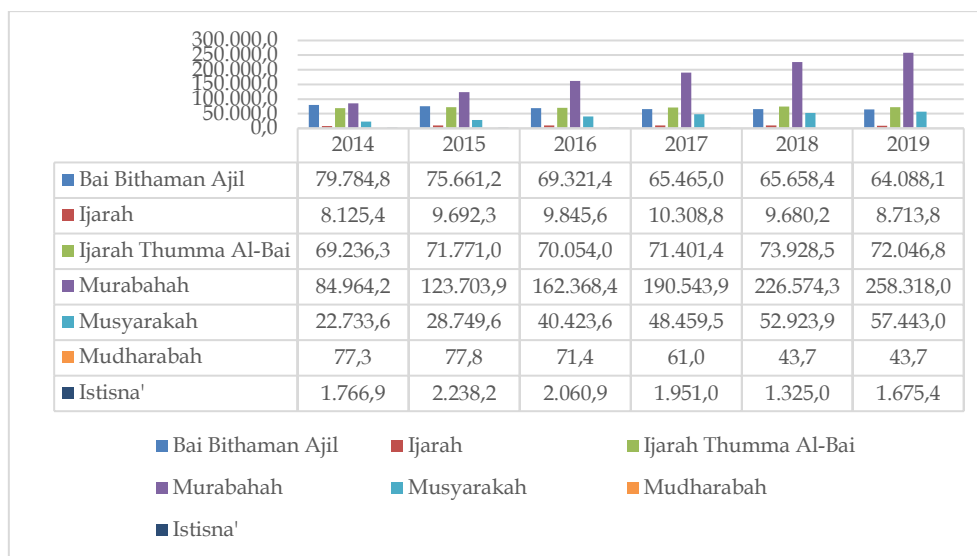

	2014	2015	2016	2017	2018	2019
■ Bai Bithaman Ajil	79.784,8	75.661,2	69.321,4	65.465,0	65.658,4	64.088,1
■ Ijarah	8.125,4	9.692,3	9.845,6	10.308,8	9.680,2	8.713,8
■ Ijarah Thumma Al-Bai	69.236,3	71.771,0	70.054,0	71.401,4	73.928,5	72.046,8
■ Murabahah	84.964,2	123.703,9	162.368,4	190.543,9	226.574,3	258.318,0
■ Musyarakah	22.733,6	28.749,6	40.423,6	48.459,5	52.923,9	57.443,0
■ Mudharabah	77,3	77,8	71,4	61,0	43,7	43,7
■ Istisna'	1.766,9	2.238,2	2.060,9	1.951,0	1.325,0	1.675,4

■ Bai Bithaman Ajil   ■ Ijarah   ■ Ijarah Thumma Al-Bai
■ Murabahah   ■ Musyarakah   ■ Mudharabah
■ Istisna'

Figure **5. Financing Composition of Malaysian Sharia Banks based on** *Akad* **(Agreement)**
Source: Bank Negara Malaysia, 2020

Previous Research
Numerous studies have examined the dual-monetary policy. Ramadhan & Beik (2013) explored the impacts of the conventional and Islamic monetary policy on SMEs and suggested that Sharia banking financing for SMEs demonstrated greater stability than commercial bank credit during monetary crises. Furthermore, the impact of Sharia monetary instruments on fund distribution to SMEs exceeded that of conventional monetary policy instruments.

The findings above are supported by Octaviani & Al Arif (2018), postulating that the Islamic monetary policy has a positive impact on the long-term real sector. Based on the test result of FEVD, the Inter-Sharia Banks Money Market (PUAS) has the most significant contribution to the real sector. Widodo (2018) also stated that the conventional monetary policy can lead to price instability and result in price volatility in Indonesia. Otherwise, the Islamic monetary policy has demonstrated its capacity to achieve price stability by mitigating high inflation volatility.

Meanwhile, the study on the transmission of the Islamic monetary policy through bank lending channels in Malaysia has been reviewed by Sukmana & Kassim (2010). Their analysis focused on the role of Sharia banks within the Malaysian economy's monetary transmission process. This study extends its analysis to examine the relationship between Sharia bank financing and deposits and their role in transmitting monetary policy effects to the real economy. The findings indicate a significant connection between Sharia bank financing and deposits, monetary policy indicators, and real output. These results are consistent with those of Ibrahim (2017) and Muhammad et al., (2014).

In his study, Zulkhibri (2018) demonstrated that the financing practices of Sharia banks align with those of commercial banks. Regression analysis indicated that Sharia bank financing exhibited a similar response to interest rate fluctuations as commercial bank financing. Consequently, the study suggests that the intended distinction between Sharia and commercial banking functions is not fully realized.

This is attributed to Sharia banks' reliance on the conventional financial system, which limits their ability to provide entirely alternative financial solutions.

Ascarya (2012) examined the effectiveness of monetary transmission within Indonesia's dual-monetary policy framework. Employing Granger Causality and Vector Autoregression (VAR) models, the study demonstrated that conventional monetary policy exhibits a short-term transmission mechanism affecting both output and inflation. Conversely, Islamic monetary policy revealed no short-term relationship with these variables. However, the transmission function of the Islamic monetary policy has a positive and permanent impact in the long term. However, this finding contradicts the results presented by Sukmana & Kassim (2010), while aligning with those of Ponziani & Mariyanti (2020), revealing that there is no short-term relation between deposit and Sharia financing to output and inflation. The study conducted by Ponziani and Mariyanti explained the declining financing of Sharia banks to the economy.

Consistent with Ascarya (2012), Herianingrum & Syapriatama (2016) presented that the Islamic monetary policy potentially improves output and restrains the inflation rate. A key distinction lies in the finding that this study reveals a demonstrable impact of Islamic monetary policy on output, whereas Ascarya (2012) did not provide such evidence. The impact was evident through the Inter-Sharia Banks Money Market (PUAS), which, as an instrument of Islamic monetary policy, facilitates the allocation of idle funds to the real sector via Sharia agreement (*akad*).

Another study performed by Rusydiana (2009) concluded that there is a negative relation between the instruments of SBIS and FINC. It means that the increasing profit-sharing of governing SBIS will decrease the financing rate in Sharia banks. Septindo et al. (2016) corroborated this finding, demonstrating a negative effect of Islamic monetary policy instruments on agricultural financing, while conventional monetary policy exhibited a positive short-term impact.

A varied result is also shown by Wibowo & Mubarok (2018). Their findings indicate that Sharia financing variables generally contribute to economic growth, with the exception of profit-sharing and central bank certificates (SBIS), demonstrating no significant effect. Conversely, within conventional finance, total credit and central bank certificates (SBI) show no significant impact on economic growth, while interest rates exhibit a positive correlation. According to the above literature reviews, the researcher intends to fill the gap in previous findings related to the implementation of the dual-monetary policy in Indonesia and Malaysia. Given the prohibition of interest in Islamic finance and the emphasis on socio-economic objectives within Islamic monetary policy, a comparative analysis of its impact against conventional monetary policy necessitates a suitable benchmark. This study utilizes output as a reference point, subsequently presenting the growth of the real sector.

Moreover, this study examines the impacts of the dual-monetary policy on the growth of the real sector in Indonesia and Malaysia. This study differs from previous studies by including Malaysia in its analysis of the real sector effects of dual-monetary policy, developing the studies conducted by Octaviani & Al Arif, 2018; Ramadhan & Beik, 2013; Septindo et al., 2016; Yuliadi et al., 2016.

The rationale for comparing Indonesia and Malaysia in this research lies in their concurrent operation of dual monetary systems, specifically the coexistence of conventional and Islamic finance. Furthermore, both countries prioritize the real sector through credit distribution or financing.

Research Methods

The study employed a descriptive-quantitative approach and assisted with statistics tools. The empirical model used was the transmission model of the dual-monetary policy with output as its objective. Then, the testing was performed on both the conventional and Islamic frameworks from each country, resulting in four models to be tested.

Type and Source of Data

This study used secondary data, such as a time series of monthly data from 2010-2019. In addition, data used were the Industrial Production Index (IPI), an indicator of the real sector of both countries; SBI, PUAB, INT, and CRD, an indicator of transmission of the conventional monetary policy; dan SBIS, PUAS, ERF, and FINC, an indicator of transmission of the Islamic monetary policy. For Malaysia, the reference of monetary policy used was not SBI and SBIS, but Overnight Policy Rate (OPR). This data was obtained from Bappenas, DSM, Sharia Banking Statistic (SPS), Indonesian Banking Statistic (SPI), Directorate of Sharia Banking (DPbS), Bank Indonesia, and Bank Negara Malaysia (BNM).

Definition of Operational Variable

The research utilized two (2) main variables, namely dependent and independent variables. In this study, the dependent variable was the real sector proxied with the Industrial Production Index (IPI) in the form of an index number. While, the independent variable was the dual-monetary policy, proxied with the following variables.

1. SBI   : Conventional policy rate in Certificates of Bank Indonesia (%)
2. SBIS   : Sharia policy rate in Certificates of Sharia Bank of Indonesia (%)
3. OPR   : Policy rate in Malaysia, such as Overnight Policy Rate (%)
4. PUAB   : Interest rate of transactions in inter-commercial banks (%)
5. PUAS   : Return of transactions in inter-Sharia banks money market (%)
6. INT   : Interest rate of credit in a commercial bank (%)
7. ERF   : Financing return of Sharia bank (%)
8. CRD   : Total of credit in commercial bank (money unit)
9. FINC   : Total of financing in Sharia bank (money unit)

Table 1. Statistics-Descriptive

Variable	Observation	Mean	SD	Minimum	Maximum
Indonesia					
IPI	120	123.39	16.45	92.32	158.00
SBI	120	6.12	0.91	3.82	7.36
SBIS	120	6.09	0.89	3.82	7.36
PUAB	120	5.37	0.90	3.77	7.96
PUAS	120	5.20	1.14	1.08	7.30
INT	120	11.83	0.93	10.03	13.75
ERF	120	11.88	1.60	8.81	14.97
CRD	120	6.52	0.17	6.15	6.75
FINC	120	5.25	0.24	4.69	5.56
Malaysia					
IPI	120	107.50	6.69	90.82	123.80
OPR	120	3.03	0.24	2.00	3.25
PUAB	120	2.99	0.24	2.00	3.25
PUAS	120	2.97	0.24	2.00	3.24
INT	120	4.74	0.19	4.44	5.22
ERF	120	5.59	0.47	5.03	6.51
CRD	120	13.76	0.17	13.38	13.96
FINC	120	12.66	0.44	11.83	13.32

IPI was Industrial Production Index; SBI was Certificate of Bank Indonesia; SBIS was Certificate of Sharia Bank of Indonesia; OPR was Overnight Policy Rate; PUAB was Interbank Money Market; PUAS was Inter-Sharia Bank Money Market; INT was the interest rate of the bank's loan; ERF was financing return of Sharia bank; CRD was total of credit in the bank; FINC was total of financing in Sharia bank. Data of CRD and FINC was written in the form of a natural logarithm (ln).
Source: Eviews Output, (processed data)

Method of Data Analysis

The study employed analysis tools of Vector Autoregression (VAR)/Vector Error Correction Model (VECM). VECM/VAR was an estimation model developed by Christopher A. Sims in 1980 (Sims 1980). This model assumed that whereas there is a simultaneous correlation or causality due to the

observed inter-variables, all variables must be similarly treated so there is no more either endogenous or exogenous variable. Thus, all variables, in the VECM model, were endogenous. VECM/VAR was also a model established via a theory-minimizing approach to enhance its ability to capture economic phenomena. VECM/VAR, therefore, could be said as a non-structural model or a theoretical model (Juanda and Junaidi 2012). In this study, the VAR/VECM model is depicted in the following equation, as follows.

1. Model 1 (Conventional monetary policy in Indonesia)

$$[IPI\ SBI\ PUAB\ INT\ CRD\ ]$$
$$= [\alpha1\ \alpha2\ \alpha3\ \alpha4\ \alpha5\ ]$$
$$+ [a11\ \cdots\ a15\ \vdots\ \ddots\ \vdots\ a51\ \cdots\ a55\ ][IPI_{t-1}\ SBI_{t-1}\ PUAB_{t-1}\ INT_{t-1}\ CRD_{t-1}\ ]$$
$$+ [\varepsilon1\ \varepsilon2\ \varepsilon3\ \varepsilon4\ \varepsilon5\ ]$$

2. Model 2 (Islamic monetary policy in Indonesia)

$$[IPI\ SBIS\ PUAS\ PLS\ FINC\ ]$$
$$= [\beta1\ \beta2\ \beta3\ \beta4\ \beta5\ ]$$
$$+ [\beta11\ \cdots\ \beta15\ \vdots\ \ddots\ \vdots\ \beta51\ \cdots\ \beta55\ ][IPI_{t-1}\ SBIS_{t-1}\ PUAS_{t-1}\ PLS_{t-1}\ FINC_{t-1}\ ]$$
$$+ [e1\ e2\ e3\ e4\ e5\ ]$$

3. Model 3 (Conventional monetary policy in Malaysia)

$$[IPI\ OPR\ PUAB\ INT\ CRD\ ]$$
$$= [\gamma1\ \gamma2\ \gamma3\ \gamma4\ \gamma5\ ]$$
$$+ [\gamma11\ \cdots\ \gamma15\ \vdots\ \ddots\ \vdots\ \gamma51\ \cdots\ \gamma55\ ][IPI_{t-1}\ OPR_{t-1}\ PUAB_{t-1}\ INT_{t-1}\ CRD_{t-1}\ ]$$
$$+ [\mu1\ \mu2\ \mu3\ \mu4\ \mu5\ ]$$

4. Model 4 (Islamic monetary policy in Malaysia)

$$[IPI\ OPR\ PUAS\ PLS\ FINC\ ]$$
$$= [\delta1\ \delta2\ \delta3\ \delta4\ \delta5\ ]$$
$$+ [\delta11\ \cdots\ \delta15\ \vdots\ \ddots\ \vdots\ \delta51\ \cdots\ \delta55\ ][IPI_{t-1}\ OPR_{t-1}\ PUAS_{t-1}\ PLS_{t-1}\ FINC_{t-1}\ ]$$
$$+ [e1\ e2\ e3\ e4\ e5\ ]$$

The process of VAR analysis commenced with the stationary test of each variable using the quadratic unit test. Whereas data had already been stationary at a certain level, the VAR model could be formulated and estimated. However, as the data were not stationary at the level, differencing was performed to achieve stationarity at the first difference. If stationarity was achieved at the first difference, the data were then tested for inter-variable cointegration, and the Vector Error Correction Model (VECM) would be employed. Furthermore, if cointegration was confirmed, the Vector Autoregression (VAR) model in differences would subsequently be used. Next, the causality test was conducted to identify the transmission flow of the dual-monetary policy in both Indonesia and Malaysia, the interest rate line, and the return in influencing the real sector. The causality testing was adjusted in the framework of monetary as shown in the following Figure 1, as follows.
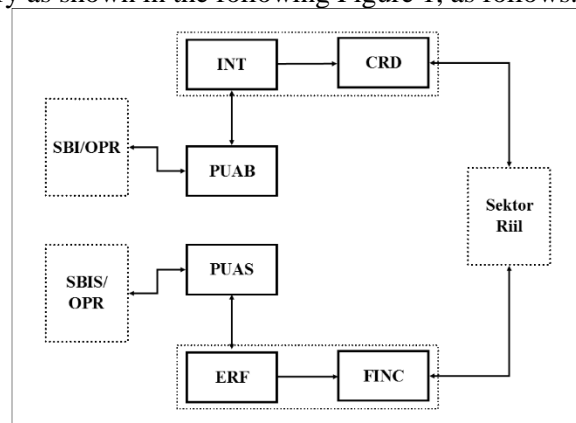

Figure 1. Transmission Flow of Dual-Monetary Policy

The VECM estimation was conducted to determine the effects of each monetary variable on both short-term and long-term real sector growth. Impulse Response Function (IRF) analysis was then employed to examine the real sector's responses to shocks from the dual-monetary policy instruments. Lastly, Variance Decomposition (VD) analysis was performed to quantify the contribution of variables within the dual-monetary policy to real sector growth.

Analysis and Discussion

The study commenced its analysis by assessing the presence of quadratic unit roots in each model's variables. The results of this assessment are presented in Table 2. At this level, none of the variables were found to be stationary. However, after performing the quadratic unit root test on the first differences, the null hypothesis was rejected, indicating that all variables achieved stationarity.

Table 2. Result of Stationarity Test

Variable	PP t-Statistic		MacKinnon Critical Value 5%
	Level	*First Difference*	
Model 1 and 2 (Indonesia)			
IPI	**-11.085****	**-105.204****	-3.448
SBI	-2.582	**-8.840****	-3.448
SBIS	-2.481	**-8.029****	-3.448
PUAB	-3.181	**-14.725****	-3.448
PUAS	**-4.870****	**-19.607****	-3.448
INT	-1.535	**-10.025****	-3.448
ERF	**-3.965****	**-18.167****	-3.448
CRD	-2.147	**-12.953****	-3.448
FINC	-2.838	**-11.049****	-3.448
Model 3 and 4 (Malaysia)			
IPI	**-5.791****	**-44.145****	-3.448
OPR	**-4.242****	**-11.644****	-3.448
PUAB	**-4.169****	**-8.153****	-3.448
PUAS	**-3.899****	**-13.678****	-3.448
INT	-1.908	**-10.523****	-3.448
ERF	-1.182	**-14.882****	-3.448
CRD	-1.931	**-10.609****	-3.448
FINC	-0.766	**-10.604****	-3.448

The table presents the results of a Phillips-Perron (PP) stationarity test. The null hypothesis, indicating the presence of a unit root, was rejected at the 5% significance level. This decision was based on the PP test statistic exceeding the MacKinnon critical value at 5%.
Source: Eviews Output, (processed data)

The second step of this testing was the determination of optimal Lag using Hannan-Quinn Criterion (HQ) and Schwarz Information Criterion (SC) with the smallest value. The finding indicated that all models exhibited an optimal lag of one, as shown in the following Table 3 as follows.

Table 3. Result of Optimal Lag Test

			Model 1			
Lag	LogL	LR	FPE	AIC	SC	HQ

0	-605.0455	NA	0.027879	10.60949	10.72883	10.65793
1	165.3278	1460.36	6.54E-08	-2.353526	**-1.637457***	**-2.062878***
2	194.1999	52.22096	6.13E-08	-2.420869	-1.108075	-1.888012
3	241.1753	80.87938	**4.21e-08***	-2.803049	-0.893531	-2.027985
4	266.2186	**40.94027***	4.26E-08	-2.803802*	-0.297559	-1.78653
5	282.5817	25.32722	5.04E-08	-2.653594	0.449372	-1.394116

Model 2					
Lag	**LogL**	**LR**	**FPE**	**AIC**	**SC**	**HQ**
0	-706.6128	NA	0.286228	12.93841	13.06116	12.9882
1	-113.0933	1122.291	9.28E-06	2.601697	**3.338192***	**2.900423***
2	-87.57858	45.92657	**9.22e-06***	2.592338*	3.942578	3.140003
3	-68.14759	33.20934	1.03E-05	2.693592	4.657578	3.490196
4	-37.99928	**48.78543***	9.49E-06	2.599987	5.177718	3.645529
5	-14.72953	35.53927	1.00E-05	2.631446	5.822923	3.925926
6	-4.594623	14.55741	1.35E-05	2.90172	6.706943	4.445139
7	18.06697	30.49014	1.48E-05	2.944237	7.363205	4.736594
8	46.0074	35.05254	1.50E-05	2.890775	7.923488	4.93207
9	72.60926	30.95489	1.58E-05	2.86165	8.508109	5.151884
10	99.79754	29.16561	1.70E-05	2.821863	9.082067	5.361036

Model 3					
Lag	**LogL**	**LR**	**FPE**	**AIC**	**SC**	**HQ**
0	71.40396	NA	1.92E-07	-1.276999	-1.149865	-1.225493
1	682.4522	1151.591	2.45E-12	-12.54716	**-11.78435***	**-12.23812***
2	710.9183	**50.91049***	**2.30e-12***	-12.61381	-11.21534	-12.04725
3	724.6925	23.31015	2.87E-12	-12.39793	-10.36379	-11.57384
4	740.3533	24.99707	3.50E-12	-12.21833	-9.548515	-11.13671
5	757.9746	26.43191	4.13E-12	-12.07643	-8.770945	-10.73728
6	776.6313	26.19114	4.86E-12	-11.95445	-8.013288	-10.35777
7	792.0647	20.18224	6.17E-12	-11.77048	-7.193645	-9.916267
8	821.1948	35.29218	6.16E-12	-11.84990	-6.637399	-9.738162
9	848.5072	30.46381	6.52E-12	-11.89437	-6.046196	-9.525102
10	884.3448	36.52683	6.05E-12	-12.10278	-5.618942	-9.475990
11	915.4166	28.68162	6.41E-12	-12.21955	-5.100035	-9.335225
12	948.6300	27.46498	6.84E-12	-12.37750	-4.622316	-9.235647
13	974.1082	18.61865	9.02E-12	-12.3867	-3.995840	-8.987313
14	1006.782	20.73525	1.13E-11	-12.53427	-3.507741	-8.877356
15	1056.010	26.50747	1.14E-11	-13.00019	-3.337996	-9.085753
16	1135.942	35.35440	7.55E-12	**-14.05657***	-3.758704	-9.884603

Model 4					
Lag	**LogL**	**LR**	**FPE**	**AIC**	**SC**	**HQ**
0	-66.21452	NA	2.64E-06	1.34367	1.469304	1.39459

1	574.6266	1209.134	2.37E-11	-10.27597	**-9.522171***	**-9.970454***
2	605.1153	54.64951	**2.15e-11***	-10.37953	-8.997561	-9.819413
3	621.7972	28.32764	2.53E-11	-10.22259	-8.212445	-9.407866
4	648.1322	42.23542	2.50E-11	-10.24778	-7.609465	-9.178455
5	675.2320	40.90546	2.47E-11	-10.28740	-7.020915	-8.963474
6	688.6699	19.01583	3.18E-11	-10.06924	-6.174592	-8.49072
7	704.0134	20.26497	4.02E-11	-9.887045	-5.364224	-8.053921
8	722.0350	22.10203	4.93E-11	-9.755378	-4.604387	-7.667654
9	738.4631	18.59777	6.38E-11	-9.593643	-3.814483	-7.251318
10	755.8883	18.08280	8.34E-11	-9.450723	-3.043393	-6.853797
11	779.8467	22.60223	1.00E-10	-9.431070	-2.395570	-6.579543
12	814.0668	29.05478	1.03E-10	-9.605033	-1.941364	-6.498906
13	866.0746	**39.25116***	8.09E-11	-10.11461	-1.822776	-6.753887
14	917.6451	34.05601	6.88E-11	**-10.61595***	-1.695937	-7.000617

The analysis indicated potential lag candidates based on the values of the Likelihood Ratio (LR), Final Prediction Error (FPE), Akaike Information Criterion (AIC), Schwarz Criterion (SC), and Hannan-Quinn Criterion (HQ). The optimal lag was determined by identifying the highest values for LR, FPE, AIC, and SC, and the lowest value for HQ.

Source: Eviews Output, (processed data)

The following step determined the cointegration existence of inter-variables relationships. Table 4 presents the result of the cointegration test, performed to determine the long-term relations and equilibrium among observed variables, and determine the appropriate VAR model. Conversely, if cointegration had not been detected, a VAR model in differences would have been employed. The null hypothesis for the trace test was that the trace statistic was less than the critical value at the 5% significance level, while the null hypothesis for the maximum eigenvalue test was that the eigenvalue statistic was less than the critical value at the 5% significance level. The results revealed that all models exhibited cointegrating equations at the 5% significance level, thus the VECM model was used.

Table 4. Result of Johansen's Cointegration Test

Model	Trace Statistic	0.05 Critical Value	Max-Eigen Statistic	0.05 Critical Value
Model 1	**167.4739***	79.34145	**66.20865***	37.16359
	101.2653*	55.24578	**53.29973***	30.81507
	47.96554*	35.01090	**33.10469***	24.25202
	14.86085	18.39771	9.457556	17.14769
	5.403294*	3.841466	**5.403294***	3.841466
Model 2	**188.7049***	88.80380	**75.98699***	38.33101
	112.7179*	63.87610	**48.23504***	32.11832
	64.48290*	42.91525	**44.24385***	25.82321
	20.23906	25.87211	13.63158	19.38704
	6.607475	12.51798	6.607475	12.51798
Model 3	**98.79921***	79.34145	**40.72598***	37.16359
	58.07324*	55.24578	26.55617	30.81507
	31.51706	35.01090	15.42175	24.25202
	16.09532	18.39771	10.18359	17.14769
	5.911724*	3.841466	**5.911724***	3.841466

Model 4	**115.0289***	69.81889	**49.68406***	33.87687
	65.34483*	47.85613	**39.56601***	27.58434
	25.77882	29.79707	15.63519	21.13162
	10.14363	15.49471	8.602167	14.26460
	1.541461	3.841466	1.541461	3.841466

Models 1 and 2 were the model of conventional and Islamic monetary policy in Indonesia; Models 3 and 4 were the model of conventional and Islamic monetary policy in Malaysia. (*) was the significance rate at 5%.

Granger's Causality Test

The next step was Granger's causality test. Table 5 shows the result overview of Granger's causality test from the conventional monetary policy in Indonesia. In Model 1, the causality relationship was only shown between variables of SBI and PUAB; PUAB and INT; and CRD and IPI; while the expected correlation between INT and CRD was not found.

In Model 2, there was a causality relationship between SBIS and PUAS; ERF and FINC; and FINC and IPI, and there was no causality relationship between PUAS and ERF, which theoretically suggested a relationship. Meanwhile, in Model 3, the causality relationship was shown in variables of OPR to PUAB, and CRD to IPI, but there was no causality relationship between PUAB to INT and INT to CRD. Model 4 demonstrated that there was a causality relationship between OPR and PUAS; PUAS and ERF; and FINC and IPI, but there was no causality relationship between ERF and FINC.

Based on those results, it can be postulated that the transmission flow of the dual-monetary policy with the final goal of the real sector or output in the conventional view from both countries presented no continuity of interest rate line from interest rate reference of SBI or OPR to IPI. Based on the Islamic view, there was no continuity of the return line from SBIS or OPR to IPI. In detail, the causality relationship of inter-variables in each model is presented in Figures 2, 3, 4, and 5.

Table 5. Result of Granger's Causality Test

Model	Variable Y	Variable X				
		F-Statistic				
		SBI	PUAB	INT	CRD	IPI
Model 1	SBI		**8.76016** **[0.0037]**			
	PUAB	**8.99248** **[0.0033]**		**9.03759** **[0.0032]**		
	INT		1.24862 [0.2661]		3.11016 [0.0804]	
	CRD			0.64327 [0.4242]		**33.8043** **[0.0005]**
	IPI				1.60891 [0.2072]	
Model 2		SBIS	PUAS	ERF	FINC	IPI
	SBIS		**8.96671** **[0.0034]**			
	PUAS	2.28272 [0.1335]		0.83833 [0.3618]		

ERF		1.26726 [0.2626]		0.01063 [0.9181]	
FINC		8.48766** [0.0043]			21.4535** [0.0001]
IPI				2.21721 [0.1392]	

Model 3	OPR	PUAB	INT	CRD	IPI
OPR		23.7252** [0.0004]			
PUAB	0.00532 [0.9420]		3.18778 [0.0768]		
INT		0.00099 [0.9750]		0.04557 [0.8313]	
CRD			0.54272 [0.4628]		7.17388** [0.0085]
IPI				0.25404 [0.6152]	

Model 4	OPR	PUAS	ERF	FINC	IPI
OPR		6.91274** [0.0097]			
PUAS	0.00058 [0.9809]		0.93547 [0.3355]		
ERF		3.92309** [0.05]		0.00246 [0.9605]	
FINC			1.96152 [0.164]		7.31140** [0.0079]
IPI				0.60936 [0.4366]	

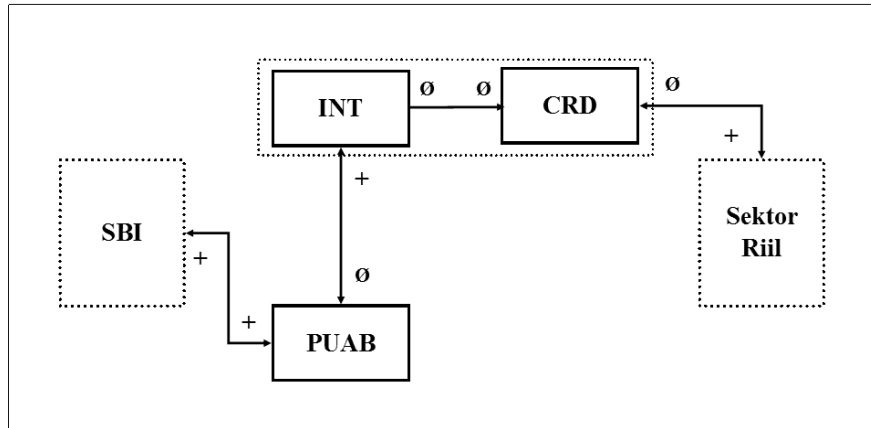Source: Eviews Output, (processed data)

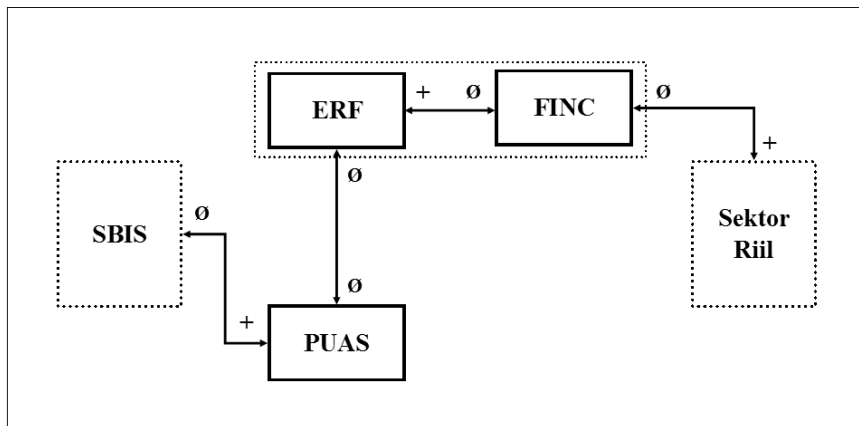**Figure 2. Flow of the Dual-Monetary Transmission from the Conventional Variable to the Real Sector (Indonesia)**

Figure 3. Flow of the Dual-Monetary Transmission from the Islamic Variable to the Real Sector (Indonesia)
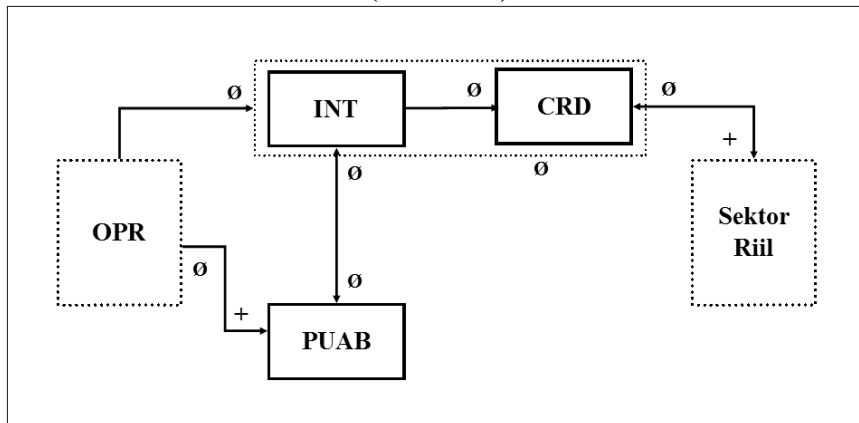

Figure 4. Flow of the Dual-Monetary Transmission from the Conventional Variable to the Real Sector (Malaysia)
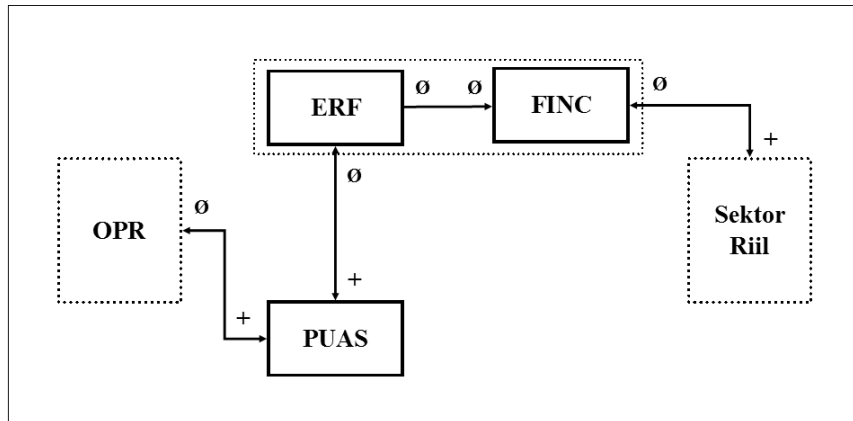
Figure 5. Flow of the Dual-Monetary Transmission from the Islamic Variable to the Real Sector (Malaysia)

VECM Estimation Test

The following Table 6 describes the result of the VECM estimation test in the transmission model of the dual-monetary policy in both Indonesia and Malaysia, based on the conventional view. In the conventional outlook, the transmission instrument of the dual-monetary policy having a short-term impact in Indonesia was a variable of PUAB, and the most impacting variables in the long term were PUAB, INT, and CRD.

Based on the Islamic finance perspective, the variables of the dual-monetary policy, including SBIS, PUAS, ERF, and FINC, as presented in Model 2, demonstrate a long-term impact on the real sector, as evidenced in Table 6.

In Malaysia, the only variable affecting the conventional real sector was PUAB, which exhibited a long-term impact. While, all variables, excluding FINC, influenced the real sector in the short-term impact, from the Islamic view.

Table 6. Result of the VECM Estimation Test

Model	Variable	Coefficient	t-Statistic	t-table
	Long-Term			
	LOG(SBI(-1))	-0.02227	[-0.32691]	1.97993
	LOG(PUAB(-1))	-0.14264	**[-2.31453]**	1.97993
	LOG(INT(-1))	0.321983	**[3.12331]**	1.97993
	LOG(CRD (-1))	-5.29825	**[-15.5459]**	1.97993
Model 1	**Short-Term**			
	D(LOG(IPI(-1)))	-0.27404	**[-3.00501]**	1.97993
	D(LOG(SBI(-1)))	0.036177	[0.66593]	1.97993
	D(LOG(PUAB(-1)))	-0.10466	**[-2.21784]**	1.97993
	D(LOG(INT(-1)))	-0.69399	[-1.48098]	1.97993
	D(LOG(CRD(-1)))	7.119613	[1.38056]	1.97993
	C	-0.00294	[-0.55611]	1.97993
	Long-Term			
	LOG(SBIS(-1))	-0.20071	**[-5.68206]**	1.97993
Model 2	LOG(PUAS(-1))	0.074460	**[3.57927]**	1.97993
	LOG(ERF(-1))	0.282825	**[6.89393]**	1.97993
	LOG(FINC(-1))	-2.76051	**[-19.3254]**	1.97993

	Short-Term			
	D(LOG(IPI(-1)))	-0.28522	**[-3.10838]**	1.97993
	D(LOG(SBIS(-1)))	0.048491	[0.80385]	1.97993
	D(LOG(PUAS(-1)))	0.005252	[0.40465]	1.97993
	D(LOG(ERF(-1)))	0.065148	[0.81139]	1.97993
	D(LOG(FINC(-1)))	5.482179	[1.84434]	1.97993
	C	-0.00314	[-0.56818]	1.97993
	Long-Term			
	LOG(OPR(-1))	9.932544	[0.92373]	1.97993
	LOG(PUAB(-1))	-22.4257	**[-2.10602]**	1.97993
	LOG(INT(-1))	-2.07484	[-0.73720]	1.97993
	LOG(CRD(-1))	24.65970	[1.70250]	1.97993
Model 3	**Short-Term**			
	D(LOG(IPI(-1)))	-0.49162	**[-5.89264]**	1.97993
	D(LOG(OPR(-1)))	-0.34798	[-1.15792]	1.97993
	D(LOG(PUAB(-1)))	0.338506	[0.88560]	1.97993
	D(LOG(INT(-1)))	-0.08724	[-0.25387]	1.97993
	D(LOG(CRD(-1)))	2.073619	[0.16434]	1.97993
	Long-Term			
	LOG(OPR(-1))	-26.7921	**[-2.97385]**	1.97993
	LOG(PUAS(-1))	16.19439	[1.71853]	1.97993
	LOG(ERF(-1))	-4.91349	[-1.79049]	1.97993
	LOG(FINC(-1))	-11.2783	[-1.64176]	1.97993
Model 4	**Short-Term**			
	D(LOG(IPI(-1)))	-0.41151	**[-5.18690]**	1.97993
	D(LOG(OPR(-1)))	-1.04892	**[-3.04196]**	1.97993
	D(LOG(PUAS(-1)))	0.769276	**[2.76504]**	1.97993
	D(LOG(ERF(-1)))	0.836459	**[2.43495]**	1.97993
	D(LOG(FINC(-1)))	-8.75087	[-1.49418]	1.97993
	C	0.013952	**[2.00913]**	1.97993

Source: Eviews Output, (processed data)

Impulse Response Function (IRF) Analysis

Figure 6 presents the IRF analysis for four distinct models. In Indonesia, shocks to the SBI, PUAB, and CRD had a positive response from the real sector, indicating that these variables contributed to sustained real sector growth. Conversely, a shock to the INT resulted in a persistent negative response from the real sector, signifying a detrimental impact. The effects of these variable shocks stabilized and attenuated between periods 14 and 17. From an Islamic finance perspective, shocks to SBIS and FINC positively influenced the real sector, demonstrating a lasting enhancement of real sector growth. However, shocks to PUAS and ERF had a persistent negative response, suggesting a decline in real sector activity. The effects of variable shocks within the Islamic finance framework stabilized and attenuated between periods 12 and 17.

In Malaysia, the conventional monetary policy transmission mechanism, as evidenced by the IRF test, consistently exerted a negative and enduring impact on the real sector. Furthermore, the effects of these variable shocks stabilized and attenuated between periods 9 and 19. Conversely, within the Islamic finance framework in Malaysia, shocks to PUAS and financing return (ERF) positively influenced real sector growth, while shocks to the OPR and FINC negatively impacted growth rates. The effects of variable shocks in the Islamic finance model stabilized and attenuated between periods 6 and 10.
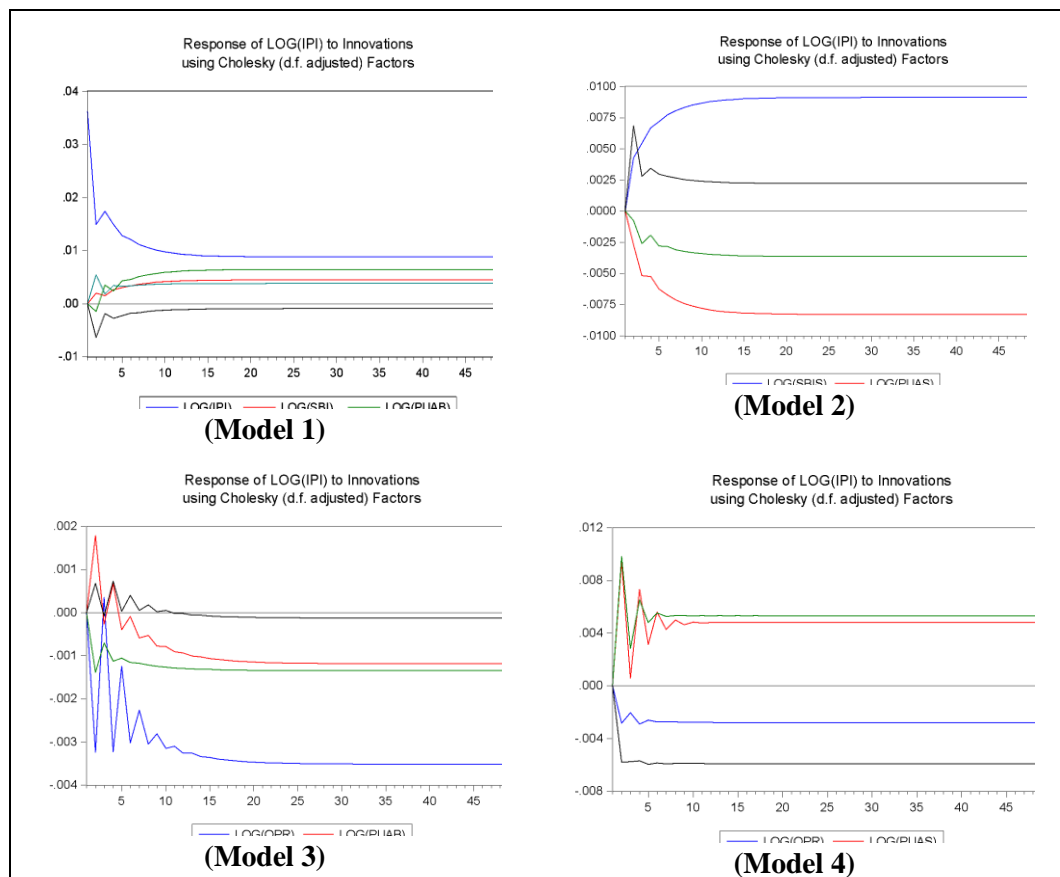
Figure 6. Analysis Result of Impulse Response Function
Source: Eviews Output, (processed data)

Variance Decomposition Analysis
Variance Decomposition (VD) analysis was employed to assess the relative contribution of each variable's variance to forecast error variance within the VECM. Specifically, Forecast Error

Variance Decomposition (FEVD) was utilized, and the results are illustrated in the subsequent

Variabel	Besaran VD (%)	
	Konv	Islam
IPI	45.76	
SBI	3.06 (+)	
SBIS		0.52 (+)
PUAB	0.85 (+)	
PUAS		0.73 (-)
INT	14.88 (-)	
ERF		7.09 (-)
CRD	19.80 (+)	
FINC		7.31 (+)
Total	**8.83 (+)**	**0.02 (+)**
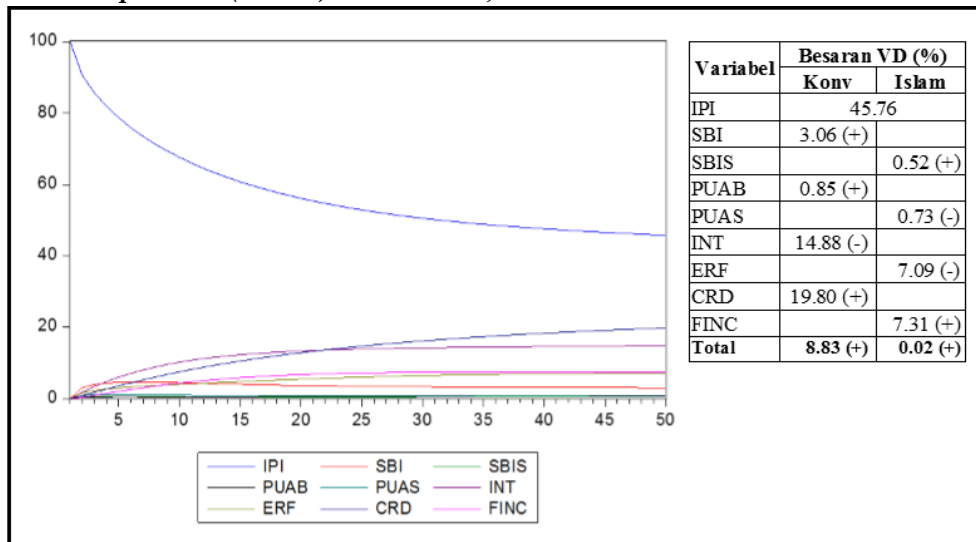
figures.

Figure 7. Variance Decomposition of the Real Sector Contributor (Indonesia)

Variabel	Besaran VD (%)	
	Konv	Islam
IPI	80.65	
OPR	3.60 (-)	3.60 (-)
PUAB	2.40 (-)	
PUAS		0.13 (+)
INT	1.33 (-)	
ERF		10.04 (+)
CRD	1.23 (-)	
FINC		0.62 (-)
Total	**8.56 (-)**	**5.96 (+)**
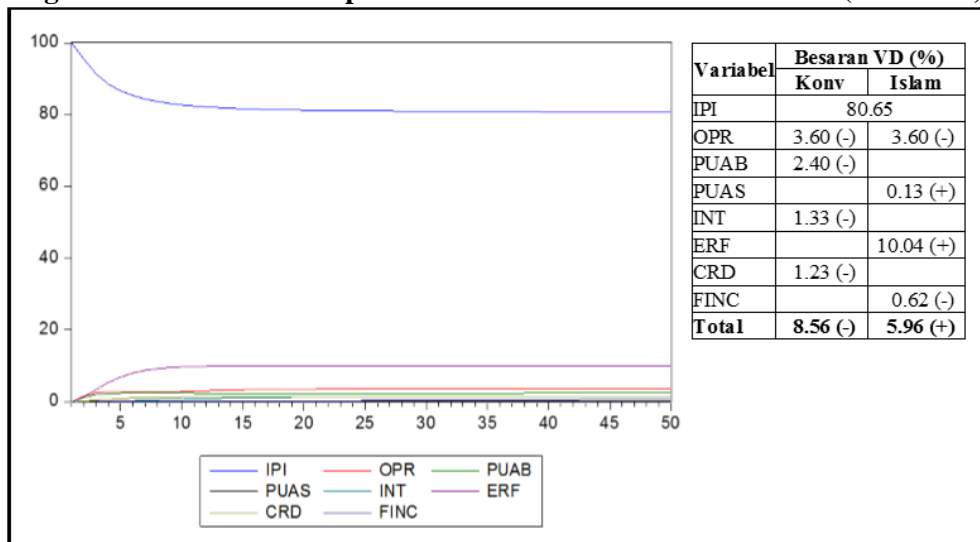
Figure **8. Variance Decomposition of the Real Sector Contributor (Malaysia)**

Based on the above figures, Figure 7 exhibits the result of the FEVD test on the dual-monetary policy in Indonesia. It seems that the conventional monetary policy had a positive impact (increasing) on the real sector at 8.83%, and the Islamic monetary policy also improved the growth of the real sector at 0.02%.

Furthermore, Figure 8 illustrates the impact of dual-monetary variables on Malaysia's real sector. Within the conventional framework, these variables exhibited a negative impact, resulting in an 8.56% reduction in real sector growth. Conversely, from an Islamic perspective, it had a positive impact, leading to a 5.96% increase in real sector performance.

Discussion

Impacts of the Dual-Monetary Policy on the Real Sector in Indonesia

In this section, the researcher compared the Model 1 and 2, based on prior testing results. According to Granger's causality test, either conventional or Islamic variable, there was no continuity of monetary line and the final goal, output. The line within the conventional framework was cut off between INT to CRD, and PUAS to ERF in the Islamic framework.

Furthermore, the VECM estimation indicates that PUAB exhibited a short-term impact on conventional monetary variables in Indonesia, while PUAB, INT, and CRD demonstrated long-term impacts. This finding demonstrates that conventional monetary policy variables in Indonesia have

generally elicited a long-term response from the real sector. Notably, SBI exhibited no significant impact on the real sector, either in the short or long term, despite its role as a primary policy instrument in the conventional framework. This suggests that adjustments to the SBI interest rate primarily attract funds to the financial sector, rather than stimulating real sector activity. Consequently, the transmission of conventional monetary policy to the real sector appears to be protracted, likely due to the substantial activity within the financial sector. Additionally, PUB had a negative short-term impact on IPI, suggesting that the increase in the PUAB interest rate would decrease the real sector. "An increase in PUAB could lead to a corresponding rise in financing interest rates (INT). This, in turn, would reduce demand for funds in the real sector for production, consumption, and investment, thereby decreasing loan volumes and ultimately slowing industrial production growth. This result was consistent with the studies performed by Setiawan & Karsinah (2016) and Ascarya (2012) but contradicted by Septindo et al. (2016).

INT had improved the real sector. It could happen as the increase of such interest rates is still balanced with the movement of the real sector. Taylor (1995) argued that the increase of interest rate does not always result in an inverted proportion with the real sector, so the increasing interest rate of credit can also grow the real sector. Similarly, the finding was similar to the research findings stated by Wibowo & Mubarok (2018) but contradicted the finding of Septindo et al. (2016)

The total amount of financing (CRD) had increased in the real sector. In line with the theory, the total amount of financing reflecting overall demand indicated a rise in circulating money. Consequently, a significant portion of these funds was allocated to the production sector, in addition to consumption and investment, resulting in an enhanced production value within the real economy. This result was consistent with the findings of Setiawan and Karsinah (2016) but contradicted Wibowo & Mubarok (2018).

Consistent with conventional frameworks, Model 2 in Table 5 demonstrates that all variables of the Islamic dual-monetary policy elicit long-term responses from the real sector. The sluggish response of the real sector to Islamic monetary policy is attributable to the diminished capacity of Sharia banks when contrasted with conventional banks, to effectively transmit the dual-monetary policy within the Indonesian economy. Consequently, the financial intermediation facilitated by the Sharia monetary framework proved insufficient for the optimal financing of real sector sustainability. Moreover, the SBIS variable demonstrated a significant negative correlation with the IPI. Specifically, an increase in SBIS returns led to improved returns on PUAS and financing for Sharia banks. Consequently, this resulted in a reduction of total financing, or aggregate supply, and a diversion of funds away from the production sector. Therefore, industrial production value would decrease. Notably, the relationship between PUAS, ERF, and IPI was positive. This indicates that an increase in Sharia bank transactions within the money market, in response to rising PUAS returns, would enhance liquidity, thereby facilitating the productive sector's financing requirements. The observed positive correlation between ERF and IPI provides evidence that an increase in ERF contributes to the revenue growth of Sharia banks, with a significant portion of these funds being allocated to the real sector. These findings align with those reported by Septindo et al. (2016), Setiawan & Karsinah (2018), and Ascarya (2012), but contradicted Wibowo & Mubarok (2018).

Furthermore, the relationship between FINC and IPI exhibited an unexpectedly strong negative correlation, contrary to the typical positive relationship. This deviation likely stemmed from the central bank's restrictive monetary policy, specifically the increase in the OPR. This policy, while intended to manage inflation, may have adversely affected total financing, leading to a subsequent reduction in real sector output. Consequently, the real sector experienced a negative impact. This aligns with the findings of Sukmana & Kassim (2010).

Meanwhile, IRF analysis demonstrates that shocks to conventional variables within Indonesia's dual-monetary policy transmission mechanism have an increasing impact on real sector growth. This effect is similar to, albeit smaller than, that of shocks to Islamic monetary policy variables. However, the impact of Islamic monetary policy shocks stabilizes more rapidly than that of conventional shocks,

particularly between periods 12 and 17, while the latter stabilizes between periods 14 and 17. Based on the FEVD analysis, both conventional and Islamic policy frameworks have an increasing influence on real sector growth. While the conventional policy contributes 8.83%, the Islamic policy's contribution is significantly lower, at 0.02%. These findings indicate that the impact of Islamic monetary policy on real sector growth is substantially less pronounced than that of its conventional counterpart.

Impacts of the Dual-Monetary Policy Ono the Real Sector in Malaysia

In this section, the researcher compared the Model 3 and 4 based on the previously conducted testing. The Granger causality tests revealed that both models demonstrated a transmission mechanism from interest rates or the OPR return to the real sector. However, the conventional model exhibited a longer transmission lag than the Islamic model. In essence, the real sector displayed a greater responsiveness to conventional monetary policy. Furthermore, the VECM estimation reveals that the Malaysian real sector, as represented by the IPI, did not respond to conventional monetary policy. In the short term, no conventional monetary policy variables significantly impacted the IPI. While a long-term negative relationship exists between the IPI and the PUAB, other conventional variables, including the OPR, INT, and CRD, showed no significant long-term influence on the real sector. This finding suggests that interest rate adjustments in Malaysia have not effectively achieved output targets within the framework of conventional monetary policy. The observed results imply that these policies primarily focus on fostering financial sector development, rather than stimulating real sector growth. Conversely, in Malaysia, the output demonstrated a strong short-term responsiveness to dual-monetary policy principles grounded in Islamic finance. This can be attributed to the inherent focus of Islamic instruments on real value, which effectively mitigates money market volatility. The study indicates that Malaysia can effectively utilize Islamic monetary policy tools, specifically OPR, PUAS, and ERF to stimulate real sector growth, rather than relying solely on conventional frameworks. Specifically, an increase in the OPR exhibited a significant negative correlation with IPI, while improvements in PUAS returns and financing returns (ERF) demonstrated a significant positive correlation with real sector performance. These findings align with the studies conducted by Majid (2014) and Caporale et al. (2019).

Hence, according to the IRF analysis, the conventional monetary policy delayed the growth of the real sector in Malaysia, but the Islamic variable improved the growth of the real sector. This disparity arises because the interest rate-driven nature of conventional policy primarily circulates funds within the financial sector, allocating limited resources to real sector activities. Furthermore, the shock response of the Islamic monetary policy variables demonstrated greater stability and a faster return to equilibrium compared to conventional variables, which exhibited stabilization between periods 9 and 19. In contrast, the Islamic variables stabilized between periods 6 and 10. The FEVD analysis reveals that conventional monetary policy has a negative impact on the real sector of 8.56%. Conversely, Islamic monetary policy demonstrated a positive effect, contributing to real sector growth by 5.96%. This finding, therefore, affirms that the Islamic monetary policy was more effective in supporting the real sector.

The Dual-Monetary Policy of Indonesia vs. Malaysia

After presenting the impacts of both conventional and Islamic monetary policy in both Indonesia and Malaysia, the researcher came to a conclusion on the comparison of the dual-monetary policy implementation from Indonesia and Malaysia.

Based on the conventional view, the real sector in Indonesia was more responsive to most monetary policy having been stipulated by the central bank than Malaysia. It could be seen from Granger's causality test. Though there was a discontinuity, the transmission line of the dual-monetary policy was only cut off between variables of INT to CRD. Subsequently, the line of monetary transmission was further cut off, such as the PUAB interest rate to total credit (CRD).

According to Islamic views, the transmission line of the dual-monetary policy in both Indonesia and Malaysia showed collective discontinuity of the return line from the variable of policy reference to the

real sector (IPI). In Indonesia, the line connection was cut off between PUAS to ERF; while, in Malaysia, the line connection was cut off between ERF to FINC. Therefore, the real sector of each country had not collectively responded to policy stipulated by the central bank, comprehensively. However, in general, the variable of credit (CRD) and financing (FINC) from both countries had improved the real sector.

Considering the result of the causality test, it can be said that the real sector was slightly unresponsive to the monetary policy. Lately, the economic response to the monetary policy has been weaker than the previous response. In their research, they affirmed that the line of interest rate in Malaysia is weakening from time to time. Furthermore, in reference to the aforementioned argument, a salient point is that financial reform, characterized by significant structural changes to the financial system through various financial innovations, integration, and market development, occurred. As a result, the changing of this financial system can respond to the output variable or the real sector to the monetary policy transmission.

Based on the result of the VECM estimation test, the researcher's analysis indicates that the Indonesian real sector exhibited an indirect, long-term response to both conventional and Islamic monetary policy. In contrast, the Malaysian real sector demonstrated a more immediate reaction to Islamic monetary policy compared to its conventional counterpart. This observation underscores the significant role of Sharia banks in Malaysia in effectively transmitting monetary policy objectives to real output.

In general, the finding of the IRF test indicates that shocks to Islamic monetary policy exhibit faster stabilization compared to conventional monetary policy. This is attributed to the interest rate mechanism in conventional systems, which tends to amplify fluctuations in monetary variables. Conversely, Islamic monetary policy demonstrates quicker stabilization due to the emphasis on real-value transactions, which stimulates economic activity. These findings are consistent with studies by Ascarya (2012), Kassim et al. (2009), and Ramadhan & Beik (2013).

When comparing the two countries, Malaysia's real sector demonstrated greater stability to monetary shocks than Indonesia's. This can be attributed to Malaysia's economic structure as a small, open economy heavily reliant on exports and international trade. This is supported by evidence indicating Malaysia's faster recovery from economic crises, as evidenced by its GDP trends, which showed a single-year contraction within the past decade, followed by subsequent periods of growth.

Thus, the result of the FEVD test indicates that Islamic monetary policy in Malaysia had a greater impact on the real sector than in Indonesia. This disparity can be attributed to the market share of Islamic banks, which reached 30% in Malaysia in 2019, compared to approximately 6% in Indonesia. Consequently, a more extensive implementation of the Islamic monetary system is likely to yield more significant positive effects on the real sector. **Conclusion**

The research aims to examine the impacts of the dual-monetary policy on the growth of the real sector in both Indonesia and Malaysia through the conventional view on the line of interest rate and the Islamic view on return. Based on the result of the VECM test, this study provides several significant findings. First, the transmission flow of both conventional and Islamic monetary policy in both countries, according to the causality test of Granger, has not been clearly identified and cut off in the middle of its line. However, variables of credit and financing in commercial and Sharia banks from both countries have a significant impact on the growth of the real sector.

Second, based on the test result of VECM estimation in the Indonesian model, PUAB, interest rate of credit (INT), and credit (CRD) have an impact on the short-term real sector in the conventional domain, and PUAB has a long-term impact on the real sector. While, from the Islamic view, SBIS, PUAS, return of financial result (ERF), and financing (FINC) have a long-term impact on the real sector. In the context of Malaysia, none of the conventional variables has an impact on the real sector, excluding PUAB. On the other side, OPR, PUAS, and return of financing result (ERF) have an impact on the short-term real sector, and OPR has a long-term impact.

Third, based on the test result of IRF, the shock of Certificates of Bank Indonesia (SBI), PUAB, and credit (CRD) in Indonesia generally have a positive and permanent impact on the real sector. Whereas, the shock of SBIS and the return of financing result have a positive and permanent impact on the real sector. In Malaysia, all variables of the conventional framework (OPR, PUAS, INT, and CRD) have a negative and permanent impact on the real sector. Meanwhile, from the Islamic viewpoint, PUAS and return of financing result (ERF)have a positive and permanent impact on the real sector.

Lastly, referring to the test result of FEVD, In Indonesia, conventional financing has positively contributed to real sector growth, with a contribution of 8.83%. Islamic financing has also provided a supporting contribution, albeit a smaller one, at 0.02%. Conversely, in Malaysia, conventional financing has exhibited an impeding effect on real sector growth, registering a negative contribution of 8.56%. However, Islamic financing in Malaysia has demonstrated a positive contribution to real sector growth, amounting to 5.96%. These four research findings yield the empirical conclusion that the economic response to the current monetary policy is marginally lower than previous responses. Furthermore, in the Indonesian context, a Sharia-based monetary policy demonstrates greater stability in supporting real sector growth compared to the conventional model. While its contribution is modest, the return-based instrument of Sharia monetary policy has generally enhanced long-term real sector growth. Conversely, in Malaysia, Sharia-based monetary policy proves more effective than its conventional counterpart, playing a significant role in stimulating real sector growth. This disparity in responsiveness between the real sector and Islamic monetary policy can be attributed to the larger market share of Sharia finance in Malaysia compared to Indonesia. Consequently, Malaysian Sharia banks are better positioned to effectively transmit funds to the real sector through return-based channels.

References

Abdullah, Adam. 2016. "An Islamic Monetary Theory of Value and Equation of Exchange: Evidence from Egypt (696-1517)." *Humanomics* 32(2):121–50. doi: 10.1108/H-12-2015-0090.

Ascarya. 2002. "Instrumen-Instrumen Pengendalian Moneter." *Seri Kebanksentralan, Pusat Pendidikan dan Studi Kebanksentralan (PPSK) Bank Indonesia* (3):58.

Ascarya, Ascarya. 2012. "Transmission Channel And Effectiveness Of Dual Monetary Policy In Indonesia." *Buletin Ekonomi Moneter Dan Perbankan* 14(3):269–98. doi: 10.21098/bemp.v14i3.405.

Azis, Abdul, dan A. Herani Rusland. 2009. "Peranan Bank Indonesia di Dalam Mendukung Pengembangan Usaha Mikro, Kecil, dan Menengah." *Seri Kebanksentralan, Pusat Pendidikan dan Studi Kebanksentralan (PPSK) Bank Indonesia* (21):96.

Caporale, Guglielmo Maria, Abdurrahman Nazif Çatık, Mohamad Husam Helmi, Faek Menla Ali, dan Mohammad Tajik. 2019. "The Bank Lending Channel in the Malaysian Islamic and Conventional Banking System." *Global Finance Journal* 100478. doi: 10.1016/j.gfj.2019.100478.

Chapra, M. Umer. 1983. "Monetary Policy in an Islamic Economy." *International Centre for Research in Islamic Economics, King Abdulaziz University* 28.

Chapra, M. Umer. 1985. *Towards a Just Monetary System: A Discussion of Money, Banking, and Monetary Policy in the Light of Islamic Teachings*. Leicester, UK: Islamic Foundation.

Chapra, M. Umer. 2000. *Sistem Moneter Islam, Terjemahan oleh Ikhwan Abidin Basri*. Depok: Gema Insani.

Herianingrum, Sri, dan Imronjana Syapriatama. 2016. "Dual Monetary System And Macroeconomic Performance In Indonesia." *Al-Iqtishad: Journal of Islamic Economics* 8(1):65–80. doi: 10.15408/aiq.v8i1.2509.

Ibrahim, Mansor H. 2017. "The Bank Lending Channel of Monetary Policy Transmission in a Dual Banking System." *Journal of Islamic Monetary Economis and Finance* 2(2):193–220.

Islahi, Abdul Azim. 1996. *Economic Concepts of Ibn Taimīyah*. Leicester, UK: Islamic Foundation.

Ismal, Rifki. 2011. "Central Bank Islamic Monetary Instruments: A Theoretical Approach." *Studies in Economics and Finance* 28(1):51–67. doi: 10.1108/10867371111110552.

Juanda, Bambang dan Junaidi. 2012. *Ekonometrika Deret Waktu, Teori dan Aplikasi*. IPB Press.

Juhro, Solikin M., Darsono, Ferry Syarifuddin, dan Ali Sakti. 2018. *Kebijakan Moneter Syariah dalam Sistem Keuangan Ganda: Teori dan Praktik*. Cetakan I. Tebet, Jakarta: Tazkia Publishing kerjasama [dengan] Bank Indonesia.

Kassim, Salina H., M. Shabri Abd Majid, dan Rosylin Mohd Yusof. 2009. "Impact Of Monetary Policy Shocks On The Conventional And Islamic Banks In A Dual Banking System: Evidence From Malaysia." *Journal of Economic Cooperation and Development* 30(1):19.

Majid, M. Shabri Abd. 2014. "Islamic Banks and Monetary Transmission Mechanism in Malaysia." *Journal of Economic Cooperation and Development* 35(2):137–66.

Mansur, Ahmad. 2013. "Kebijakan Moneter dan Implikasinya terhadap Pembangunan Ekonomi dalam Perspektif Islam." *TSAQAFAH* 9(1):57. doi: 10.21111/tsaqafah.v9i1.38.

McCauley, Robert Neil. 2006. "Understanding Monetary Policy in Malaysia and Thailand: Objectives, Instruments and Independence." *BIS Papers Chapters, in: Bank for International Settlements (Ed.),Monetary Policy in Asia: Approaches and Implementation* (31):172–98.

Noviasari, Anisa. 2017. "Efektifitas Mekanisme Transmisi Kebijakan Moneter Ganda Di Indonesia." *Media Ekonomi* 20(3):23. doi: 10.25105/me.v20i3.786.

Octaviani, Isnaeni. 2017. "Pengaruh Kebijakan Moneter Syariah terhadap Indeks Produksi Industri." *Skripsi tidak dipublikasikan* 128.

Octaviani, Isnaeni, dan Mohammad Nur Rianto Al Arif. 2018. "Islamic Monetary Policy And Its Impact On Real Sector." *Jurnal Trikonomika* 17(2):43. doi: 10.23969/trikonomika.v17i2.1144.

Ponziani, Regi Muzio, dan Tatik Mariyanti. 2020. "Islamic Bank and Monetary Policy: The Case of Indonesia." *International Journal of Islamic Economics and Finance (IJIEF)* 3(1). doi: 10.18196/ijief.2124.

Ramadhan, Masyitha Mutiara, dan Irfan Syauqi Beik. 2013. "Analisis Pengaruh Instrumen Moneter Syariah dan Konvensional Terhadap Penyaluran Dana ke Sektor Usaha Mikro Kecil dan Menengah (UMKM) di Indonesia." *Al-Muzara'ah* 1(2):175–90. doi: 10.29244/jam.1.2.175-190.

Rusydiana, Aam Slamet. 2009. "Mekanisme Transmisi Syariah Pada Sistem Moneter Ganda Di Indonesia." *Buletin Ekonomi Moneter dan Perbankan* 11(4):345–67. doi: 10.21098/bemp.v11i4.345.

Septindo, Dendy, Tanti Novianti, dan Deni Lubis. 2016. "Analisis Pengaruh Instrumen Moneter Syariah dan Konvensional terhadap Penyaluran Dana ke Sektor Pertanian di Indonesia." *Al-Muzara'ah* 4(1):1–18. doi: 10.29244/jam.4.1.1-18.

Setiawan, Rifky Yudi, dan Karsinah Karsinah. 2018. "Mekanisme Transmisi Kebijakan Moneter dalam Mempengaruhi Inflasi dan Pertumbuhan Ekonomi di Indonesia." *Economics Development Analysis Journal* 5(4):460–73. doi: 10.15294/edaj.v5i4.22183.

Sims, Christopher A. 1980. "Macroeconomics and Reality." *Econometrica* 48(1):1. doi: 10.2307/1912017.

Sukmana, Raditya, dan Salina H. Kassim. 2010. "Roles of the Islamic Banks in the Monetary Transmission Process in Malaysia." *International Journal of Islamic and Middle Eastern Finance and Management* 3(1):7–19. doi: 10.1108/17538391011033834.

Taylor, John B. 1995. "The Monetary Transmission Mechanism: An Empirical Framework." *Journal of Economic Perspectives* 9(4):11–26. doi: 10.1257/jep.9.4.11.

Wahyudi, Amien. 2013. "Kebijakan Moneter Berbasis Prinsip-Prinsip Islam." *Justicia Islamica* 10(1). doi: 10.21154/justicia.v10i1.142.

Wibowo, Muhammad Ghafur, dan Ahmad Mubarok. 2018. "Analisis Efektivitas Transmisi Moneter Ganda Terhadap Pertumbuhan Ekonomi Indonesia." *Jurnal Ekonomi Pembangunan* 25(2):127–39. doi: 10.14203/JEP.25.2.2017.127-139.

Widodo, Arif. 2018. "Evaluating The Effectiveness Of Dual Monetary Policy In Promoting Price Stability In Indonesia." *Iqtishadia* 10(2):210. doi: 10.21043/iqtishadia.v10i2.2378.

Wulandari, Neni Sri. 2019. "A Comparative Study Of Indonesian And Malaysian Monetary Policy." *The International Journal of Business Review (The Jobs Review)* 2(1):47–56. doi: 10.17509/tjr.v2i1.20468.

Yuliadi, Imamuddin, Dimas BagusWiranata Kusuma, dan Aria Sandubaya Syahputra. 2016. "Dynamics Of Inflation Determinants Under Dual Monetary Systems: Empirical Evidences From Indonesia And Malaysia." *Jurnal Ekonomi Dan Bisnis Islam* 2(2):18.

Yungucu, Burak, dan Buerhan Saiti. 2016. "The Effects of Monetary Policy on the Islamic Financial Services Industry." *Qualitative Research in Financial Markets* 8(3):218–28. doi: 10.1108/QRFM-02-2016-0006.

Zulkhibri, Muhamed. 2018. "The Impact of Monetary Policy on Islamic Bank Financing: Bank-Level Evidence from Malaysia." *Journal of Economics, Finance and Administrative Science* 23(46):306–22. doi: 10.1108/JEFAS-01-2018-0011.

Zulkhibri, Muhamed, Turkhan Ali Abdul Manap, dan Aishath Muneeza, ed. 2019. *Islamic Monetary Economics and Institutions: Theory and Practice*. Cham: Springer International Publishing.