Relationship between Conventional and Islamic Interbank Rates of a Dual Banking System in Malaysia, Middle East, and Western Countries

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***Abstract* — The purpose of this research is to investigate the relationship between conventional monetary policy rate (CIMMR) and Islamic monetary policy rate (IIMMR) in Malaysia and selected Middle East countries and Western countries. This study runs a panel Cointegration test, a panel VECM and Wald test to examine the relationship and causal effect between the CIMMR and IIMMR for the sample of six countries starting from 2009 until 2018 based on monthly and yearly basis dataset. This study finds that CIMMR and IIMMR, in monthly and yearly basis, are both cointegrated and have a long-run relationship amongst them. Our findings confirm that there is a long run causality effect between conventional and Islamic monetary policies based on monthly interbank rates. Our findings further confirm that there is a short run causality effect between conventional and Islamic monetary policies based on yearly interbank rates. We confident that the implication of Islamic interbank rates in the implementation of monetary policy within a dual system is very high as proven by taking into consideration a different regions as samples for this panel study. To the best of the authors' knowledge, this would greatly contribute to the body of knowledge in the field of monetary policy.**

***Keywords* –** *CIMMR, Cointegration, IIMMR, VECM*

I. Introduction

Interbank money market rates is defined as the interest rates charged on deposits between banks. Many past studies had focused on the predictive power of the financial variables on the macroeconomic measure in order to indicate the most relevant policy indicators (Bernanke & Blinder, 1992; Bullock, Morris, & Stevens, 1988; Friedman & Kuttner, 1992; Tallman & Chandra, 1996). Majority of these studies had utilized the auto-regression (VAR hereafter) methodology in order to evaluate the forecasting ability on the financial aggregates on major macroeconomics variables. Bernanke and Blinder (1992) conclude that federal funds rate is the best monetary policy indicator in the USA. They utilized the VAR methodology to evaluate the predictive ability of the selected policy measure candidates, such as the money supply (M1 and M2), 3-month T-Bill rate, federal funds rate and 10-year government bond rate. This study, on the other hand, intends to examine the relationship between conventional and Islamic interbank money market rates (CIMMR and IIMMR hereafter, respectively) in dual banking scenarios. This is because one of the critical factors for an efficient and effective monetary implementation is to make sure the most relevant indicators, either Islamic or conventional rates.

A study done by Friedman and Kuttner (1992), however, prove that monetary aggregates are becoming less relevant in being a monetary policy measure and further states that interest rates are a better economic activity predictor. This adds the rationale on choosing the interbank rates as the proxy for interest rates in this study. Keynesian Theory is one of the main underlying theories that determines interest rate. The Keynesian theory of interest refers to the market interest rate that depends on the balance of demand and supply for money, which is the economy's most liquid asset (Keynes, 1937). Keynes defined interest rate as the willingness to hold wealth in the form of cash or to simply put, the interest rate is the opportunity cost of holding money.

Dual banking system is defined as when both conventional and Islamic banking coexist in a system. It would be fair to say that a country that caters both conventional and Islamic banking is a country that practices dual banking system. Dual banking in Middle East countries has long way started beforehand Malaysia, with Saudi Arabia is geographically pictured as the largest nation in the state. The term "Islamic" in Islamic banking emphasizes that the said banking system must apply the Islamic law in their operations and products (Alemu, 2016). Western countries are the most developed in the world in terms of wealth, quality of life and civil liberties and these should include the countries like Germany, UK, and the USA. Islamic banking began its influences in the mid-70s, where not only it offers a substitute and a supplement to the conventional banking in

Western Countries but also plays a part in the growth of financial intermediation (El-Bdour, 1984). The main basis of Islamic banking is that it rejects interest (riba) entirely as the premise of operations and to overcome that, it offers profit participation (i.e. Mudharabah and Musyarakah) in project-based financing.

1.1 Problem statements

A study done by Ali, Manap, and Kassim (2008) analyse whether the IIMMR has the potential to become a reliable monetary policy measure and compared it to the CIMMR in Malaysia. They conclude that IIMMR can be a dependable monetary policy rate and had proven that the predictive power of IIMMR is commensurable with the CIMMR adopted by the Bank Negara Malaysia. This indicates that IIMMR can be a trigger variable in supporting the CIMMR to reflect the monetary policy position of a dual banking system in Malaysia. The findings of this study further prove that Islamic monetary policy is being adopted gradually in Malaysia. However, a study done by Kaleem and Isa (2006) prove that it is a big disadvantage for Islamic financial system to operate in a dual banking system as the conventional financial system obtains arbitrage opportunity due to difference between IIMMR and CIMMR. The Islamic financial system is at a disadvantage as they are only limited to transact in Islamic financial market only. This debatable issue encourages the authors' to further investigate not only the relationship, but also the cause and effect of having an Islamic monetary policy in a dual banking system, either it acts as a complement or acts as a threat to conventional monetary policy.

The number of Islamic banks and windows of conventional banks increased from 184 banks and 84 windows in the first quarter of 2017, to 188 banks and 85 windows in the first quarter of 2018 (Islamic Financial Services Board, n.d.). The marketability for Islamic banking have been on the rise for the past decade due the increase demand of appropriate banking products that abide the Islamic rules by people that give importance to the religious rules (Yüksel, Canöz, & Özsarı, 2017). Due to this, they are reluctant on doing their deposit business with conventional banks but still wants to earn income through using their savings (Ersin & Duran, 2017). As there are many obvious similarities between the Islamic and conventional banking system there are a handful of differences between the aforementioned banking systems too (Dincer, Hacioglu, & Yuksel, 2016). The primary difference is that Islamic banks' customers do not have a guarantee to earn income but can also experience loss, whereas customers of the conventional banking are able to earn a fixed rate of interest (Kartal & Demir, 2017). Unfortunately, there have been many criticism towards the Islamic banking system due to its nature of operations. The main debate is the alarming similarities of the profit sharing rate and interest rate as the public do not think there are any differences between the two systems. Due to this issue, there have been plenty of studies have been conducted on that issues (Adewuyi & Naim, 2016; Ajmi, Hammoudeh, Nguyen, & Sarafrazi, 2014; Charap & Cevik, 2011; Erisah & Cetin, 2018; Ismath Bacha, 2008; Ito, 2017; Saraç & Zeren, 2015; Tekin, Atasoy, & Ertugrul, 2017; Yüksel et al., 2017).

Even though Islamic banking is growing bigger and becoming popular amongst the society, the conventional banks are yet to be dominated. Therefore, it would be interesting to see the relationship as well as the cause and effect between CIMMR and IIMMR when they work together under the same roof by taking closely the samples of data from Malaysia, Middle East, and Western countries. This study intends to highlight insight on either an Islamic monetary policy could possibly taking over the role of conventional monetary policy or just complementing the existing policy. Our dataset consists of both monthly and yearly basis of CIMMR and IIMMR for all selected countries. The rationale of having this is because we wish to capture any short-term or long-term effects via these datasets.

1.2 Contribution of the study

The relationship between Islamic banks' return on term deposits and conventional banks' interest rates on term deposits has been a debate in regards to Islamic finance. Thus, the authors had decided to consider countries that have both conventional and Islamic banking coexist in their banking system. To the best of our knowledge, there is no single studies yet combining Malaysia together with Middle East and Western Countries of a dual banking system as most studies are solely focused on Islamic countries that practice a dual banking system (Erisah & Cetin, 2018; Ito, 2017; Saraç & Zeren, 2015; Tekin et al., 2017; Yüksel et al., 2017). Thus, these six countries are selected as sample for this study. This research gap aspires the authors' to further investigate the relationship between monthly and yearly CIMMR and IIMMR in Malaysia, in Middle Eastern (represent by Kuwait and Saudi Arabia), as well as in Western countries (represent by Germany, United Kingdom and the United States of America). This research hopes to contribute to the field of monetary policy

setting especially a country with a dual banking system. The study uses monthly and yearly basis data of CIMMR and IIMMR between 2009 and 2018 in order to investigate the long-and-short-run relationship between the two interbank rates in six selected countries.

II. Literature Review

There are a few of previous studies that look into the relationship between Islamic and conventional benchmarks. A study done by Charap and Cevik (2011) enquire into the causal relationship between the profit rates on Islamic (profit-loss sharing) rates and conventional bank deposit rates, and they find that there is a cointegration between both of the variables. This finding is further been backed up by Zainol and Kassim (2012) where the study finds that Islamic banks are sensitive to changes in the conventional interest rates because many Islamic banks' products and services use conventional interest rate as the benchmark. The study also asserts that the volatility of the conventional interest rate affects the Islamic banks' incomes, together with the value of the banks' assets and liabilities. Moreover, a study by Ergeç and Arslan (2013) confirm that there is a long-run cointegration between Islamic profit rates and conventional interest rates in Turkey and conclude that the conventional interest rates highly influence the Islamic profit rates.

In the quest of investigating the sensitivity of the profit rates of Islamic banks to macroeconomic conditions, Sanwari and Zakaria (2013) conclude that the profit rates of Islamic deposit are sensitive to the movements of the interest rate. Additionally, a study done by Anuar, Mohamad, and Shah (2014) corroborates the results of past studies that highlighted the profit rates of Islamic banks are influenced by the interest rate of conventional banks, whether in short or long run. In order to examine the existence of a long-run relationship between Islamic profit rates and conventional interest rates in Malaysia, Anuar et al. (2014) employ the VAR order selection procedure and Johansen cointegration test to verify the study's hypothesis.

To add on to the literature, a study done by Adewuyi and Naim (2016) investigate the cointegration between the rate of returns on deposits of Islamic banks and the interest rate on term deposits of conventional banks in Malaysia, Indonesia and Bahrain using autoregressive distributed lag (ARDL hereafter) approach to cointegration. The study states that there is an existence of causality effect as well as short and long run relationships between the two variables during the period of 2007 and 2015. Ito (2017) also finds that there is a long-run equilibrium between the conventional interest rates and Islamic profit rates on all maturities in Malaysia. The results are very similar to Ito (2013), which signifies that the profit rates spur conventional rates on three, six and 12-month maturities between 2005 and 2014. Tekin et al. (2017) conduct a similar study by employing an ARDL, fully modified ordinary least squares (FMOLS hereafter) and dynamic OLS (DOLS hereafter) model to analyse the relationship between conventional interest rates and Islamic profit rates in Turkey. Their study finds that the correlation between the two rates are relatively stable when there is no market disturbance, such as crises or shocks. On top of that, the model that they employed are able to detect although the correlation heavily fluctuates during stress periods, which is between 1998 and 2016. Overall, based on the previous studies done by researchers, the authors can conclude that Islamic bank rates highly depend on the conventional bank rates. This study intends to widen the existing thread of literature by further investigating the relationship between IIMMR and CIMMR in Malaysia, Middle East, and Western countries.

III. Research methodology

This study applies a quantitative data in order to measure the variables selected. In specific, a secondary data are collected via the Thomson Reuters Eikon database, where it focuses on the countries that offers both conventional and Islamic banking services in their countries (i.e. Malaysia, Saudi Arabia, Kuwait, Germany, UK and the USA). Data chosen are on monthly and yearly basis of both conventional (CIMMR) and Islamic (IIMMR) for all six countries mentioned between 2009 and 2018.

This research employs three types of diagnostic tests to test the sensitivity and specificity of the variables. The first diagnostic test is the *normality test* where this study takes a Jarque-Bera test to ascertain the distribution of data. The second diagnostic test is the *panel unit root test* where this study takes an Augmented Dickey Fuller (ADF hereafter) test in order to examine the stationarity of the data whether at level, first difference or second difference (Mahadeva & Robinson, 2004). Lastly, this study will adapt the Breusch-Pagan test (1979) to identify the existence of *heteroscedasticity* in the data.

For data analysis, this research runs a multiple analysis with panel data so that the research questions can be answered and the research objectives can be fulfilled. The types of method analysis used in this study are the panel Cointegration test, panel VEC model (VECM hereafter), and/or panel Granger test. This research intends to examine the long-run relationship between CIMMR and IIMMR by using the Johansen Fisher Panel

Cointegration test. The *F*-test will indicate which variable should be normalised when there is a long-run relationship between CIMMR and IIMMR (Keele & De Boef, 2004). A pre-condition to conduct the Johansen Co-integration test is the data should be non-stationary at level, *I*(0) and stationary when converted into first difference. If the variables are stationary it will introduce restricted co-integrating vectors (Osterholm & Hjalmarsson, 2007). If the *p*-value is less than 5%, it means that null hypothesis (H_0) will be rejected indicating there is a cointegration between the variables (Osterholm & Hjalmarsson, 2007). Consequently, if cointegration do exists between the variables, it means that there is a long-run relationship between the variables. VECM test can be carried out when the result show that cointegration exists between the variables. On the other hand, a panel Granger causality test can be written if cointegration between CIMMR and IIMMR do exist and the series is stationary at level *I*(0) as a result from the previous step above (Engle & Granger, 1987). Equations (1) and (2) below is developed in preparation for Vector Autoregressive (VAR hereafter) model.

$$\Delta \text{CIMMR}t = \alpha 1 + \sum \beta 1i \Delta \text{CIMMR}t-i + \sum \varphi 1i \Delta \text{IIMMR}-i + \epsilon 1t \quad (1)$$

$$\Delta \text{IIMMR}t = \alpha 2 + \sum \varphi 2i \Delta \text{IIMMR}t-i + \sum \beta 2i \, \Delta \text{CIMMR}\, t-i + \epsilon 2t \quad (2)$$

[where Δ is the first difference operator, CIMMRt and IIMMRt are the log of CIMMR and IIMMR respectively, $\alpha 1 \; and \; \alpha 2$ are constant drifts, βji and φji are polynomials of order k-1 and lastly, $\epsilon 1t \; and \; \epsilon 2t$ are the vector for random errors].

However, if the order of integration of the series results in stationary at first difference, *I*(1) thus they are both cointegrated, following Engle and Granger (1987), an error correction term (ECT) will be added into the panel Vector Error Correction Model (VECM) as specified in Equations (3) and (4) below:

$$\Delta \text{CIMMR}t = \alpha 1 + \sum \beta 1i \, \Delta \text{CIMMR}t-i + \sum \varphi 1i \, \Delta \text{IIMMR}t-i + \delta 1 ECTt-1 + \epsilon 1t \quad (3)$$

$$\Delta \text{IIMMR}t = \alpha 2 + \sum \varphi 2i \, \Delta \text{IIMMR}t-i + \sum \beta 2i \, \Delta \text{CIMMR}t-i + \delta 2 ECTt-1 + \epsilon 2t \quad (4)$$

[where is $ECTt-1$ the error correction term that depict the deviations from the long-run cointegration relationship, and $\delta 1 \; and \; \delta 2$ are the speed of adjustment towards the long-run equilibrium, that are expected to be negative (Engle & Granger, 1987). The presence of ($ECTt-1$) and the lagged dynamic terms in ΔIIMMR $t-i$ (d) enables the existence of two sources causality between CIMMRt and IIMMRt.The other terms in the above equation are similar as to the terms in the Equations (1) and (2) above].

IV. Results and findings

Empirical findings are the source of knowledge acquired by the means of observation and experimentation. All empirical findings in this research is based on analysis through EViews software. For the first diagnostic test we use a Jarque-Bera to see the distribution of the data (normality test). Table 4.1 below shows that the *p*-value of both monthly and yearly CIMMR and IIMMR are lower than the significance level of 0.05, which indicates that both variables are normally distributed. On top of that, the skewness of both monthly and yearly CIMMR and IIMMR are positive portraying that all distributions have long right tail. Not only that, the data are leptokurtic as the Kurtosis of the monthly and yearly CIMMR and IIMMR are greater than 3 as a rule of thumb.

Table 4.1 Normality test results – monthly and yearly basis

	CM/IM	**CY/IY**
Skewness	0.411049	0.265435
Kurtosis	7.040570	5.493713
Jarque-Bera	488.8091	16.25107
p-value	0.00000	0.000296

The second diagnostic test is the panel unit root test, in which the authors use an ADF in order to determine whether the data are stationary or non-stationary at an automatic selection of maximum lags. The panel unit root test is conducted with the assumption that there is no intercept or trend, at level and 1st difference. Table 4.2 shows that the series are *I*(0), non-stationary at level since the *p*-value of both monthly and yearly CIMMR and IIMMR are more than 0.05. However, when the both series are converted into first difference, Table 4.2 displays that the series are *I*(1), stationary at first difference. This concludes that IIMMR and CIMMR are stationary at first difference in monthly and yearly basis. When both variables are integrated at the same order,

the variables can be further tested for cointegration test. However, a panel Granger causality test can be written if both series is stationary at 1st difference, *I*(1).

Table 4.2 Unit root test results – monthly and yearly basis

Variables	**Stage**	**Augmented Dickey Fuller (ADF) Test**	
		Level	**1st Difference**
CM	None	19.5751 (0.0756)	1037.68 **(0.0000)**
IM	None	20.5274 (0.4546)	1362.78 (**0.0000**)
CY	None	5.88941 (0.9216)	48.0828 (**0.0000**)
IY	None	7.85233 (0.7966)	62.1428 (**0.0000**)

The last diagnostic test is the heteroscedasticity. Table 4.3 shows that the *p*-value for both monthly and yearly CIMMR and IIMMR are more than the 0.05 of significance level, which indicates that the error terms in both variables are not heteroscedastic or in other words, the error terms in both monthly and yearly CIMMR and IIMMR are homoscedastic. This means that all of the random variables have the same finite variance.

Table 4.3 Breusch-Pagan test results – monthly and yearly basis

	CM/IM	**CY/IY**
Obs*R-squared	2.7900	0.0033
Prob Chi-Square (1)	0.0949	0.9543

This study employs a Johansen Fisher Panel Cointegration test to detect the cointegration between the variables. Table 4.4 below shows that the *p*-value of both trace test and max-eigen test for both monthly and yearly CIMMR and IIMMR are less than the significance level of 0.05, which can be concluded that there is a long-run relationship between monthly and yearly CIMMR as well as IIMMR.

Table 4.4 Panel Cointegration test results – monthly and yearly basis

Tests	**Trace Test**		**Max-Eigen Test**	
	Coefficient	***p*-value**	**Coefficient**	***p*-value**
CM/IM	81.49	0.0000	83.84	0.0000
CY/IY	80.58	0.0000	72.42	0.0000

This study also employs a VECM using an Ordinary Least Square (OLS hereafter) Estimation of Equation in order to determine a causality effect between the variables. Table 4.5 is the OLS Estimation of Equation that indicates the error correction term, C(1) of CM as DV (i.e. dependent variable) has a negative coefficient of -0.0990 and *p*-value of 0.0221. Since the *p*-value of CM is less than 5% significance level, this depicts that it is significant. Similarly, Table 4.6 provides that the C(1) of IM as DV has a negative coefficient of -0.2370 and *p*-value of 0.0000. With a negative coefficient and a significant *p*-value, this signifies that a long-run causality running from Islamic monetary policy to conventional monetary policy, as well as from conventional monetary policy to Islamic monetary policy based on monthly datasets. These findings describe that there would be a low speed of adjustment towards long-run equilibrium (Ma'in, Nordin, Zailan, Sulaiman, & Ismail, 2018).

Table 4.5 Panel VECM – CM as DV (CM is monthly CIMMR)

Variable	Position	Coefficient	p-value
CM	DV	-0.098955	0.0221**

Table 4.6 Panel VECM – IM as DV (IM is monthly IIMMR)

Variable	Position	Coefficient	p-value
IM	DV	-0.237026	0.0000***

Table 4.7 indicates that C(1) of CY as DV (i.e. dependent variable) has a positive coefficient of 0.8171 and *p*-value of 0.0569, which indicates that the CY is more than 5% and thus is insignificant. Since CY is positive and insignificant, this signifies that there is no long-run causality running from yearly Islamic monetary policy towards the yearly conventional monetary policy. However, Table 4.8 shows a different result as the coefficient for IY as DV has a negative coefficient and is significant as the *p*-value is less than 5%. This signifies that there is long-run causality running from yearly conventional monetary policy towards the yearly Islamic monetary policy. Overall, the panel VECM shows that there is a long-run effect between monthly CIMMR and monthly IIMMR. The same cannot be said with the yearly basis as there is a long-run causality running from yearly CIMMR to yearly IIMMR only. At this point, we make a solid conclusion yet on the policy implication due to one insignificant result in a long-run test. We therefore conduct a Wald test in order to detect whether there are any short-run causality is running from yearly Islamic monetary policy to yearly conventional monetary policy.

Table 4.7 Panel VECM – CY as DV (CY is yearly CIMMR)

Variable	Position	Coefficient	p-value
CY	DV	0.817069	0.0569

Table 4.8 Panel VECM – IY as DV (IY is yearly IIMMR)

Variable	Position	Coefficient	p-value
IY	DV	-0.882470	0.0259**

Table 4.9 below shows the result of the Wald test that is solely conducted on the CY as a DV (i.e. dependent variable) to determine the short-run causality running from the yearly Islamic monetary policy to the yearly conventional monetary policy. The *p*-value of the test is 0.0003 that is lower than 5% significance value, which indicates that there is a short-run causality running from yearly IIMMR to the yearly CIMMR.

Table 4.9 Wald test – CY as DV

Test Statistic	value	p-value
Chi-square	16.38388	0.0003

V. Conclusion and recommendation

In order to fulfill the research objectives, this study must employ a Johansen Fisher Panel Cointegration to test the Cointegration between the variables. This study finds that both monthly and yearly CIMMR and IIMMR are cointegrated. This bring means that panel VECM need to be employed instead of the VAR Model in order to examine the long-run causality that runs from independent variable to dependent variable. The results from panel VECM confirm that there is a long-run causality effect between monthly conventional and monthly

Islamic monetary policies. On the other hand, our finding based on Wald test confirm that there is a short-run causality effect between yearly conventional and yearly Islamic monetary policies. Overall, we confident that Islamic monetary policy will probably have an influence on the movement of interest rates in short time period and not a surprise that one day it might have the power to overtake the role of conventional monetary policy in long term. We believe that this research has contributed greatly towards the monetary policy literature as it expands the research gap of the current and existing studies. There are numerous models available for measurement especially in the field of monetary policy that could further provide better and more accurate results. For example, instead of employing the Granger causality test, this study would recommend using a Toda-Yamamoto (1995) test instead, to analyse the causality relationship between two variables. The Toda-Yamamoto method is simpler because the test does not require any pre-condition either for stationary or cointegration tests before run the causality test and this could reduce leads and lags in data.

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