The determinants of islamic mudharabah interbank investment rate: Malaysia as a case study

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20 July 2018

The determinants of islamic mudharabah interbank investment rate: Malaysia as a case study

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Abstract

This paper is intended to identify the determinants of Islamic Interbank Money Market (IIMM) rate in Malaysia with a specific focus on Mudharabah Interbank Investment (MII) transactions. The nature of Mudharabah outlined is that profit for this contract is based on Profit Sharing Ratio (PSR) pre-agreed between two contracting parties which are capital provider and enterpreneur. Basically, it should be based on real business case. On the other hand, IIMM is operated within the framework of financial transactions and governed by Bank Negara Malaysia (BNM). The main issue here is the justification of whether MII rate of return is moving in line with the movement of real economy rather than moving in parallel with any policized or quoted rate.Time series standard methodology will be applied in testing the relationships and causality between the factors affecting the determination of MII rate. Factors include real economy represented by Gross Domestic Product (GDP) and Consumer Price Index (CPI) while Overnight Policy Rate (OPR) and conventional interbank money market rate representing the policized and quoted rate. Another independant variable that may affect MII rate is the volumes of MII transaction. This study evidences the long-run relationship between the MII rate and various economic units, financial and economic variables. Findings suggest that MII rate are not influenced by the financial variables but mostly influenced by the economic variables which is in contrast with the nature of banking industries. It is strongly viewed that MII rate will move depending on the movement of the conventional money market rate which is also benchmarking against the overnight policy rate (OPR) but it is proven otherwise.

Keywords: Mudharabah interbank investment, rate of return, real economy, overnight policy rate, VECM, VDC, Malaysia

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INTRODUCTION

The Islamic Interbank Money Market (IIMM) has been introduced in January 1994 to serve as a liquidity tool to Islamic banks operating in Malaysia. Additionally, it is also a channel for the regulator to transmit monetary policy. The purposes are basically similar to the function of conventional interbank money market. The main question here, do the two markets collocate with each other or are they independent. One of the justifications is to look at the rate being offered by both markets and compare it to the policy rate, Overnight Policy Rate (OPR), that is being issued by the Monetary Policy Committee (MPC) of Bank Negara Malaysia (BNM).

Large portion of IIMM transactions are coming from Mudharabah Interbank Investment (MII) deposits and placements activities. Even though Commodity Murabahah Programme (CMP) which offers fixed rate of return is relatively contiguous with conventional approach, the application of Mudharabah concept is preferable due to stronger Shariah permissibility. The return of Mudharabah however, can only be ascertained at the end of the investment period whereby it should be based on the real business activities instead of benchmarking against any specific rate as adopted by the conventional bank.

Hypothetically, Islamic banks' return for Mudharabah transactions should move in line with the movement of real economy and real production whereby some of the indicators are Gross Domestic Product (GDP) and Consumer Price Index (CPI). It is due to the nature of Mudharabah contract where the Profit Sharing Ratio (PSR) is not something that can be tagged to a fixed rate. Even though the banking business in convention seemly unrelated to those indicators rather subjected to OPR, it should be acknowledged that OPR is also dependent on the economic growth in its determination. Whenever economy is in upward trend, GDP and CPI tend to move upward and basically the OPR will also be increasing. The issue, does it justify that all of them, both interbank rate of return either Islamic or conventional,OPR, GDP and CPI are inter-related?

Another possible cause determining interbank rate is the placement volume. When a bank needs more funds, it will offer higher return and lower return will be quoted when they are in a long position. That is the factor varying rate of returns between banks either Islamic or conventional. For the purpose of this study, it will be tested as to whether MII return is dependent on benchmarking factors or economic factors.

1.0 LITERATURE REVIEW

According to Junaina and Carl, there is no relation between Kuala Lumpur Interbank Offered Rate (KLIBOR)[1] and overnight IIMM rate and both run independently. The data used are taken from the month of May 2006 until May 2007 which in our view may not lead to a precise assumption as within a year, the rates may not significantly differ. It was indirectly justified by the conclusion written by Chong and Ming (2008) saying that the conventional and Islamic deposit rate had long term relation in Profit Loss Sharing (PLS) paradigm, while no relation within short term. The latter study sampling period was from April 1995 to April 2004 which tends to be more reliable.

Kaleem and Isa (2003) found out that Islamic bank is considering interest rate before adjusting its deposit return. Based on their Johansen cointegration test, it shows that all Islamic investment rates are cointegrated with their corresponding maturity-matched and there is long term relation between conventional and Islamic rate. However, IIMM rate does not granger caused conventional money market rate.

Junaina and Carl explained that the different result between Kaleem and Isa and theirs is due to the data in Kaleem and Isa's study was using 1, 3, 6, 9 and 12 months observation and covering a longer period from January 1984 to December 2002 that contributed to a more significant result.

On the other hand, Sudin and Nursofiza in their paper assume that all variables tested have no relations with the dependent variable which is the return on Islamic banking deposit. Their variables are the Islamic and conventional return on savings and investment, GDP, CPI, Base Lending Rate (BLR), Kuala Lumpur Composite Index (KLCI) and M3[2]. However, after testing using the Johansen cointegration procedure, it reveals that a long-run relationship existed between

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[1] KLIBOR is an interest rate derived from the activities of borrowing and lending funds in the professional interbank market. Market participants comprising of commercial and merchant banks, discount houses, finance companies and Cagamas bid for funds or offer to lend from or to each other in the inter-bank market through money brokers and/or at times directly. As the rate is arrived at objectively, the KLIBOR is used by some banks as a benchmark for pricing loans to corporate bodies as well for the pricing of other money market instruments.

[2] M3 includes notes and coins (currency) in circulation (outside Federal Reserve Banks and the vaults of depository institutions), traveler's checks of non-bank issuers, demand deposits, other checkable deposits which consist primarily of negotiable order of withdrawal accounts at depository institutions and credit union share draft accounts, savings deposits, time deposits less than $100,000 and money-market deposit accounts for individuals, large time deposits, institutional money market funds, short-term repurchase and other larger liquid assets.

all deposit accounts and its determinants. In addition, most variables investigated shown a significant relationship with the dependant variables.

In relation to the IIMM establishment, Bacha discussed that Islamic banks need Shariah-compliant money market as a liquidity management tool. As BNM had no existing workable model to follow suit, the IIMM was designed in way similar to the conventional market. Not to say imitating as the structure of instruments and the underlying concepts applied are certainly different from what have been offered by its counterpart, though, operationally it may move in parallel especially when comes to the return promised to their depositors as both markets are competing in raising funds to smoothen their business.

Masih, et al.(2010) paper provides technical guidance in interpreting the results generated from Microfit.

2.0   THEORIES

BNM is the regulator for banking institutions be it Islamic or conventional. The frameworks, policies and guidelines governing them are similar except for those special to Islamic banking operations such as Mudharabah and Musharakah return, Profit Sharing Investment Account (PSIA) as risk absorbent, smoothening payout for variable deposits etc. It is understandable that whenever MPC announcing it OPR, both Islamic and conventional rate of return will adjust accordingly.

Even though OPR seems to affect the volatility of banking rate of return the most, there are also few other factors that give rise to the movement including but not limited to liquidity position of the bank and loyalty level of the customer/depositor. Loyalty is not easily quantified so it will not be taken into consideration while liquidity of a bank can be estimated by the volumes of placements through interbank money market. Whenever the bank is in short position, it tends to offer a higher return to its customer in order to attract the customer to deposit money with the bank and vice versa.

Sudin and Nursofiza stated that the growth in the economy is represented by GDP. Most empirical literature has shown an ambiguous relationship between deposit/placement and growth. Similarly, the direction of causality between these variables is still under much debate.

The simple permanent income theory postulates that higher growth reduces current savings because of higher anticipated future income. But in the life-cycle model, growth has an ambiguous effect on savings, depending on which age cohorts benefit the most from the growth, how steep their earning profiles are, and the extent to which borrowing constraints apply. The above is more relevant to mass deposit activities, however, retail level activities will directly impact interbank money market activities.

Additionally, CPI is used as a proxy for inflation and inflation is expected to increase saving for two reasons. First, theory postulates that greater uncertainty should raise savings since risk-averse consumers set resources aside as a precaution against possible adverse changes in incomeand other factor. Second, inflation could influence saving through its impact on real wealth. If consumers attempt to maintain their target level of wealth or liquid assets relative to income, saving will rise with inflation.

M3 is also one of the tools used by the government in managing its monetary policy. Changes in money supply can have a major impact on economic conditions. An increase in money supply makes loanable funds cheaper, thus reducing cost of borrowing for corporate and individual customers. Hence, it is expected that people will increase consumption and reduce savings. Therefore, money supply is presumed to have an inverse relationship with deposits. However, this paper will not apply M3 as one of the variable as it has no longer been tracked by the US central bank shows the insignificancy while some says it is a poor indicator of monetary inflation.

4.0 METHODOLOGIES

4.1 Data Descriptions

There are 6 variables to be tested with total observations of 44. Data collected are on quarterly basis from the year 2000 until 2010. The small number of observations is due to unavailable monthly figure of GDP while the monthly data of CPI available starting the year 2000. Another limitation that may give effect to the test result is the replacement of 3-month Intervention Rate to OPR in April 2004 while the rate quoted starting then recorded a significant reduction. It is observed from the raw data that MII rate and conventional money market rate also have a

significant variance with the 3-month Intervention Rate as compared to OPR whereby the all rates are relatively stood within the same range.

Following table shows the list of variables:

Variable	Level Form	Differenced Form
MII Rate	MIIR	DMIIR
MII Transaction Volumes (log)	LMIIV	DMIIV
OPR	OPR	DOPR/DDOPR
Conventional Money Market Rate	MMR	DMMR
GDP (log)	LGDP	DGDP
CPI (log)	LCPI	DCPI

4.2 Step 1: Unit Root Test

Unit root test is a test to determine the stationarity of all variables applied in this study. A variable is stationary when its mean, variance and covariance are constant overtime. The constantness assumption does not reflect the reality as everything keeps on moving. When we assume everything is constant, it excluded the long run factor in the equation that makes the theorical assumption invalid. That is the importance of testing the stationarity of each variables to make sure the long run effect remains in proving the economic theory.

There are 2 forms of variables; Level Form and Differenced Form. The Ho (null hypothesis) for the Level Form variables is I(1) where it is non-stationary in order to make sure it is not constant and carries the long term effect. We will accept Ho whenever the Test Statistic of the highest AIC and SBC is lower than the ADF Statistic; reject Ho whenever the Test Statistic exceed critical value at 5% significant level.

Result of the Level Form variables test as follows:

Variable	Test Statistic	ADF Statistic	Test Result
Variables in Level Form			
MIIR	-2.8304	-3.5279	Variable is non-stationary
LMIIV	-2.2522	-3.5279	Variable is non-stationary
OPR	-2.2478	-3.5279	Variable is non-stationary

Variable	Test Statistic	ADF Statistic	Test Result
MMR	-2.5358 (AIC)	-3.5279	Variable is non-stationary
MMR	-2.6385 (SBC)	-3.5279	Variable is non-stationary
LGDP	-3.0760 (AIC)	-3.5279	Variable is non-stationary
LGDP	-1.9533 (SBC)	-3.5279	Variable is non-stationary
LCPI	-2.4396	-3.5279	Variable is non-stationary

Basically, from the above results we accepted Ho for all variables.

Differenced Form variables Ho is I(0) whereby it is stationary. The variables need to be "differenced" in order to retrieve the short term effect. We will accept Ho whenever the Test Statistic of the highest AIC and SBC is higher than the ADF Statistic and vice versa.

Result of the Differenced Form variables test as follows:

Variable	Test Statistic	ADF Statistic	Test Result
Variables in Differenced Form			
DMIIR	-3.9003	-2.9400	Variable is stationary
DMIIV	-3.1833	-2.9400	Variable is stationary
DOPR	-2.7755	-2.9400	Variable is non-stationary
DMMR	-3.8479	-2.9400	Variable is stationary
DGDP	-4.1689 (AIC)	-2.9400	Variable is stationary
DGDP	-6.9715 (SBC)	-2.9400	Variable is stationary
DCPI	-4.7376	-2.9400	Variable is stationary

From the above results, it shows that Test Statistic for DOPR is lower than the critical value at 5% significant level, so, we reject Ho for DOPR. However, 2nd level of "differenced", DDOPR, shows that the Ho is accepted. The subsequent test will then apply DDOPR.

Variable	Test Statistic	ADF Statistic	Test Result
Variables in 2nd Level of Differenced Form			
DDOPR	-3.8602	-2.9422	Variable is stationary

4.3 Step 2: Vector Auto-Regression (VAR)

Before reaching to cointegration test, the optimal number of lag has to be identified through VAR test to make sure that the model is well-specified. Based on highest computed values for AIC and SBC after stipulating an arbitrary relatively high VAR order of 4, the optimal number of lag selected is 3.

4.4 Step 3: Cointegration Test

The test of cointegration is important to evaluate as to whether all variables are cointegrated and having a long term relationship. This test will determine the co-movement of the variables whether there are only one or more groups of cointergrations. The presence of cointegration implies that the variables are not drifting away from each other arbitrarily. Cointergration will tell if there is any deviation towards the variables but in the end it will adjust and return back in the long run.

The Ho in this particular test is no cointegration and will be tested by using 2 models; Maximum Eigenvalue and Trace. According to the first model, there is only 1 cointegration vector while there are 3 cointegration in Trace at 5% significant level and 2 cointegration at 10% significant level.

Null	Alternative	Test Statistic	95% Critical Value	90% Critical Value
Maximal Eigenvalue				
r = 0	r = 1	65.5498	43.6100	40.7600
Trace				
r = 0	r = 1	158.1693	115.8500	110.6000
r = 1	r = 2	92.6195	87.1700	82.8800
r = 2	r = 3	62.6836	63.0000	59.1600

The SBC test result eventually shows that only 1 cointegration is preferable as the highest SBC is at r = 1. For the purpose of this study, Maximal Eigenvalue and SBC results will be carried to the subsequent steps.

4.5   Step 4: Long-Run Structural Modeling (LRSM)

LRSM is a test to determine the coefficient of variables against theoritical expectations in long run. We will start by identifying the dependant variable and put restriction on its relation with other variables. This particular variable will be normalised in the Microfit, stated as A1=1. In this paper as we are testing the determinants of MII rate, MII rate is the dependant variable. Once the results generated, Coefficient need to be divided by Standard Error to get T-Ratio. Whenever the T-Ratio is higher than 2, it shows that the variable is significant and when the T-Ratio is lower than 2, it is insignificant and we may justify whether to put a restriction to the variable or not subsequently.

Variable	Coefficient	Standard Error	T-Ratio	Test Result
MIIR	1.0000	*NONE*	-	Variable is significant
LMIIV	-.16171	.023954	-6.75	Variable is significant
OPR	-.047774	.0091797	-5.20	Variable is significant
MMR	-.93520	.016152	-57.90	Variable is significant
LGDP	.26372	.084276	3.13	Variable is significant
LCPI	-.33079	.26630	-1.24	Variable is insignificant

The above result show that LCPI is insignificant. So, we need to proceed with Over Identifying Restriction test to determine whether restriction to it is necessary or not. A1=1;A6=0 equation will be inserted to test Ho which is restriction is correct. After the testing, it is proven that LCPI variable is insignificant as the Chi Squared is 23.8% which is more that the 5% significant level. So, the second equation will be applied in the next steps.

4.6   Step 5: Vector Error-Correction Modeling (VECM)

The main objective in performing this test is to determine which variable will be significantly affected by the error term and which variable is not. The principle behind this model is that there often exists long run equilibrium relationships between economic variables. The variable which is significantly affected by the error term is called endogenous, while the variable which is insignificantly affected by the error term is called exogenous.

From the following table we may see that all variables are exogenous except for one which is LGDP as the ecm(-1) shows the probability is less than the 10% significant level. It means that all other variables will affect LGDP whenever there is movement.

Variable	Coefficient	Standard Error	T-Ratio	Test Result
MIIR	-1.0699	1.1012	-.97154 [.340]	Variable is exogeneous
LMIIV	1.5263	2.0260	.75337 [.458]	Variable is exogeneous
OPR	3.0238	2.9107	1.0389 [.308]	Variable is exogeneous
MMR	-.46133	1.1405	-.40448 [.689]	Variable is exogeneous
LGDP	-.52045	.28572	-1.8215 [.080]	Variable is endogeneous
LCPI	.024167	.11153	.21669 [.830]	Variable is exogeneous

The above results are unexpected as the LGDP is estimated to become the strongest variable that will affect all other variables or at least becoming the exogeneous variable. Theoretically we know that OPR is set based on the economic conditions, while GDP and CPI are few of the drivers and OPR will later on leads the movement of MII and conventional money market rate.

As the above are produced, we can say that all variables except for LGDP are independent and will only affect GDP. We must remember that OPR is a channel for the regulator to transmit monetary policy while it may also be affected by international import-export activities, currency fluctuations, political situation and many other factors. It may turn the other way round where OPR will impact GDP as when the OPR increasing, banking customer starts to keep more money to receive higher return while stop spending in order to avoid higher interest expense. In this scenario, demand will reduce that will lead supply to reduce.

4.7 Step 6: Variance Decompositions (VDC)

In the previous test of VECM, we can only find out which variable is exogeneous and which is endogeneous and we do not know which exogeneous is the most exogeneous variable and vice versa. VDC is a test that shows the relative degree of endogenenous or exogenous variables. It decomposes the variance of the forecast error of a particular variable into proportions attributable after getting a shock in each variable including its own.

The variable which is explained mostly by its own shocks is deemed to be the most exogenous. The variable that have a lot of decomposed propotions in other variables are said to be endogenous. Period taken is 20 and 40 which represent the forecasted VDC in 5 years and 10 years time respectively.

Period 20 = 5 years

Variable	MIIR	LMIIV	OPR	MMR	LGDP	LCPI
MIIR	0.3584	0.0071	0.1074	0.3429	0.1008	0.0834
LMIIV	0.0794	0.4708	0.0898	0.0603	0.0603	0.2393
OPR	0.2463	0.0635	0.4010	0.2370	0.0428	0.0094
MMR	0.3602	0.0033	0.1126	0.3496	0.1025	0.0719
LGDP	0.1568	0.1389	0.0245	0.1741	0.4897	0.0160
LCPI	0.1249	0.0952	0.0173	0.1031	0.0266	0.6328

Period 40 = 10 years

Variable	MIIR	LMIIV	OPR	MMR	LGDP	LCPI
MIIR	0.3587	0.0063	0.1077	0.3433	0.1001	0.0838
LMIIV	0.0805	0.4487	0.0751	0.0584	0.0944	0.2429
OPR	0.2462	0.0653	0.4014	0.2368	0.0413	0.0091
MMR	0.3599	0.0039	0.1122	0.3494	0.1033	0.0713
LGDP	0.1621	0.1357	0.0237	0.1791	0.4851	0.0143
LCPI	0.1243	0.1020	0.0173	0.1026	0.0259	0.6279

In both period, there are no difference in the relative degree of endogenenous and exogenous in terms of ranking. Both led by CPI whereby all other variables will be most impacted by it whenever CPI move. However, the only endogeneous variable in VECM which is GDP becomes the second most exogeneous in 5 and 10 years period of time.

Rank	Period 20 = 5 years	Period 40 = 10 years
1	LCPI	LCPI
2	LGDP	LGDP
3	LMIIV	LMIIV
4	OPR	OPR
5	MIIR	MIIR
6	MMR	MMR

The test also tells that Islamic and conventional money market rate are closely related to each other in long run. Furthermore, there are not so much of difference in the relationship between all variables after 5 years and after 10 years. It indirectly tells us that all of the variables applied in this study tend to be consistently relevant in future years to come.

LCPI and LGDP to become the most exogeneous variable in determining the MII rate is something unexpected as the result rather shows MMR or at least OPR and LMIIV. However if we went back to the purpose of the study, it is to justify that the MII rate is not bechmarked against conventional or policied rate is successfully done. In a different view, we will still see that all policised and quoted rates are moving in a same direction but comprehensively affected by the economic factors. It does not prove that MII rate is not driven by the policised and conventional money market rate except for all rate based variables are independent.

4.8 Step 7: Impulse Response Functions (IRF)

IRF is basically producing the same result as VDC presented in graphical form.

4.9 Step 8: Persistence Profiles (PP)

Finally, PF indicates that if the whole cointegrating relationship is shocked, it will take about 18 periods for the entire equations to come back to equilibrium. As the data is on quarterly basis, it will take around 4 and a half years to get back to the equilibrium point.

5.0 FINDINGS and ANALYSIS

Result shows that MII rate is independant and so does the conventional money market. Both of the rates are also independent from the policised rate which is OPR. It shows that even though there is a relation between all of those rates, the determination of each are independant from the others. It may have another factors that form part of the MII rate component apart from OPR and conventional money market rate which gives more effect.

The best part is, MII rate is driven mostly by the movement of real economy and real production whereby the indicators used for the test were GDP and CPI. Even though that is the less

expected result as the banking institutions are basically driven by the policy rate, OPR, or at least the volume of placement, we must also acknowledge that the economy is basically determined by supply and demand whereby CPI and GDP are the most relevant indicators to be based on. In order for the regulator to stabilize the economic conditions from inflation due to the unmatched demand and supply, BNM through the MPC need to adjust the OPR accordingly.

Whenever the OPR is adjusted, banking institutions' rate of return on deposit/placement, rate of borrowing for conventional banks and rate of financing for Islamic banks will also be adjusted accordingly. In the event OPR is increasing in order to reduce spending in the market while promoting savings, the borrowing and financing rate will be increasing as well due to lesser customer to apply for loan and financing. It is all subjected to rule of economies of scale; as the demand is shrinking, in order to get the optimal profit for the company or in this case the bank, it should increase the financing rate whenever the deposit rate increased.

6.0   CONCLUSION

This study supports the long-run relationship between the MII rate and various economic units; financial and economic variables. Findings suggest that MII rates are not influenced by the financial variables but most influenced by the economic variables which is in contrast with the nature of banking industries. It is strongly viewed that MII rate will move depending on the movement of the conventional money market rate which is also benchmarking against the overnight policy rate(OPR) but it is proven otherwise.

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