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Monetary Policy Transmission through the Bank-Financing Channel in Malaysia: Evidence from Bank-Level Data

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This study analyses the role of Islamic banks in transmitting monetary policy through the bank-financing channel in Malaysia. Bank size, liquidity and capitalization levels are hypothesized to be sources of cross-sectional differences among banks. If relevant, this implies that the financing channel is operational through the Islamic banks. We evaluate a sample period from 2000 to 2011, using panel data with robust standard errors, to investigate the heterogeneity of the financing supply in response to monetary policy shocks. The results show no significant differences across banks, based on size, capitalization and liquidity levels, and thus do not support the presence of a bank-financing channel in Malaysia. The study contributes a deeper understanding of the role of Islamic banks in the monetary policy transmission mechanism in Malaysia.

1. Introduction

Monetary authorities study the transmission mechanism of monetary policy to adopt suitable monetary policy frameworks. Successful monetary policies depend on accurate interpretations of the relationship between policy Measures and policy objectives. The literature shows that opposition to policy activism is based on the argument that there is not enough information about these relationships (Mishkin, 2007). Therefore, studying the mechanism of monetary policy transmission mechanism is important for both academics and policymakers. In Malaysia, the monetary policy framework has continuously evolved alongside the development of its economic and financial system. Malaysian authorities are in constant pursuit of effective monetary policy implementation. However, the rapid ascent of interest-free

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banking, alongside the existing conventional banking system, may have complicated the transmission process of monetary policy and added further challenges to the assessment of the effectiveness of monetary policy in the country.

Over the last decade, the Islamic banking industry has been successful in Malaysia. At the end of 2000, Malaysia had 2 full-service Islamic banks and 17 commercial banks with Islamic windows. By 2011, Malaysia had 17 full-fledged Islamic banks and subsidiaries, aided by liberal and accommodating measures of the Financial Sector Master Plan. Islamic financing in Malaysia surged from 2% of gross domestic product (GDP) in 2000 to about 42% of GDP in 2012. This trend is expected to continue as Islamic financing is projected to account for 40% of total financing advances in 2020, compared to 20% in 2000, in Malaysia (Bank Negara Malaysia Financial Stability Report, 2011). This attests to the importance of the Islamic banking institutions in financing the economy, and thus, policymakers should have a clear picture of the role of these banks in the transmission process of monetary policy.

The significant expansion of the Islamic banking in Malaysia may undermine the potency of the traditional interest rate channel and caution the impact of monetary actions. However, the lending channel may provide an alternative explanation to how monetary policy in a dual banking system can influence financing advanced by Islamic banks. The lending channel theory assumes that bank deposits and sources of wholesale funds are not perfect substitutes for each other. Following strict monetary policies, some banks (based on their characteristics) cannot fully replace lost deposits, which leads them to decrease lending. Based on the assumptions of bank-dependent borrowers, this leads to a reduction in aggregate demand components (mainly investment and consumption), which ultimately affects price level and output.[3] Thus, the lending channel mechanism works by affecting credit availability, not loan cost, as the traditional interest rate channel suggests.

The Islamic banks, although non-interest financiers, they share the underlying basis of deposits with conventional banks and thus it is

[3] Alistair et al. (2009) argue that the possibility for the lending channel to either amplify or attenuate monetary policy depends on the net effect between the supply of deposits and demand for lending. This means that the bank lending channel should not be viewed as a freestanding mechanism that is independent of the traditional interest rate channel.

possible for them to be affected by changes of monetary policy stance. Depositors of the Islamic banks may switch to conventional banks during rising interest rates, making the outflow of deposits even worst for the Islamic banks leading to a reduction in supply of financing (Kasri and Kassim, 2009). This is conceptually known as the Displaced Commercial Risk. Although Bank Negara Malaysia (BNM) has introduced regulatory measures to mitigate this unique risk, it is not clear to what extent these measures can caution the destabilising effects of monetary policy changes upon Islamic financing. By adopting a bank-level data approach, this study tries to identify the Islamic financing channel and to investigate the determinants of financing supply in response to monetary policy actions in Malaysia.

2. Literature Review

Since Bernanke and Blinder (1988) first laid the foundation for the lending channel theory, research has been conducted on the role of banks in the monetary policy transmission process. For example, Bernanke and Blinder (1992), Kashyap and Stein (2000), and Kishan and Opiela (2000) find evidence in support of the presence of the lending channel in the United States. Most of the evidence is from the cross-sectional differences among banks of different characteristics such as liquidity, size, and capitalization. Ehrmann et al. (2003) also adopt a bank-level data approach and find evidence to suggest that the lending channel is operational in the Eurozone. Olivero et al. (2011) use panel data to obtain a sample from emerging and developing economies in Asia and Latin America and find that the transmission of monetary policy through the lending channel has weakened because of consolidation in the banking sector. Several studies focus on the transmission of monetary policy through the bank-lending channel in Malaysia. Goh and Yong (2007) adopt aggregate data approach and conclude that bank lending is generally insensitive to changes in monetary policy after the Asian crisis period.

A limited number of studies address the role of Islamic banks in the transmission mechanism of monetary policy. Kassim et al., (2009) adopt VAR methodology to investigate the effect of monetary policy shocks on the balance sheet items (deposits and financing) of Islamic banks, in comparison to conventional banks. They find that the Islamic banks' deposits and financings are more responsive to monetary policy actions,

compared to their conventional counterparts. Said and Ismail (2007) use panel data methodology to investigate how changes in monetary policy affect the financing behaviour of Islamic banks in Malaysia. The results suggest that monetary policy has a significant impact on the volume of financing advanced by Islamic banks. However, they find that bank characteristics (profitability and capitalization) have no role in determining the banks reaction to monetary policy, which does not help to identify the financing channel. Muhammad et al., (2012) also adopt the bank-level approach. They utilised annual data on the Islamic banking institutions in Malaysia covering the period from 1997 to 2010. Using the Islamic Interbank Rate as a monetary policy indicator, the monetary policy changes are found insignificant in determining the level of the Islamic financing in Malaysia. Characteristics found influential in determining financing supply are capitalization, liquidity, and specific risk.

Some similar studies were conducted in other Muslim countries. For instance, Zaheer et al. (2011), use disaggregate data from Pakistan to examine the responses of the Islamic banks to monetary policy in comparison to conventional banks. They find that, unlike conventional banks, the Islamic banks maintain the volume of their financing irrespective of their size and liquidity positions. They concluded that the monetary policy transmission mechanism through the lending channel might be attenuated by the growth of the Islamic banking industry. Their findings were justified by the lack of competitiveness and investment opportunities as well as inefficiency of Islamic interbank market in Pakistan.

Malaysian Islamic banking industry has weathered the global financial crisis thanks to the well-developed Islamic financial system as well as sound supervisory and regulatory framework (IMF Country Report, 2013). This study is an effort to shed light on one of the aspects of the Islamic banking in Malaysia, namely their role in the transmission mechanism of monetary policy. From the review of the literature, previous studies use the Islamic interbank rate as a monetary policy indicator to investigate the existence of the financing channel in Malaysia. Although this rate closely follows the precursor rate (the conventional rate), there might be some lag in this relation which does not help reflect the real speed of pass-through of the policy rate in the transmission of monetary policy. Moreover, this study use data from its

primary sources and all variables included are calculated manually to obtain more representative information.[4]

3. Empirical Framework

3.1 Data

We use annual data from 11 Islamic banks that operated in Malaysia from 2000 to 2011. The 11 banks are selected from 17 Islamic banks, based on available data. The data are sourced from the banks' annual reports, BNM's annual reports, and Department of Statistics Malaysia. Table 1 describes the variables used in the model. These variables represent bank-specific characteristics, namely capitalization, liquidity and size in addition to macroeconomic variables, namely GDP, inflation, and a monetary policy indicator. The bank-specific variables are calculated using the formulas in Table 1.

Table 1: Model Variable Definitions and Sources

Variable	Definition	Source
GDP	Real Gross Domestic Product based on 2000 price	Department of Statistics Malaysia
Monetary policy indicator (BLR)	annual average of Base Lending Rate	BNM annual reports
Inflation rate(Inf)	inflation rates (CPI based on 2000 price)	Department of Statistics Malaysia
Liquidity (Liq)	(liquid assets/ total assets)*100	Banks' annual reports
Capitalization (Cap)	[(total equity + reserves) / total assets]*100	Banks' annual reports
Size (S)	(bank total assets/banking system total assets)*100	Banks' annual reports and BNM annual reports
Islamic Financing (F)	volume of Islamic financing, as reported at the end of the period (31- December)	Banks annual reports

[4] Ehrmann (2003) believes that the bias in the BankScope database information is responsible for the contrasting results obtained from studies used BankScope information and other studies used the national banks information in the Euro zone.

3.2 Model Specification and Methods of Investigation

Aggregate data is widely used to investigate the existence of lending channels in different economies. However, the problem of identifying the lending channel requires disentangling the demand effects from the loan supply effects, which is not completely resolved by using the aggregate data approach (Kashyap and Stien, 2000). Following Ehrmann (2003) and Kashyap and Stein (1995, 2000), we examine the heterogeneity of Islamic banking institutions across size, liquidity and capitalization to identify the financing channel. The estimation model can be written as follows:

$$\log(F_{it}) = a_0 + \beta_1 \log GDP_t + \beta_2 inf_t + \beta_3 r_t + c_k x_{itk} + e_k r_t x_{itk} + \varepsilon_{it} \quad (1)$$

$$i = 1\ldots,N, \qquad t = 1,\ldots,T$$

where F is the volume of financing for bank i in time t. The subscript k stands for the number of the bank specific factors. GDP is included to capture financing demand. Because GDP can also be obtained as a general proxy for business cycle and real activities, we assume that time effect also can be captured by including GDP and inflation rate in the model. The bank-specific characteristics are given as x_{it}, which denotes the levels of liquidity (Liq) capitalization (Cap).and size (S).

In the model, the coefficient β3 refers to the impact of monetary policy on the average bank in the sample, regardless of their size, liquidity and capitalization levels. The coefficient e_k is a vector of interactions between the monetary policy indicator and the interval-independent variables of bank characteristics. Because these variables are hypothesised to be moderators, the heterogeneity among banks should be reflected in significant and positive (or, more accurately, a less negative) interaction terms.[5] Multiplicative models usually have high

[5] The coefficients of the interaction terms give the ratio by which B2 is moderated when Cap and Liq are taken into account. Therefore, our primary aim is to investigate whether increases in capitalization and liquidity make the relationship between policy rate and bank lending less negative (e.g. see Franklin and College, 1982).

levels of multicollinearity. Balli and Bent (2010) suggest reducing collinearity by demeaning the interaction terms.

As for the model specifications, if the following assumptions hold, then nothing is special about our data and pooled ordinary least squares (OLS) estimator can be applied safely.

$$E(\varepsilon_{it}) = 0 \tag{2}$$

$$Var(\varepsilon_{it}) = E(\varepsilon_{it}^2) = \sigma_\varepsilon^2 \tag{3}$$

$$cov(\varepsilon_{it}, \varepsilon_{js}) = E(\varepsilon_{it}, \varepsilon_{js}) = 0 \; for \; i \neq j \; or \; t \neq s \tag{4}$$

$$cov(\varepsilon_{it}, x_{2it}) = 0, \;\; cov(\varepsilon_{it}, x_{3it}) = 0, \quad where \; x \; is \; regressor \tag{5}$$

To ensure that, we conduct the following tests:

Lagrange Multiplier Test: Breusch and Pagan (1980) describe the theoretical background of the Lagrange Multiplier (LM) test, which assesses the property of random-effect estimation (RE) against pooled estimation. For the pooled method to be correct, the heterogeneity among banks should not be explained by the cross-sectional dimension, but instead by other micro and macro explanatory variables. To test for unobserved bank effects, the error terms in equation (1) can be decomposed into:

$$\varepsilon_{it} = u_i + e_{it} \tag{7}$$

where u_i is the bank-specific random effect.

Given the basic assumptions, the presence of bank heterogeneity can be investigated by testing these hypotheses:

$$H_0 : \; \sigma_u^2 = 0$$
$$H_A : \; \sigma_u^2 > 0$$

If u_i in equation (7) equals zero for each bank, then there is no bank effect, either random or fixed to count for.

Over-identifying Restrictions Test: The ordinary Hausman test investigates the consistency of the RE model. If $\sigma_u^2 \neq 0$ and $cov(u_i, x_{itk}) = 0$, then the RE is more appropriate (more efficient) than the fixed-effects (FE) estimator. The main limitation for this test is that it assumes that both estimators are efficient under the null hypothesis, which requires assumptions (3) and (4) to hold. Moreover, the RE model uses the orthogonality condition $(u_i, x_{itk}) = 0$, which may be difficult to maintain for panels. In our data, where financing is provided by varying bank size, we expect to encounter heteroskedasticity in the disturbance term. In this case, the FE is a consistent but inefficient estimator, and thereby, the ordinary Hausman test becomes invalid. Arellano (1993) and Wooldridge (2002) propose an alternative approach, to assess FE models against RE models, which is robust to heteroskedasticity and autocorrelation. Under the homoscedasticity and independence assumptions, this test is asymptotically equivalent to the popular Hausman test.[6]

4. Empirical Results

This section includes the description of the data and the major specifications conducted to ensure an unbiased estimation.

4.1 Descriptive Statistics

In Table 2, the uppercase N denotes the overall observations, and the lowercase n denotes the number of banks. The min and max columns give minimums and maximums of x_{it} for overall variance, $\bar{x}_i$ for between-group variance, and $x_{it} - \bar{x}_i + \bar{x}$ for within-group variance (Cameron and Trivedi, 2010).

[6] The Stata software (College Station, TX) includes an over-identifying restrictions test (xtoverid).

Table 2: Descriptive Statistics

variable		mean	median	std	min	Max	Obs
Log loans	overall between within	14.53	14.92	1.73 1.33 1.17	9.36 12.21 10.07	17.72 16.43 17.16	N =132 n =11 T=12
Log GDP	overall between within	19.93	19.51	.16 0 .16	19.69 19.93 19.69	20.19 19.93 20.19	N =132 n =11 T =12
Inflation	overall between within	2.29	1.77	1.32 0 1.32	.57 2.29 .57	5.38 2.29 5.38	N =132 n =11 T =12
BLR	overall between within	6.32	6.39	.36 0 .36	.551 6.32 5.51	6.87 6.32 6.87	N =132 n =11 T =12
Capital Strength	overall between within	7.59	6.6	4.03 2.3 3.37	2.4 5.02 .62	23.5 11.87 19.22	N =132 n =11 T =12
Liquidity	overall between within	46.99	48.5	19.71 12.5 15.87	10 26.92 1.42	96.5 66.02 85.09	N =132 n =11 T=12
Size	overall between within	.94	.74	.86 .76 .45	.01 .09 .9	5.33 2.54 3.72	N =132 n =11 T =12

Although log loans show more variations between groups, the bank-invariant regressors (GDP, inflation, and BLR) have zero between-group variations; hence, the between-group estimation is not appropriate for these data. Liquidity and capitalization levels show greater variance within banks than between banks. This is due to the considerable development of Islamic banking during the 2000s. Inflation rate and bank specific factors are skewed. Thus, we use log transformation to meet the normality assumption.

4.2 Results of the Specification Tests

To have a clear picture of the sequences of testing process, Table 3 combines results of different estimators. It also includes tests for the consistency of the RE model and the presence of heteroskedasticity, multicollinearity as well as a poolability test (LM test).

Table 3: Results of the Specification Tests

Dependent Variable log Financing	**Model 1 Fixed Effect (OLS)**	**Model 2 Random Effect (FGLS)**	**Model 3 Pooled OLS**
Constant	-22.434*** (7.349)	-19.652*** (6.292)	19.96*** (6.35)
GDP	1.96*** (0.364)	1.854*** (0.306)	1.87*** (0.308)
Inflation	0.122 (0.107)	0.113 (0.111)	0.112 (0.144)
Blr	-0.026 (0.189)	-0.021 (0.195)	-0.023 (0.201)
Capitalization	0.445*** (0.13)	0.286** (0.119)	0.231** (0.117)
Liquidity	-0.651*** (0.116)	-0.703*** (0.104)	-0.718*** (0.101)
Size	1.032*** (0.093)	1.099*** (0.048)	1.097*** (0.044)
Blr*Cap	-0.729** (0.428)	-0.935*** (0.439)	-1.003*** (0.444)
Blr*Liq	-0.341 (0.386)	-0.444 (0.389)	-0.479 (0.394)
Blr*S	-0.641*** 0.265	-0.609*** (0.272)	-0.6*** (0.278)
LM test		χ^2= 3.94***	
Over-identifying restrictions test	Sargan-hansen = 231.59***		
Multicollinearity test (VIF)			Mean VIF= 1.85
Modified Wald test for group-wise Heteroskedasticity	χ^2=323.71***		

Notes: ***, **, and * indicate significance at 1%, 5%, and 10%, respectively

In Table 3, Model 1 is the FE within-group estimation, Model 2 is the FGLS RE estimator, and Model 3 is the OLS pooled regression. These are the default methods for FE, RE, and pooled models. For the selected variables, each model exhibits different results, which signals the presence of bias. The LM test clearly detects the influential presence of bank effects; therefore, pooling the data leads to biased estimates. Before testing how the unobservable effects should be treated, we first, test the efficiency of Model 1 (FE model). The result reveals that the null hypotheses that panels are homoskedastic is rejected at better than 95% level of confidence. Therefore, the usual Hausman test is not valid. The over-identifying restrictions test provides evidence in favour of FE model as the test significantly rejects the null hypothesis that the over-

identifying restrictions of consistency hold for RE model. As our tests suggest, assumptions (3) and (5) are violated. Therefore, the efficiency of Model 1 and the reliability of the hypotheses testing are questionable. In order to insure valid statistical inference, it is common in the literature to rely on "robust" standard errors that developed by Huber (1967), White (1980) and Arellano (1987). This provides residuals that are valid even if the residuals are heteroskedastic.

4.3 Findings

Table 4 displays the results of the model, specified to estimate the impact of monetary policy on our sample of Islamic banks. The main estimate (r) represents the baseline for the different conditions, namely capital strength, liquidity degree and size. The table shows that the coefficient of monetary policy is small and insignificant, even at 90% level of confidence. This implies that the financings of the Islamic banks are explained by other micro and macroeconomic factors. This result is in line with Muhammad et al., (2012), yet inconsistent with the conclusion of Said and Ismail (2007).

Table 4: Results of the Fixed Effect Model

Dependent variable log Financing		**Coef**	**Robust standard errors**
Constant		-22.434***	(4.92)
Control variables			
log GDP		1.968***	(0.251)
inflation		0.122***	(0.037)
Monetary policy indicator			
	BLR	-0.026	(0.282)
Bank characteristics			
	Capitalization (cap)	0.445**	(0.156)
	Liquidity (liq)	-0.651***	(0.99)
	Size (S)	1.032***	(0.096)
Interaction terms			
	BLR*cap	-0.729	(0.632)
	BLR*liq	-0.341	(0.623)
	BLR*S	-0.641	(0.418)
R^2		within = 0.86 between = 0.97 overall = 0.92	
F(9,10)		214.6***	

Notes: ***, **,* indicates significance at 1%, 5% and 10% respectively. Bank dummies are not reported.

The findings of this study can be understood in the context of monetary policy implementation in Malaysia. The inflationary pressures have been assessed to be broad based and due to supply factors rather than excessive local demand. Accordingly, monetary policy has not been used aggressively as the BNM believes that there are limits to what monetary policy can achieve in combating rising price levels (BNM Annual Report, 2007). The result can also reflect the development of the Islamic financial system in Malaysia, which enables the Islamic banks to diversify their assets and efficiently manage their liquidity to hedge against liquidity shocks caused by monetary operations.

The coefficients of capitalization and size exhibit significant positive effects on loan supply. As for liquidity, in spite of highly significant coefficient, the relationship is negative. This can be explained by *flight to quality* phenomenon, where banks prefer liquid assets than financing as a hedge against credit and market risks. Capitalization levels for the Islamic banks are highly significant in their association with the financing levels. This can be understood in the context of the dramatic development in the Islamic banking industry during the past 10 years. Since 2002, the Malaysian banking system has witnessed the transformation of Islamic banking windows into full-fledged Islamic subsidiaries. Amidst growing demand for the Islamic banking services, the new-established banks had to increase their start-up capital in order to comply with the regulatory standards.

The changes in real GDP have a positive and statistically significant impact on the volume of Islamic financing. With elasticity of 1.96, our findings suggest that Islamic financing is sensitive to changes in real activities. This result is compliant with most studies conducted on Malaysia, such as Ibrahim (2006), Ibrahim and Shah (2012), Said and Ismail (2007) and Kassim et al., (2009).

The coefficients of the interaction terms are also not statistically significant, suggesting that bank responses to monetary policy are not influenced by the capitalization, size, and liquidity conditions of Islamic banks. According to Goh and Yong (2007), these findings can be attributed to the low interest rate regime prevailed in Malaysia over the last decade. It is also can be justified by Ample liquidity enjoyed by Islamic banks in Malaysia, which shields Islamic financings from the consequences of deposit outflow hypothesised by the lending channel.

Similar results reported by Zaheer et al. (2011) for Pakistan and Said and Ismail (2007) for Malaysia. Yet, it is not consistent with other studies such as Muhammad et al. (2012) how find that monetary policy effect depends on bank specific factors.

The inconsistency between this study and other studies conducted on Islamic banks in Malaysia is probably due to adopting different monetary policy indicators and different data sources. Previous studies rely on the Islamic interbank rate whereas this study uses the conventional interest rate as a monetary policy indicator. It is also noteworthy that the discrepancy among different sources of data (banks' financial statements and BankScope database) can lead to varying results.

5. Conclusion and Discussion

This study investigates the transmission mechanism of monetary policy through the Islamic banks in Malaysia during the period from 2000 to 2011. We adopt a bank-level approach to investigate whether the supply side of financing plays any role in the transmission of monetary policy through the Islamic banks. The study does not find any evident effect for the supply side of financing. Thus, the financing channel seems to have little importance in the transmission mechanism of monetary policy through the Islamic banks. It may, at the first glance, imply that the growth of the Islamic banking industry hinders the transmission of monetary policy through the lending channel. However, such a conclusion requires further investigation into whether weak reaction to monetary policy can be seen as an Islamic banking idiosyncrasy. To answer this question, future research should evaluate the financing behaviour of the Islamic banks in comparison to the conventional banks. The shortcoming of this study is that it employs a static model with a dynamic relationship between monetary policy and loan supply. Because of a lack of quarterly data for bank balance sheet items covering a reasonably long period, we use static model with a longer period to capture the changes of monetary policy.

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