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THE TRANSMISSION MECHANISM OF MONETARY POLICY IN MALAYSIA: THROUGH BANK LOANS OR DEPOSITS?

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ABSTRACT

We investigate the link between banking activities and macroeconomic performance in Malaysia with respect to the money and credit channel by studying the causal influence of banks' assets and liabilities. The Granger causality analyses that we performed support the importance of the credit channel within the Malaysian economy. Significant causations are traced running from changes in loans issued by banks to economic variables. Limited evidence is found for the deposits. Parallel to the working of the credit channel, a one-way causation pattern from deposits to loans is identified. Thus, the Central Bank's policies with respect to the availability of reservable deposits are transmitted to the economy via bank lending activities, supporting the credit channel explanations.

JEL classification: E5

Key words: Transmission mechanism, Banking, Monetary policy

1. INTRODUCTION

The view that banks act as conduits of monetary policy is widely accepted by economics and financial researchers. The general equilibrium models, showing the real impact of monetary policy on the economy such as in Grossman and Weiss (1983), Rotemberg (1984), Lucas (1990) and Fuerst (1992), all include banks in their models.[1] Nevertheless, the role

that was assigned to banks is generally as passive agents through which money is delivered into the economy. Banking decisions do not exert a significant influence on the final results of the model since banks are important only because of their liability side, i.e., as issuers of deposits, which are conceptually monetary aggregates, since deposits are under direct influence of the monetary authorities.[2] These general equilibrium models differ from the earlier view that financial intermediaries (particularly banks) have a special role in determining the impact of monetary policy. Earlier works such as Brunner and Meltzer (1963), and Tobin and Brainard (1963) propose a special role for banks particularly in their decisions with respect to loans issuance. Availability of bank loans assumes a major force that determines the efficacy of monetary policy. The monetary equilibrium models developed by Fuerst (1994) and Labadie (1995) are consistent with this important role for banks. The real impact of money is shown to be dependent on the reactions of banks toward monetary conditions. Both authors indicate that the real economy will be stimulated only if banks' loans supply is affected. Thus, the ability of monetary policy to influence real activities requires the Central Bank's ability to motivate banks to vary their lending activities. Within this framework, banks are important not because of their role as issuers of deposits but mainly due to their loans disbursement. Banking decisions with respect to their assets (particularly loans) are key factors that determine the importance of banking firms.

The studies cited above are related to a broader theme of monetary economics, i.e., the transmission mechanism of monetary policy. An important debate arises in understanding the channels through which monetary policy is transmitted into the economy. Existing discussions on the transmission mechanism generally boil down to two major channels of transmission, the money channel and the credit channel. Proponents of these channels differ in their views regarding the role of banks in transmitting changes in monetary policy. Through the money channel, the effect of monetary policy is direct and largely dependent on variations in bank liabilities (deposits). The monetary authorities' ability to vary the amount of reservable liabilities supplied by banking firms (i.e., deposits) is an important element that determines the effectiveness of the policies implemented.[3] On the other hand, proponents of the credit channel argue that banking firms play an

important role in the transmission process especially due to their lending activities. Bank loans represent a critical factor that influences real activities.[4] The significance of bank loans is further emphasized by the presence of bank-dependent agents who are precluded from assessing the open capital market for their financing needs due to market imperfections.[5] Banks act as mediating agents to resolve these imperfections and fulfil these financing requirements. Thus, monetary policies carry more weight through their ability to influence bank-lending activities. A larger impact of monetary policy comes through the amount of loans supplied by banking firms. Investigations on the effectiveness of monetary policy, therefore, require greater emphasis to be placed on understanding banks' assets particularly their loan portfolio. Studies by Fuerst (1994), Labadie (1995), and Bernanke and Gertler (1995) support the importance of bank loans supply as a critical variable that transmits monetary policy into the economy.

The debate over the transmission mechanism of monetary policy requires greater understanding of the importance of banks' assets and liabilities in explaining variation in economic activities. In addition, being a bank-dependent economy, understanding the impact of bank activities on the Malaysian economic performance is vital.[6] The relative strength of the two channels of transmission mechanisms can be implied by the relative importance of banks' assets and liabilities in explaining economic performance. The strength of the credit channel largely rests on the ability of the Central Bank to influence banking decisions with respect to their lending activities. Thus, the credit channel requires that variations in deposits, triggered by the monetary authorities, affect banks' lending decisions. We examine the role of banks' assets (loans) and banks' liabilities (deposits) in influencing several economic and financial activities in Malaysia. Our analysis supports the important role of the credit variable, i.e., loans issued by banks, in causing changes in the economic performance. The evidence is in line with the credit channel mechanism highlighted earlier. Our results also show a one-way causation pattern running from banks' deposits (under the influence of the Central Bank) to banks' loans issuance. Thus, monetary policy engineered by the Central Bank exerts a significant influence on bank lending activities, firming the credit channel explanation for the Malaysian economy.

The paper is divided as follows. Section 2 describes related empirical studies that examine the relationship between banking activities and the economy particularly its role in the transmission mechanism of monetary policy. This is followed by Section 3 that provides descriptions of the data set and method of analysis employed in this study. The empirical findings are presented and discussed in Section 4. Section 5 concludes with a brief summary.

2. BANKING ACTIVITIES AND THE ECONOMY

A major theoretical debate in banking studies centers on the justification for the existence of banking firms. The traditional view such as that of Benston and Smith (1976) justify the existence of banks based on their ability to reduce the transaction costs of intermediation through economies of scale and specialized services. Intermediation tasks in matching different needs of economic agents (quantity, maturity, risk, liquidity, terms of contracts, etc.) are shown to be cost effective when they go through institutional intermediaries such as banks. This view, however, could not explain the continued existence of banks in an economy that witnesses the development of an open financial market and rapid technological progress. In an efficient financial market, lower transaction costs to match surplus and spending units diminish the role of banks as providers of low cost services. With the assumption of perfect market, Fama (1980) shows that banks are not unique, performing functions which could easily be replicated by individual agents themselves. Thus, banks are subject to the financing irrelevance theorem of Modigliani and Miller (1958).[7]

A more contemporary view offers a new set of theoretical justifications for the existence of banks. It is based on market imperfection in which banks help reduce the problem of asymmetric information. Asymmetric information increases the sorting task faced by lenders to distinguish between good and bad borrowers. Without effective monitoring and screening mechanisms, markets will be filled with *lemons*, leading to sub-optimal allocation of resources. Leland and Sounders (1977) argue that banks play a special role in the economy that could not be performed by the direct financial market. Diamond and Dybvig (1983) and Ramakrisnan and Thakor (1984) show that

banks perform the monitoring role at a lower cost compared to direct monitoring. Rajan (1998) argues that banks are more than just a 'nexus of contracts, whose existence is to take advantage of the incomplete nature of contracts by bringing a variety of non-contractual mechanisms into play derived from the relationship between banker, depositor and borrower. With delegated monitoring, Pareto optimality is achieved thus justifying the importance of banks.

Studies such as Bernanke and Blinder (1992), Petersen and Rajan (1992), and Gertler and Gilchrist (1994) all offer evidence that banking activities significantly influence economic activities. Roussean and Wachtel (1998) establish the quantitative importance of long-run relationships of financial intensity and real per capita levels of output for the United States, United Kingdom, Canada, Norway, and Sweden. Their analysis indicates that an economy with greater financial depth appears to grow faster compared to one with a lower level of financial activity. Gibson (1995), who studies the importance of bank health in the Japanese economy, shows that firms dealing with unhealthy banks invested less than other firms, and thus end up affecting the firms' stock market valuation and cash flows. These studies provide evidence that banking decisions matter for the real economy.

In a wider macroeconomic perspective, banks assume a special role in the transmission mechanism of monetary policy. Proponents of the credit channel propose that banks are special not because of their money liabilities but more so due to their lending activities. Bernanke and Blinder (1988), Bernanke and James (1991), Fuerst (1994), and Labadie (1995) shows that the effect of monetary policy on real economic activities is enhanced by its effect on bank lending capacity. The existence of bank-dependent agents (small firms that heavily rely on bank funding) produces the asymmetric effect of monetary policy. Gertler, Hubbard and Kashyap (1991), Gertler and Gilchrist (1994), Kashyap, Stein and Wilcox (1993), Kashyap, Lamont and Stein (1994), and Oliner and Rudebusch (1996) highlight that smaller bank-dependent firms are adversely affected by contractionary policy compared to large firms that can borrow from the open financial market. These studies that assign a special role for banks suggest the importance of a more detailed characterization of bank behaviour.

The way banks respond to monetary policy partly determines the

final outcome of a given monetary shock. Kashyap and Stein (1995) indicate that reactions of banks vary according to the size of the banks. Larger banks are able to shield their loan portfolios compared to smaller banks. Kishan and Opiela (2000) segregate banks according to assets size and capital-leverage ratio and argue that loan growth of small banks is significantly affected by policy. The results show that loans of small under-capitalised banks are the most responsive to monetary policy, supporting the hypothesis that small under-capitalised banks are unable to raise alternative funds to continue financing loans. Ghazali and Rahman (2001), show that the direct effect of monetary policy on Malaysian banks lending activities diminishes as financial markets developed and liberalized. Thus, the stages of development and evolution of the financial system could exert a significant influence on the way banks react to policies implemented by the monetary authorities.

3. DATA AND METHOD OF ANALYSIS

In assessing the importance of banks' assets and liabilities, we analyze the ability of each of these components to predict economic and financial activities. Monthly observations from 1982: 1 to 1999: 12 of the following series of assets and liabilities of commercial banks and the macroeconomic and financial variables are gathered from the *Monthly Statistical Bulletin* of the Central Bank of Malaysia: (i) total loans issued by commercial banks (TL); (ii) short-term loans (STL); (iii) medium-term loans (MTL); (iv) long-term loans (LTL); (v) total deposits held by the commercial banks (TD); (vi) demand deposits (DD); (vii) savings deposits (SD); (viii) fixed deposits (FD); (ix) Industrial Production Index (IPI); (x) Consumer Price Index (CPI); (xi) Kuala Lumpur Inter Bank Offer Rate-3 months (KLIBOR); and (xii) Kuala Lumpur Stock Exchange Composite Index (COMP).

The patterns of movement between banks' assets (loans) and liabilities (deposits) and the variables of interest are plotted in Figures 1a-1d and 2a-2d. Overall evaluation of these plots of annual growth indicates that there is some co-movement between the macroeconomic and financial variables and banks' assets and liabilities. Positive co-movements are quite obvious in all plots except between loans and stock prices. There are also some lags in between changes in bank's

assets and liabilities and movement in the targeted variables. We calculate the degree of these linear associations using the Pearson correlation coefficients and these are presented in Table 1. In line with the graphical observations, positive associations are supported for all except between total loans growth and stock prices. Lagged (about 6 months) significant positive associations are traced for output (industrial production). A significant positive relationship is observed between prices and banks' assets, and liabilities. There is also a strong linear association between loans and interest rates movement. These linear relationships form the motivation for further analysis on the importance of banks' assets and liabilities and the pattern of causality.

We examine the importance of banks' assets and liabilities by measuring their ability to explain variations in the economic (changes in

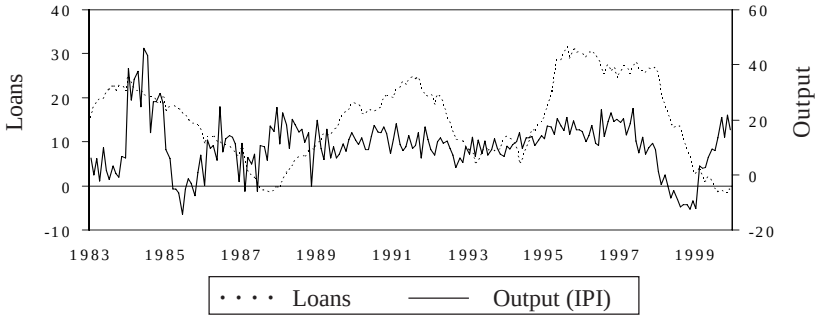
TABLE 1
Pearson Correlations Coefficients:
Bank Loans, Deposits and Economic Activities

Lag	Industrial Productions		Consumer Price Index	
	Total Loans	Total Deposits	Total Loans	Total Deposits
1	.043	.000	.282**	.314**
2	.094	.010	.273**	.329**
3	.132	.028	.270**	.335**
6	.212**	.136	.274**	.387**
9	.246**	.246**	.293**	.499**
12	.261**	.297**	.314**	.639**
	KLIBOR		Composite Index	
Lag	Total Loans	Total Deposits	Total Loans	Total Deposits
1	468**	.095	-.296**	.331**
2	.410**	.109	-.271**	.318**
3	.348**	.121	-.230**	.300**
6	.143*	.179*	-.061	.164*
9	-.095	.231**	.127	-.053
12	-.283**	.234**	.271**	-.166*

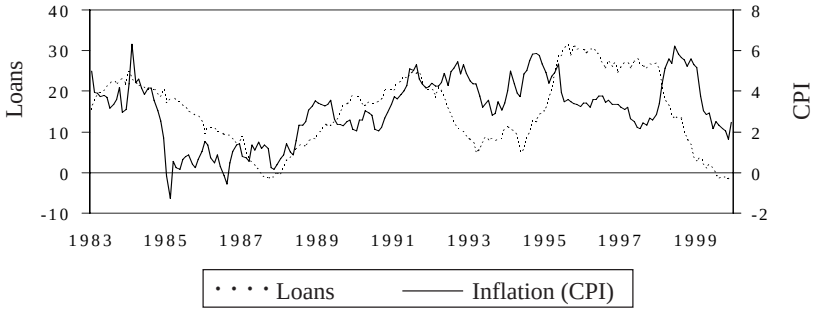
Note: ** significant at the 5% level; *significant at the 10% level.

FIGURE 1

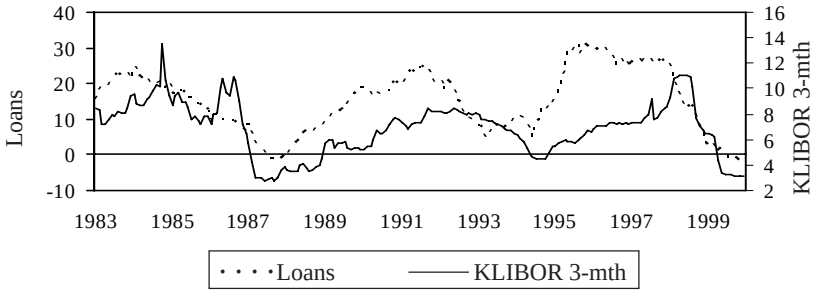
(a) Annual Growth Rates Loans and Output



(b) Annual Growth Rates of Loans and Inflation



(c) Annual Growth Rates of Loans and Interest Rates



(d) Annual Growth Rates of Loans and Stock Prices

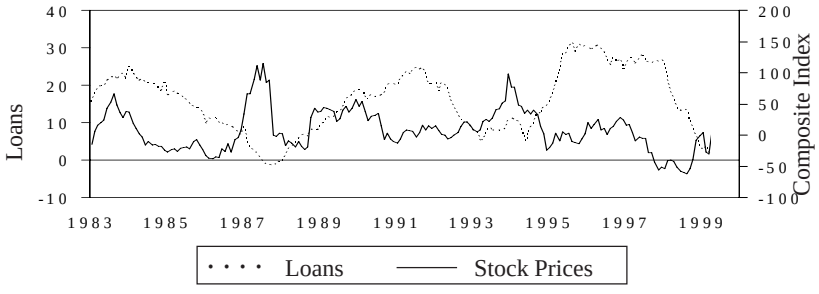
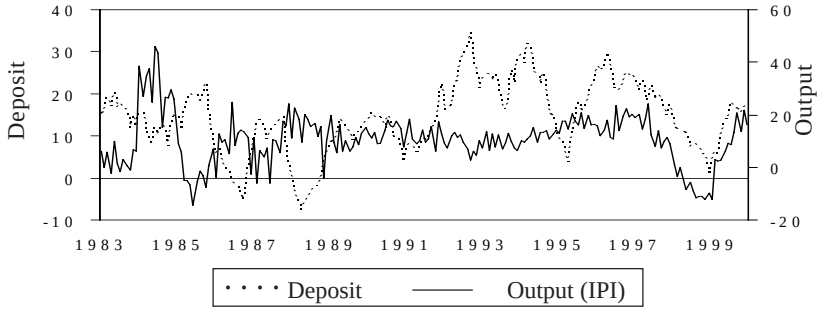
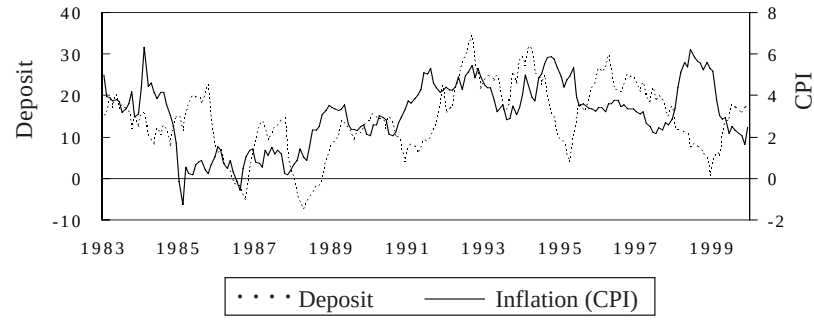


FIGURE 2

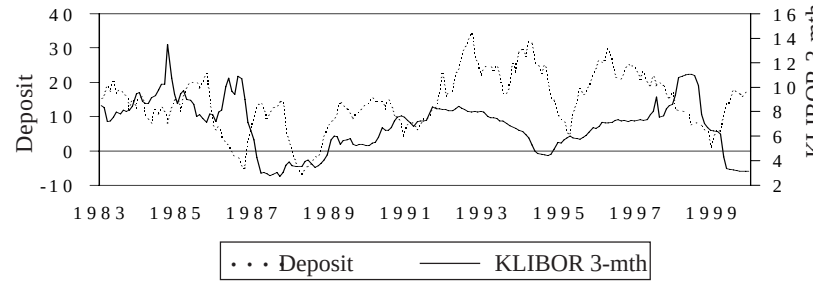
(a) Annual Growth Rates Deposit and Output



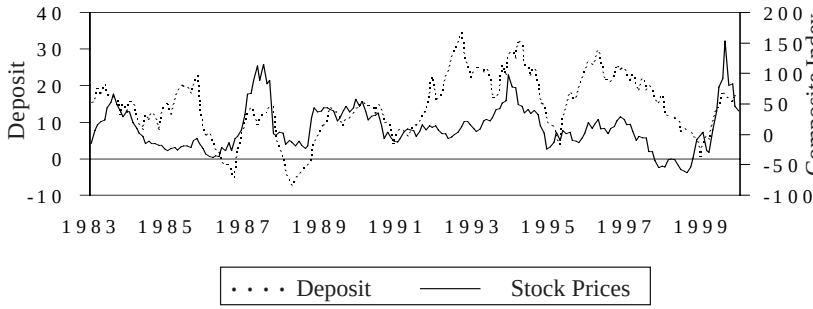
(b) Annual Growth Rates of Deposit and Inflation



(c) Annual Growth Rates of Deposit and Interest Rates



(d) Annual Growth Rates of Deposit and Stock Prices



output, prices, interest rates) and financial activities (changes in stock prices). This is performed through a series of bi-variate Granger (1969) causality analyses between banks' assets and liabilities and the rest of the variables.[8] In our analysis, the dependent variables are the economic and financial variables of interest while banks' assets and liabilities are the restricted variables.

4. RESULTS AND DISCUSSION

Tables 2 and 3 present the Granger causality results of no causation hypothesis running from banks' assets and liabilities to the four economic and financial variables. We provide results based on estimations that employ different lag structure as well as the optimal lag chosen based on the Aikake's (1970) Information Criteria (AIC). The table reports the *F*-statistics and the significance levels for the null hypothesis that coefficients of lagged banks' assets and liabilities variables are not significantly different from zero. Overall, the results support the significant role of banks' assets (i.e., loans variables) in causing changes in the economic variables tested. Significant causation from banks' loans variables is traced particularly when longer lag length is used, i.e., 9 and 12 months. There is limited causation pattern for the shorter lag estimations. Consistent causation is obtained for the KLIBOR 3-month rates regardless of the lag length specification. The results also indicate that medium- and long-term loans exert a significant influence on the economic activities. On the other hand, limited significant causation is traced for banks' liabilities. The null hypothesis of no causation is rejected in the IPI equations that include demand deposits and fixed deposits, respectively. The same applies for the Composite Index equations. These causation analyses favor the view of the importance of banks' assets. Variations in the issuance of loans exert a significant impact on the economic and finance sectors of the Malaysian economy. Thus, understanding the behavior of banking firms in their lending decisions is a critical factor in gauging the Malaysian economic performance. The credit channel view relies greatly on bank lending activities assuming an important role in the transmission mechanism of monetary policy.

We perform additional causation analysis to highlight the importance of the credit channel in the Malaysian economy. As described earlier,

TABLE 2
Granger Causality: From Loans to Economic Variables

Loans	Lag	Industrial Productions	Consumer Price Index	KLIBOR	Composite Index
Total Loans	3	0.801	0.782	4.792**	1.435
		(0.495)	(0.506)	(0.003)	(0.234)
	6	0.786	0.897	2.600**	1.032
		(0.582)	(0.498)	(0.019)	(0.412)
	9	0.894	2.217**	1.823*	2.001
		(0.532)	(0.023)	(0.067)	(0.417)
	12	2.001**	1.744*	1.774*	2.399**
		(0.027)	(0.062)	(0.056)	(0.007)
	Optimal	2.001**	0.800	6.690**	2.389**
		(0.027)	(0.372)	(0.001)	(0.001)
Short-term Loans	3	0.356	0.224	2.267*	1.556
		(0.785)	(0.880)	(0.083)	(0.202)
	6	0.863	0.524	2.205**	1.358
		(0.524)	(0.789)	(0.045)	(0.235)
	9	0.841	1.745*	1.511	1.771*
		(0.579)	(0.084)	(0.148)	(0.078)
	12	1.711*	1.456	1.195	1.638*
		(0.070)	(0.148)	(0.292)	(0.087)
	Optimal	1.711*	0.067	2.616**	1.598
		(0.070)	(0.796)	(0.026)	(0.105)
Medium-term Loans	3	0.480	3.087**	5.354**	0.800
		(0.696)	(0.029)	(0.002)	(0.495)
	6	1.065	2.094*	2.644**	0.855
		(0.386)	(0.057)	(0.018)	(0.529)
	9	1.940**	3.547**	2.099**	0.842
		(0.050)	(0.001)	(0.033)	(0.579)
	12	2.036**	3.154**	1.833**	0.902
		(0.025)	(0.001)	(0.048)	(0.546)
	Optimal	2.036**	0.234	5.354**	0.800
		(0.021)	(0.629)	(0.002)	(0.495)
Long-term Loans	3	0.906	0.857	1.389	1.081
		(0.440)	(0.465)	(0.248)	(0.359)
	6	0.708	1.293	3.770**	1.366
		(0.643)	(0.264)	(0.002)	(0.232)
	9	1.143	0.955	2.821**	3.194**
		(0.336)	(0.480)	(0.004)	(0.001)
	12	3.008**	1.317	2.195**	3.728**
		(0.001)	(0.216)	(0.015)	(0.000)
	Optimal	3.008**	0.836	4.147**	3.699**
		(0.001)	(0.362)	(0.001)	(0.001)

Notes: 1. The reported figures are *F*-values for the null hypothesis that all lagged coefficients of loans are not significantly different from zero.
2. Figures in parenthesis are *p*-values.
3. **significant at the 5% level; *significant at the 10% level.

TABLE 3
Granger Causality: From Deposits to Economics Variables

Deposits	Lag	Industrial Productions	Consumer Price Index	KLIBOR	Composite Index
Total	3	0.339	1.212	0.540	1.225
Deposit		(0.797)	(0.307)	(0.655)	(0.302)
	6	1.318	1.049	1.494	1.750
		(0.251)	(0.395)	(0.182)	(0.110)
	9	1.299	0.875	1.246	1.405
		(0.240)	(0.5531)	(0.270)	(0.189)
	12	0.942	0.954	1.330	1.326
		(0.507)	(0.495)	(0.205)	(0.208)
	Optimal	0.942	1.789	1.494	1.670
		(0.507)	(0.170)	(0.182)	(0.108)
Demand	3	3.938**	0.802	1.391	1.489
Deposit		(0.009)	(0.494)	(0.247)	(0.219)
	6	2.880**	1.252	1.173	1.703
		(0.014)	(0.282)	(0.322)	(0.123)
	9	2.011**	1.027	1.021	2.780**
		(0.041)	(0.421)	(0.425)	(0.005)
	12	1.632*	1.534	1.114	2.259**
		(0.087)	(0.116)	(0.352)	(0.011)
	Optimal	1.632*	0.905	1.173	2.287**
		(0.087)	(0.406)	(0.322)	(0.015)
Saving	3	5.498**	1.407	0.907	0.784
Deposit		(0.001)	(0.242)	(0.439)	(0.504)
	6	1.729	0.550	1.058	1.245
		(0.116)	(0.769)	(0.390)	(0.285)
	9	1.302	0.608	0.976	1.415
		(0.239)	(0.798)	(0.461)	(0.185)
	12	1.016	0.782	1.431	1.080
		(0.436)	(0.668)	(0.156)	(0.380)
	Optimal	1.016	1.730	0.951	1.451
		(0.436)	(0.180)	(0.449)	(0.178)
Fixed	3	1.209	0.369	0.853	2.209*
Deposit		(0.308)	(0.776)	(0.467)	(0.088)
	6	2.822**	0.891	0.983	1.674
		(0.012)	(0.502)	(0.437)	(0.130)
	9	2.469**	0.970	0.792	1.813*
		(0.011)	(0.467)	(0.625)	(0.069)
	12	1.687*	0.912	0.894	1.729*
		(0.074)	(0.537)	(0.555)	(0.065)
	Optimal	1.687	0.596	1.150	2.001**
		(0.074)	(0.552)	(0.319)	(0.049)

Notes: 1. The reported figures are *F*-values for the null hypothesis that all lagged coefficients of deposits are not significantly different from zero.
2. Figures in parenthesis are *p*-values.
3. **significant at the 5% level; *significant at the 10% level.

an important aspect of the credit channel is the link between a bank's liabilities, i.e., reservable deposits, which is within the control of the Central Bank and the bank's lending activities. The credit channel is effective when the Central Bank is able to exert its influence on bank lending through variations in reservable deposits. Table 4 provides evidence of this causal link for the Malaysian banking sector. We examine the causation pattern between total loans issued by the commercial bank *vis-à-vis* the amounts of deposits. The *F*-statistics indicates rejection of the null hypothesis of no causation from deposits to loans. Thus, in line with the credit channel framework, the Central Bank's ability to set the amount of reservable deposits available in the economy provides the link between changes in monetary policy and bank loans issuance. By adjusting its monetary tools (reserve requirements, open market operations and discount activities) accordingly, the Central Bank will be able to influence the volume of bank lending. On the other hand, there is no support for reverse causation from loans to deposits except for the case of fixed deposits (significant at the 10 percent level). This evidence strengthens the case for the credit channel in Malaysia. Credit variables (i.e., loans issued by commercial banks) exert significant influence on the Malaysian macroeconomic performance. Thus, in understanding the transmission mechanism in a small developing economy such as Malaysia, greater attention should be given to the availability of credit and banking decisions.

5. SUMMARY AND CONCLUSION

We investigate the transmission mechanisms of monetary policy in Malaysia in light of two channels of transmission, money and credit channels. This is done by examining the role of commercial banks' assets (credit-loans) and liabilities (money-deposits) in causing variations in selected Malaysian macroeconomic and finance variables. Our results support the effectiveness of the credit mechanism by showing a significant causation pattern running from the credit variables to the performance of the economy. There is limited evidence to support the importance of the money channel in the Malaysian economy. The credit channel mechanism is strengthened by the causation running from banks' liabilities to assets. This is in line with the mechanism of the credit

TABLE 4
Granger Causality Analysis between Total Deposits and Loans

	Null: Deposits Do Not Cause Loans	Null: Loans Do Not Cause Deposits
Total Deposits	2.831**	0.848
	(0.000)	(0.601)
Demand Deposits	3.687**	0.862
	(0.000)	(0.587)
Saving Deposits	1.984**	1.011
	(0.030)	(0.441)
Fixed Deposits	2.281**	1.685*
	(0.011)	(0.685)

Notes: 1. The reported figures are *F*-values for the null hypothesis that all lagged coefficients of deposits are not significantly different from zero.
2. Figures in parenthesis are *p*-values.
3. **significant at the 5% level; *significant at the 10% level.

channel that requires variations of reservable deposits to exert an influence on the issuance of loans by commercial banks. Thus, understanding the credit market and the behavior of banking firms in achieving their decisions is critical in the analysis of the transmission mechanism of monetary policy in a developing economy such as Malaysia.

ENDNOTES

1. In essence, these are dynamic cash-in-advance models that incorporate the IS-LM framework. The real impact of monetary policy is generated via the liquidity effect, i.e., the ability of money to bring down the level of interest rates in the economy.

2. In a strict sense, monetary aggregate (M2) is composed of currency in circulation and deposits held by the banking institutions. For the case of Malaysia (from 1982-1999), currency in circulation represents only about 10.35 percent of the monetary aggregate while the major component (89.65 percent) is deposits of banking institutions. Thus, conceptually we refer to banks' deposits as money. In addition, since our focus is on the role of banks in the transmission process, we limit our definition of money to be represented by banks' deposit.

3. This view is consistent with the traditional IS-LM explanation of how money affects the economy. Injection (contraction) of money is expected to reduce (increase) the level of interest rates in the economy, thus, spurring economic activities. This is also known as the 'interest rate rule' since reactions of interest rates are an important requirement for money to have a real impact on the economy.

4. In brief, three important conditions support the presence of the credit channel: (i) bank loans and open market credit must not be perfect substitutes; (ii) the monetary authorities must be able to influence the supply of bank loans; and (iii) imperfect price adjustment.

5. This important role of banks in the monetary transmission process is parallel to the modern intermediation theory that justifies the existence of banking firms on the ability of banks to resolve inefficiency resulting from market imperfections. See Baltensperger (1980), Bhattacharya and Thakor (1993) and Allen and Santomero (1998) for a selected review of intermediation theory. The contemporary view is that banks are seen as special agents that improve the well-being of the society as frictions are reduced.

6. Ghazali and Rahman (2001) show that bank loans represent approximately 90 percent of the total credit issued in Malaysia. This percentage is slightly smaller following the development in the direct financial market by the end of the 1980s. Nevertheless, banks remain the dominant suppliers of credit in the Malaysian economy. See Table 1 in Ghazali and Rahman (2001) for the detailed statistics.

7. Fama (1980) discusses the role of banks from the perspective of finance and concludes that banks are passive economic agents. They have no effect on the general equilibrium of the economy and that their activities conform with the Modigliani-Miller (1958) theorem on the irrelevance of the pure financing decisions. However, Fama (1985) agrees that commercial banks are special which allows them to maintain spread.

8. Our study focuses on the direct causality between banks' assets and liabilities with selected macro and financial variables. Bi-variate Granger causality will be sufficient in exploring these direct causation patterns. System estimation techniques such as the vector autoregression (VAR) analysis that employs vectors of variables is suitable for assessing a wider macro-picture that depict interactions of variables in the transmission process.

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