DOI: 10.7763/IPEDR. 2013. V65. 4

Financial-Investment Linkages in Malaysia: Sectoral Shock Analysis

Siti Muliana Samsi[1,2 +], Zarinah Yusof[1] and Kee-Cheok Cheong[1]

[1]Faculty of Economics and Administration, University Malaya, 50603 Kuala Lumpur, Malaysia.

[2]Faculty of Business Management, University Technology MARA, 40450 Shah Alam, Malaysia.

Abstract. Findings from the generalized impulse response functions reveal that the innovations in the stock market have a major impact on investment. More evidence of stock market effect on investment is found from the variance decompositions. This finding suggests that strong stock market drives more investment in Malaysia.

Keywords: Financial Sector, Investment, Impulse Response Functions, Variance Decompositions.

1. Introduction

Studies have shown that financial development and investment play an important role in economic growth. As a highly open economy, Malaysia continues to remain as a competitive investment location to the foreign investors. Of the total investments approved in 2011, RM34.2 billion or 61 per cent was foreign investments. Malaysia has to date attracted more than 5,000 foreign companies from more than 40 countries to establish their operations in the country. Most of the foreign companies have expanded and diversified their operations in the country, reflecting their confidence on the Malaysian economy (MIDA, 2012: p.20).

The purpose of this study is to determine the effects of financial sector on investment. This study focuses on the financial sector because it was the most affected during the financial crises (Stiglitz, 1999; Williams and Nguyen, 2005; Kutan et al., 2012). Changes in the financial sector also have major impact on investment, the most volatile component of aggregate demand. Therefore, examining financial-investment linkages is important in understanding how these sectors behave to the changing in the global economic environment and thus to a better policy response. This study raises two questions. First, do financial sector shocks affect investment in Malaysia? Second, is the investment hit by variable-specific shocks or system-wide shocks?

2. Literature Review

Since the emergence of endogenous growth theory, the importance of financial development has been widely discussed (King and Levine, 1993; Demetriades and Luintel, 1996; Denizer et al., 2002). Motivated by the work of King and Levine (1993), Johnston and Pazarbasioglu (1995) conduct further study to examine more on the importance of the financial sector in determining economic performance. Their study demonstrates that reforms in financial sector have important structural implications in the way financial sector variables affect the real economy. Although some researchers attempted to examine the causality between the financial and real sectors (Bashir and Hassan, 2002; Denizer et al., 2002; Ang and McKibbin, 2007; Jaafar and Ismail, 2009; Nidhiprabha, 2011), still there is no clear consensus regarding the effect of the financial sector on investment in the context of developing countries.

A growing body of literature has developed studies on the feedback between the real economy and the financial sector in times of economic shocks. Dovern et al. (2010) find that the well being of the banking sector can be affected by macroeconomic shocks, but bank lending plays no role in transmitting a financial shock to the real sector (Mansor, 2006). In the context of the global financial crisis, Nidhiprabha (2011) asserts that although the real and financial sectors in Thailand are susceptible to the adverse impacts of external shock, it had little impact on the financial sector. It can be argued that the result of this finding shows an ambiguity of empirical findings in explaining the impact of external shocks on the real sector and financial sectors in Thailand. Even though the research on the financial sector and economic growth have been documented by previous studies, however, there is no conclusive evidence exist in examining the dynamic interaction of the financial sector on investment. This study attempts to redress this gap by

+ Corresponding author. Tel.: +60379673609 ; fax: +60379673738.
E-mail address: muliana_samsi@yahoo.com

investigating the effect of the financial sector innovation on investment in Malaysia over the period 1986 to 2011.

3. Methodology and Data

This study uses Malaysian quarterly data covering the period 1986:1 to 2011:4. The analysis involved financial sub-sector indices of Kuala Lumpur Stock Exchange (klse), banks (bnk), real estate (res) and selected macroeconomic variables of investment (inv), M2 (m), the interest rate (r), inflation (p), and the exchange rate (e). All the indicators are treated as exogenous variables while investment (inv) is an endogenous variable. The gross fixed capital formation is used as a proxy for investment. The quarterly data of macroeconomic variables are taken from the *International Financial Statistics* compiled by the International Monetary Fund (IMF) and all the indices are obtained from the *Datastream* database. All the series are in logarithmic form except for the interest rate and the exchange rate.

To test for dynamics responses of financial sector and investment, all the series should be non-stationary in the level and stationary after the first differences. The Augmented Dickey and Fuller (ADF) and Phillips Perron (PP) unit root test were used to test the stationarity of the data. Next is to proceed to the cointegration analysis. The number of lag in the vector autoregression (VAR) is selected based on the properties of well behave residuals. The cointegration test is based on Johansen and Juselius (1990) approach.

More evidence on the dynamic interaction between the real and financial sector is utilized from impulse response functions and variance decompositions analyses. The impulse responses for the cointegrating VAR model are based on the VECM model. The orthogonalized impulse responses for the cointegrating VAR model will be computed exactly in the same way as in the case of the stationary VAR models. The difference is that the matrices in the moving-average representation tend to zero when the underlying VAR model is trend-stationary, and non-zero when the underlying VAR model is first-difference stationary. The responses between the real and financial sectors in Malaysia are examined using the following model

$$\Delta inv_t = \alpha + \sum_{i=1}^{\rho_i} \delta_{1i} \Delta sp_{t-1} + \sum_{i=1}^{\rho_i} \tau_{1i} \Delta m_{t-1} + \sum_{i=1}^{\rho_i} \theta_{1i} \Delta r_{t-1} + \sum_{i=1}^{\rho_i} \eta_{1i} \Delta p_{t-1} + \sum_{i=1}^{\rho_i} \psi_{1i} \Delta e_{t-1} + \gamma ECT + \varepsilon_t$$

where *inv*, *sp*, *m*, *r*, *p*, *e*, and *ECT* are investment, financial sub-sector indices, the money supply (M2), the interest rate, inflation, the exchange rate, and the error-correction term (ECT). The ECT is obtained from the cointegration equation using the Johansen maximum likelihood procedure. All the series are in logarithmic form except for the interest rate and the exchange rate.

4. Findings

Table 1 reports the augmented ADF and PP test statistics for the log levels and first differences. The results show that all variables contain a unit root, implying that the null hypothesis of the presence of a unit root at a level form cannot be rejected even at the 10 per cent significance level. Since all the variables are found to be non-stationary at level, the first differences for all the variables are analyzed. The same tests are applied to the first differences and the results show that all the variables are stationary after differencing once. This result demonstrates that all variables are integrated of order one, *I*(1) and, therefore, we proceed to the cointegration analysis.

Table: Unit Root Test

	Augmented Dickey Fuller H_0: Unit Root			Phillips Perron H_0: Unit Root		
Series	Level		Difference	Level		Difference
	τ_μ	τ_τ	τ_μ	τ_μ	τ_τ	τ_μ
klse	-2.148[4]	-2.884 [4]	-5.760 [4]^a	-2.372[4]	-2.938[4]	-10.05[4]^a
bnk	-1.560[4]	-2.996 [4]	-5.749 [4]^a	-1.688[4]	-2.990[4]	-9.746[4]^a
res	-2.277[5]	-2.981 [5]	-5.576 [5]^a	-2.402[5]	-3.039[7]	-10.44[5]^a
inv	-2.369[4]	-2.769 [4]	-3.820 [4]^b	-1.580 [4]	-1.871[4]	-11.20 [4]^a
m	-0.618[4]	-1.775 [4]	-3.333 [4]^b	-0.510[4]	-1.407[4]	-7.924[4]^a
r	-2.204[4]	-2.876 [2]	-5.290[4]^a	-2.571[4]	-2.878[4]	-7.684[4]^a
p	-1.134[4]	-1.417 [4]	-4.310[4]^a	-0.611[4]	-1.331[4]	-7.792[4]^a
e	-1.629[4]	-1.460 [4]	-4.680 [4]^a	-1.591[4]	-1.557[4]	-9.824[4]^a

Notes: 1. a and b represents significant level at 1 per cent and 5 per cent respectively.
2. τ_μ represents the model with intercept; and, τ_τ is the model with trend and intercept. Numbers in brackets are number of lags used in the ADF test in order to remove serial correlation in the residuals. At n=103, the ADF critical values are -3.50 (1 per cent), -2.89 (5 per cent), and -2.58 (10 per cent) for intercept (τ_μ); -4.06 (1 per cent), -3.46 (5 per cent), -3.15 (10 per cent) for trend and intercept (τ_τ).

The multivariate cointegration test for investment, the money supply, the interest rate, inflation, the exchange rate, Kuala Lumpur Stock Exchange, banks, and real estate is reported in Table 2. The null hypothesis of models A, B and C of no cointegration against the alternative of one cointegrating vector ($r \leq 1$) is rejected since λ_{max} and λ_{trace} statistics exceed the critical values at 5 percent significance level for these models. This means that there are two cointegration equations in Model A, B and C. To further investigates the information concerning interactions among variables, the impulse response function (IRF) and variance decomposition analysis (VDC) will be discussed.

Table 2: Johansen Cointegration Test

		Trace Statistic (λ_{trace})					
	k	r = 0	r ≤ 1	r ≤ 2	r ≤ 3	r ≤ 4	r ≤ 5
Vector : [inv, klse, m, r, p, e]							
Model A	5	165.4433 [b]	82.5753 [b]	48.2112	21.4437	7.2330	.82106
Vector : [inv, bnk, m, r, p, e]							
Model B	3	151.9360 [b]	88.1631 [b]	42.3585	19.5988	7.7488	1.7081
Vector : [inv, res, m, r, p, e]							
Model C	7	158.8512[b]	77.0747[b]	43.7999	24.8308	9.1072	.047659
		Max Eigenvalue Statistic (λ_{max})					
	k	r = 0	r ≤ 1	r ≤ 2	r ≤ 3	r ≤ 4	r ≤ 5
Vector : [inv, klse, m, r, p, e]							
Model A	5	82.8680 [b]	34.3641 [b]	26.7675	14.2107	6.4120	.82106
Vector : [inv, bnk, m, r, p, e]							
Model B	3	63.7729 [b]	45.8046[b]	22.7597	11.8500	6.0407	1.7081
Vector : [inv, res, m, r, p, e]							
Model C	7	81.7766[b]	33.2747	18.9691	15.7236	9.0596	.047659

Note: [b] denote significant at 5 per cent levels respectively. λ_{trace} and λ_{max} are the likelihood ratio statistics for the number of cointegrating vectors. The lag length (k) was selected based on Akaike Information Criteria (AIC).

Fig. 1 report the results of the generalized impulse response analysis of financial sub-sector shock on investment. This study finds that innovation in the Kuala Lumpur Stock Exchange has more responses on investment.

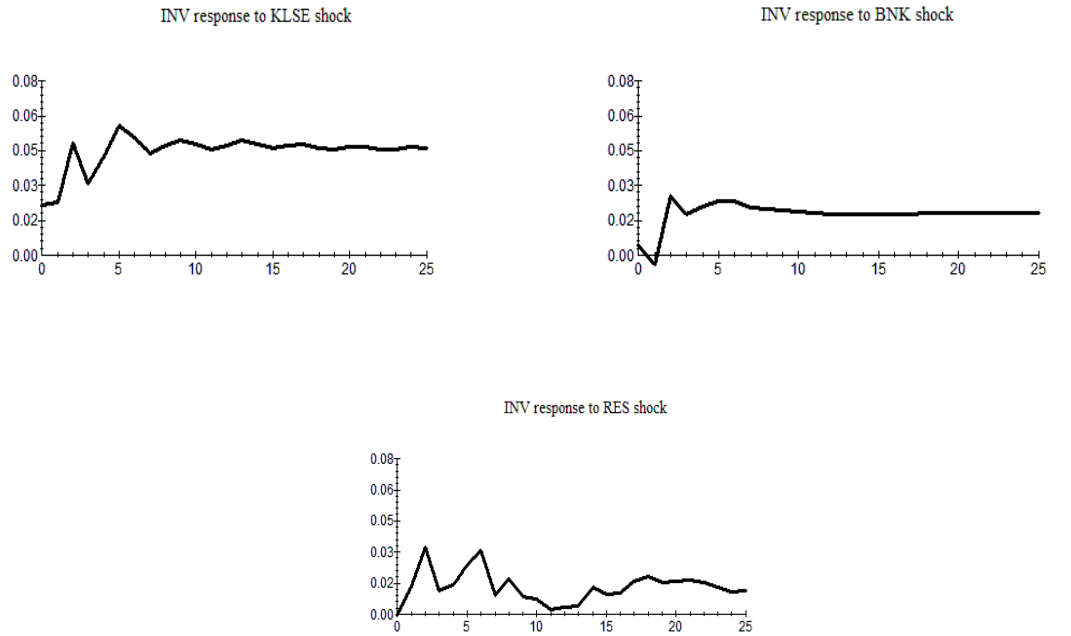

Fig. 1: Generalized Impulse Response Function of Investment

The result of variance decompositions (VDC) is reported in Table 3. Nearly 37 per cent to 88 per cent forecast error of shock is explained by its own shock. Among the financial indices, shock in the stock market has the larger effect on investment and the effect remain strong until the period 20. The banking sector comes second and the effect is not immediate but only obvious at the longer horizon. At period 20, about 19 per cent of the error variance in investment is explained by the shock in the banking sector. Meanwhile,

investment is less responsive to the innovation in the real estate and which implies that shock in the real estate has less effect on investment.

Table 3: Forecast Error Variance Decompositions of Investment in VAR

Panel A [Vector: inv, klse, m, r, p, e]

Period	ΔINV	ΔKLSE	ΔM	ΔR	ΔP	ΔE
1	21.950	85.500	5.6366	5.6377	2.0193	4.0946
5	29.453	64.516	13.187	7.4012	10.753	4.9533
10	33.859	61.070	11.543	6.1410	11.624	6.1249
20	38.483	58.595	9.1783	4.4844	11.154	7.3560

Panel B [Vector: inv, bnk, m, r, p, e]

Period	ΔINV	ΔBNK	ΔM	ΔR	ΔP	ΔE
1	1.6755	83.681	8.1437	9.5546	1.9872	4.1182
5	3.3675	69.748	13.272	6.6999	12.911	2.9321
10	10.479	54.177	19.218	5.1510	13.405	2.8743
20	19.148	37.040	25.563	2.8793	16.673	2.6307

Panel C [Vector: inv, res, m, r, p, e]

Period	ΔINV	ΔRES	ΔM	ΔR	ΔP	ΔE
1	3.4755	88.632	0.23197	4.3157	11.250	2.5966
5	3.3439	83.754	0.27653	7.0548	17.398	3.7244
10	4.3572	73.342	1.1903	7.4067	24.607	3.3884
20	4.6039	68.668	7.7866	11.264	21.808	2.6984

5. Conclusion

This study analyzes the effect of financial sector shocks on investment. Findings from the generalized impulse response functions reveal that the innovation in the stock market has a major impact on investment. Further analysis from the variance decompositions confirmed that the variance in the investment is explained largely by innovations of Kuala Lumpur Stock Exchange. This finding suggests that development in the stock market has greater role in investment in Malaysia. Thus, stability in the stock market brings stability to the investment spending and thus the economy as a whole. Strong stock market drives higher investment and economic growth.

6. References

[1] J. B. Ang, & W. J. McKibbin. Financial liberalization, financial sector development and growth: evidence from Malaysia. *Journal of Development Economics.* 2007, **84**(1): 215-233.

[2] Denizer, C. A., Iyigun, M. F., & Owen, A. Finance and macroeconomic volatility. *The BE Journal of Macroeconomics*. 2002, **2**(1): 1-30.

[3] Dovern, J., Meier, C. P., & Vilsmeier, J. How resilient is the German banking system to macroeconomic shocks? *Journal of Banking & Finance*. 2010, **34**(8): 1839-1848.

[4] Jaafar, P., & Ismail, A. Dynamic relationship between sector-specific indices and macroeconomic fundamentals. *Malaysian Accounting Review*. 2009, **8**(1): 81-100.

[5] Johansen, S., & Juselius, K. Maximum likelihood estimation and inference on cointegration, with applications to the demand for money. *Oxford Bulletin of Economics and Statistics*. 1990, **52**(2): 169-210.

[6] Johnston, R. B., & Pazarbasioglu, C. Linkages between financial variables, financial sector reform and economic growth and efficiency. *IMF Working Paper*. 1995, No. 95/103.

[7] King, R. G., & Levine, R. Finance and growth: Schumpeter might be right. *The Quarterly Journal of Economics*. 1993, **108**(3): 717-737.

[8] Kutan, A. M., Muradoglu, G., & Sudjana, B. G. IMF programs, financial and real sector performance, and the Asian crisis. *Journal of Banking & Finance*. 2012, **36**(1): 164-182.

[9] Mansor, H. I. Stock prices and bank loan dynamics in a developing country: the case of Malaysia. *Journal of Applied Economics*. 2006, **9**(1): 71-89.

[10] Malaysian Investment Development Authority (MIDA). Malaysia investment performance 2011. Report, 2012, p.20.

[11] Muhammad, I. Impact of the global crisis on Malaysia's financial system. *Bank for International Settlements*. 2010, No. 54.

[12] Nidhiprabha, B. The global financial crisis and resilience of the Thai banking sector. *Asian Development Review*. 2011, **28**(2): 110-132.

[13] Stiglitz, J. E.. Reforming the global economic architecture: lessons from recent crises. *The Journal of Finance*. 1999, **54**(4): 1508-1522.

[14] Odhiambo, N. Finance-Investment-Growth Nexus in South Africa: An ARDL-Bounds Testing Procedure. *Economic Change & Restructuring.* 2010, **43**(3): 205-219.

[15] Tan, S. H., Habibullah, M. S., Baharumshah, A. Z., & Azali, M. On engine of growth in Malaysia: export-led, financial-led or investment-led? *International Journal of Business and Society*. 2007, **8**(1): 74-88.

[16] Williams, J., & Nguyen, N. Financial liberalisation, crisis, and restructuring: a comparative study of bank performance and bank governance in South East Asia. *Journal of Banking & Finance*. 2005, **29**(8): 2119-2154.