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The Response of Sectoral Returns to Macroeconomic Shocks in the Malaysian Stock Market

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Abstract: This paper examines the responses of sectoral returns to shocks in five macroeconomic indicators using the vector autoregressive (VAR) model and generalised impulse response functions for an emerging stock market, Malaysia. The empirical results suggest that, while the temporal responses of sectoral returns to macroeconomic shocks are relatively identical, their initial responses are slightly different. Monetary policy and exchange rate shocks have the largest effect on the finance sector, whereas output and exchange rate shocks exert most influence on the property sector. Comparatively, among the shocks, monetary shocks (i.e., money supply, interest rate and exchange rate shocks) are more influential in influencing sectoral returns than goods market shocks (i.e., output and consumer price shocks).

Key words: Impulse response functions, macroeconomic shocks, sectoral returns
JEL classification: G10, E40

1. Introduction

It has been argued in the literature that stock returns fluctuate with changes in macroeconomic variables. The argument suggests that the intrinsic value of stock prices depends on the present value of dividends which is distributed out of firm's earnings. Since the firm's earnings are influenced by real economic activities, therefore, there should be a link between economic fundamentals and stock prices.

2. Literature Review

Shiller (1981) and Leroy and Porter (1981) point out that the macroeconomic variables may affect the discount rate and the ability of the firm to generate cash flows – two fundamental variables which establish the intrinsic value of equities based on the discounted cash flow model. The traditional equilibrium and arbitrage based models, such as the Capital Asset Pricing Model and the Arbitrage Pricing Theory (APT) also incorporate a number of macroeconomic factors that influence stock returns.

Chen *et al*. (1986) pioneered an empirical model to test the validity of the APT model to investigate whether innovations in macroeconomic variables are risks that are

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rewarded in the stock market. They found that stock market returns in the United States reflect changes in the interest rate spread, inflation, industrial production and bond market. Other studies that analysed the relation between stock prices and economic variables such as economic growth, interest rate, inflation, yield spread, money supply and so forth, among others, are Pearce and Roley (1988), Chen (1991), Fama (1981), Wei and Wong (1992), Kwon and Shin (1999), Hondroyiannis and Papapetrou (2001), Wongbangpo and Sharma (2002), Hooker (2004), Azeez and Yonezawa (2006), Tsouma (2009) and Birz and Lott (2011). Much of the empirical evidence reveals that fundamental economic activities are strongly linked to stock market returns, but the evidence tends to differ, depending on macroeconomic indicators. Aráujo (2009) investigated the macroeconomic shocks and the co-movement of stock returns in Latin America using structural vector autoregressive models (SVARs), and concludes that macroeconomic shocks (supply and demand) cannot be neglected in accounting for the dynamics of real stock returns.

So far the literature linking macroeconomic variables to stock markets deals mainly with the overall stock market performance. The effects of macroeconomic performance on a sectoral basis has, however, received relatively little attention. According to Ewing *et al.* (2003), sector-specific responses to macroeconomic shocks may not be identical due to underlying differences in market and industrial characteristics. In today's investment world, financial market participants are interested not only in how individual stocks perform, but also in how various sectoral indices perform. Market practitioners use sectoral indices as benchmarks to track the performance of publicly traded stocks and actively managed portfolios. Of late, individual investors, fund managers and institutional investors are beginning to look at sectoral performance as sectoral indices yield different returns and risks, which allow them to target the performance of a particular sector or industry. According to Balli and Balli (2011), sectoral indices are less dependent on the aggregate equity index in the Euro area, suggesting that diversification across the sectors within the region would be much more effective in reducing portfolio risk.

The objective of this study is to investigate the response of sectoral returns to macroeconomic shocks in the Bursa Malaysia (formerly known as Kuala Lumpur Stock Exchange). In particular, the study examined the magnitude and persistence of the responses of five specific sectoral indices[1] to unexpected changes in money supply, interest rate, consumer price index, exchange rate and industrial production. Understanding how innovations in certain key macroeconomic indicators are transmitted to sectoral indices is crucial especially to market practitioners. Market practitioners are mainly interested in the direct effects that macroeconomic shocks exert on sectoral returns, which could affect their pricing and portfolio diversification decision. In addition, knowing the behavior of sectoral indices can provide a useful tool in tracking the

[1] These sectors are industrial, finance, property, tin and plantation. The property sector has received much attention in the literature compared to other sectors. See McCue and Kling (1994), Ewing and Payne (2005) and Liow *et al.* (2006). For example, McCue and Kling (1994) found that prices, nominal interest rates, output and investment all directly influence the real estate series. However, nominal interest rates explain the majority of the variation in the real estate series.

movement and performance of a particular sector, since these indices have a tendency to affect the overall market direction.

The Bursa Malaysia appears to be an excellent case for this subject due to several unique features. First, since the late 1980s, the Malaysian stock market has undergone robust development and has gradually evolved to be one of the fastest growing markets in the region. The market capitalisation over GDP of the Bursa Malaysia is the highest among the universe of the emerging markets and comparable to that of developed countries (see Figure 1). Second, although some repressionist policies remain in place, Malaysia has undergone a series of financial sector reforms and achieved rapid deepening of its banking sector and stock market. It is likely that one of the driving factors of these changes has come in the form of strong macroeconomic fundamentals despite short-term risks. Since the Malaysian stock market is actively traded, it would be very beneficial to examine the link between macroeconomic shocks and sectoral performance from the emerging markets perspective. Finally, as an added advantage, the database for Malaysia is considered relatively good by emerging country standards and hence serves as an ideal laboratory to investigate the behaviour of sectoral returns.

Ewing *et al*. (2003) examined how different sectors respond to shocks to real output, monetary policy and risk premium in the United States using the impulse response functions. Their results indicate that unanticipated changes in economic growth lead to similar patterns in the S&P sector-specific indices, with the effects differing mainly in terms of the size of initial impact and the amount of overshooting. A monetary policy shock has its largest effect on financial and capital goods, and seems to lead to a short but dramatic cyclical volatility in the utility sectors. On the other hand, risk premium changes appear to affect utilities and transportation very differently than they do financials, capital goods and industrials. Another study by Ewing and Payne (2005)

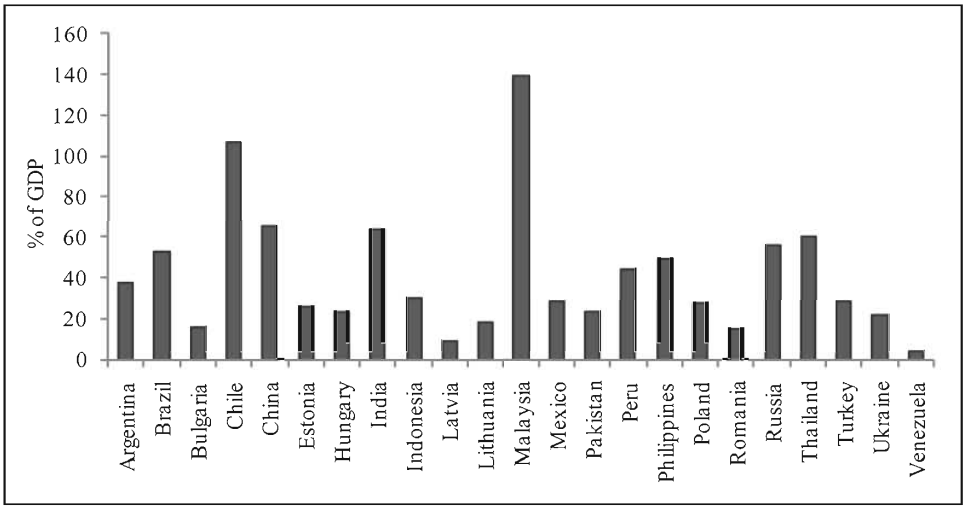

Figure 1. *Market capitalisation of emerging markets, 2000 - 2011*
Source: World Development Indicators

which focused on a real estate sector in the United States reveals that shocks to monetary policy, economic growth, and inflation all lead to lower expected real estate returns, while a shock to the risk premium is associated with higher future returns.

With respect to the Malaysian stock market, several studies have been conducted to examine the effects of macroeconomic indicators on stock returns. However, in terms of the response of sectoral returns to macroeconomic shocks, to date there is no empirical evidence for the case of Malaysia. Ibrahim (1999) analysed the dynamic interactions between seven macroeconomic variables and the stock prices in Malaysia. The empirical findings based on the bivariate and multivariate analyses suggest that the Malaysian stock market is informational inefficient with respect to macroeconomic variables. Besides, there is some evidence that the stock prices are Granger-caused by changes in the official reserves and exchange rate in the short run. Rahman *et al.* (2009) investigated the interactions between macroeconomic variables and stock prices for Malaysia using a VAR framework. Their results indicate that the Malaysian stock market is sensitive to changes in the macroeconomic variables. Moreover, it has a stronger dynamic interaction with reserves and industrial production index as compared to money supply, interest rate and exchange rate.

The rest of the paper is organised as follows. Section 3 describes the data employed in the analysis. Section 4 explains the econometric methodology while Section 5 reports and discusses the econometric results. Section 6 summarises and concludes.

3. The Data

In this study, we utilised five sectoral indices namely industrial, plantation, finance, tin and property to analyse the response of sectoral returns to macroeconomic shocks. The macroeconomic indicators are money supply (M3), interest rate, consumer price index, exchange rate and industrial production index.[2] These indicators were selected based on their purported links to stock pricing to be explicated later. The data sets consisted of 288 monthly observations for the period January 1988 – December 2011. The sectoral indices were collected from Datastream, whereas the macroeconomic variables were gathered from International Financial Statistics. All variables were entered in natural logarithms.

Table 1 presents the descriptive statistics for sectoral returns and macroeconomic indicators. All sectoral indices show positive mean returns with the plantation and finance sectors recording the highest returns and the property sector the lowest returns over the sample period. The standard deviation, as a measure of stock return volatility, reveals that the tin sector is most volatile, followed by property, finance, plantation and industrial sectors.

Table 2 reports the pairwise correlations among sectoral price indices and macroeconomic indicators. The sectoral indices are generally positively correlated with each other, except between the property and plantation sectoral indices. The statistics also indicate a low correlation between the property index and the industrial and finance

[2] The Hodrick-Prescott filter was employed to remove short-term fluctuations of IP associated with the business cycle.

Table 1. Descriptive statistics: sectoral returns and macroeconomic variables

	Mean	Standard deviation	Maximum	Minimum
Sectoral returns				
Industrial (IND)	0.0070	0.0729	0.2872	-0.3956
Finance (FIN)	0.0087	0.0998	0.4896	-0.4906
Property (PRO)	0.0017	0.1025	0.3841	-0.4139
Tin (TIN)	0.0048	0.1358	0.4923	-0.7330
Plantation (PLT)	0.0088	0.0866	0.5298	-0.3931
Macroeconomic variables				
Money Supply (M3)	364261.45	210298.21	808447.00	75784.20
Treasury Bill (TB)	4.58	1.88	9.98	1.74
Consumer Price Index (CPI)	91.58	14.78	116.43	66.09
Industrial Production Index (IP)	82.92	30.73	140.10	27.52
Exchange Rate (ER)	3.21	0.59	4.57	2.44

Table 2. Correlations (Level)

	IND	FIN	PRO	TIN	PLT	M3	TB	CPI	IP	ER
IND	1.00									
FIN	0.95	1.00								
PRO	0.07	0.05	1.00							
TIN	0.74	0.73	0.52	1.00						
PLT	0.92	0.89	-0.05	0.65	1.00					
M3	0.79	0.84	-0.46	0.33	0.82	1.00				
TB	-0.42	-0.51	0.55	-0.13	-0.47	-0.65	1.00			
CPI	0.78	0.82	-0.50	0.30	0.81	0.99	-0.67	1.00		
IP	0.76	0.80	-0.53	0.32	0.77	0.98	-0.70	0.98	1.00	
ER	0.17	0.26	-0.79	-0.21	0.21	0.66	-0.65	0.67	0.72	1.00

Note: IND = industrial; FIN = finance; PRO = property; TIN = tin; PLT = plantation; M3 = Money supply; TB = treasury bill; CPI = consumer price index; IP = industrial production; ER = exchange rate.

indices, where the correlation coefficients ranges 0.05 - 0.07. Furthermore, the Industrial, finance, and plantation sectors are positively correlated with all macroeconomic variables, except the interest rate. Nevertheless, the property index has a positive correlation with interest rate and negatively correlated with other macroeconomic variables. It should be noted that, while the pairwise correlation table seems indicative of differential relations between various sectoral indices and macroeconomic indicators, it is only suggestive. In the ensuing sections, we proceed to a formal analysis of the subject by means of a VAR framework.

4. Methodology

In this study, we established the following six-variable vector autoregressive (VAR) to evaluate the impacts of macroeconomic shocks on sectoral returns:

$$\begin{bmatrix} MACRO_t \\ IND_t \\ FIN_t \\ PRO_t \\ TIN_t \\ PLT_t \end{bmatrix} = \begin{bmatrix} \alpha_1 \\ \alpha_2 \\ \alpha_3 \\ \alpha_4 \\ \alpha_5 \\ \alpha_6 \end{bmatrix} + \begin{bmatrix} \beta_{1,1}(L) & \mathrm{K} & \beta_{1,6}(L) \\ \mathrm{M} & \Lambda & \Lambda \\ \mathrm{M} & \Lambda & \Lambda \\ \mathrm{M} & \Lambda & \Lambda \\ & & \\ \beta_{6,1}(L) & \Lambda & \beta_{6,6}(L) \end{bmatrix} \begin{bmatrix} MACRO_t \\ IND_t \\ FIN_t \\ PRO_t \\ TIN_t \\ PLT_t \end{bmatrix} + \begin{bmatrix} \varepsilon_1 \\ \varepsilon_2 \\ \varepsilon_3 \\ \varepsilon_4 \\ \varepsilon_5 \\ \varepsilon_6 \end{bmatrix} \quad (1)$$

where *MACRO* denotes a macroeconomic variable of interest; *IND* is industrial index; *FIN* is finance index; *PRO* is property index; *TIN* is tin index, *PLT* is plantation index and $\beta(L)$ is a matrix of polynomial in the lag operator L. In the analysis, the macroeconomic variables considered were industrial production, exchange rate, money supply, interest rate, and consumer price index, purported to influence stock pricing via the discounted present value framework.

It is well known that stock returns are related to the business cycle or output variables (Fama and French 1989). Notably, representing a nation's output, the industrial production has a direct relation with the expected future cash flows of the firms, hence, it is expected that stock price is positively associated with the industrial production index. With respect to exchange rate, its relation to stock prices can be either positive or negative depending on the country's trade structure and expectation of future currency values. On one hand, currency depreciation makes domestically produced goods and services more competitive and accordingly stimulates exports and production. This should stimulate the stock prices. On the other hand, it raises the costs of production via the increasing costs of imported inputs. This means that the stock prices would decline following the currency depreciation. Moreover, if currency depreciation results in expectation of further depreciation, as witnessed during the 1997/1998 Asian crisis, the stock prices can further decline.

Both the Simple Quantity theory and the Monetary Portfolio theory suggest that the money supply has stable economic effects on asset prices including stock prices. Mishkin (2007) pointed out that growth in nominal money stock would provide economic stimulus, resulting in increases in cash flows to firms, leading to a rise in stock prices. In addition, an increase in the money supply directly raises stock price due to a lower interest rate. In particular, an interest rate decrease motivates the investors to change the structure of their portfolio against bonds. Investors tend to buy stocks and transfer funds to the stock market, resulting in the stock prices being bid up. Therefore, money supply and interest rate are expected to have positive and negative relationship with stock price, respectively.

However, a controversy exists in the literature regarding the relationship between inflation and stock returns. Recently two hypotheses that received empirical support are the inflation illusion hypothesis proposed by Modigliani and Cohn (1979) and the two-regime hypothesis proposed by Hess and Lee (1999). The former states that stock market investors are subject to inflation illusion.[3] The latter proposes that aggregate demand

[3] The inflation illusion hypothesis proposes that the typical investor irrationally raises (lowers) the required rate of return from equities (discount rate) as the inflation rate rises (falls), thereby undervaluing (overvaluing) stocks.

(supply) shocks drive a positive (negative) relationship between inflation rate and stock returns. Higher consumer price index may allow companies to generate more revenue, which can boost stock prices and enrich investors. Based on the two hypotheses, the relation between inflation and stock returns can be negative or positive.

To estimate the VAR model, we followed the standard procedure of time series analyses. First, we applied the commonly used augmented Dickey-Fuller (ADF) and Kwiatkowski-Phillips-Schmidt-Shin (KPSS) unit root tests to determine the variables' stationarity properties or integration order. Classification of the variables into stationary and non-stationary variables is important since standard statistical procedures can deal with only stationary series. In addition, there also exists a possible long-run co-movement, or cointegration relationship, among non-stationary variables having the same integration order. Accordingly, in the second step, we implemented a VAR-based approach of cointegration test suggested by Johansen (1988) and Johansen and Juselius (1990). The cointegration test provides us information on whether the variables, particularly macroeconomic variables and sectoral prices, are tied together in the long run. More importantly, given our interest in the dynamic responses to macroeconomic shocks, the presence of cointegration justifies the use of the level vector autoregressive (VAR) model from which impulse-response functions (IRFs) can be simulated.

Essentially, IRFs trace temporal responses of a variable to its own shocks and shocks in other variables. We employed the generalised impulse response function developed by Koop *et al*. (1996) and Pesaran and Shin (1998) that is not sensitive to the ordering of the variables in the VAR models. The generalised impulse response function provides more robust results than the orthogonalised method. This is because the generalised impulse responses are invariant to any re-ordering of the variables in the VAR and moreover, orthogonality is not imposed. This key feature allows for meaningful interpretation of the initial impact response of each variable to shocks to any other variable. Thus, from the functions, we can observe, for example, the direction, magnitude and persistence of sectoral stock indices responses to innovations in macroeconomic variables.

5. Empirical Results

As noted, before estimating the VAR model, the time series properties of the variables were investigated using the ADF and KPSS unit root tests. The empirical results of these tests are presented in Table 3, which indicate that all variables require first differencing to attain stationarity or integrated of order one, or as I(1) variables. Table 4 provides the Johansen-Juselius cointegration test results of five models. In conducting the test, we set the optimal lag order to 2 for all models using the Akaike Information Criterion (AIC), which is sufficient to provide the error terms serially uncorrelated. The maximum eigenvalue and trace statistics indicate the presence of one cointegrating vector in the system. This implies that there is a long-run relationship among the variables in all models, or the variables are tied together in the long-run and their deviations from the long-run equilibrium path will be corrected.

To assess the dynamic interactions between stock returns and macroeconomic variables, we further simulated generalised IRFs from the level VAR. The lag order was 3

Table 3. Results of ADF and KPSS unit root tests.

Variables	ADF		KPSS	
	Constant	Constant with trend	Constant	Constant with trend
	Level			
Industrial	-2.5213	-2.9992	1.3358***	0.1459
Finance	-2.0710	-3.0515	1.3666***	0.1524**
Property	-2.1919	-2.7968	0.8562***	0.1691**
Tin	-2.0334	-3.0533	0.8887***	0.1712**
Plantation	-0.7725	-1.9166	1.4216***	0.2107**
M3	-1.7335	-1.6337	1.9544***	0.4327***
Treasury Bill	-1.5698	-2.8148	1.2529***	0.1293
CPI	-1.5282	-1.8030	1.9845***	0.4077***
Industrial production	-0.9333	-1.9334	1.9823***	0.3001***
Exchange Rate	-1.5690	-1.3916	1.1403***	0.2850***
	First difference			
Industrial	-16.1605***	-16.1572***	0.1229	0.0756
Finance	-9.5345***	-9.5276***	0.0830	0.0605
Property	-14.9009***	-14.8803***	0.0952	0.0864
Tin	-16.9336***	-16.9117***	0.0515	0.0392
Plantation	-10.2914***	-10.2824***	0.0789	0.0619
M3	-8.8495***	-9.2619***	0.1032	0.0875
Treasury Bill	-15.2836***	-15.2730***	0.1036	0.0822
CPI	-13.0206***	-13.1007***	0.2708	0.0592
Industrial production	-5.1582***	-5.1358***	0.1834	0.0301
Exchange Rate	-13.0080***	-13.0223***	0.1503	0.0743

Note: ** and *** denote significance at 5% and 1% levels, respectively.

for all models which is sufficient to render the error terms serially uncorrelated. Figures 2–6 depict the results of the IRF for the five VAR models, where the responses are plotted out over a 20-month period. The figures trace out the response of each of the sectoral indices to one standard error (positive) shock in the log of the money supply (M3), interest rate (Treasury bill), consumer price index (CPI), exchange rate (ER) and industrial production index (IP). The IRF results demonstrate that the responses of sectoral indices as well as the magnitudes of initial impacts to macroeconomic shocks are different, despite similar patterns of their temporal responses (see Table 5).

Figure 2 shows the generalised responses to a shock to M3 money supply. When a temporary aggregate shock is introduced, all sectoral indices move in the same direction and there is not much difference in the size of their responses. All sectoral indices respond positively and are statistically significant to a shock in M3, and all sectoral prices increase in the six periods following the shock. Among these sectoral indices, the finance sector seems to create the most significant responses, whereas the industrial sector has the lowest responses. This result is reasonable since the financial sector is well noted to be a conduit through which monetary shocks are passed through to the

Table 4. Results of Johansen-Juselius cointegration test

	Model 1: M3		Model 2: Interest rate		Model 3: CPI		Model 4: Exchange rate		Model 5: Industrial production		Critical value(5%)	
Null	trace statistic	Maximum Eigenvalue	Trace statistic	Maximum Eigenvalue	Trace statistic	Maximum Eigenvalue	Trace statistic	Maximum Eigenvalue	Trace statistic	Maximum Eigenvalue	Trace statistic	Maximum Eigenvalue
r = 0	106.91**	41.28**	104.26**	46.56**	98.14**	45.42**	102.45**	46.44**	241.13**	163.25**	95.75	40.07
r ≤ 1	66.62	28.71	47.69	19.90	52.72	21.88	46.01	19.45	77.88**	30.62	69.81	33.87
r ≤ 2	37.90	17.54	27.79	16.58	30.84	14.99	26.54	15.82	47.26	21.77	47.85	27.58
r ≤ 3	20.35	13.72	11.20	7.61	15.85	10.02	10.72	7.97	25.48	15.31	29.79	21.13
r ≤ 4	6.63	5.07	3.58	3.24	5.82	4.86	2.74	2.20	10.16	7.11	15.49	14.26
r ≤ 5	1.56	1.56	0.34	0.34	0.95	0.95	0.54	0.54	3.05	3.05	3.84	3.84

Note: The lag order specified for the test is 3, which we find sufficient to provide the error term serially uncorrelated. ** denotes significance at 5% level.

Table 5. Initial impact for sectoral returns in response to macroeconomic shocks

	Property	Industrial	Finance	Tin	Plantation
M3	0.0042	0.0041	0.0056	0.0051	0.0067
Treasury bill	-0.0059	-0.0055	-0.0081	-0.0076	-0.0062
Consumer Price Index	0.0001	0.0007	0.0003	0.0020	0.0045
Exchange rate	-0.0065	-0.0021	-0.0033	-0.0027	-0.0028
Industrial production	-0.0044	-0.0033	-0.0053	0.0017	-0.0021

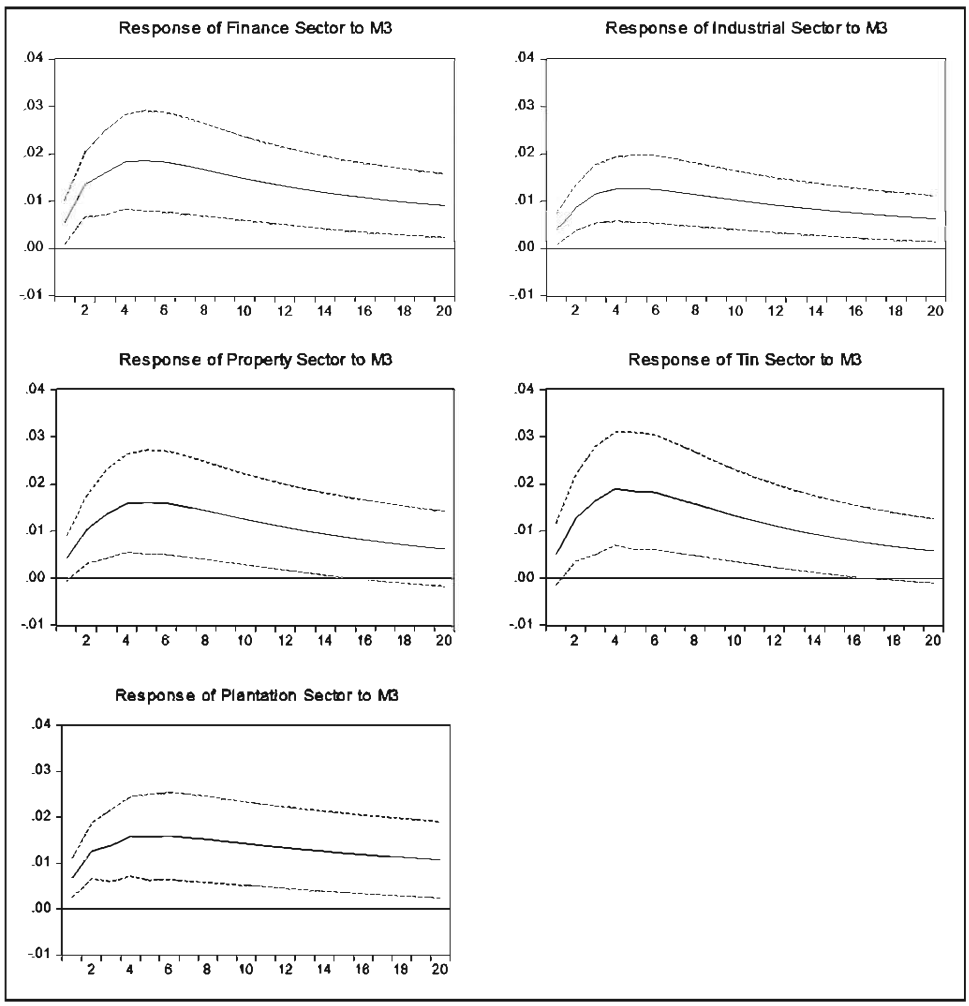

Figure 2. *Generalised impulse response to a shock to M3*

other sectors. Overall, the findings suggest that monetary expansion leads to an increase in all sectoral returns and the general behaviour is the same for each index.

The generalised impulse response of the sectoral returns to interest rate shock is presented in Figure 3. Compared to money supply shock, the initial impacts on interest rate shock are not identical across the sectors. By far and away, the largest effect is felt in the finance sector (see Table 5), which again should be expected. A sudden monetary tightening, as evidenced by an unanticipated rise in the treasury bill rate, lowers all sectoral returns. The figure also demonstrate that finance and industrial sectors are statistically significant to shock in interest rate up to 12 months, and about 8 months for property, tin and plantation sectors. Among these five sectoral indices, the finance and property sectors have the highest responses, whereas the plantation sector displays the

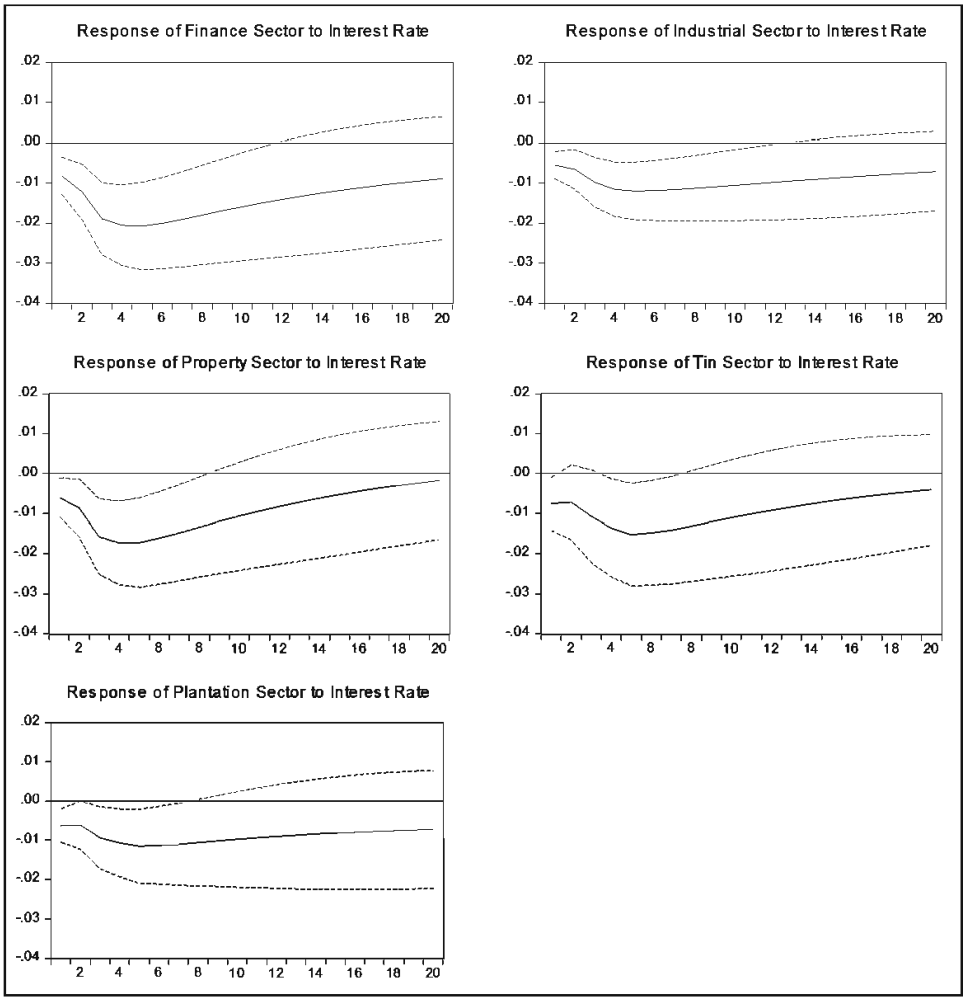

Figure 3. *Generalised impulse response to a shock to interest rate*

lowest responses. These findings suggest that the monetary authority can influence the stock returns by altering interest rate in the short term.

Figure 4 provides information as to how sectoral returns respond to unexpected increases in inflation. When a temporary aggregate shock is introduced, all sectoral indices move in the same direction, except for the property and plantation sector, where both sectors slightly increase in responses for about 2 months after the shock. Nevertheless, all sectoral returns responces are insignificant to shock in inflation, except for finance and plantation sectors where the responses are significant for T = 10–20 and T = 1–2, respectively. As shown in Figure 5, an unexpected positive change in the exchange rate has a negative effect on all sectoral returns and is statistically significant except for the initial impact effect (T = 1). Even though all sectors seem to have similar initial

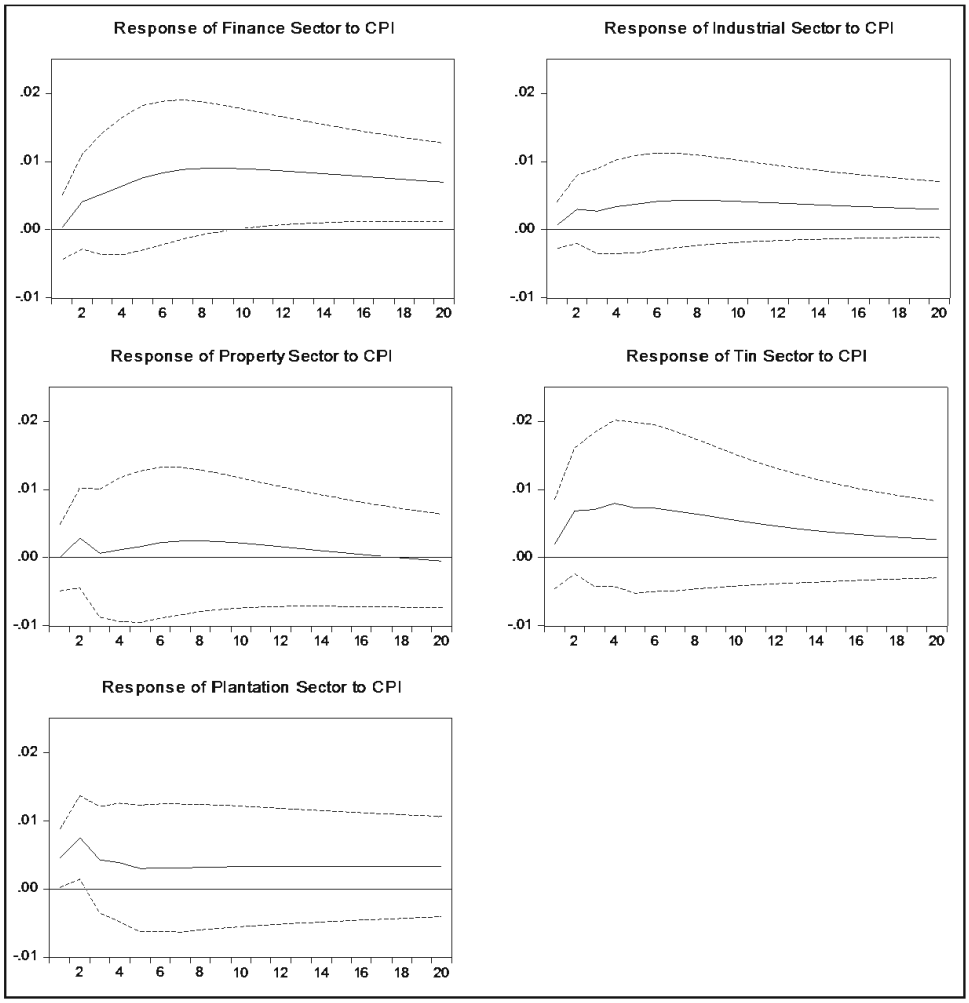

Figure 4. *Generalised impulse response to a shock to CPI*

impacts, the responses vary across the sectors. The property sector has the highest responses, followed by finance and tin sectors. This finding is in line with Ibrahim (2008) who found that exchange rate exposure has a significant impact on property and finance sectors.

Figure 6 shows the response of sectoral returns to output shock using industrial production index as a proxy for output. There is a positive initial impact (T = 1) but insignificant for tin sectoral returns in response to an unanticipated increase in output growth. The other four sectoral returns have negative initial impact (T = 1) but only results of finance and industrial sectors show significance. Immediately after the initial impact, there is a decrease in the responses, as demonstrated by all these sectoral returns bouncing back after 3–5 months. The responses are significant for properties,

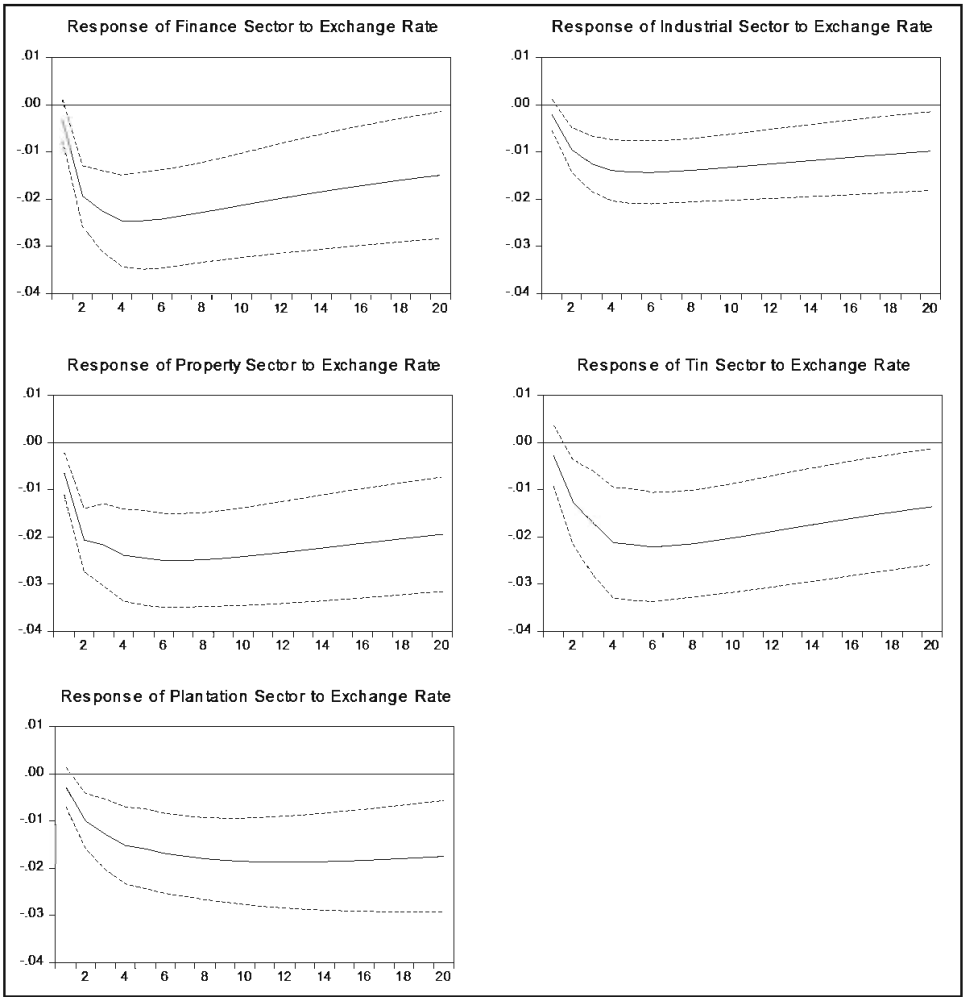

Figure 5. *Generalised impulses responses to a shock to exchange rate*

finance and industrial sectors with the effect lasting well into 5–6 months after the shock. These findings suggest that unexpected output growth leads to lower sectoral returns.

To compare the magnitude of response of each sector to macroeconomic shocks, we re-plotted all the IRF figures with similar vertical scale endpoints, as shown in Figure 7. The figure revealed that sectoral returns have the greatest responses to exchange rate, interest rate and money supply, compared to consumer price index and industrial production. Sectoral returns saw an immediate negative response to changes in exchange rate and interest rate, but positively to changes in money supply. Hence, our evidence suggests that variation in these three variables can explain the observable sectoral returns that are relevant for interested parties who want to manage their risk exposure.

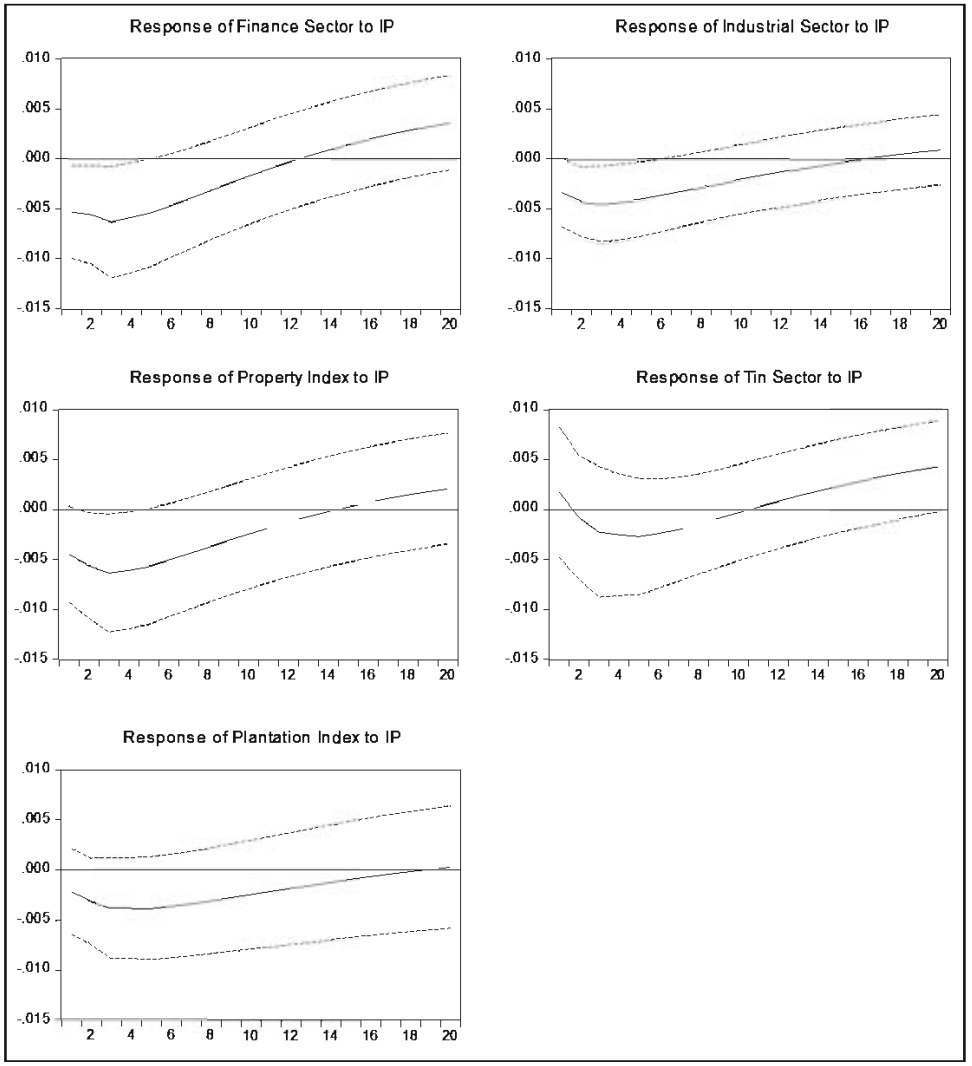

Figure 6. *Generalised impulse response to a shock to Industrial Production (IP) Index*

6. Conclusion

This study investigated the response of five sectoral price indices to shocks in five key macroeconomic indicators using the VAR and generalised impulse response analysis. Although the link between stock price and macroeconomic variables has been gaining popularity in recent years, there has been no available econometric evidence to trace the response of sectoral returns to macroeconomic shock in the Malaysian stock market, which has one of the highest market capitalisation ratios in the emerging markets. This highest market capitalisation record, together with other unique features of the economy,

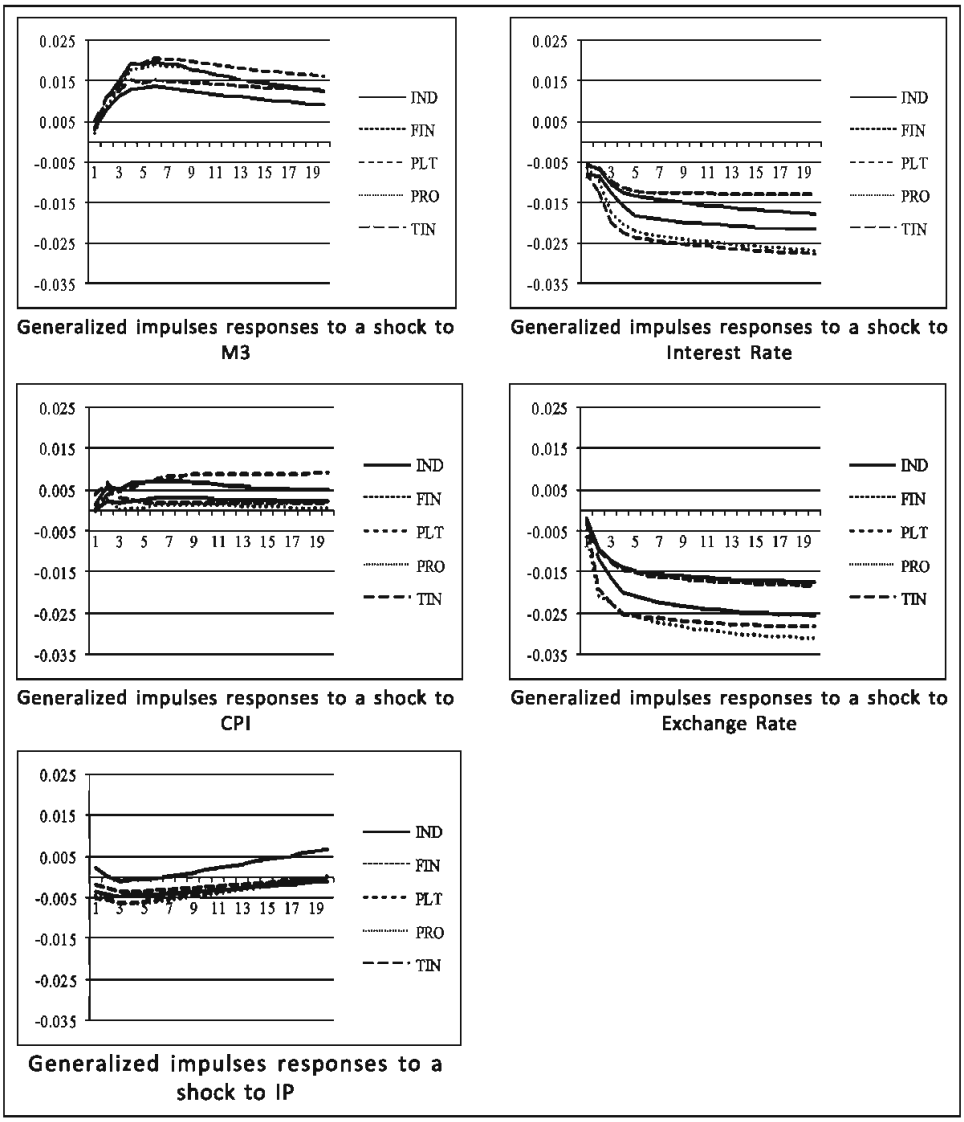

Figure 7. *Generalised impulse response to a shock to macroeconomic variables (similar vertical scale endpoints)*

including strong macroeconomic fundamentals and significant sectoral contribution to economic activities, provide an interesting setting to analyse the response of sectoral returns to macroeconomic shocks in Malaysian stock market.

The empirical results show that the initial impacts on various macroeconomic shocks are not identical across the sectors. It is also found that macroeconomic shocks lead to greater response in some sectoral returns than in others. Moreover, the effects of

macroeconomic shocks die out at different rates, lasting far longer or wearing out much quicker, depending on the sectoral price index examined. A monetary policy shock, be it a money supply shock or an interest rate shock, has its largest effect on the finance sector. Not surprisingly, financial firms are found to be very sensitive to changes in monetary policy due to the subsequent changes in lending and deposit rates that follow changes in the treasury bill rate. The findings also suggest that a sudden monetary tightening raising interest rate in the short-term also adversely affects finance, property and industrial sector activities. Moreover, an exchange rate shock leads to a reduction in all sectoral returns with the sectoral responses being significant. On the other hand, inflation shocks have only a mild and positive significant effect on the finance sector.

In terms of magnitude of sectoral responses to macroeconomic shocks, the results reveal that exchange rate, interest rate and money supply shocks correspond to the greatest magnitude responses. Unanticipated changes in exchange rate and interest rate are associated with lower returns for all sectors, whereas money supply shock leads to higher returns. On the other hand, the output growth shocks are less pronounced than other macroeconomic shocks which are proxied by industrial production. Since money supply, interest rate and exchange rate are interrelated, investors may have to look at changes in these variables to assess their stock holdings risk exposures. The findings of this paper highlight that sectoral returns respond to monetary policy shocks, or are sensitive to monetary policy. Thus, prudent and consistent monetary policy formulations as well as effective implementation are crucial to help sterilise against the adverse effects of monetary shocks on stock returns. In addition, monetary policy independence, which is not closely influenced by external global shocks, is also critical to minimising the exposure of stock returns to policy shocks.

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