EXTERNAL SHOCKS AND MALAYSIAN OUTPUT COMPOSITION: THE IMPACT OF THE 2007 GLOBAL FINANCIAL CRISIS

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ABSTRACT

The global financial crisis which hit the United States (US) in 2007 caused many countries in the world to experience a massive fall in their output level. Malaysia, as one of the major trading partners with the US, also felt the pinch from the economic chaos in that country. This paper examines the importance of external shocks on Malaysian output composition during the 2007 financial crisis. The shock focuses that are linked with the financial crisis include, specifically: foreign output shock; monetary policy shock; and asset price shock. The structural vector auto regression (SVAR) method is applied for analysing data from the period extending from the first quarter of 1999 until the fourth quarter of 2014. Based on the impulse response analysis, overall findings show that external shocks played a significant role in influencing the movement in Malaysian GDP components, especially after the crisis period.

Key words: External shocks, financial crisis, output composition.

Introduction

Numerous economists consider that the financial crisis of 2007-08 was the worst financial crisis since the Great Depression of the 1930s. This financial crisis, which originated from the United States, occurred because of the failure in the mortgage lending industry which started from the housing market. Indicators of the emerging problems came in the early part of 2007 due to two factors, namely: (1) when the Federal Home Loan Mortgage Corporation (commonly known as Freddie Mac or Freddie) announced that it would no longer purchase high-risk mortgages and; (2) when New Century Financial Corporation (which was a leading mortgage lender to riskier customers) filed for Chapter 11 bankruptcy protection in April 2007 (Marshall, 2009). Further, the French bank BNP Paribas announced to its investors on 9 August 2007 that they would not be able to take money out of its three funds because it could not value the assets in them, owing to a complete evaporation of liquidity in the market. This caused widespread panic in the market and triggered world understanding as to the extremely serious position of financial conditions at that time. The fall of Lehman Brothers was the culmination of the credit crisis and the US has been mired in recession since then. This has considerably aggravated the economic situation both in the country and globally.

Figure 1: Malaysian GDP growth
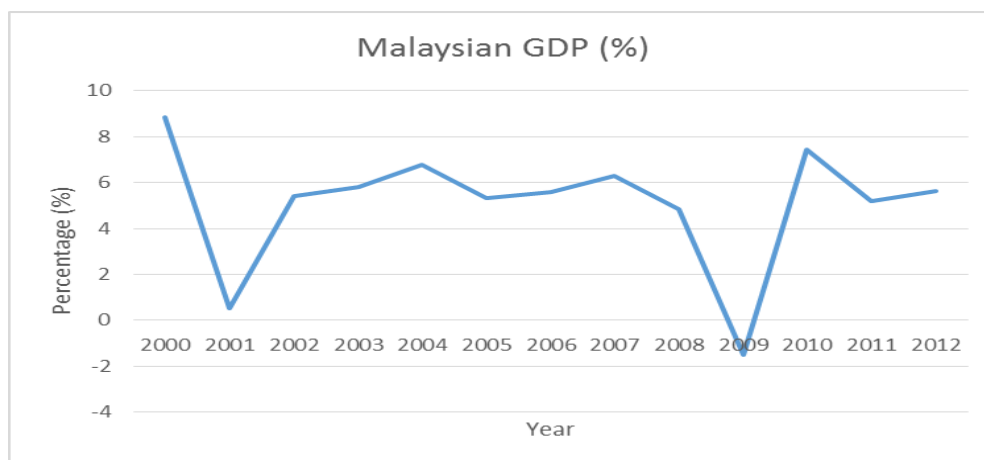
Source: World Bank

Malaysia, as one of the major trading partners with the US, also felt the pinch from the economic chaos prevailing in that country. Figure 1 shows the growth of Malaysian Gross Domestic Product (GDP) from the year 2000 until 2012. The GDP

growth started to decline in 2008, dropped drastically and reached a negative value in 2009. This situation occurred as a result of the consequences from the chaos in the US. Furthermore, in 2001, there was also a sharp decline in GDP growth due to the dot.com bubble crisis that hit the US in that year. This situation clearly shows how fragile the Malaysian economy is towards economic changes in the US

This paper examines the importance of external shocks towards the Malaysian economy during the 2007 global financial crisis. Instead of investigating the effect on output level like previous studies which discussed in literature review section (to name a few see Gimet (2011), Sato et.al (2012), Allegret et.al (2012), Yamamoto (2014) and many more), this study examines the effect of external shocks on each of the output components which are, specifically: consumption, investment, government spending and net export. It is because by identfying the output composition dissimilarities is a step to better understand the process of the effects from the external shocks to the specific real sectors rather than investigating the whole economy. This study will be based on previous studies including those of Angeloni et.al (2003), Fujiwara (2003), Afandi (2009), and Phan (2014). However, in contrast with these previous studies which focused solely on the monetary policy effect on output composition, this study examines the effects of external shocks upon output composition. As a small open economy, Malaysia is seen easily will affected from the changes in the world economy. Therefore, the external shocks that will be considered in this analysis are those of output, monetary and asset price shocks respectively. House prices are used as a proxy for asset price shock instead of stock price. The SVAR method is applied to focus on contemporaneous restrictions and impulse response analysis.

This paper is organised as follows. The second section discusses some previous empirical studies on the role of external shocks. The third and fourth sections describe the data and outline the methodological framework respectively. The fifth section presents the findings of the analysis and the final section is the conclusion.

Literature review

The global financial crisis of 2007, also known as the US subprime crisis, was the culmination of the failure of the US mortgage industry following the collapse of the housing market in the US. The US is understood so well as one of the world's largest economies. Therefore, any economic chaos prevailing in this country is able to infect other countries, especially those who have a high degree of dependence upon it. This can be proved by Kwark (1999) in his study on identifying the sources of business cycle in the context of an open economy. He concluded that there is a strong relationship between shocks in the US and output level in foreign countries. Besides that, various studies have been conducted in order to ascertain how the collapse of the US financial market affects the peripheral countries in terms of both the financial sector and the real sector.

The subprime crisis that erupted in mid-2007 demonstrated the vitally important role that the financial sector plays as a source of fluctuations in the business cycle. Naoui et.al (2010) conducted a study to analyse the correlation between the US stock market and stock returns for ten emerging markets during the US subprime crisis. The ten emerging markets were Argentina, Brazil, Korea, Hong Kong, Indonesia, Malaysia, Mexico, China, Singapore and Taiwan respectively. The US Dow Jones stock index is used as a proxy by which to represent the subprime crisis. The results showed a significant relationship existing between stock market returns for the countries studied together with the US stock market during the global financial crisis in 2007 except for China (Shanghai). Based on the results, this study concluded that any shocks that affect the US stock market will also affect stock market activities for these countries due to the strong relationship between the two markets.

Cheung et.al (2010) studied the effects of the 2007 global financial crisis stemming from the US to the global stock market. Countries that were sampled to represent the global market comprised the United Kingdom, Hong Kong, Japan, Australia, Russia and China. The Standard and Poors 500 index (S & P 500) has been used as a proxy by which to represent the US subprime crisis in affecting the stock market of the countries. The results showed the existence of significant spillover effects from the US market towards global financial markets; in particular, towards the United Kingdom, Hong Kong, China, Japan and Australia. Furthermore, this relationship was seen to be growing stronger during the crisis.

Dimitriou and Simos (2013) analysed the impact of the US subprime crisis on equity markets for developed countries in the European Union (EU) and Japan, as well as developing countries such as China. The study found that the US subprime crisis has affected the equity markets of the European Union countries and Japan directly. Conversely, this crisis did not affect China's equity market directly but, rather, indirectly through the Japanese equity market. Overall, the results showed that there is a relationship between the US equity market and the countries studied.

Wang (2014) examined the way in which the stock markets in six East Asian countries, namely, China, Hong Kong, Taiwan, Singapore, South Korea and Japan influence each other. In addition, this study examines the interaction of market share for these countries in relation to the US national stock market both before and after the financial crisis of 2007. The results of this study found that, before the crisis, the stock market in the East Asian region was more influenced by the US market; while at the time of the crisis, the East Asian stock markets were more influenced by South Korean and Japanese stock markets rather than the US. Meanwhile, after the crisis, the US stock market once again played an important role in affecting stock markets in the East Asian region. However, the effect was much less compared to the period before the crisis.

There were also studies that did not focus solely on financial shocks. Instead, these studies also took into account other shocks as studied by Mackowiak (2007); these included alarms in US monetary policy, money stocks, aggregate outputs, price levels and commodity prices respectively. According to Gimet (2011), if the financial crisis hits only the financial sphere and involves only a small outflow of capital, the harmful consequences of the international disturbance are limited. However, if the shock spreads

into the real sector and induces a reaction of the monetary authorities in order to stabilize economies, all sectors are weakened and the time necessary to eliminate the negative impact of the crisis will be considerably lengthened.

Gimet (2011) studied the level of immunity of five ASEAN countries, namely, Indonesia, Singapore, Malaysia, Thailand, the Philippines, as well as another three Asian countries (Japan, South Korea and China) to the international financial crisis. This study was conducted by comparing the reaction of these countries towards two financial crises, specifically, the Asian financial crisis and the US subprime crisis. Overall, the results showed a significant vulnerability of emerging ASEAN countries to international shocks sustained during the Asian financial crisis episode through a causality mechanism running from the financial sector to the domestic real sector. In addition, this study also found that the US subprime crisis had limited impact on developing ASEAN countries compared to that experienced in industrialized countries including China. However, the subprime crisis that hit the developed countries through financial channels had been channeled to the real sector of developing ASEAN countries indirectly through the channel of trade links between them.

Sato et al. (2011) studied the importance of external shocks emanating from the US and affecting countries in the East Asian region. Besides that, this study also considered external shocks from Japan and China. It was found that, before the crisis, the shocks sustained by the US and the Japanese markets were important sources of disturbance for affecting the economy in this region. However, after the crisis, the influence of US shocks is seen as being more important while the importance of shocks in the Japanese market has decreased the effect for these countries. Meanwhile, the importance of Chinese shock influence showed an increasing trend over time. However, the size of the Chinese shock is still small compared to those of the US. Finally, oil price shocks have become increasingly important in influencing the stability of real output growth, especially in industrialized countries such as China, Hong Kong, Singapore and Thailand.

Allegret et a.l (2012) examined the role of external shocks in affecting domestic economies of the East Asian region, notably, China, South Korea, Hong Kong, Indonesia, Japan, Malaysia, Philippines, Singapore and Thailand. The study showed that real oil price and U.S. GDP shocks have a significant impact on domestic activity and lead to more symmetric responses compared to U.S. monetary and financial shocks. In addition, results on variance decompositions and impulse-response analysis showed that the East Asian countries are seen to be more sensitive to the trade channel compared to the monetary channel. Finally, in accordance with their financial openness, those economies also seem affected by financial shocks but on a smaller scale.

Tng (2013) conducted a study to investigate the effects of three external shocks (global demand, commodity prices and global financial pressures) upon five ASEAN countries, namely, the Philippines, Indonesia, Malaysia, Singapore and Thailand. In addition, the study also examined the role of domestic bank credit as a channel to divert the impact of the global crisis to the real economy. The findings show that external demand broadly emerges as the most important driver of domestic output and prices, followed by commodity prices and global financial conditions.

Yamamoto (2014) studied the spillover effects of the US 2007-2009 financial crisis on the economies of Asian countries. The study found that both trade and financial shocks have a significant impact in affecting the growth of production for the countries studied. However, financial shocks had a greater impact than trade shocks for the period 2007-2009 during which the US financial crisis erupted. Overall, the study concluded that there is a strong relationship between the financial sectors among Asian countries and the US; especially with regard to countries that are experiencing rapid development.

Feldkircher and Huber (2015) studied the international transmission of shocks in aggregate demand, aggregate supply and monetary policy from the US economy towards eleven developed countries, eighteen emerging European countries, nine Asian countries and five Latin American countries respectively. This study also took into account the oil price shocks as global variables. The results showed the existence of significant spillover effects of three types of shocks on output levels. Positive shocks for the US supply and demand increased the level of output while negative shocks in monetary policy caused the output level to fall for each country. In addition, the study also found that the financial channel is an important channel by which to transmit the impact shock to other countries. Further, the study also identified the role of trade channels in addition to the financial channel in affecting the economy.

Data

External shocks that have been considered in this study include: output shock, monetary policy shock and asset price shock. US real Gross Domestic Product (GDP) is used as a proxy for output shock (Y^*); Federal Fund Rate (FFR) is a policy rate for the US Federal Reserve and used as a monetary policy shock (R^*) proxy; and the US Case-Schiller housing price index (H^*) is an indicator used as a proxy for asset price shock. All data used were compiled using US data since this subprime crisis originated from the US. The US consumer price index (2010=100) is also used to transform the variable from nominal to real term.

Meanwhile, variables used for the domestic block comprise: household expenditure, including non-profit institutions as consumption proxy (C); gross fixed capital formation by firm, household and non-profit institutions as investment proxy (I); government spending (G) and net export (X). Net export is calculated by dividing the export value by the import value. If the ratio exceeds 1, it can be concluded therefore that net export is positive and vice versa.

All variables used are in a quarterly format, running from the first quarter of 1999 until the fourth quarter of 2014. The sample period was divided into two sub-sample periods (before the crisis (1999Q1-2007Q2) and after the crisis (2007Q3-2014Q4)). Firstly, all variables were adjusted for seasonality using the US Census Bureau X-13 ARIMA method in Eviews 9 package. All variables were captured in real term value by using the consumer price index with 2010 as the base year. Lastly, all variables

were transformed into a log. All variables were obtained through Datastream while FFR and housing price index were obtained from the Federal Reserve Bank of St. Louis website (https://www.stlouisfed.org).

SVAR methodology

This section briefly explains the applied econometric method used to capture the impact of external shocks on Malaysian composition of output. A SVAR with AB model which first formalized in Amisano and Giannini (1997) was applied and the model is given below:

$$AY_t = A_1 Y_{t-1} + A_2 Y_{t-2} + \ldots\ldots + A_p Y_{t-p} + \mathbf{B}\varepsilon_t \tag{1}$$

Where **A** is $n \times n$ matrix of contemporaneous relationships, Y_t is $n \times 1$ vector of dependent variables included in the model, A_p is $n \times n$ matrix of lagged relationships, Y_{t-p} is $n \times 1$ matrix of lagged variables and ε_t is vector of structural disturbances by Bernanke (1986) where it is serially and mutually uncorrelated with $E(\varepsilon_t) = 0$ and $E(\varepsilon_t \varepsilon_t') = I_n$.

From the structural form, the reduced form VAR can be recovered by multipliying both sides of equation (1) by A^{-1} and can be written as below:

$$Y_t = A^{-1}A_1 Y_{t-1} + A^{-1}A_2 Y_{t-2} + \ldots + A^{-1}A_p Y_{t-p} + A^{-1}\mathbf{B}\varepsilon_t \tag{2}$$

$$Y_t = C_1 Y_{t-1} + C_2 Y_{t-2} + \ldots + C_p Y_{t-p} + u_t \tag{3}$$

Where $C_p = A^{-1}A_p$ and $u_t = A^{-1}\mathbf{B}\varepsilon_t$. It is assumed that $u_t \sim N(0, \Sigma_u)$ are reduced form disturbances that are connected to structural disturbances as follows:

$$\mathbf{A}u_t = \mathbf{B}\varepsilon_t \tag{4}$$

Then VAR in reduced form can be easily estimated with OLS and one can obtain forecast errors from the estimated residuals. The relationship between the estimated variance-covariance matrix of reduced form disturbances (Σ_u) and parameter matrices **A** and **B** is as follows:

$$(\mathbf{A}u_t)(\mathbf{A}u_t)' = \mathbf{A}u_t u_t'\mathbf{A}' = \mathbf{A}\Sigma_u\mathbf{A}' = \mathbf{B}\mathbf{B}' = \mathbf{B}\varepsilon_t\varepsilon_t'\mathbf{B} = (\mathbf{B}\varepsilon_t)(\mathbf{B}\varepsilon_t)' \tag{5}$$

When a reduced form VAR is estimated, $N^2 p$ parameters from lagged matrices are obtained while a structural model has additional $2N^2$ parameters from **A** and **B** matrices. Given estimated VAR, there is a variance-covariance matrix Σ_u that contains $\frac{(N^2+N)}{2}$ distinct known elements. Thus, this study requires at least $2N^2 - \frac{(N^2+N)}{2}$ additional restrictions to be imposed on **A** and **B** matrices in order to identify structural disturbances and parameters left in structural VAR.

SVAR can be estimated in two steps. First, the reduced form VAR is estimated by applying OLS to each equation. During this step variance-covariance matrix (Σ_u) is obtained. At the second step, the log-likelihood function in equation (6) is as shown below:

$$\ln L(\mathbf{A},\mathbf{B}) = C + \frac{T}{2}\log[\det(\mathbf{A})^2] - \frac{T}{2}\log[\det(\mathbf{B})^2] - \frac{T}{2}tr[\mathbf{A}'\mathbf{B}^{-1'}\mathbf{B}^{-1}\mathbf{A}\widehat{\Sigma_u}] \tag{6}$$

This is maximized with respect to unrestricted parameters of **A** and **B** matrices. In the end, it is possible to recover the structural disturbances, $u_t = A^{-1}\mathbf{B}\varepsilon_t$.

$$\begin{bmatrix} Y^* \\ R^* \\ H^* \\ C \\ I \\ G \\ X \end{bmatrix} = \begin{bmatrix} 1 & a_{12} & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 & 0 & 0 \\ a_{31} & a_{32} & 1 & 0 & 0 & 0 & 0 \\ a_{41} & a_{42} & a_{43} & 1 & 0 & 0 & 0 \\ a_{51} & a_{52} & a_{53} & a_{54} & 1 & 0 & 0 \\ 0 & 0 & 0 & a_{64} & a_{65} & 1 & 0 \\ a_{71} & a_{72} & a_{73} & a_{74} & a_{75} & a_{76} & 1 \end{bmatrix} = \begin{bmatrix} u_t^{Y^*} \\ u_t^{R^*} \\ u_t^{H^*} \\ u_t^{C^*} \\ u_t^{I^*} \\ u_t^{G^*} \\ u_t^{X^*} \end{bmatrix} = \begin{bmatrix} b_{11} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & b_{22} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & b_{33} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & b_{44} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & b_{55} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & b_{66} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & b_{77} \end{bmatrix} = \begin{bmatrix} \varepsilon_t^{Y^*} \\ \varepsilon_t^{R^*} \\ \varepsilon_t^{H^*} \\ \varepsilon_t^{C^*} \\ \varepsilon_t^{I^*} \\ \varepsilon_t^{G^*} \\ \varepsilon_t^{X^*} \end{bmatrix} \tag{7}$$

Equation (7) shows the restrictions that were imposed on the matrix contemporaneously. The order of the foreign variables follows that used by Dungey and Fry (2003), where the commodity price is placed at the top among other variables. Later, it is followed by foreign real output, inflation and the interest rate. However, this study neglected the commodity price and inflation variable in the foreign block. Real asset prices only come after the interest rate as explained in a study by Dungey and Pagan (2000). This study used house prices as a proxy for asset prices instead of stock prices. Meanwhile, the domestic block consists of Malaysian output components which are consumption, investment, government spending and net export respectively. Angeloni et.al (2003), Fujiwara (2003) and Afandi (2009) models used only consumption and investment components. They included government expenditure and net exports together and are defined as 'the rest of GDP'. According to their studies, consumption and investment are placed at the top followed by other GDP components. Since Malaysia is a small open economy

and because net exports play an important role, this paper splits 'the rest of GDP' into its components, in order to capture the potential impact that external shocks may have on net exports.

Based on the assumption of a small open economy, foreign variables are unaffected by domestic variables in lag as well as contemporaneously. Therefore, at the top of the right corner which covers the first three rows and the last four columns, it can be seen that zero restrictions have been imposed. The objective of this study is to examine the effect of external shocks on Malaysian GDP components. Therefore, this study allowed the external variables to contemporaneously affect domestic variables, with the exception of the government spending variable. The exclusion of foreign variables from contemporaneously affecting domestic government spending reflects the information lag faced by policy-makers. This exclusion has caused coefficients a_{61}, a_{62} and a_{63} to have zero restrictions. For the same reason, foreign output also disallowed its own policy rate to be affected contemporaneously, where a_{21} is equal to zero.

This study has seven variables. Therefore, at least 70 restrictions $\left(2(7^2) - \frac{(7^2+7)}{2}\right)$ need to be imposed on **A** and **B** matrices in order for the SVAR to be identified. This model has 42 restrictions from **B** matrix and additional 31 unities and zero restriction from **A** matrix. Overall, this model is over-identified because there are 73 restrictions instead of 70 required for exact identification. Therefore, chi-square (χ^2) test statistic as in equation (8) is used to estimate the restrictions imposed.

$$\chi^2 = |\Sigma_e^R| - |\Sigma_e| \qquad\qquad (8)$$

Where R (number of exceeding restriction) refers to degrees of freedom and Σ_e^R is the restricted variance-covariance matrix while Σ_e represents the unrestricted variance-covariance matrix.

Empirical result

This section discusses the key findings from the SVAR model, especially the contemporaneous restrictions and impulse response functions. This paper follows the work of the majority of SVAR studies and estimates the reduced form VAR in levels. The stability of the VAR process is assessed in order to ascertain the reliability of the estimated model. The model is stable since all the values for each sample are inside the unit circle. This also implies that the system process is stationary (see Lutkepohl, 2005). Finally, due to the shortness of the data set in sub-periods, this study sets the lag length of the model to one (1) as in Allegret et.al (2012), instead of applying the usual Akaike's, Schwartz and Hannan-Quinn's information criteria. Moreover, by choosing one lag it does not involve the loss of too many degrees of freedom.

Table 1: Test for three (3) over-identifying restrictions

Before		After	
χ^2	p	χ^2	p
3.54	0.32	1.20	0.75

Based on the estimated VAR equation (4), this study imposes the restrictions as specified in equation (7) to identify structural shocks. The structural parameter estimates of *A* are given in Table 2. As indicated earlier, there are three over-identifying restrictions on the structural model. The test statistic of the over-identifying restrictions is distributed as a chi-squared (χ^2) with three degrees of freedom. The results of the test statistic for before and after crisis periods are shown in Table 1. Based on the table, before the crisis the value for the test statistic was 3.54 having a *p*-value of 0.32. Meanwhile, the value obtained for the test statistic during the period after the crisis is 1.20 with the *p*-value 0.75. Thus the over-identifying restrictions cannot be rejected even at the 10% significance level. This suggests that there is evidence that the identifying restrictions imposed on the models are supported by the data.

Table 2: Estimates of coefficients in contemporaneous matrix

Coefficients	Before	After
Foreign Output Shock		
a_{41}	**-1.315234**[**]	-0.623060
a_{51}	1.427602	-0.456463
a_{71}	0.561770	**1.921078**[*]
Foreign Monetary Policy Shock		
a_{42}	-0.000814	-0.021979
a_{52}	-0.015025	-0.018879
a_{72}	-0.014037	-0.024202
Foreign House Price Shock		
a_{43}	**1.456343**[*]	-0.735908
a_{53}	**-2.417982**[*]	**-0.584697**[***]
a_{73}	-1.024099	**1.063664**[**]

Note: Coefficients that are statistically significant are shown in boldface.
   * Significant at 1% level
   ** Significant at 5% level
  ***Significant at 10% level

Table 2 presents the estimates of the coefficients in a contemporaneous matrix for the periods both before and after the crisis as shown in equation (7). The negative (positive) sign of the estimated coefficients should be read as being positive (negative) which contradicts what is shown in the table (see Ibrahim dan Sufian, 2014). Before the crisis, the foreign output shock is significant at 5% contemporaneously affecting Malaysian consumption. The relationship is found to be positive. After the crisis, this shock contemporaneously affected Malaysian net exports at a 1% significance level. However, the sign of the relationship is a puzzle as it is supposed to positively affect net exports. Meanwhile, there is no significant contemporaneous relationship between foreign monetary policy shock and Malaysian output composition for both periods. Therefore, it is believed that foreign monetary policy will affect Malaysian output composition with a lag through appropriate channels existing in the monetary transmission mechanism. Finally, foreign house price shock is seen as being more important than other shocks in contemporaneously affecting Malaysian output composition. Malaysian consumption reacted immediately to this shock before the crisis and in a lag for the period after the crisis. Despite being significant, however, the sign relationship between these two variables remains a puzzle. Meanwhile, Malaysian investment had a positive relationship with this shock and reacted immediately to it over both periods. Lastly, this shock only affects net exports contemporaneously after the crisis period.

Table 3 shows the responses of Malaysian GDP components towards external shocks for the pre-crisis period, while Table 4 depicts the post-crisis period. During the pre-crisis period, a fall in foreign output positively affects consumption and investment components. Consumption is seen to have started to decline after the second quarter, while investment only declined after the fourth quarter. Government spending is seen to have responded sluggishly towards this shock. The fall in foreign output caused government spending to increase slowly up to the third quarter and then disappear in the following quarter. Net exports could be seen to fall sluggishly when responding towards the fall in foreign output shock.

Table 3: Responses of output components during pre-crisis
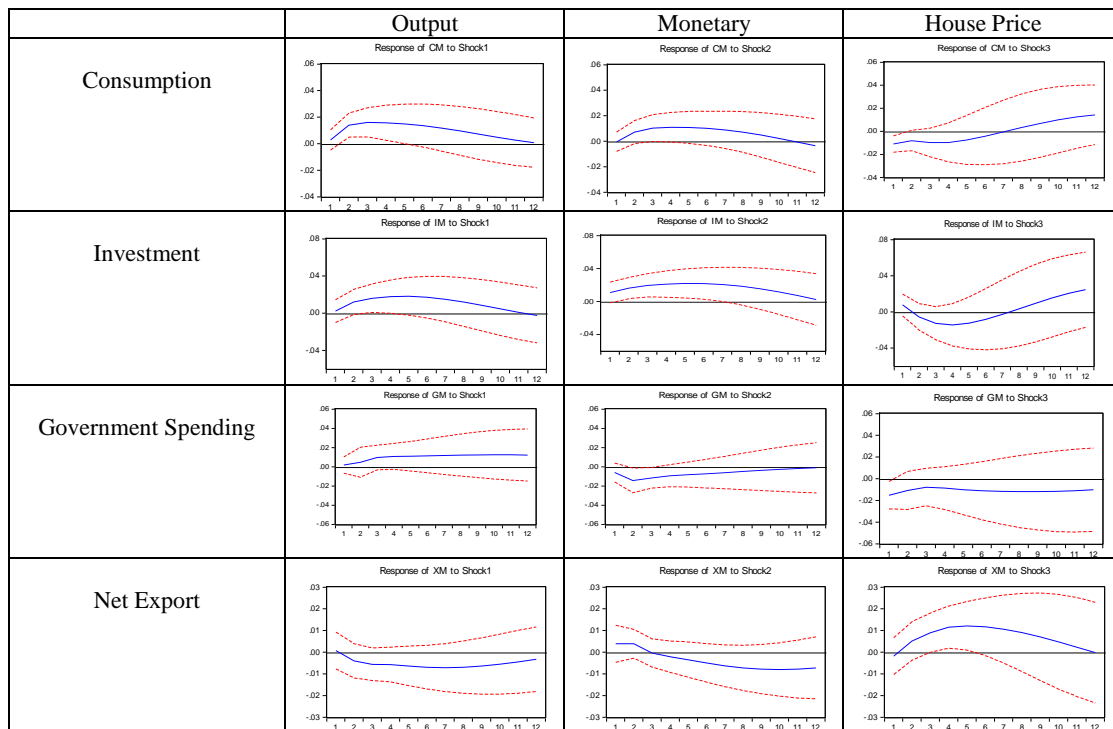
Compared to other shocks, foreign monetary policy shock is seen as being less important in affecting Malaysian GDP components. This can be seen through the impulse magnitude of all components towards this shock (which is less responsive compared to other shocks). A contraction in foreign monetary policy only caused consumption and investment to decline after the third quarter. Government spending only increased sluggishly after the second quarter when responding to this shock. Meanwhile, net exports responded neutrally towards this shock for the first two quarters and started to decline in the following quarters.

Consumption is seen as having been less responsive towards the fall in foreign house prices and only increased modestly after the fourth quarter. Meanwhile, the fall in house prices has caused investment to decrease as early as the first quarter until the third quarter. Again, government spending is seen as being less affected by this shock as it only displayed a sluggish response in accordance with the other shocks. Net exports, however, increased drastically at the beginning of the quarter until the fourth quarter and only started to decline after that.

The responses of GDP components for the post-crisis period are shown in Table 4. The impulse magnitude of GDP components towards foreign output shock is seen as more responsive compared to the pre-crisis period. The fall in foreign output only caused consumption and investment to decline after the third quarter. Further, government spending in the post-crisis period was seen as

being more responsive towards the output shock compared to the pre-crisis period. The fall in foreign output has caused government spending to increase at the beginning of the quarter until the third quarter. However, net exports have seen an increasing trend towards output shock, which was not expected.

Table 4: Responses of output components during the post-crisis period
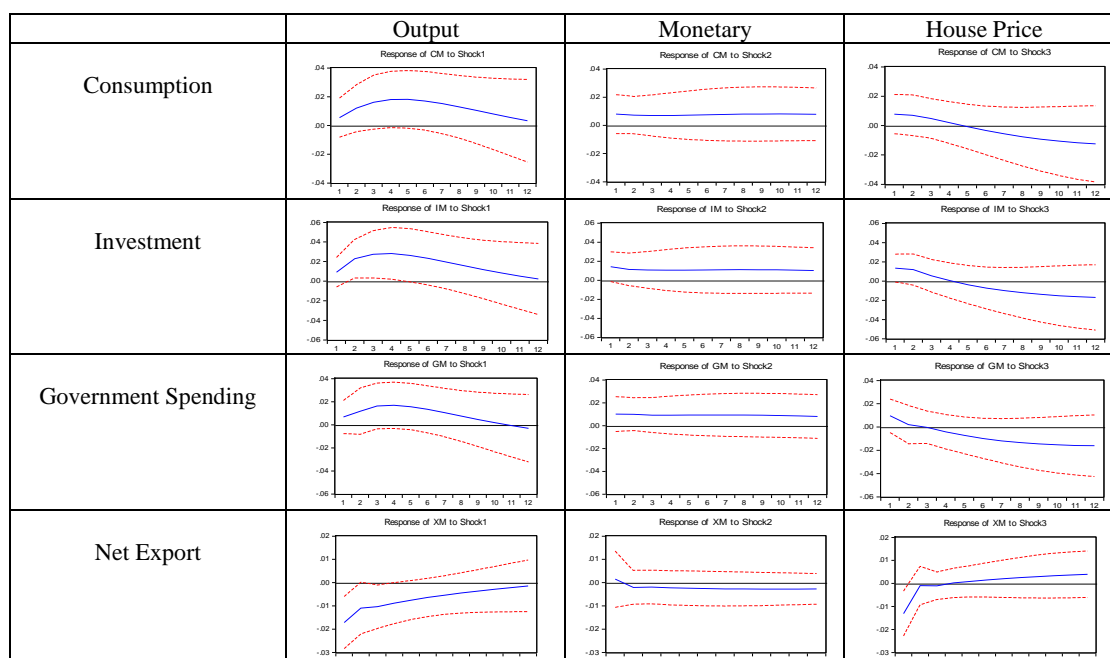
The foreign monetary policy shock during the post-crisis period was not seen as important in affecting the Malaysian GDP component. An increase in the foreign monetary policy rate had no effect at all upon GDP components. Consumption, investment and government spending are seen to have had neutral responses towards this shock where they neither increased nor decreased. However, this shock caused net exports to fall at the beginning of the quarter until the second quarter; but the response disappeared or became neutral after that. Finally, the fall in foreign house prices caused Malaysian consumption, investment and government spending to decline continuously throughout the period. Meanwhile, net exports increased drastically for the first two quarters and performed sluggishly for the rest of the quarter.

Conclusion

This paper investigates the importance of external shock towards Malaysian output composition during the 2007-08 global financial crisis. By applying SVAR methodology, the effect of shocks in foreign output, foreign monetary policy and foreign house price is examined on four components of the Malaysian GDP. These comprise consumption, investment, government spending and also net exports (since Malaysia practises an open economy). Moreover, this study was divided into two sub-periods, namely: pre and post-crisis periods.

Based on the contemporaneous restrictions output, it can be seen that foreign house prices were more dominant than other shocks in contemporaneously affecting Malaysian GDP components for both periods. Meanwhile, foreign monetary policy shock was not important enough to contemporaneously affect the GDP component for both periods. It can be concluded that foreign monetary policy shock only affected the components with lag through the appropriate channel in monetary transmission mechanism, which was not discovered by this study.

Impulse response analysis shows that foreign output shock became more important in affecting output composition during the post-crisis period. Meanwhile, foreign house prices were more important during the pre-crisis period. Moreover, monetary policy shock was seen as not important at all in influencing Malaysian GDP components for both periods of the crisis, especially in the post-crisis period. However, based on the impulse response graph, it is hard to come to a conclusion as to which component was most affected by external shock. This is because all components have similar movements of impulse response magnitude. Further, this study also neglected the contribution analysis as in Angeloni (2003). Therefore, this study cannot make a conclusion as to which components had a significant contribution in changes of output level during the 2007 global financial crisis.

Finally, this study has reached its objective in examining the importance of external shocks on GDP components. The result shows the existence of external shocks in influencing output composition in Malaysia, especially during the post-crisis period. As a country with an open economy which is highly dependent on international trade activity, it is not impossible for this country to become affected by any economic turmoil that hits its trading partners. Therefore, Malaysia needs to have a good and

appropriate policy and implement appropriate strategies in order to prevent this country becoming more severely affected by unexpected changes in the world's economy.

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