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Global Shocks, Monetary policy, and Financial Market: Evidence from a Transition Economy

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ABSTRACT

This study investigates the Malaysian monetary and financial impacts and responses of global economic shocks, considering geopolitical uncertainty, global economic policy uncertainty, global economic activities, global oil supply, global oil demand, and global financial market uncertainty as the influential factors in the global economy. We employ factor augmented-SVAR model and 71 monthly time series. The empirical results reveal that monetary and financial impacts and responses of shocks in geopolitical risk, global economic policy uncertainty, oil supply, and global economic activities are negative, while the effects and responses of shocks in global financial market and oil demand are positive for oil exporting and emerging economy like Malaysia. The empirical results imply that all global shocks are not bad for Malaysian economic activities and financial market, because some shocks in global economic factors can promote macroeconomic activities. Furthermore, the effects may be complicated in estimating as each global economic factor has its own shocks transmitting channels, which facilitates them to influence even indirectly to macroeconomic and financial market activities. Hence, the empirical results of this study will be imperatively crucial to policymakers in developing policies, to minimize undesirable macroeconomic instabilities.

JEL Classification: C58, E32, E37, E44, E52, E62, F5, F65, G10

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INTRODUCTION

A strong economic and financial system pushes the economy to grow with significant and sustainable developments. Despite having a strong economic system as a part of the global economic system, every economy has to confront turbulence which occurs from shocks in global economic factors (see, Berger et al., 2017; Cheng and Chiu, 2018). In tandem with macroeconomic theory, it can be said that the global economic uncertainties and shocks are likely to have disturbing and dampening effects on macro-economic activities and financial activities. The effects of global factors mostly transmit through global, international level, and domestic level transmission channels (Hoque et al., 2019; Zaidi et al., 2016; Razmi et al., 2016; Taghizadeh-Hesary and Yoshino, 2016)

Economists and researchers have been considering geopolitical risk (GRP), global economic policy uncertainty (GEPU), global financial market uncertainty (GF), and global oil market uncertainty as global economic factors because these factors can influence the economic and financial performance of any economy at every level (e.g., Tasi, 2017, Lee and Lee, 2020; Mensi et al., 2014; Naifar, and Hammoudeh, 2016; Yalçinkaya and Daştan, 2020; Yildirim et al., 2016; Zhou et al., 2020). While these factors have the potentiality of affecting all economies around the globe, the emerging economies are vibrant and volatile to global level shocks than developed economies (see, Boursa et al., 2018; Carrière-Swallow and Céspedes, 2013; Cheng, 2017; Cheng and Chui, 2018; Greig et al., 2018; Hoque and Zaidi, 2020; Yalçinkaya and Daştan, 2020; Yildirim et al., 2016, Tasi, 2017). Several studies including Cheng, (2017), and Cheng and Chui (2018) argue and document the impacts of global and international economic shocks considered to be country-specific.

Based on this premises, this paper examines the responses of the monetary and financial system of Malaysia to global economic factors and the transmission channels of global economic factors. The rational is that Malaysia is an emerging country and export driven economy, and thus its economic is highly exposed to global uncertainties like considering geopolitical risk (GRP), global economic policy uncertainty (GEPU), global financial market uncertainty (GF), and global oil market uncertainty. Additionally, it has been empirically evidenced that each economy reacts to these factors in distinctive way, so the empirical investigations is crucially important to understand the responses and fill the research gaps. Moreover, such analysis may be beneficial to policymakers and lawmakers, by helping understand how global economic changes can influence the Malaysian monetary and financial system and maintain sustainable economic and financial performances.

To capture the impacts of global economic uncertainties and shocks, we consider geopolitical uncertainty (GRP), global economic policy uncertainty (GEPU), global financial market uncertainty (GF) uncertainty, and oil market shock as the global economic factors. These factors interact with the overall economy, and it is essential to consider the overall economy with a large scale of information into economic modeling. Thus, factor-augmented VAR (FAVAR, hereafter) is an optimal choice as an empirical strategy and econometric modeling as because of its compresses data for many related data series into a latent factor which can capture the dynamics of a large scale of information. Additionally, this method apprehends the dynamics of identified factors from a large set of data series representing the underlying information. Therefore, in this study, we employ factor-augmented SVAR (FA-SVAR) for investigating the interaction between global economic uncertainty and Malaysian macroeconomic factors and follow the research of Aastveit (2014).

This study contributes to the literature in the following ways. This study is a first attempt to examine how shocks in global economic factors affect Malaysian monetary and financial activities using factor-augmented SVAR. Thus, unlike others, this study integrates two emerging strands of literature into a single research study considering four components- geopolitical uncertainties, global economic policy uncertainty (GEPU), global financial market uncertainty (GF), and global oil market uncertainty. Additionally, prior studies related to the first strand of the literature has not shed light on Malaysian monetary policy to global economic uncertainty, specifically focusing shock in geopolitical uncertainty, global economic policy uncertainty, and global financial market uncertainty. Furthermore, studies related to the second strand of the literature, in the Malaysian case, investigate impacts of each global economic factor like GEPU and oil price on stock market performance separately using single equations (e,g., Hoque and Zaidi, 2019, Lie et al., 2015). However, the VAR model of this study facilitates the consideration of structural equations. Hence, this study enhances the literature related to emerging economies and global economic uncertainty. Second, this study is

related to Karim and Karim (2016), Zaidi and Fisher (2010), and Zaidi et al., (2013) as they look at Malaysian macroeconomic responses to foreign shocks. Despite this, our study is different from their studies since we consider global economic uncertainty and FA-SVAR model instead of a few foreign shocks and SVAR model. Thus, the empirical results of this study extend their studies by documenting the significant influence of global economic uncertainties and their transmission channels. In addition, this study is also somewhat related to the study of Razmi et al. (2016) which provided evidence of the transmission channel of oil price shock and while considering only real oil price. However, we present Malaysian monetary channels- such as interest rate, exchange rate, and asset price channel- that act as a shock transmitting channel for three structural oil market shocks. Third, to date, the prior studies show the direct negative impacts of geopolitical uncertainty on financial asset price and macro-economic performance (e.g., Cheng and Chui, 2018; Lee et al., 2018). We present empirically that geopolitical uncertainty can affect macro-economic and financial market activities through global level channels (global economic policy uncertainties, oil supply shocks, and global financial market uncertainty) and monetary channels. Even though we estimate effects on volatilities in line with the study of Balicar et al. (2018), Bouri et al. (2018), and Bousra et al. (2018), it can be said that geopolitical uncertainty can create volatilities in economic output and financial asset price. Similarly, we also present empirically that the impacts of global economic policy uncertainties can pass through oil market shocks, global financial market shocks, and monetary channels. In addition, we present shocks transmitting channel of global financial market uncertainty shock. Besides, the monetary transmission mechanism of global uncertainty shocks has implications for policy responses. Fourth, our findings suggest that Malaysian monetary policymaker and the financial market respond to global shocks while observing domestic economic conditions.

The remainder of the paper is structured as follows. Section 2 briefs the related the past studies. Section 3 presents the econometric framework. Section 4 provides a discussion on the primary analysis in the study. Section 5 discussion empirical findings and implications. Finally, Section 6 concludes the study along with providing policy suggestions.

BRIEF LITERATURE

The host subject matters are devoted to two strands of the literature. The first strand is related to monetary responses to global economic uncertainties and shocks. Cheng and Chui (2018) and Lee et al. (2018) have shown that global uncertainties like political tensions and geopolitical uncertainty have negative impacts on macroeconomic performance including investment, interest rate policy, and money supply, and thus, the domestic economic conditions emerge policy reactions to such uncertainty shocks. Additionally, they have shown the effects of geopolitical uncertainty shocks depend on the economic structure and domestic economic conditions. Furthermore, researchers show that global economic uncertainty and international economic policy uncertainty have negative impacts on macroeconomic performance causing lower investment, higher unemployment, lower trade flows and lower output (e.g. Bloom, 2009; Baker et al., 2016; Caggiano et al., 2020; Carrière-Swallow and Céspedes, 2013; Cheng, 2017; Fontaine et al., 2018; Greig et al., 2018; Nguyen et al., 2020; Trung, 2018). Thus, policymakers have been responding with interest rate policy to stabilize domestic economic uncertainty; however, sometimes, international economic policy uncertainty can dampen the effectiveness of monetary policy and create monetary policy uncertainty (Husted et al., 2019). Moreover, an oil price shock has positive and negative impact on monetary policy rate (interest rate) depending on the types of oil shocks, characteristics of economies, and status of economies in world oil market (see Aastveit, 2014; Cunado and De-Gracia, 2005; Cunado et al., 2015; Filis and Chatziantoniou, 2014; Kim et al., 2017; Kilian, 2014; Koh, 2016; Razmi et al., 2016; Taghizadeh-Hesary and Yoshino, 2016). These studies mention that monetary policymakers respond to oil price depending on the condition of unemployment, inflation, and macroeconomic performances. In overall, all empirical evidence lead to believe that impacts on Malaysian macro-economic performance could be different from others, and thus, monetary activities indeed respond differently as well.

The second strand of literature is linked to the responses of the financial market to global economic uncertainties and shocks. Antonakakis et al. (2017), Bouri et al. (2018), Caldara and Iacoviello (2018), Hoque and Zaidi (2020) among many others find negative effects of geopolitical uncertainty on financial market

performance, where they use geopolitical risk index as a proxy for geopolitical uncertainty. Thus, the financial market responds negatively to shocks in geopolitical uncertainty. Balcilar et al. (2018) provide evidence that different emerging stock market react to geopolitical uncertainty in different ways. Furthermore, Arouri et al. (2016), Hoque and Zaidi (2019), Pástor and Veronesi (2013) find that global economic policy uncertainty has mostly negative effects on financial asset price. In enhancing understanding, Ko and Lee (2015) Sum (2013) demonstrate that the effects of international policy uncertainty also depend on economic structure, and emerging stock markets are highly volatile to international uncertainties. The empirical evidence of these studies suggests that the financial market responds negatively to global economic policy uncertainty shocks. Additionally, Mensi et al. (2014) Naifar and Hammoudeh (2016), and Yildirim et al. (2016) document that the stock market negatively responds to global financial uncertainty, especially to volatilities of the global financial market. Moreover, using the VAR model and time series models, previous studies examine the stock market response of world oil market shocks and conclude that the reaction of stock market performance depends on the origin of oil market shocks and the position in the global oil market (e.g., Apergis and Miller, 2009; Fang and You, 2014; Cunado and Gracia, 2014; Filis and Chatziantoniou, 2014; Kilian and Park, 2009; and Wang et al., 2013).

ECONOMETRIC FRAMEWORK

Bernanke et al. (2005) and Stock and Waston (2005) introduce the factor-augmented VAR (FAVAR, hereafter) model for capturing the macro-economic response to policy shocks in the rich data environment[1]. Stock and Waston (2005) include structural dynamic factor model into the FAVAR model, and it is referred to as structural FAVAR or popularly known as FA-SVAR. Henceforth, following the study of Aastveit (2014), the study has modeled a Factor-Augmented Structural VAR (FA-SVAR) model with a combination of both observed and unobserved variables. The current FA-SVAR model is also built on the exogenous assumption, and thus, it has a global block and domestic block[2]. The global block is comprised of geopolitical uncertainty (GRP), global economic policy uncertainty (GEPU), global financial market (GF) and three structural oil shocks. The three structural oil price shocks are driven by oil supply (WOP), oil price shocks driven by global demand (GDA), and oil price shocks driven by oil-specific demand (REA). In the global block, GRP, GEPU, GF, WOP, and GDA are observable factors, while oil-specific demand shocks (REA) is an unobservable component as several oil price indices are available in the world oil market. In the domestic block, monetary policy rate (INT), money supply (MS), exchange rate (EER), financial market activity (SM) are considered as unobservable factors[3]. These unobservable components can be observed through principal components analysis using a large data series. Henceforth, the following vector C_t presents the vector of structural factors.

$$C_t = [GRP\ \ GEPU\ \ WOP\ \ GDA\ GF\ \ REA\ \ IPI\ \ INT\ \ MS\ \ EER\ \ SM\ ] \quad (1)$$

Dataset and Principal Components

The FAVAR model has eleven structural variables including five observable non-latent variables and six unobservable latent variables. Thus, a large dataset of 71 monthly time-series variables is employed for extracting the structural factors (See Appendix A1 and Supplementary S1 for variable descriptions with data sources), and the study sample covers the period of 2009:01 and 2017:12.

As Stock and Watson (2005) and Ratti and Vespignani (2016) recommend stationarity of the time series before principal component analysis, we have transformed all series into stationary form before extracting leading principal component. The following equations (2) through (7) are employed for extracting

[1] See for Malaysian monetary transmission Channels: Athanasopoulos et al. (2012); Poon (2018); Razmi et al. (2015).
[2] We employed SVAR owing to it advantages. First, it is efficient in policy analysis and response (Sims et al., 1990; Razmi et al., 2016; Zaidi et al., 2013). Second, it solves the price puzzles and effective in small-open economy setting (Kim & Roubini, 2000; Rami et al., 2016).
[3] There are several studies that recommends domestic factors such interest rate, money supply, domestic credit, exchange rate, and stock market interact with each other, and they are influenced by the international and global economic factors ((Hoque et al., 2019; Zaidi et al., 2013; Razmi et al., 2016; Taghizadeh-Hesary and Yoshino, 2016). Sometimes, these factors act as transmission channels depending on origin and type of shocks (see Hoque et al., 2019). These assumptions are applied in many Malaysian macro-economic analysis (e.g., Karim and Karim, 2016, Raghavan et al., 2012; Razmi et al., 2015, 2016, 2017, Zaidi et al., 2013).

leading principal component indexes from concerned time series. These latent/principal component indexes will be considered as structural factors into the VAR model.

$$ipi_t = [\,\mathrm{ip}_t^{S1}, \ldots\ldots \mathrm{ip}_t^{Sn}] \quad (2)$$
$$int_t = [\,\mathrm{int}_t^{1}, \ldots\ldots \mathrm{int}_t^{n}] \quad (3)$$
$$ms_t = [\,\mathrm{ms}_t^{1}, \ldots\ldots \mathrm{ms}_t^{n}] \quad (4)$$
$$eer_t = [\,\mathrm{eer}_t^{1}, \ldots\ldots \mathrm{eer}_t^{n}] \quad (5)$$
$$sm_t = [\,\mathrm{sm}_t^{S1}, \ldots\ldots \mathrm{sm}_t^{Sn}] \quad (6)$$
$$rea_t = [\mathrm{op}_t^{Dubai},\ \mathrm{op}_t^{Brent}, \mathrm{op}_t^{WTI}] \quad (7)$$

where, ipi_t is a vector that contains a production index of different sectors, which is proxied for economic output. int_t is a vector which covers different types of interest rates in Malaysia, that proxied for monetary policy rate/tools. ms_t is a vector that preserves several types of money supply indicators, which is also proxied for money supply in the economy. eer_t is a vector that contains the value of the Malaysian currency (Ringgit) against several world currencies, which is proxied for the exchange rate. sm_t is a vector that has indices of several financial assets, which is proxied for financial market activities. rea_t is a vector that contains several types of the crude oil price index, which is proxied for oil demand.

Henceforth, following the study of Ratti and Vespignani (2016), we consider the approach of factor loading and eigenvalue-based principal components analysis in generating latent variables. The results of the principal components analysis are presented in Table 1, which highlights that the first leading principal component of each factor has extracted more than 70% information from many data-series. Hence, we consider the first principal component of each factor in creating latent factors which are employed as structural factor into SVAR.

Table 1 Variation explained by the first and second principal components for each factor

	IPI	INT	MS	EER	SM	REA
1st principal component	76.1%	78.7%	88.1%	69.6%	81.0%	70%
2nd principal component	16.4%	11.4%	10.6%	21.8%	13.5%	22.1%

Note: Based on orthonormal (normalized) loading and Bai and Na (2002) information creation

Factor Augmented SVAR (FA-SVAR) Setting and Estimation

Vector C_t in equation (1) captures economic conditions through some commonly observed and unobserved factors. That said, the dynamics of all the factors are modeled using the FA-SVAR model; therefore, the following a VAR model is developed.

$$C_t = \Phi(L) + C_{t-1} + \mu_t \quad (8)$$

where $C_t = [GRP\ \ GEPU\ \ WOP\ \ GDA\ GF\ REA\ \ IPI\ \ INT\ \ MS\ \ EER\ \ SM]$.

Moreover, Φ(L) stands for a conformable lag polynomial of finite order. μ_t denotes the error term and assumed it to be i.i.d., with zero mean. The system (8) is a reduced form of VAR in C_t. At this point, with standard VAR the difficulty is that the factors represented by the M × 1 vector F_t which is unobservable. Where the factors are extracted from a given large dataset, C_t of dimension N × 1. Therefore, it is assumed that an N×1 vector C_t can summarize the state of the economy, and in the following the dynamics factor is modeled.

$$Y_t = \Lambda C_t + \varepsilon_t \quad (9)$$

where Λ shows N × (M + 11) matrix of factor loadings and ε_t stands for the vector of series-specific components. In addition, this study assumes that vector and matrix are weakly correlated or uncorrelated with the common component C_t and across indicators (see, Bernake et al., 2005; Stock and Watson, 2016; for details). However, opposed to a standard dynamic factor model, it presumes that some of the factors are observable. As such, it allows model a FA-SVAR with observed and non observed dynamic factor. In our FA-SVAR model, GRP, GEPU, GF, WOP, and GDA are observable factors, and oil-specific demand (REA) monetary policy rate (INT), money supply (MS), exchange rate (EER), financial market activity (SM) are unobservable factors.

As the FA-SVAR model is a combination of the SVAR model and factor augmentation, after obtaining the leading or 1st principal component using principal component (PC) estimation, an SVAR can be modeled with the estimated leading PC factors in which equation (1) is considered as the standard VAR. This study assumes that the errors identified in equation (8) will be correlated. Therefore, interpretation will not be as structural shocks. In such a case, it is needed to consider the moving average representation of equation (8) which presented in equation (10)

$$C_t = G(L)\mu_t \tag{10}$$

where, μ_t stands for reduced form innovations, and it is assumed that it can be written as linear combinations of the underlying orthogonal structural disturbances (ε_t), i.e., $\mu_t = S\varepsilon_t$, where S is a ((M + 11) × (M + 11)) contemporaneous matrix. Henceforth, this study assumes that equation (10) can be written as the following equation (11).

$$C_t = G(L)S\varepsilon_t = H(L)\varepsilon_t \tag{11}$$

where *G(L)S = H(L).*

Model identification

The variance-covariance matrix of observed and unobserved elements is represented by equation (12).

$$\boldsymbol{\Omega} = \begin{bmatrix} \sigma_{11}^2 & \sigma_{11} & \cdot & \cdot & \cdot & \cdot & \sigma_{n1} \\ \sigma_{21} & \sigma_2^2 & \cdot & \cdot & \cdot & \cdot & \sigma_{n2} \\ \sigma_{31} & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\ \sigma_{n1} & \sigma_{n2} & \cdot & \cdot & \cdot & \cdot & \sigma_n^2 \end{bmatrix} \tag{12}$$

The **Ω** matrix helps to determine whether the SVAR model requires restriction. The restriction on the system is based on $\frac{n^2-n}{2}$. This FA-SVAR model has 11 variables. Thus, 55 restrictions should be identified for fulfilling the assumption and definition of the just-identified SVAR model.

This study adopts a non-recursive structure for estimating the FA-SVAR model. A non-recursive structural structure allows for the recognition of optimal identification. In this study, the ordering of system variables is driven by economic theory and follows that of Aastveit (2014), Kang et al. (2017), Razmi et al. (2016) and Hence, with exogenous assumptions, structural factors are ordered as shown in equation (12) which is derived from equation (8).

$$C_t = \begin{bmatrix} GPR_t \\ GEPU_t \\ WOP_t \\ GDA_t \\ GF_t \\ REA_t \\ IPI_t \\ INT_t \\ MS_t \\ EER_t \\ SM_{i,t} \end{bmatrix} = G(L) \begin{bmatrix} S_{11} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ S_{21} & S_{22} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ S_{31} & S_{32} & S_{33} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ S_{41} & S_{42} & S_{43} & S_{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ S_{51} & S_{52} & S_{53} & S_{54} & S_{55} & 0 & 0 & 0 & 0 & 0 & 0 \\ S_{61} & S_{62} & S_{63} & S_{64} & S_{65} & S_{66} & 0 & 0 & 0 & 0 & 0 \\ S_{71} & S_{72} & S_{73} & S_{74} & S_{75} & S_{76} & S_{77} & 0 & S_{79} & 0 & 0 \\ S_{81} & S_{82} & S_{83} & S_{84} & S_{85} & 0 & 0 & S_{88} & S_{89} & 0 & 0 \\ S_{91} & S_{92} & S_{93} & S_{94} & S_{95} & S_{96} & S_{97} & S_{98} & S_{99} & 0 & 0 \\ S_{101} & S_{102} & S_{103} & S_{104} & S_{105} & S_{106} & S_{107} & S_{108} & S_{109} & S_{1010} & 0 \\ S_{111} & S_{112} & S_{113} & S_{114} & S_{115} & S_{116} & S_{117} & S_{118} & S_{119} & S_{1110} & S_{1111} \end{bmatrix} \begin{bmatrix} \varepsilon_t^{GPR} \\ \varepsilon_t^{GEPU} \\ \varepsilon_t^{WOp} \\ \varepsilon_t^{GDA} \\ \varepsilon_t^{GF} \\ \varepsilon_t^{REA} \\ \varepsilon_t^{IPI} \\ \varepsilon_t^{INT} \\ \varepsilon_t^{MS} \\ \varepsilon_t^{EER} \\ \varepsilon_t^{SM} \end{bmatrix} \tag{13}$$

The above presented FA-SVAR has two blocks- such as global block and domestic block- containing eleven (11) structural factors. The current FA-SVAR designed for a small country open-economic system, and thus, the factors in the global block do not respond to shock in the domestic block. Rows one to six belong to the global block, where geopolitical uncertainty shock (GRP), global economic policy uncertainty shock (GEPU), oil price shocks driven by oil supply (WOP), oil price shock driven by global demand (GDA), global financial market uncertainty shock (GF), and oil price shock driven by oil-specific demand (REA) are identified in row one to row six, respectively. Similarly, rows seven to eleven belong to the domestic block,

where economic output shock (IPI), monetary policy shock (INT), money supply shock (MS), exchange rate shock (EER and financial market shock (SM) are identified in row one to row six, respectively.

In the global block restrictions, the study considers the exogeneity assumption for geopolitical risk as Apergis et al. (2017) advocate that geopolitical risk is exogenous to all other structural variables. Thus, this study identifies that it does not respond to other system variables in a contemporaneous and lagged manner since geopolitical risk arises from terrorist attacks and wars and those are not driven by any other economic factors. Thus, the exogeneity assumption applies to geopolitical risk. A similar strategy is applied to Cheng and Chui (2018). Furthermore, following Kang and Ratti (2013a, 2017), this study identifies that global economic policy uncertainty does other structural factors contemporaneously, excluding geopolitical risk. In addition, following Kilian (2009) and Kang and Ratti (2013a, 2017b), this study also identifies that world oil production is not affected contemporaneously by changes in global demand activity and oil specific demand. Similar to Kilian (2009) and Kang and Ratti (2013a, 2017), this study also identifies that oil-specific demand shock does not affect global demand activity in the same month of shocks.

In identifying restrictions in the domestic block, the study has drawn the restrictions based on standard economic theory and the extant empirical study that covers the Malaysian macroeconomic and policy analyses. Being an oil exporting and emerging economy, the Malaysian economy responds quickly to shocks in global economic factors. Henceforth, consistent with Kim and Roubini (2000) and Razmi et al. (2016), this study also identifies that interest rate does not respond to a domestic variable within the same month, apart from the money supply. As identified in Razmi et al. (2016), this study also considers that the money supply does not respond contemporaneously to the exchange rate and financial market. Following Kim and Roubini (2000) and Razmi et al. (2016), this study proposes that forward-looking nexus of the exchange rate and financial market, and thus, exchange rate does not respond contemporaneously to financial market activities.

EMPIRICAL RESULTS AND DISCUSSION

Preliminary Analysis

We transform series into stationary form in the principal component stage; therefore, this study does not perform a further test of unit-root with structural factors excluding five observed variables which are geopolitical risk, global world oil production, economic activity, global financial market. Hence, this study performs ADF and PP unit root test to check stationarity, and the estimated results of unit root tests suggest that factors are stationary at the level form. Furthermore, Razmi et al. (2016) also observe no breakpoint after 2008 for the Malaysian macro-economic variable. The first observation of this study starts from January 2009; this study conjectures that there will be no break points in the Malaysian macro-variable series. Therefore, this study moves forward for the VAR model estimation without breakpoints testing. Furthermore, this study uses AIC, and BIC/SC criterion criteria for the optimal lag in VAR model[4]. Henceforth, BIC/SC criterion criteria indicate to use lag one as an optimal lag in the VAR model. This study employs a justified identified model factor-augmented SVAR model; therefore, the test of overidentification restrictions is waived.

Main Analysis

Geopolitical Uncertainty Shocks

Figure 1 shows the responses of structural factors to shocks in geopolitical uncertainty. Focusing on the monetary impacts of geopolitical uncertainty, this study finds that there are insignificant adverse effects on interest rate but has a significant negative effect on the money supply. The explanation of these findings may be that shocks in geopolitical uncertainty have a negative influence on Malaysian economic output and financial market, indicating it is a very keen downside risk in the economic performance of the economy. This may occur, since foreign trade level drops drastically in geopolitical unrest. As of 2018, Malaysia is an export-oriented economy, and thus, the shock in geopolitical political uncertainty reduces its economic performance. In addition, the money supply decreases, during geopolitical unrest, happened because consumer purchasing power has declined, so the central bank also reduced the money supply in the economy. As a result, the monetary policymaker has reduced interest rate in order to revive the economy. Several empirical studies

[4] Unit root and Lag section information will be provided on the request

support this assertion as the geopolitical uncertainty emerges the policy responses depending on the economic situation (e.g., Carrière-Swallow and Céspedes; Cheng, 2017; Cheng and Chui, 2018; Lee et al., 2018).

Looking at the impacts of geopolitical uncertainty on financial market activities, there are insignificant adverse effects on financial market activities. To the extent, this finding is in line with Balicilar et al. (2016) and Caldara and Iacoviello (2018), as they find geopolitical risks do not affect stock market return significantly. Drawing on the findings of Balcilar et al. (2018), it can be implied that having negative responses, an increase in geopolitical uncertainty can create volatilities in the financial market. However, the insignificant effects of geopolitical uncertainty on financial market activities are not as similar to the findings of Apergis et al. (2017), Bouri et al. (2018), and Hoque and Zaidi (2020). The overall results confirm that the impacts of geopolitical risk depend on the economic structure of the country.

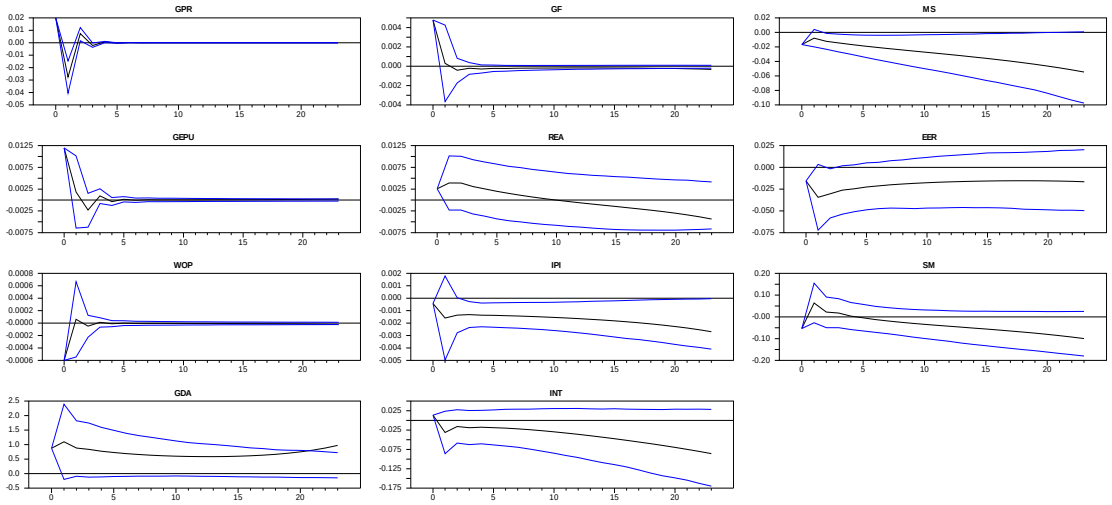

Figure 1 Structural responses to one-standard deviation of geopolitical uncertainty shocks. The confidence bands are based on 84% significance level and constructed from Monte Carlo simulations based on 2,500 replications

Focusing on indirect effects of geopolitical uncertainty on monetary and financial sector, the variance decomposition in Table 2 shows that the impact of geopolitical uncertainty on monetary and financial sector possibly transmit through global economic policy uncertainty, oil supply, and global financial market, as it has significant power in explaining some of the variances in global economic policy uncertainty, global oil production, and global financial market activities. Given that, the findings suggest that global economic policy uncertainty, global oil production, and global financial market act as shock transmitting channels of geopolitical uncertainty. Hence, based on Figure 2, Figure 3 and Figure 5, it can be said that an increase in geopolitical uncertainty affect monetary and financial market activities negatively through contributing in global economic uncertainty shocks and oil supply shocks, whereas growth in global financial market activities can reduce the influence of geopolitical uncertainty. Thus, it can also be implied that increases in geopolitical uncertainty could have mixed effects on the Malaysian economy.

Table 2 Variance Decomposition of global block

Step	Std Error	GPR	GEPU	WOP	GDA	GF	REA
Panel A: Variance Decomposition of GPR							
1	0.13	100.00	0.00	0.00	0.00	0.00	0.00
3	0.14	100.00	0.00	0.00	0.00	0.00	0.00
6	0.14	100.00	0.00	0.00	0.00	0.00	0.00
18	0.14	100.00	0.00	0.00	0.00	0.00	0.00
24	0.14	100.00	0.00	0.00	0.00	0.00	0.00
Panel B: Variance Decomposition of GEPU							
1	0.09	1.91	98.09	0.00	0.00	0.00	0.00
3	0.09	1.84	89.43	0.15	0.00	8.58	0.00
6	0.09	1.85	89.39	0.15	0.01	8.60	0.00
18	0.09	1.85	89.38	0.15	0.01	8.60	0.00
24	0.09	1.85	89.38	0.15	0.01	8.60	0.00

Table 2 Cont.

Panel C: Variance Decomposition of WOP							
1	0.01	1.80	0.47	97.73	0.00	0.00	0.00
3	0.01	1.81	0.47	97.55	0.04	0.12	0.02
6	0.01	1.81	0.48	97.47	0.08	0.12	0.04
18	0.01	1.81	0.49	97.27	0.21	0.14	0.08
24	0.01	1.80	0.49	97.22	0.25	0.15	0.09
Panel D: Variance Decomposition of GDA							
Step	Std Error	GPR	GEPU	WOP	GDA	GF	REA
1	13.78	0.40	0.92	0.38	98.30	0.00	0.00
3	21.89	0.57	1.92	0.23	96.38	0.90	0.00
6	27.21	0.59	2.15	0.18	95.97	1.11	0.00
18	31.85	0.60	2.24	0.17	95.81	1.17	0.02
24	32.10	0.60	2.24	0.18	95.80	1.16	0.02
Panel E: Variance Decomposition of GF							
1	0.04	1.28	11.34	0.50	0.49	86.40	0.00
3	0.04	1.27	11.28	0.83	1.54	85.02	0.07
6	0.04	1.27	11.18	0.85	2.31	84.25	0.15
18	0.04	1.27	11.11	0.89	2.75	83.66	0.32
24	0.04	1.27	11.10	0.89	2.75	83.62	0.36
Panel F: Variance Decomposition of REA							
1	0.07	0.13	3.56	2.31	3.67	8.12	82.21
3	0.13	0.20	4.49	9.02	6.97	14.61	64.72
6	0.19	0.16	4.98	9.50	13.10	15.45	56.82
18	0.30	0.07	5.41	7.51	30.73	14.17	42.11
24	0.33	0.06	5.42	6.94	35.00	13.64	38.93

Note: Units are in percentage form

Global Economic Policy Uncertainty

Figure 2 demonstrates the responses of structural factors to shocks in global economic policy uncertainty. This study finds that reactions are adverse to global economic policy uncertainty shock. This suggests that the central bank gradually reduces the interest rate during a global economic policy uncertainty shock. This response of monetary policy to a global economic policy uncertainty shock is expected as the economic output, money supply, and financial market are negatively affected by global economic policy uncertainty shock. It can be said that monetary policymaker responds to economic conditions rather than global economic policy uncertainty shock. This finding is supported by Baker et al. (2016), Carrière-Swallow and Céspedes (2013), Fontaine et al. (2018), Greig et al. (2018), and Trung (2018).

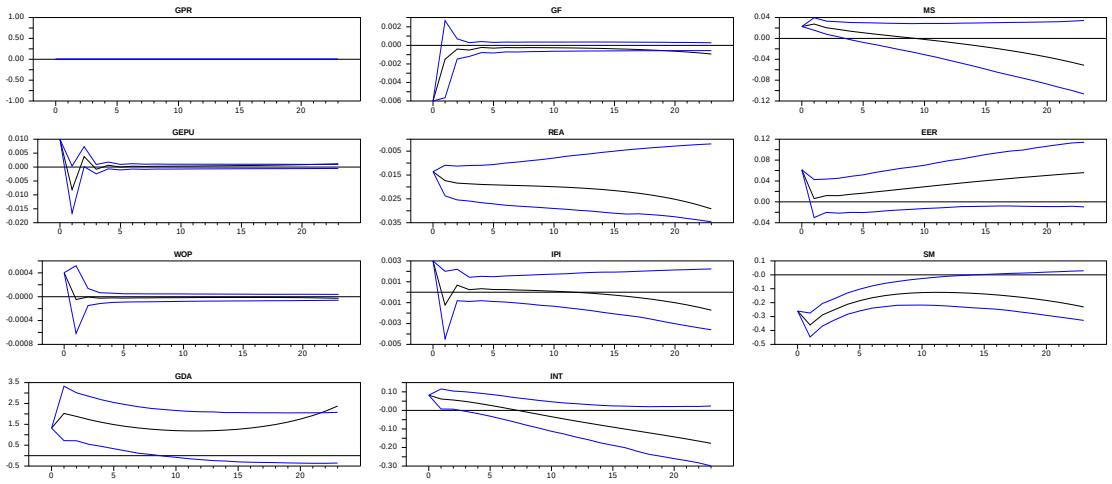

Figure 2 Structural responses to one-standard deviation of global economic policy uncertainty shocks. The confidence bands are based on 84% significance level and constructed from Monte Carlo simulations based on 2,500 replications

Furthermore, this study finds that the effects of global economic policy uncertainty have a negative impact on the financial market. Given that, this finding implies that the Malaysian stock market does not perform in the presence of global economic policy uncertainty. Thus, these findings lend strong support to conclusions of prior studies showing that global and international economic policy uncertainty causes reductions in stock market returns (Antonakakis et al., 2013; Arouri et al., 2014 and 2016; Kang and Ratti,

2013; Liu et al., 2017; Sum, 2013; Tsai et al., 2017). Moreover, as stated prior, the effects of geopolitical uncertainty shocks transmit through global economic uncertainty; it suggests that the impact of global economic policy uncertainty shocks on Malaysian monetary and financial sector are strengthened by the presence of geopolitical risk shock. Therefore, it can be implied that geopolitical uncertainty shocks have been negatively affecting the Malaysian monetary and financial sector through global economic policy uncertainty. These findings are somewhat in line with Apergis et al. (2017).

Looking at indirect effects of global economic policy uncertainty on the monetary and financial market, this study finds that, at the global level, global economic policy uncertainty has significant power in explaining some of the variances in global oil production, global oil demand, and global financial market. Hence, with reference to Figure 3, 5 and 6, it can be implicit that the effects of global economic policy uncertainty transmit via global oil production, global oil demand, and global financial market channels. Such explanations of the transmission mechanism of GEPU effects are also partially in agreement with those of Kang and Ratti (2013b) and Kang et al. (2017) showing that global oil market factor factors are shock transmitting channel of GEPU. Similarly, at the domestic level, it has significant power in explaining some of the variances in all domestic factor. Hence, it can be said that all domestic factors act as a shock transmission mechanism channels of global economic policy uncertainty. Thus, the estimating the final effects of global economic policy uncertainty monetary policy and financial market is indeed complicated for economic agents. However, the interest rate tool of monetary policymaker could be effective in handling the perilous effects of global economic policy uncertainty shocks.

Global Oil Supply Shocks

Figure 3 illustrates the responses of structural factors to global oil supply shocks. This study observes that interest rate negatively affected by global oil supply shocks. The possible explanation of this type of effect is that economic output and financial market negatively responded to global oil supply shocks. So, to keep momentum in the economy, monetary policymaker possibly has reduced interest rate. This kind of monetary policy response to global oil supply shocks is consistent with economic theories and empirical evidence on oil exporting economies (see, Cunado et al., 2015; Filis and Chatziantoniou, 2014). Furthermore, this study also finds that the money supply is also negatively affected by oil supply shocks. This finding implies that an oil supply shock dampens the money supply in the Malaysian economy, which occurs for oil exporting economies as oil supply shocks results in oil price reduction and thus economic output decreases and trade imbalance happens. Such conditions lead to money supply reduction in the economy. Additionally, the adverse effects of oil supply shock on the money supply of oil-exporting economies (see, Aastveit, 2014; Cunado et al., 2015, Kho, 2016).

Moreover, this study notes that oil supply shocks have dampening effects on the financial condition/market of Malaysia. This finding implies that during oil supply shocks the financial performance of oil-exporting economies are negative. The possible explanation for these findings that the lower oil prices cause poor economic performance of an oil exporting country and as a result, the financial sector also performs poorly. This adverse effect of oil supply shocks on stock market returns is consistent with the many existing empirical studies (e.g., Apergis and Miller, 2009; Cunado and de-Gracia, 2014; Kilian and Park, 2009). However, the finding of this study is not consistent with those of Wang et al. (2013) and Fang and You (2014) as they have documented insignificant effects of oil supply shocks on stock market performance of oil exporting economies. In addition, as mentioned earlier, global oil production channels transmit some of the impacts of geopolitical risk and global economic policy uncertainty; thus, it can be said that in the interaction of oil supply shocks with geopolitical risk and global economic policy uncertainty intensify the adverse effects on the Malaysian monetary and financial conditions. This assertion is also supported by Antonakakis et al. (2017) as they find world oil factor acts as shocks transmitter when geopolitical unrest exists in the global economy. Therefore, oil supply shock originated from geopolitical risk and global economic policy uncertainty will bring uncontrollable vulnerabilities in the economy. Besides, the overall findings confirm that the effects of oil supply shocks on the economic factors depend on the economic structure and the position in the world oil market.

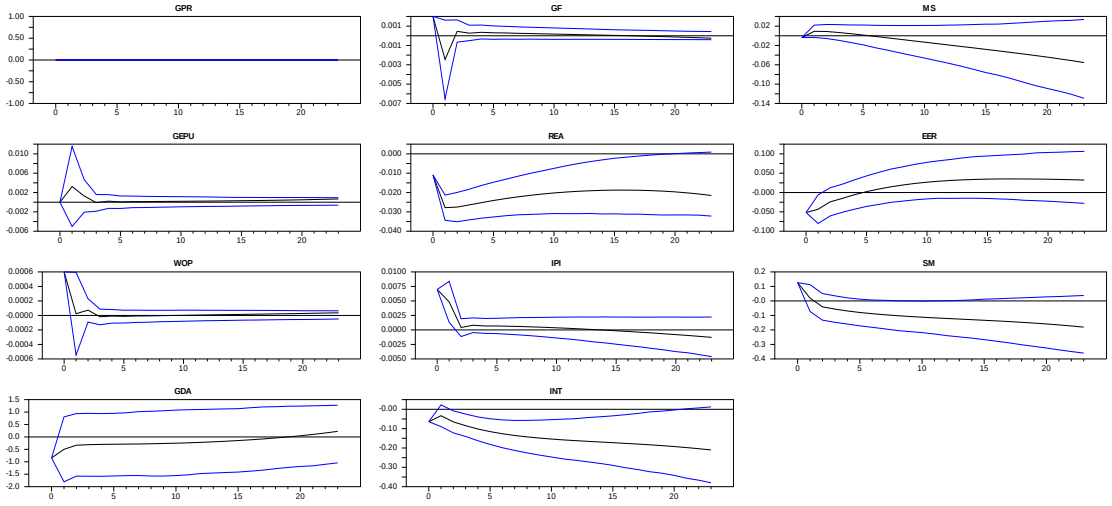

Figure 3 Structural responses to one-standard deviation of global oil supply shocks. The confidence bands are based on 84% significance level and constructed from Monte Carlo simulations based on 2,500 replications

Focusing on the indirect effects of oil supply shocks, the variance decomposition in Table 2 and 3 show that it has some significant power in describing variance in real oil price, economic output, exchange rate, and financial market. Given that, oil supply shocks have indirect effects on interest rate/monetary policy via real oil price, economic output, exchange rate, and financial market, and it has indirect effects on the financial market through real oil price, economic output, and exchange rate. In this instance, the results imply that oil supply shock has four shock transmitting channels which makes complexity in estimating final effects.

Global Economic Activity Shocks

Figure 4 presents the responses of structural factors to global economic activity shocks. This study finds the negative monetary and financial response to global economic activity shocks, and the effects of global economic activity shocks are also adverse to Malaysian monetary and financial condition. These findings are indeed surprising as the positive increases in global economic activities are supposed to promote the economy. Instead, the increase in global economic activities has caused and reduced the economic performance of the Malaysian economy. The main reason of the adverse effects of global economic activities may be that reductions in the real oil price[5] which reflects a lower economic output, money supply, and poor stock market performances. Therefore, the monetary authority possibly reduced the interest rate during the global economic activities shocks. Furthermore, from a different point of view, the global economic activities factor also has been used to capture global economic activity driven oil price shocks. Therefore, the negative monetary and financial responses to global economic activity driven oil price shocks could be true for the Malaysian economy because global economic activity shocks have condensed the real oil price which caused negative impacts on economic output, money supply, exchange rate, and financial market. Thus, the effects are negative on the monetary and financial conditions. In addition, the findings on negative monetary responses to global economic activity driven oil price shocks are not in agreement with Cunado et al. (2015) as their study shows oil exporting economies' interest rate responded positively global economic activity driven oil price shocks. This dissimilarity is because their model did not control other exogenous and endogenous global factor which are directly associated with oil price and global economic activities. This dissimilarity with extant studies implies the monetary responses to global economic activity exhibits the different responses from the extant studies if the effects of GRP, GEPU, GF are controlled in the system or VAR model.

Additionally, in the oil exporting and emerging economies' case, the finding on financial response to global economic activity is driven oil price shocks in line with the study Fang and You (2014) as the financial market of Malaysia had a negative response. However, the financial effects of global economic activity driven oil price shocks are the opposite of those finding of Wang et al. (2013) because their study exhibited a positive

[5] The study sample are belonging to high-tech age and the global economy looking forwards renewable and green energy, where the global economy did not demand crude oil for activities as earlier, and thus real oil price dropped with an increase in global economic activities.

impact on stock market performance. Moreover, as global economic activity driven oil shocks displays the negative development in real oil price, the negative monetary financial responses to negative oil price are expected and economic theory consistent for oil export economies (Iwayemi and Fowowee, 2011). Therefore, these findings are in line with the findings of Filis and Chatziantoniou (2014).

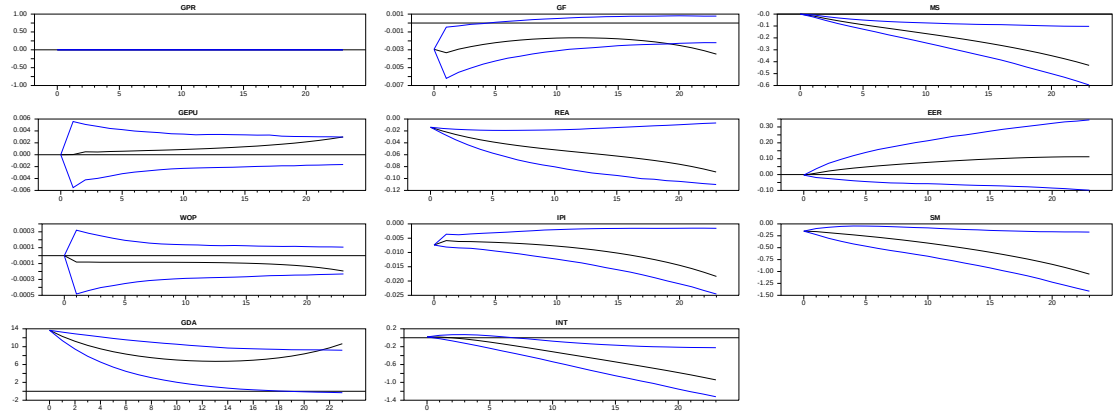

Figure 4 Structural responses to one-standard deviation of global demand activity driven oil demand shocks. The confidence bands are based on 68% significance level and constructed from Monte Carlo simulations based on 2,500 replications

Focusing on the indirect effects of global economic activities shocks, the variance decomposition in Table 3 shows that it has some power in explaining the variance of oil price, global financial market, economic output, interest rate, money supply, and financial market. Hence, it is implied that these global and domestic economic factors could act as shock transmitting channels. Therefore, global economic activities shock has indirect effects on monetary and financial condition thorough oil price, global financial market, economic output, interest rate, money supply, and financial market factor.

Table 3 Variance decomposition of Domestic Block

Step	Std Error	GPR	GEPU	WOP	GDA	GF	REA	IPI	INT	MS	EER	SM
Panel A: Decomposition of Variance for Series IPI												
1	0.03	0.01	6.15	4.06	4.56	0.64	0.01	0.04	3.89	80.64	0.00	0.00
3	0.04	0.32	5.42	5.19	9.00	0.76	0.55	3.08	3.37	69.68	0.29	2.33
6	0.04	0.57	4.61	4.49	14.21	0.85	1.26	6.32	2.98	59.56	0.42	4.73
12	0.05	0.89	3.51	3.48	20.83	1.29	1.87	10.93	3.11	45.84	0.51	7.74
18	0.05	1.07	2.72	2.71	25.48	2.02	1.66	14.24	3.84	36.26	0.59	9.42
24	0.06	1.16	2.10	2.10	29.74	3.01	1.29	16.46	4.60	28.66	0.67	10.20
Panel B: Decomposition of Variance for Series INT												
1	0.57	0.06	2.10	1.27	0.10	0.02	0.00	2.34	94.11	0.00	0.00	0.00
3	0.92	0.17	1.59	1.09	0.07	2.58	2.49	3.97	87.37	0.13	0.52	0.01
6	1.26	0.15	1.16	2.48	0.80	4.87	9.95	6.24	72.33	0.41	1.56	0.06
12	1.85	0.15	0.62	4.34	10.04	8.90	20.30	8.40	44.04	0.75	2.06	0.37
18	2.48	0.20	0.78	4.36	23.65	10.91	21.06	8.51	27.23	0.83	1.63	0.85
24	3.13	0.27	1.03	3.84	34.48	11.47	18.72	8.26	18.52	0.84	1.24	1.34
Panel C: Decomposition of Variance for Series MS												
1	0.13	1.78	3.28	0.08	0.69	0.67	0.18	93.26	0.00	0.06	0.00	0.00
3	0.23	0.94	3.28	0.36	3.22	5.90	0.17	81.15	2.28	2.00	0.00	0.70
6	0.36	1.00	1.81	0.20	13.62	7.91	0.09	64.14	5.91	2.47	0.05	2.80
12	0.63	1.10	0.61	0.16	29.72	8.83	0.44	41.91	8.66	2.54	0.35	5.67
18	0.93	1.08	0.32	0.35	38.46	9.11	1.26	31.25	8.45	2.42	0.58	6.72
24	1.25	1.04	0.28	0.53	43.79	9.28	2.00	25.45	7.66	2.28	0.68	7.01
Panel D: Decomposition of Variance for Series EER												
1	0.39	0.16	2.46	1.74	0.01	3.72	1.51	0.02	0.89	0.49	10.71	78.28
3	0.61	0.61	1.05	1.35	0.15	3.56	2.59	0.02	1.29	4.02	9.27	76.08
6	0.77	0.65	0.75	0.88	0.93	3.64	5.55	0.08	2.50	4.47	7.63	72.91
12	0.95	0.59	0.84	1.11	3.68	4.50	13.40	0.30	3.54	3.98	5.39	62.67
18	1.08	0.53	1.24	1.87	6.95	5.27	19.69	0.56	3.23	3.39	4.19	53.09
24	1.18	0.48	1.71	2.43	9.73	5.70	23.15	0.89	2.76	3.02	3.54	46.59
Panel E: Decomposition of Variance for Series SM												
1	0.94	0.32	7.69	1.81	2.59	27.49	0.32	0.07	0.50	0.61	55.85	2.75
3	1.49	0.33	12.57	0.82	3.72	31.96	0.16	0.22	0.93	0.94	43.85	4.48
6	1.83	0.23	12.05	0.97	6.91	33.28	0.79	1.04	2.65	0.66	35.11	6.31
12	2.31	0.23	9.02	1.75	15.75	29.63	3.89	3.69	4.90	0.69	22.69	7.75
18	2.81	0.31	6.55	2.10	25.37	24.65	6.08	5.96	5.18	0.92	15.34	7.54
24	3.36	0.40	4.94	2.08	33.62	20.83	6.77	7.43	4.91	1.07	10.93	7.02

Global Financial Market Shocks

Figure 5 demonstrates the responses of structural factors to global financial market shocks. This study finds that positive monetary response to positive developments in the global financial market. This finding is expected as real oil price positively influenced by positive shocks in the global financial market. Similarly, in the presence of positive oil price development, the positive developments in the global financial market have promoted economic output and money supply in the economy. Therefore, the monetary authority has increased interest rate to control headline inflation in the economy, and thus, positive shocks in the global financial market have positive impacts on the interest rate.

Furthermore, this study finds that initial negative financial responses to positive shocks in the global financial market, but the effects are positive. The positive impact of shocks in the global financial market increases and promotes country financial conditions. Henceforth, all of these findings imply that positive shocks in the global financial market support the overall economic performance of Malaysian by promoting economic output and financial market. Moreover, as mentioned earlier, the effects of global economic policy uncertainty pass through global financial market towards Malaysian economic factor; given that, it can be implied that positive shocks in the global financial market are not able to promote the Malaysian economy to its full potential in the presence of global economic policy uncertainty.

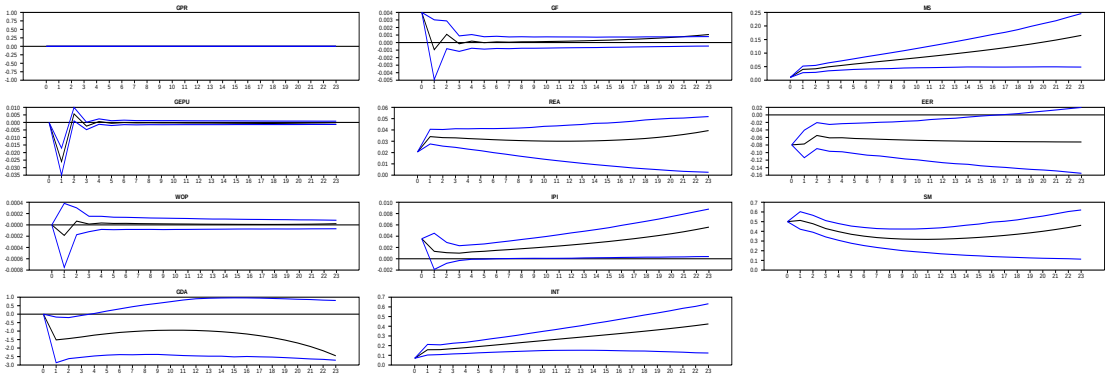

Figure 5 Structural responses to one-standard deviation of global financial market shocks. The confidence bands are based on 68% significance level and constructed from Monte Carlo simulations based on 2,500 replications

Looking at the indirect effects of global financial market shocks, the variance decomposition in Table 3 shows that it has some power in explaining the variance of global economic policy uncertainty, real oil price, economic output, interest rate, money supply, and financial market. These findings infer that the global financial market shock has several transmit mechanism channels. Thus, it can be said that the global financial market shock has pass-through effects on Malaysian monetary and financial condition thorough oil price, economic output, interest rate, money supply, and financial market factor.

Global Oil Demand Shocks

Figure 6 demonstrates the responses of structural factors to demand specific oil price shock. This study finds positive monetary and financial responses to demand specific oil price shock. The positive monetary responses and impacts of demand to specific oil price shock are expected for oil exporting economies. It is for this reason that, in the presence of higher oil price, consumer price and money supply in the economy increases. Thus, the monetary authority responds positively to demand specific oil price shock, which leads to a positive effect on the interest rate. Besides, the findings on positive monetary effects and responses of demand to a specific oil price shock or positive oil price shock are in line with those findings of Ahmed and Wadud (2011), Cunado et al. (2015), Iwayemi and Fowowe (2011), and Razmi et al. (2016). Interestingly, this finding also points out that the monetary authority of oil exporting and importing economies exhibits positive responses during demand specific oil price shock (e.g. Cunado et al., 2015). Furthermore, positive financial responses and impacts of demand specific oil price shock are also expected in the Malaysian case for being an oil exporting economy. The fact is that the higher and positive oil price shocks because oil demand promotes the financial condition of the oil exporting economy as it brings additional oil revenue to the oil exporting economy. This supports economic output, money supply, and stock market performance. This finding on

positive financial response to oil price shocks is in agreement with Wang et al. (2013) and Fang and You (2014). In addition, this finding of the study is opposite to Apergis and Miller (2009), Cunado and de-Gracia (2014), Kilian and Park (2009), Wei et al. (2017), and You et al. (2017). This study again confirms that financial responses and impacts of demand specific oil price shock are contingent to country status in the global oil market which highlighting oil exporting and importing status. Moreover, as stated earlier, earlier global economic policy uncertainty, global economic activities, and the global financial market influence oil demand. Given that, the presence of shock in those factors can influence the relationship between a positive development in oil price and the Malaysian economy, implying that shocks in those global factors moderates the positive relationship between oil price and economic performance of oil exporting economies. These findings are partially constant with Kang and Ratti (2013b) and Kang et al. (2017) as they showed the global economic policy uncertainty amplifies/ changes the effects of demand specific oil price shock on the economic performance and stock price.

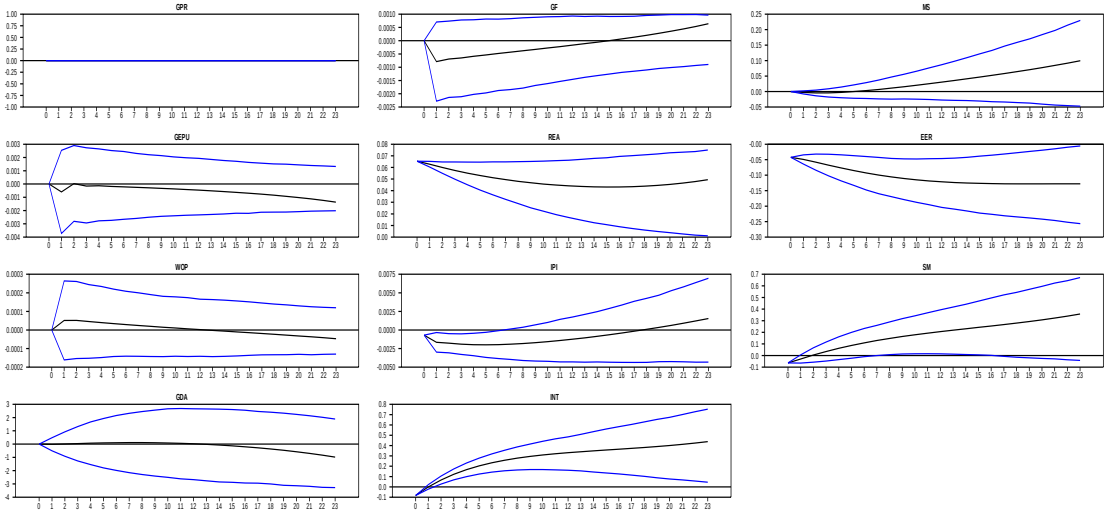

Figure 6 Structural responses to one-standard deviation of global oil demand shocks. The confidence bands are based on 84% significance level and constructed from Monte Carlo simulations based on 2,500 replications

Converging on the indirect effects of demand specific oil price shock, the variance decomposition of factors, in Table 3, show that development in world oil demand has a significant influence on Malaysian economic factors, while it has limited influence on global factors. These findings imply that the impacts of demand specific to oil price shock on Malaysian monetary and financial conditions can also be transmitted through Malaysia economic factors, which suggest that indirect effects of demand specific oil price shock through shock transmitter makes an assessment of the situation difficult for policymakers and economist.

Robustness Checking

We estimate FA-SVAR with recursive identification to compare with the impulse responses of the baseline model, and the response of structural factors to shocks presented in Figure 7 to 12. Looking at impulse responses from recursive FA-SVAR, we observers that the responses of all domestic variables to global economic factors are identical to those observed from the non- recursive FA-SVAR.

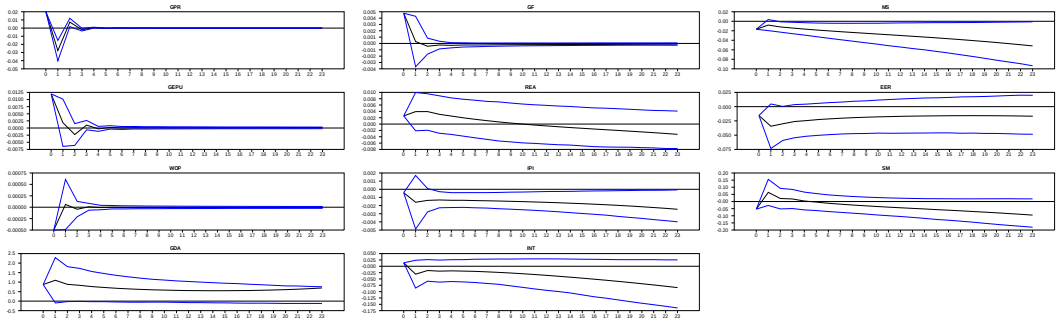

Figure 7 Structural responses to one-standard deviation of geopolitical uncertainty shocks in recursive-FA-SVAR.

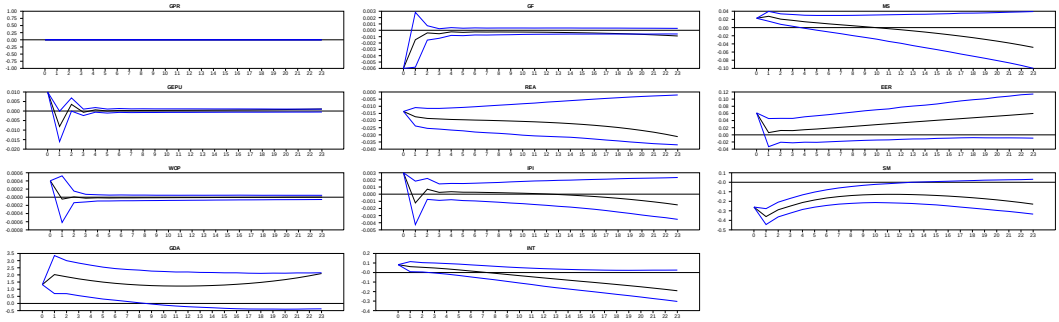

Figure 8 Structural responses to one-standard deviation of global economic policy uncertainty shocks in recursive-FA-SVAR.

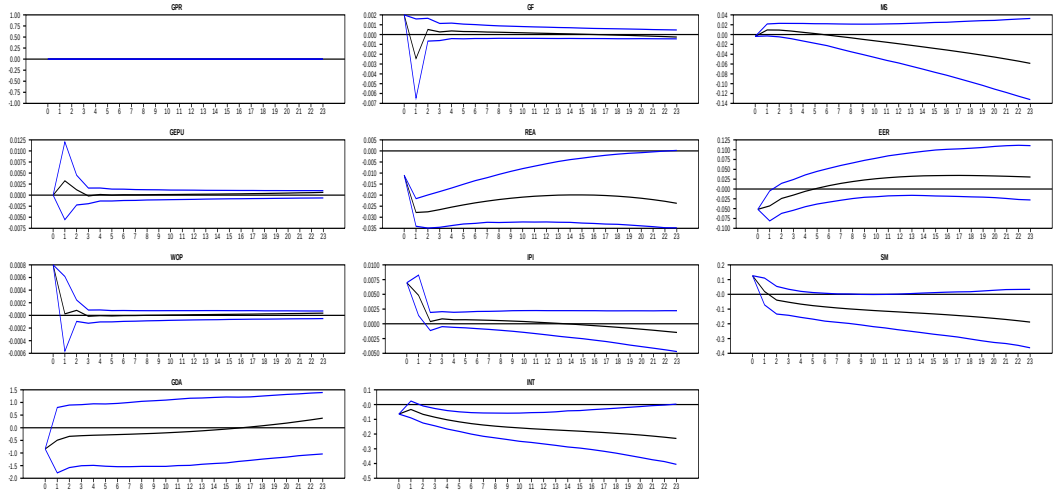

Figure 9 Structural responses to one-standard deviation of global oil supply shocks shocks in recursive-FA-SVAR.

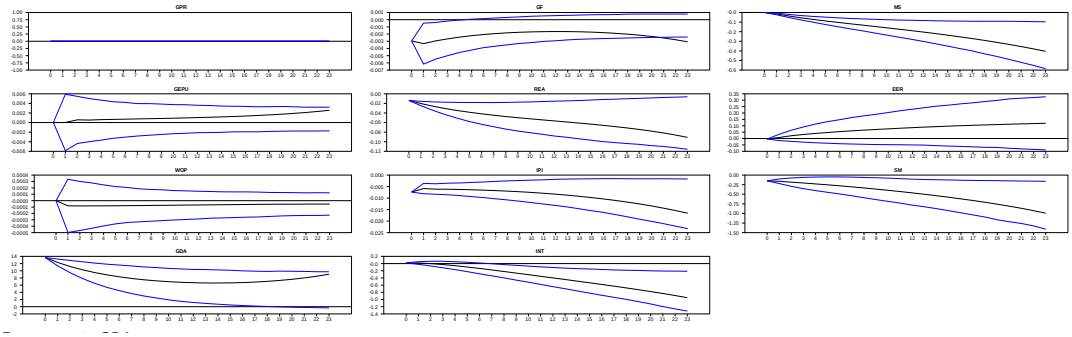

Figure 10 Structural responses to one-standard deviation of global economic activity driven oil demand shocks in recursive-FA-SVAR.

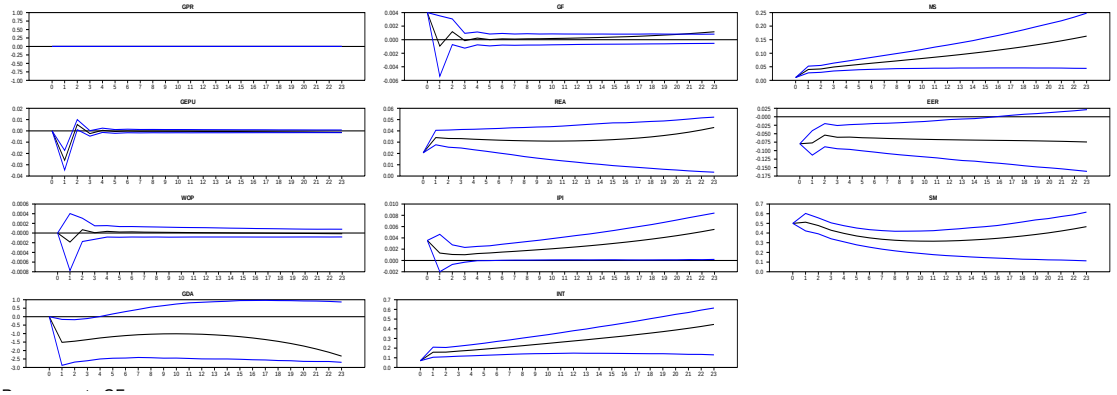

Figure 11 Structural responses to one-standard deviation of global financial market shocks in recursive-FA-SVAR

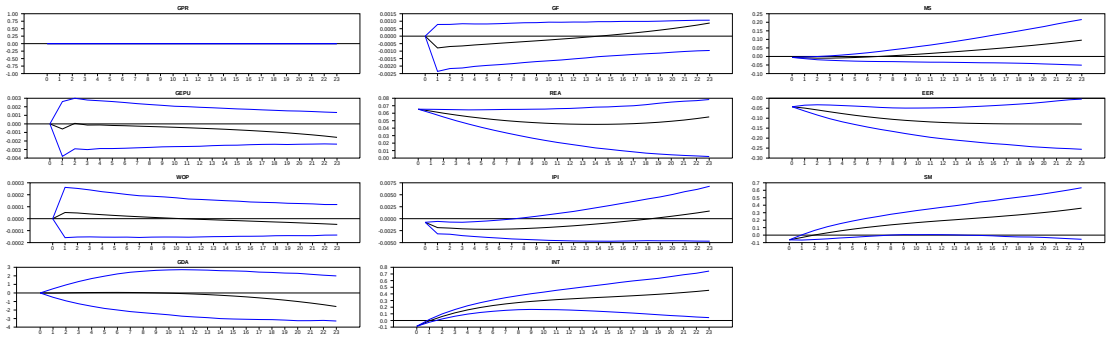

Figure 12 Structural responses to one-standard deviation of global oil demand shocks in recursive-FA-SVAR

Additionally, we estimate a FA-SVAR model has different exogenous assumptions, where we allow global economic policy uncertainty, oil production, global economic activity, global financial market, and oil demand to respond to shocks in the Malaysian economy. The estimate responses of the current FA-SVAR are presented in Figure 13 to 18. Looking at impulse responses in the current FA-SVAR, we observe that the responses of all domestic variables to global economic factors are identical to those observed from the recursive FA-SVAR and non- recursive FA-SVAR with full exogenous assumptions. Furthermore, the responses of global block variables to global level shocks are remained identical, which are expected as Malaysia being a small open economy with limited or no influence on global economic factors. Hence, the baseline model has captured true interaction among global economic factors and domestic economic factors.

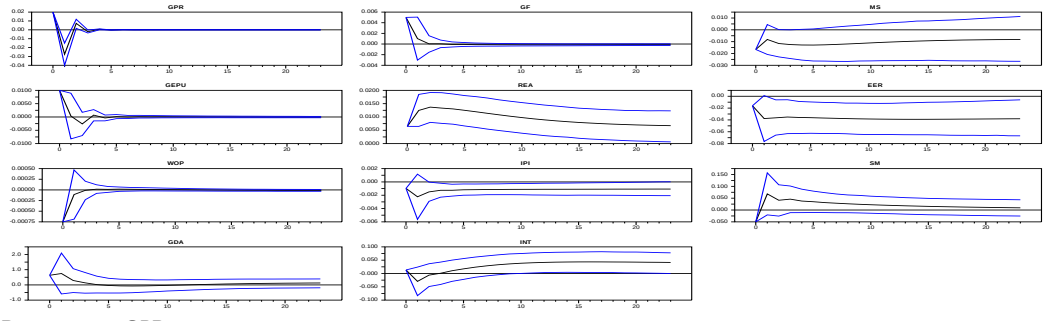

Figure 13 Structural responses to the one-standard deviation of geopolitical uncertainty shocks in FA-SVAR with different exogenous assumptions.

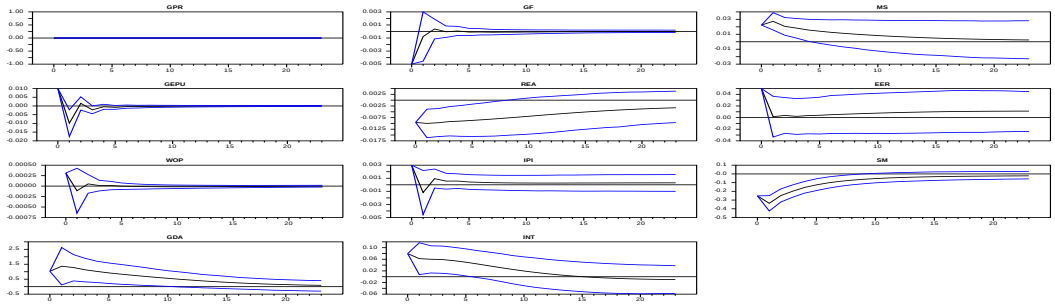

Figure 14 Structural responses to the one-standard deviation of global economic policy uncertainty shocks in FA-SVAR with different exogenous assumptions.

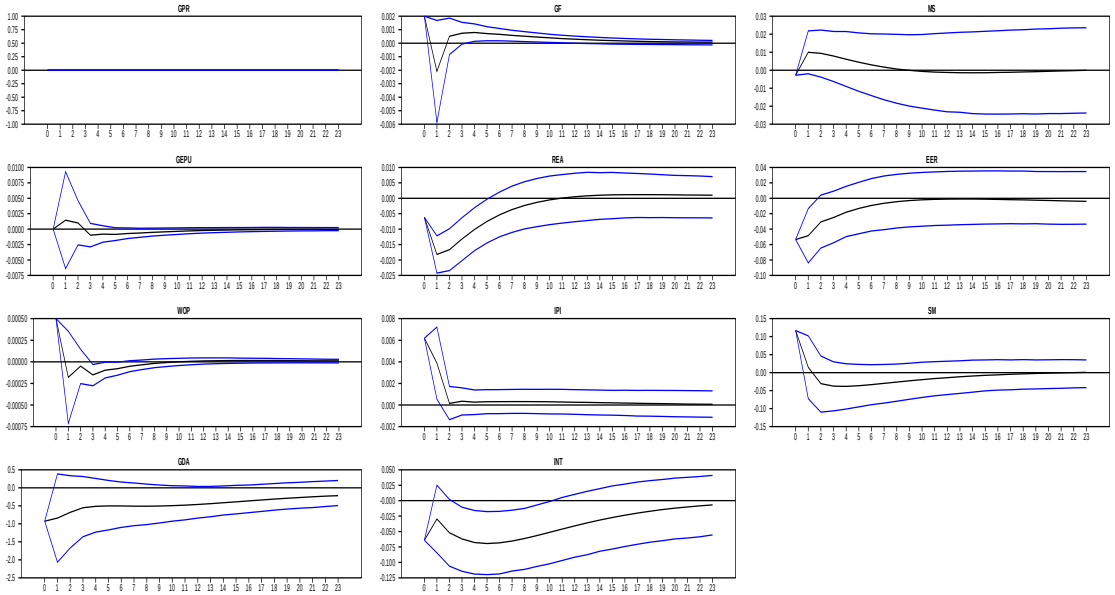

Figure 15 Structural responses to the one-standard deviation of global oil supply shocks in FA-SVAR with different exogenous assumptions.

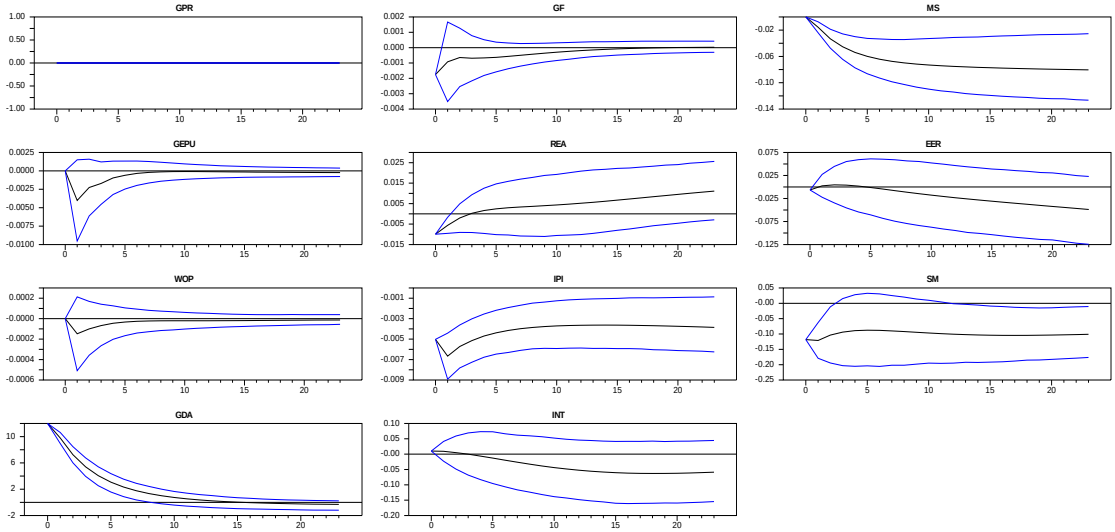

Figure 16 Structural responses to the one-standard deviation of global economic activity driven oil demand shocks in FA-SVAR with different exogenous assumptions

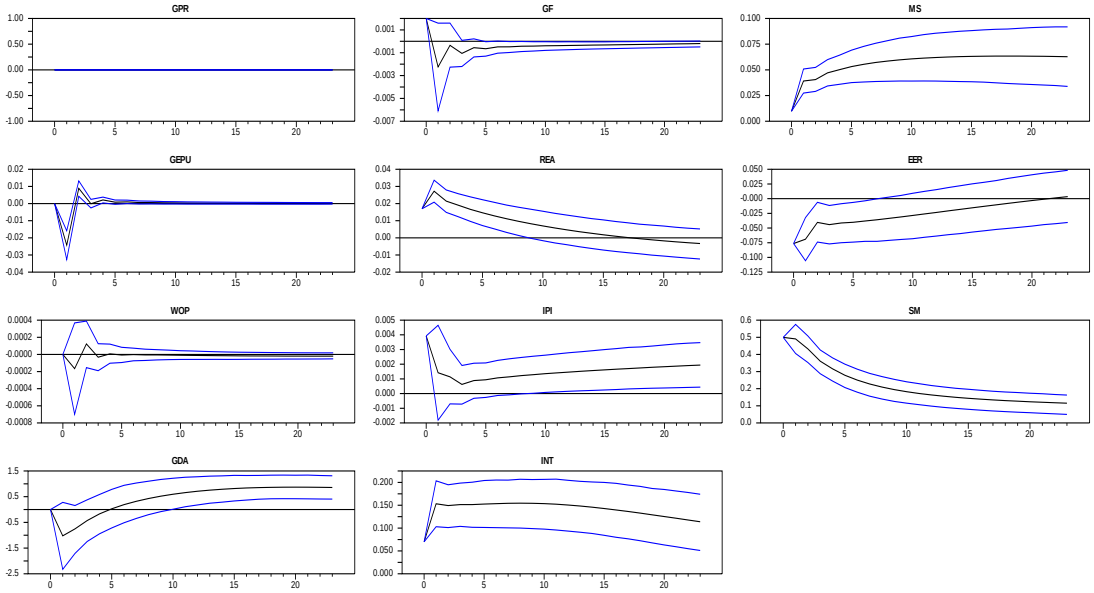

Figure 17 Structural responses to the one-standard deviation of global financial market shocks in FA-SVAR with different exogenous assumptions.

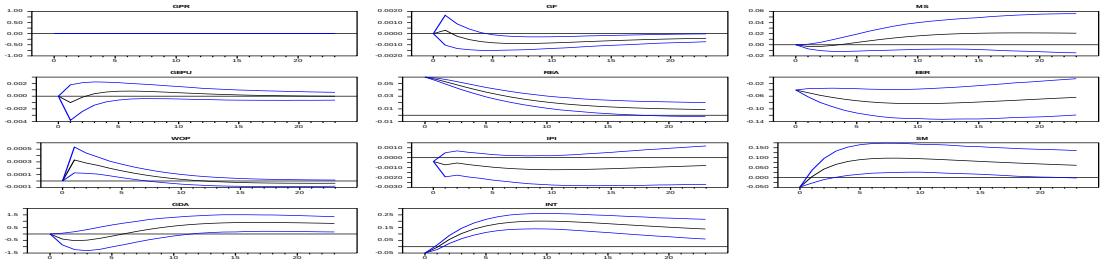

Figure 18 Structural responses to the one-standard deviation of global oil demand shocks in FA-SVAR with different exogenous assumptions.

CONCLUSION AND IMPLICATIONS

The purpose of the study was to examine the monetary and financial impacts and responses of shocks in global economic factors, employing a Factor augmented SVAR with 75 monthly series. The main findings of the study are as follows. First, monetary and financial impacts and responses of geopolitical risk shocks are insignificantly negative, but the effects can be transmitted via global economy uncertainty shocks, oil supply shocks, and global financial market channels. Second, monetary and financial impacts and responses of global economic policy uncertainty are significantly negative, and the effects can pass through the global oil production, global oil demand, and global financial market channel. The monetary and financial impacts of global economic policy uncertainty have been intensifying from the presence of geopolitical risk. Third, monetary and financial effects and responses of supply specific oil price shocks are negative, and the effect can be transmitted through real oil price, economic output, exchange rate, and financial market. The monetary and financial effects of supply specific oil price shocks have been escalating by the existence of geopolitical risk and global economic policy uncertainty. Fourth, monetary and financial impacts and responses of global economic activity shocks are negative, and the effect can be passed via real oil price, global financial market, economic output, interest rate, money supply, and financial market channels to monetary and financial activities. Fifth, monetary and financial impacts and responses of global financial market shocks are positive, and its positive effects also pass through oil price, economic output, interest rate, money supply, and financial market channels to monetary and financial activities. The presence of global economic policy uncertainty reduces the positive effects of the global financial market on Malaysian monetary and financial activities. Sixth, monetary and financial impacts and responses of demand specific oil price shock are positive, and its

positive effects also pass through oil price, economic output, interest rate, money supply, and financial market channels to monetary and financial activities. The results of demand specific oil price shock are moderated by the presence of shocks in global economic policy uncertainty, global economic activities, and the global financial market. Finally, the overall findings highlight that monetary policy and the financial market responds to global shocks depending on the economic conditions.

The findings are drawn in this study have some implications for economic agents including policymakers. First, the negative influence of geopolitical uncertainty and global economic policy shocks on throughout Malaysian macroeconomic activities suggest that Malaysian policymakers should attract foreign direct investment, by showing stable economic and political conditions, to keep momentum in macroeconomic performance. This suggestion is applicable to other economy as geopolitical uncertainty and global economic policy shocks likely to have negative effects. In addition, it also suggests that geopolitical risk and global economic policy uncertainty index can be used in forecasting economic and financial performance of the economy. Henceforth, investors may consider these two factors as systematic risk factors for asset pricing. Second, the positive influence of the global oil market infers that the Malaysian economy can be improved with positive development in the world financial market. Hence, investors may invest in an emerging stock market like the Malaysian stock market as the emerging reward high-risk premium. Such type of influence also suggests that monetary policy should increase interest rate further to balance the core inflation in the economy as all economic indicators are moving upwards. This inference can also be used for other emerging stock market like Brazil, India, Indonesia, Turkey, South Africa, and Australia. Third, the findings show asymmetric effects of global oil market shocks on Malaysian macro-economic activities and financial markets based on these findings we suggest the construction of an oil revenue fund which can be done by saving excess oil revenue. This fund can be invested in the revenue generating project and used during adverse oil price shocks and oil supply shocks. The overall findings indicate that Malaysia should attract FDI and foreign investors towards building its business and financial market. Such policy implication could be useful to oil-rich economy like Nigeria and Venezuela.

This study has only focused on Malaysian economy. A future research could be explored in other emerging economy context. Additionally, this type of FA-SVAR should be employed in assessing fiscal impacts of global risk factors. Besides, there are some more web-based indices like monetary policy uncertainties, trade uncertainty, world economic uncertainty, etc., these can be explored in any future studies with FA-SVAR.

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APPENDIX

Appendix A1 Variable Description and Source

		Source
GPR	Geo-Political Risk	http://www.policyuncertainty.com
GEPU	Global Economic Policy Uncertainty	http://www.policyuncertainty.com
WOP	World Oil Production	EIA website
GF	Global Financial Market	Fama-French Website
GDA	Global Economic Activities	Kilian 's website
REA	Crude Oil Price	DataStream
IPI	Industrial Production	Refer to Supplementary S1
INT	Interest rate	
MS	Money supply	
EER	Exchange rate	
SM	Stock market	

Appendix A2 Unit root test results for Global Factor

	Unit Root Test with PP			Unit Root Test with ADF		
	With Constant	With Constant and Trend	Without Constant and Trend	With Constant	With Constant and Trend	Without Constant and Trend
			Panel: At Level Form			
GPR	-12.33***	-13.20***	-13.91***	-4.11***	-4.78***	-4.86***
GEPU	-8.10***	-8.37***	-10.53***	-4.97***	-5.26***	-5.15***
GF	5.92***	5.45***	5.53***	7.89***	8.01***	8.03***
GDA	-10.29***	-2.55*	-2.39*	-10.24***	-2.969**	-2.51**
WOP	-10.22***	-3.67**	-2.80**	-10.17***	-4.67***	-3.93***
REA	-9.79***	-2.45*	-3.05**	-9.79***	-2.86*	-2.97**
			Panel B: At First difference form (l(1))			
GPR	-35.5***	-43.82***	-25.91***	-8.83***	-8.79***	-8.85***
GEPU	-14.28***	-18.37***	-11.53***	-8.15***	-8.23***	-9.04***
GF	18.09***	18.98***	18.56***	10.48***	10.12***	10.39***
GDA	-2.99**	-3.41**	-3.04**	-2.89**	-4.03***	-2.92**
WOP	-8.53***	-8.49***	-8.23***	-8.56***	-8.52***	-8.25***
REA	-8.20***	-8.23***	-8.25***	-8.182***	-8.23***	-8.23***

Note: The optimal number of lags according to Schwarz information criteria (Maxlag = 11), where * and ** represent rejection of the null hypothesis at significance level of 1% and 5% for critical values of -3.291 and - 2.71 with constant, -4.01 and -2.91 with a constant and trend, and -2.58 and -1.94 without constant and trend.