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MACROECONOMIC RESPONSES OF EMERGING MARKET ECONOMIES TO OIL PRICE SHOCKS: ANALYSIS BY REGION AND RESOURCE PROFILE

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Macroeconomic Responses of Emerging Market Economies to Oil Price Shocks: Analysis by Region and Resource Profile

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Abstract:
This study employs a vector autoregressive (VAR) model to analyse how oil price shocks affect macroeconomic fundamentals in emerging economies. Findings from existing literature remain inconclusive how macroeconomic variables fare towards shocks, especially in emerging economies. The objective of our study is to uncover if analysis by region (Latin America and the Caribbean, East Asia and the Pacific, Europe, and Central Asia) and resource intensity of economies (oil exporters, oil importers, minerals exporters, and less resource intensive). Our unique approach forms part of our contribution to the literature. We find that Latin America and the Caribbean are least affected by oil price shocks, while in East Asia and the Pacific the response of inflation and interest rate to oil price shocks is positive, and output growth is negative. Our analysis by resource endowment fails to show oil price shocks' ability to explain huge variations in macroeconomic variables in oil importing economies. Further sensitivity analysis using US interest rates as an alternative source of external shocks to emerging economies establishes a significant response of interest rate responses to US interest rate in Europe and Central Asia, and in inflation in Latin America and the Caribbean. We also find that regardless of resource endowment, the response of output growth and capital to a positive US interest rate shock is negative and significant in EMs. Our results are persuasive that resource intensity and regional factors impact the responsiveness of emerging economies to oil price shocks, thus laying a basis for policy debate.

JEL: F44, E37, C11, E32
Keywords: Emerging market economies, Oil price shocks, Output growth, Panel VAR

1. Introduction

Oil price shocks remain an area of interest to economic researchers because of the significance of oil price movement to policymakers when assessing economic implications (Oladosu et al., 2018; Köse and Ünal, 2020), and the potential impact on international investment decisions (Valenti et al., 2020). This study aims to investigate whether regions exhibit synchronized responses to oil price shocks and if the intensity of natural resources affects the response of emerging economies to external shocks. This insight is drawn from studies by Upper (2016) and Christensen and Upper (2017) after reporting different responses to the aftermath of global financial crises for EMEs in Asia, Eastern and Central Europe, sub-Saharan Africa, and commodity exporters like Mexico and Colombia from Latin America. We also get insight into classifying economies as oil exporters or importers from the findings by Jibril et al. (2020) that demand-side shocks benefit oil exporters and exacerbate global imbalances while supply-side shock benefit oil importers when prices fall. Our study employs a panel VAR framework with EMEs from Latin America, Europe, and Asia.

Existing studies extensively analyse the effect of oil price shocks on the movement of stock markets, terms of trade volatility, and exchange rates along with other macro variables. Others have examined whether the relationship between oil prices and macro variables is linear or non-linear, especially after 1981, when nominal prices fell, and wide swings followed after the collapse of the market in 1985. The existing literature on oil price shocks applies different econometric methodologies in analysing shocks stemming from the demand side and supply side. For instance, a VAR analysis (Burbidge and Harrison, 1984; Jiménez-Rodríguez and Sánchez, 2005), Markov chain switching (Basher et al., 2016), Granger causality (Cunado and De Gracia, 2005), and panel data analysis (Behmiri and Manso, 2013; Turhan et al., 2013). Notably, the focus of most of the previous has been on advanced economies leaving much to be covered in developing economies.

We find that Latin America and the Caribbean are least affected by oil price shocks, while in East Asia and the Pacific the response of inflation and interest rate to oil price shocks is positive, and output growth is negative. Our analysis by resource endowment fails to show oil price shocks' ability to explain huge variations in macroeconomic variables in oil importing economies. In minerals exporting and less resource intensive economies one standard deviation in oil prices can explain about 2 percent variation in consumption in the

short run. In the medium run, oil price shocks can account for about 5 percent movement in interest rates in minerals exporting countries and more than 2 percent variation in output in oil and minerals exporting economies. However, in minerals intensive economies, output growth has a negative and short-lived response to oil price shocks. In contrast, a negative and persistent response is experienced in less resource intensive economies. This is an indication that minerals exports cushion oil importing economies from oil price shocks.

Moreover, comparison across regions shows a stark difference in interest rate responses to US interest rate in Europe and Central Asia, and in inflation in Latin America and the Caribbean. We also find that regardless of resource endowment, the response of output growth and capital to a positive US interest rate shock is negative and significant in EMEs. We also establish that in the medium run, US interest rate shock can explain about 10 percent for output and 7 percent for interest in minerals exporting economies, about 15 percent for consumption, 7 percent for output, and 3 percent for the interest rate in oil exporting economies, and about 10 percent for consumption, and 3 percent for output and interest rate in less resource intensive economies.

We also appreciate that in addition to the categorization of economies according to resources intensity and regional differences as shown in our study, there could be other underlying factors behind patterns in asymmetric effects of oil price shocks impacts trade balance and real economic activity as reported by Jibril et al. (2020)

The next section summarizes the literature review. The remainder of this study is organized as follows: section three presents stylized facts, section four is data and methodology, section five presents results and discussion, and the last section is the conclusion.

2. Literature review

In this section, we focus on empirical evidence and theoretical aspects.

2.1. Role of oil prices

Oil does play a vital role in a nation's economy, and changes in oil prices can be correlated with macroeconomic movements. An increase in oil prices is believed to be one of the severe supply shocks that can hit the world economy. Oil price shocks receive significant consideration due to their presumed impact on other macroeconomic activities. For

instance, oil price shocks granger cause GDP per capita in net-oil importing countries (Gershon et al., 2019), the theoretical relationship between exchange rates, interest rates, and oil price movements (Kilian and Zhou, 2019), short-lived macro adjustments in a normal regime but sizeable and sustained fluctuations in an adverse regime (Holm-Hadulla and Hubrich, 2017), and dynamic effects of oil price shocks (demand and supply) on macro variables such as GDP and CPI inflation (Kilian, 2009). In other studies, Davis and Haltiwanger (2001) credits oil prices to the natural unemployment rate effect. In real business cycle (RBC) models, oil price shocks can reduce technological shocks (Davis, 1986), and because of their impact on uncertainty oil price shocks can depress irreversible investments (Ferderer, 1996).

Earlier studies by Lee et al. (1995) and Hamilton (1996) found that oil prices and macroeconomic variables have an asymmetric relationship. In the same vein, Akay and Uyar (2016) reports a non-linear relationship between crude oil prices and macroeconomic variables using partial response functions estimated from a non-parametric model. Furthermore, Ferderer (1996) and Jiménez-Rodríguez and Sánchez (2005) highlight the existence of linear and non-linear relationships between oil prices and macroeconomic variables that exist from a theoretical point of view. For instance, when price increases, aggregate demand is likely to fall as income gets redistributed between net oil exporter and net oil importers. Besides, total supply reduces following a rise in oil prices as firms purchase less oil; consequently, lowering capital and labour productivity. If real wages fall due to a decline in factor productivity, the worker can voluntarily withdraw labour supply, thus compounding the effect. A non-linear impact is realized when sectoral reallocation occurs as irreversible investments get depressed by oil price uncertainty (Ferderer, 1996).

Other areas that empirical studies have brought to focus include the impact of oil prices on financial markets and firm returns (Kocaarslan and Soytas, 2019; Sharma et al., 2018), exchange rate and inflation (Turhan et al., 2013), real GDP and other macro variables (Behmiri and Manso, 2013; Cunado and De Gracia, 2005), unemployment (Davis and Haltiwanger, 2001), sectoral allocation (Ferderer, 1996), combined effect of policy reaction (Bernanke et al., 1997), and industrial production (Burbidge and Harrison, 1984).

2.2. *Macroeconomic impact*

The relationship between oil price shocks and economic activities has remained an area of interest in the realm of economic researchers. Using a vector autoregressive (VAR) model with seven variables, Burbidge and Harrison (1984) analysed industrial production response to oil price shock using data from January 1961 to June 1982. In OECD countries, GDP response to the oil price shock from 1972: Q3 to 2001: Q4 is analysed by Jiménez-Rodríguez and Sánchez (2005) using a seven-factor VAR model. From their multivariate VAR, Jiménez-Rodríguez and Sánchez (2005), reports that an increase in oil prices generates an impact of higher magnitude than a decline in oil prices. In addition, the existence of a non-linear relationship between real GDP and oil prices is established. Analysis of a different variable also establishes a non-linear relationship between oil price shocks and stock prices, as reported by Escobari and Sharma (2020).

A related study done by Behmiri and Manso (2013) examined granger causality between crude oil price and economic growth in oil importing and oil exporting countries using data from Sub-Saharan Africa, starting 1985-2011. In oil importing regions, a bi-directional causality relationship is reported between crude oil consumption and economic growth. In contrast, a uni-directional causality relationship from crude oil consumption to output is reported in oil exporting regions. Granger causality framework had also been previously applied by Cunado and De Gracia (2005) between oil prices and macroeconomic factors (economic activity and consumer price indexes) from 1975Q1 to 2002Q2. In the short run, the results suggest a significant effect of oil prices on CPI and economic activity, and the level of significance rises when oil price shocks are defined in domestic currency. The asymmetric relationship between oil prices and the macroeconomy is further found in some Asian economies.

Jibril et al. (2020) uses a sample of oil exporting and oil importing economies to examine how the asymmetric effects of oil price shocks impact trade balance and real economic activity. Although type of the shock and source of the shock is beyond the scope of our study, it worth highlighting that global oil expansions and the source of shock are also important in establishing asymmetric patterns as reported by Jibril et al. (2020). For an oil exporting economy such as Canada, Delpachitra et al. (2020) demonstrates that changes in the dollar value due to adjustments in the US monetary policy affects oil prices thus impacting other

economies through oil price shocks. In order to control for potential sources of variations in reported results such as data, the methodology used, and other factors, a meta-analysis regression can be applied. This a methodology applied by Oladosu et al. (2018) in the analysis of oil price elasticity of GDP for the US economy. Oladosu et al. finds a negative US GDP elasticity that has a small magnitude.

In addition to oil prices, commodity prices also transmit trade shocks from the rest of the world to small open economies (SOEs). Trade channel affects SOEs through export value. Exports further impact a country's foreign borrowing capacity because exports act as collateral in international economics Arellano (2008). A fall in exports, just like GDP, results in a rise in a country's risk premium as default risk rises (Schmitt-Grohé and Uribe, 2003). This is notably the reason why the movement of prices remains critical in emerging economies literature, as pointed out by Céspedes and Velasco (2012). As a result of increased capital inflows, investment, and output increases. Economies that are not endowed with oil reserves export commodities and import oil. Therefore, oil importers that are also net commodity exporters experience business cycle swings following fluctuations in commodity prices. High commodity prices are associated with lower country spread, where the spread is taken as the difference between a country's interest rate and the world interest rate. According to Drechsel and Tenreyro (2018), commodity prices and spreads in emerging economies jointly have a positive effect on GDP and prices in net commodity exporting economies. In the credit market, Kinda (2016) investigates the relationship between commodity price movements and credit markets using panel data for commodity exporting countries and argues there exists an adverse effect.

2.3. Policy interventions

During the last decade, economic fluctuations manifested in many economies. Oil price shocks are linked to the witnessed economic fluctuations. Although oil price shocks are known to have substantial macroeconomic effects, the last decade recorded a reduced impact of oil price shocks on inflation and economic activities. According to Blanchard and Gali (2007), monetary policy interventions reduced the effects of oil price shocks on inflation and economic activities.

The debate around recessions that precede oil price shocks has been examining whether such recessions are caused by a rise in oil prices or tight monetary policy. Others try to

disentangle the effect of oil price shocks from monetary policy intervention. In search of answers to these intriguing concerns, Bernanke et al. (2004) – hereafter BGW – applied a VAR analysis and established that a 10 percent increase in oil prices is associated with a 150 basis point increase in fund rate and a 0.7 percent decline in peak output. A counter-factual analysis by BGW (where interest rates are held constant) further established that had interest rates remained constant after oil price shocks are experienced, the output would have fallen by only a half.

According to Nazlioglu et al. (2019), controlling for structural breaks is essential in analysing oil price shocks and policy intervention. Through a study examining causal relationships between oil prices and monetary policy in emerging economies, Nazlioglu et al. found that results are improved when structural breaks are accounted for in the analysis of causal linkages between oil prices and the monetary policy.

Findings on oil price shocks and monetary policy intervention have never been conclusive though. Such inclusive findings relate to monetary policy intervention's ability to restore macro-stability after oil price shocks in oil importing advanced economies, such as Japan. An early study byBernanke et al. (1997) suggested using monetary policy to eliminate economic swing when oil price shocks hit an economy. At the same time, Hamilton and Herrera (2004) argues that the effect of monetary policy intervention is low because oil price shocks are felt after three to four quarters.

2.4. Direct and indirect effects

Oil price movements can generate demand-side as well as supply-side effects depending on the economy (Kilian, 2009; Holm-Hadulla and Hubrich, 2017; Kilian and Zhou, 2019). Consumption and investment are affected by demand-side effects. A positive indirect effect is passed to the consumption of the existence of a positive relationship with disposable income. As the shock persists, the magnitude of this effect gets stronger. On the other hand, an increase in oil prices can adversely affect investment when firms' costs get high. Besides, changes in oil prices indirectly affect real activity through exchange rate and inflation (Jiménez-Rodríguez and Sánchez, 2005). Other indirect effects may be realised as a combination of oil price shocks and a result of the reaction to policies such as monetary policy as argued by Bernanke et al. (1997) and Cunado and De Gracia (2005)

2.5. *Impact on exchange rate and financial markets*

Using daily data from emerging market economies, Turhan et al. (2013) investigates the role that oil prices play in explaining the dynamics of EMEs exchange rate movement. Over the sample period 2003-2010, the currencies of the sampled EMEs were reported to have appreciated against the US dollar when oil prices increased with the effect of becoming vast and clear after 2008.

Although the center of this study is not about financial markets and returns, highlighting the impact of oil price movements on other sectors of the economy underscores the significance of these shocks. For instance, studies that have been undertaken on the relationships between oil price shocks and the financial markets when industrialized nations like Canada, the United Kingdom, Japan, and the United States are considered. Kocaarslan and Soytas (2019) did research in the US, where an examination of the stock prices and oil prices were the main variables under consideration. The researchers found a correlation between returns and oil prices with a relatively lagged effect between 1947 and 1991. In a recent study Sharma et al. (2018) tested whether oil shocks and the international stock market's reaction can easily be justified by changes in cash or expected cash returns.

The emphasis of the economic implication of oil price shocks is also echoed in a different study on stock exchanges in Iran, Kazakhstan, and Russia. Results obtained from SVAR analysis establishes that stock exchanges from these countries – in Iran, Kazakhstan and Russia– are impacted more by negative oil price shocks than positive shocks Köse and Ünal (2020). There remain divergent arguments in the literature, with some studies linking stock price movements to oil price shocks while others report a weak correlation. Still, on the asymmetric effect of oil prices on stock prices, Escobari and Sharma (2020) examines the effect of oil price movement on stock prices using a Markov switching technique and fails to link stock price movement to either positive or negative oil price shocks. Escobari and Sharma, however, finds that it is the only economic recession that has a statistically significant effect on stock prices.

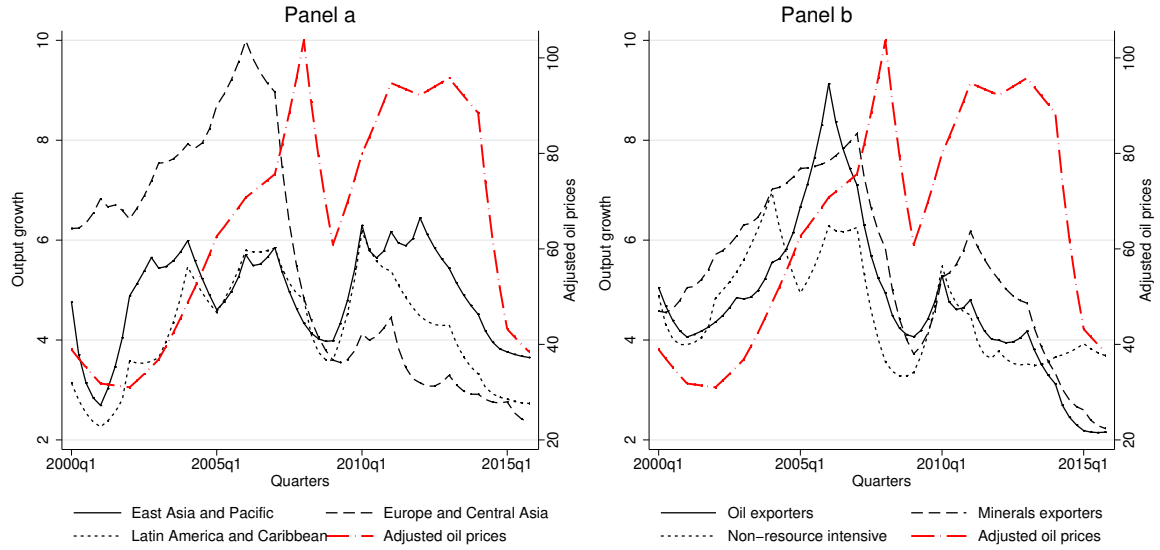
Moreover, the fundamentals of crude oil market affect investment decisions through crude oil futures risk premium. Based on SVAR results, Valenti et al. (2020) finds that real oil prices and the risk premium have a negative relationship. In addition, a shock component to oil price speculation has a larger explanatory power on expected future returns due to the

risk premium factor.

3. Stylized facts

To provide preliminary insight, we present the business cycle and oil price movement. Figure 1 shows movement in adjusted oil prices and output growth from 2000q1-2015q4. As seen in Panel, the movement in oil prices has a high and positive co-movement with output growth in East Asia and Pacific, and Latin America and Caribbean. A clear difference in trend lines is noted across regions and when economies are categorized using significant exports. Output growth in economies that are neither oil exporters nor minerals exporters, as seen in Panel b, is adversely affected by a rise in oil prices. In contrast, oil exporters realise an output growth that is larger than that of mineral exporters.

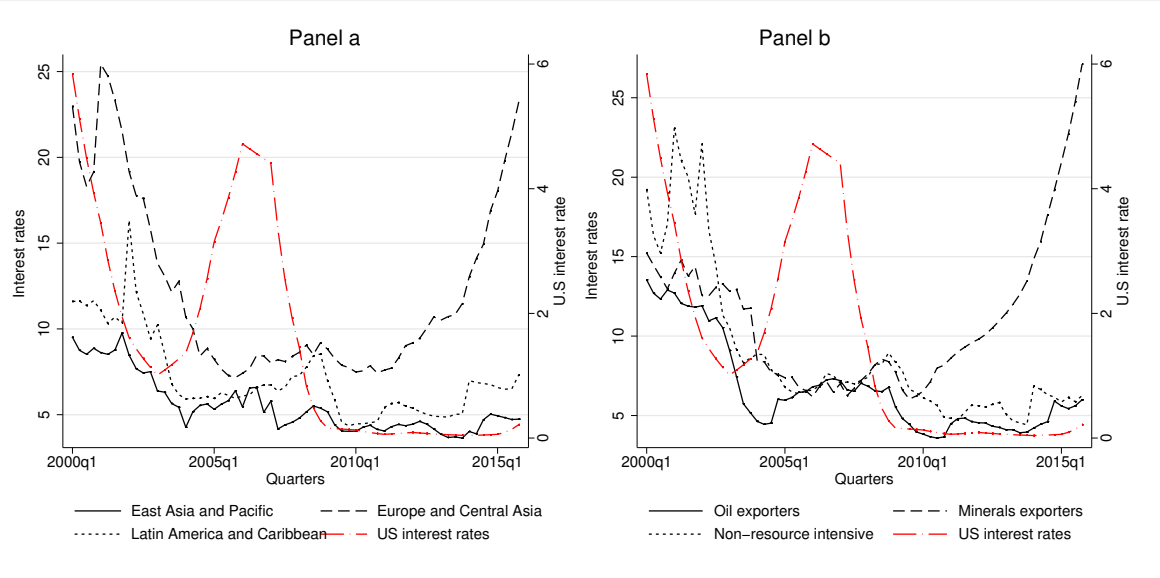
Figure 1: Business cycle and oil prices movement



Source: Author.

For comparison purposes, this study also includes US interest rates (commonly used by other studies as a global rate) as another source of external shock to emerging and frontier economies. Various studies have reported that US monetary policy has a spillover effect on emerging and other advanced economies. Panel a in Figure 2 shows that interest rates in Latin America and the Caribbean are synchronizing with US interest rates. Moreover, interest rates in oil exporting and non-resource intensive economies exhibit a co-movement with US interest rates, although it is relatively weak.

Figure 2: Global and domestic interest rates



Source: Author.

Next, Table 1 reports the existing correlations between domestic business cycle variables and potential sources of external shocks (oil prices and US interest rates). Rolling standard deviations of each region and resources category over a window from the preceding quarter to three quarters preceding is given.

Table 1: Correlation coefficients of standard deviations

	Corr(r^*,r)	Corr(r^*,y)	Corr(r^*, π)	Corr(p^*,r)	Corr(p^*,y)	Corr(p^*,π)
Region						
East Asia and Pacific	0.094	-0.273	0.296	-0.418	0.001	-0.096
Europe and Central Asia	-0.224	0.427	0.294	0.042	-0.238	-0.172
Latin America and Caribbean	-0.024	-0.105	0.279	-0.071	0.288	-0.109
Resources profiles						
Oil exporters	0.251	0.437	0.324	-0.166	-0.154	-0.378
Minerals	-0.421	0.111	-0.509	0.181	-0.712	-0.075
Less resource	0.338	-0.127	0.268	-0.285	-0.056	0.332

Note: r^* is global interest rates, r is domestic interest rates, y is output growth, π is inflation, and p^* is adjusted oil prices

Notably, Table 1 shows that oil price deviation has a positive relationship with interest rate deviations in Europe and Central Asia, but an inverse relationship with interest rate and inflation deviations in East Asia and Pacific and Latin America and the Caribbean. The relationship between oil price deviation and output growth is negatively correlated only in Europe and Central Asia. When the economies are grouped according to resources endowment, it is the only interest rate and inflation deviations that positively correlate with oil price deviation in minerals and fewer resources endowed economies. The relationship between

global interest rate deviation with other variables also varies by region and resource profiles. This underscores the importance of our analysis of economies by region and resource endowment.

4. Data and Methodology

4.1. Data

We use quarterly data for EMEs from Latin America, Europe and Asia for the period 2000q1-2019q4. The data sources are Bank for International Settlements (BIS), World Integrated Trade Systems (WITS), International Monetary Fund (IMF), and the UN COMTRADE.

The application of the quarterly data is motivated by the argument of Hamilton and Herrera (2004) that the impact of oil price shocks is felt after three to four quarters. This also gives a widow to evaluate whether a monetary policy intervention is effective since interest rates are included in the list of variables.

The variables used are oil prices, global interest rate (proxied by U.S three month treasury bill rate), real GDP growth, treasury bill rates, CPI inflation (year 2010=100), and real exchange rate (year 2010=100). In countries where treasury bill rates are missing, we replace with monetary policy related rate, deposit rate, or savings rate. See Table A.3 in the Appendices. There are 28 countries, 6 from East Asia and Pacific, 12 from Europe and Central Asia, and 10 from Latin America and the Caribbean. If oil and metal and ore exports comprise a significant portion of total exports, then a country is categorized either as an oil exporter or minerals exporter, respectively. The sample has 10 minerals endowed economies, 8 oil exporters, and 10 less resource endowed economies. A summary statistics is shown in Table 2.

4.2. Methodology

A panel VAR is applied in the analysis and is specified as an AR(1) process:

$$y_{i,t} = \mu_i + \sum_{k=1}^{p} \Phi_k y_{i,t-k} + X_{i,t}B + \epsilon_{i,t} \tag{1}$$

where μ is country-specific, and i and t denotes countries and time respectively. y denotes the regressor. Matrix B are $(l \times k)$ parameters to be estimated, and X is a $(1 \times l)$ vector of exogenous covariates (real GDP growth, inflation, interest rates, and real exchange rate).

Table 2: Summary statistics

	Log(GDP)	Log(C)	Log(K)	Log(G)	Log(X)	GDP growth	Interest rate	Inflation	Real exchange rate
Mean	10.39778	9.939641	8.861004	8.351998	9.305706	5.005241	8.092837	0.254638	120.7226
P75	11.55112	11.00541	10.00154	9.6304	10.65346	6.155234	9.800001	0.029291	135.9794
Sd	1.978925	1.938152	2.005117	2.021575	1.926598	4.205851	8.724571	1.012391	31.43979
Min	5.744774	5.724723	3.480639	3.380607	4.488241	0.065923	-0.06252	-1.80078	72.0324
Max	16.52942	15.95946	15.44017	14.38305	15.11535	113.654	107.1567	8.588677	304.642
N	1818	1818	1818	1818	1818	1862	1954	1872	1728

[1]ote: Y-GDP, C-consumption, K-capital, G-government expenditure, X-exports

This study estimates a non-stationary VAR to avoid the dangers of inconsistency that arise from the imposition of incorrect co-integration restriction (see Sims et al. (1990)). However, this approach can lead to a loss of efficiency. This study follows Hamilton (1994) by allowing the model to implicitly determine any potential co-integrating relationships.

Our choice of non-stationarity variables avoids differencing of data where useful information in the data generating process could be lost. Sims et al. (1990) and Toda and Yamamoto (1995) also supports the argument we are following that differencing data for stationarity in VAR analysis is not required if the data is cointegrated.

5. Main findings

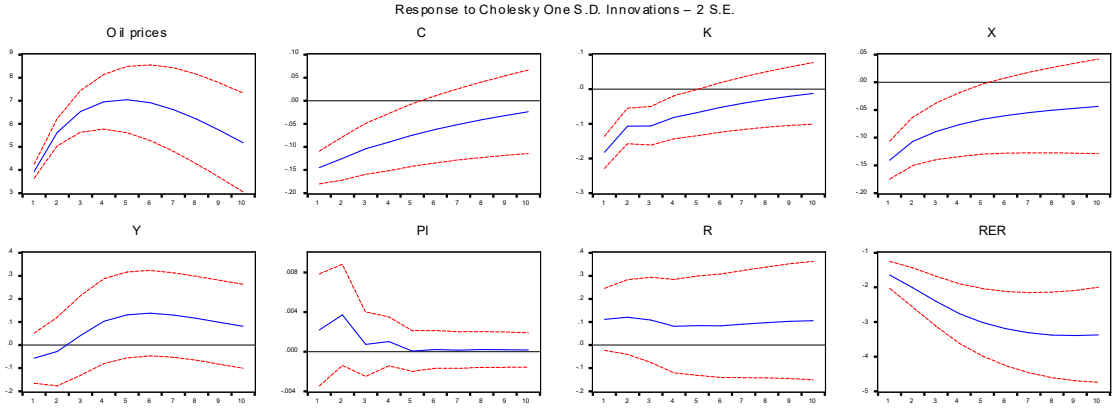
In this section, impulse responses estimated using Equation 1 are discussed. The innovations capture business cycle responses to oil prices, and global interest rates as proxied by US monetary policy. All the innovations are a Cholesky decomposition with one standard deviation.

An estimation of responses of output growth Y, consumption C, capital K, inflation PI, interest rate R, real exchange rate RER, and exports X to unrestricted innovation is done to periods ahead to fulfill the impact of a given shock. These results are reported with two standard error bands, with the red lines showing a 95 percent confidence region.

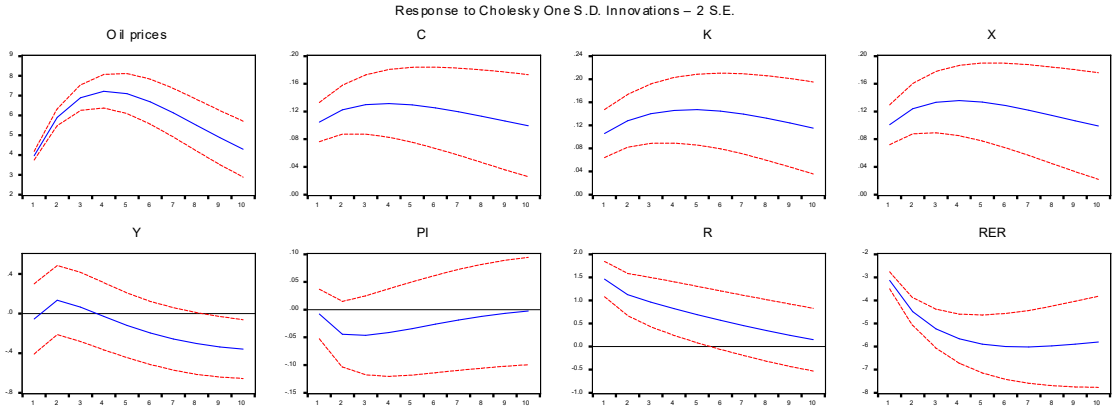
Oil price shocks have a positive impact on inflation and interest rate, while in the short-run, output growth is negative in East Asia and the Pacific, as shown in Figure 3. As oil prices push domestic price levels up, consumption records a negative and significant response. Capital, exports, and the real exchange rate also have a substantial and negative response. In Europe and Central Asia, monetary authorities maintain low inflation by raising

Figure 3: Response to oil price shocks

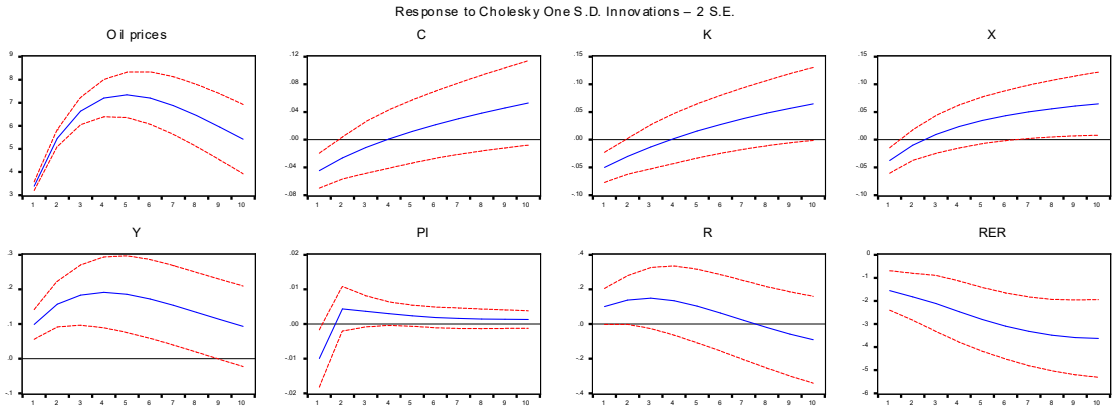
(a) East Asia and Pacific



(b) Europe and Central Asia



(c) Latin America and Caribbean



interest rates to counter positive oil price shocks. A positive and significant response of consumption, capital, and exports to oil price shocks is realised while the real exchange rate depreciates. Latin America and the Caribbean are least affected by oil price shocks where

consumption, capital, and exports have a negative response in a few periods. Still, output growth records a positive and highly significant response.

In the medium run, one standard deviation in oil prices can explain more than 3 percent of the variation in consumption and interest rates in Latin America and the Caribbean. About 2 percent of interest rate movements in Europe and Central Asia can be explained by oil price shocks in the short run. In contrast, in the medium run, oil price shocks can account for 1 percent for capital, 2 percent for output growth, more than 4 percent for an interest rate. Further, error variance decompositions (EVDs) derived from IRFs in Figure 3 shows that in East Asia and Pacific oil price shocks can account for about 2 percent variation in output growth and consumption, and in the medium run they can account for 4 and 10 percent variation in consumption and output growth, respectively.

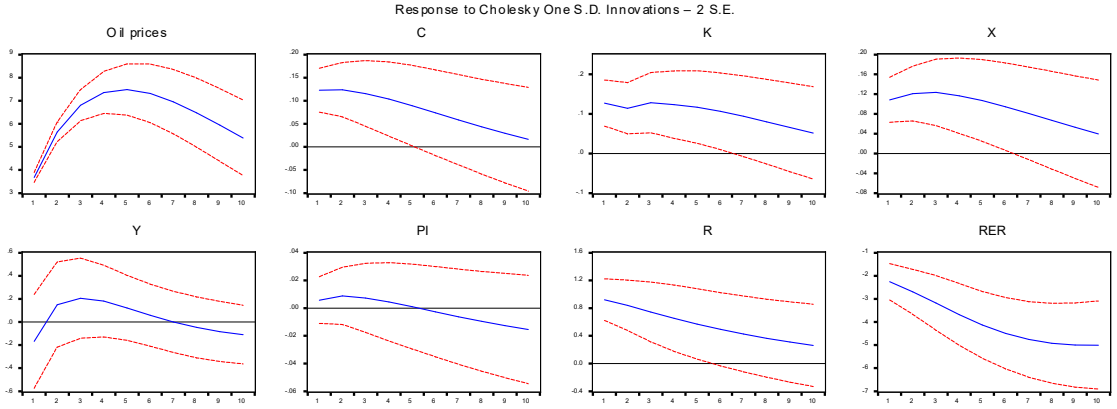
The observed variation in regional responses to oil price shocks raises another question of whether this could result from other underlying factors such as resource endowment. To investigate this possibility, we categorize the sample economies according to their resource intensities – minerals exporters, oil exporters, and less resource intensive economies.

In minerals intensive economies, output growth has a negative and short-lived response to oil price shocks, while a negative and persistent response is experienced in less resource intensive economies. Positive oil price shocks are a boom to oil exporters as observed from the response of output growth but a negative supply shock that affects production costs in oil importing countries. However, minerals endowment cushion oil importing economies, as seen in Panel a. From Figure 4, it is further clear that oil price shocks have a positive impact on inflation, but the effect is short-lived in oil exporting economies. Our is also echoed by the findings reported by Jibril et al. (2020) that demand side shocks benefit oil exporters and exacerbates global imbalances while supply-side shock benefits oil importers when prices fall. Surprisingly, inflation is negative in less resource intensive economies. Capital, consumption, and exports are only positive and significant in minerals exporting economies.

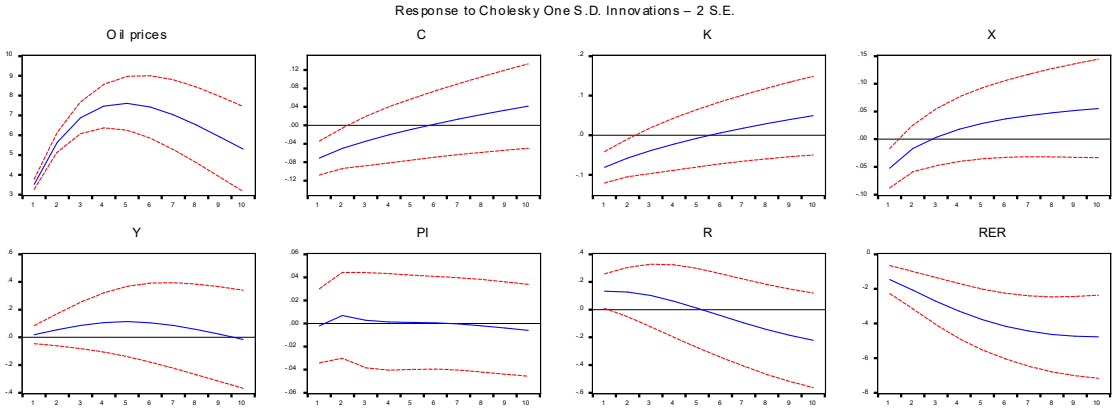
From the EVDs obtained from the impulses responses of Figure 4, oil price shocks have a marginal impact on consumption in the short run in oil exporting economies. However, in minerals exporting and less resource intensive economies one standard deviation in oil prices can explain about 2 percent variation in consumption in the short run. In the medium

Figure 4: Response to oil price shocks

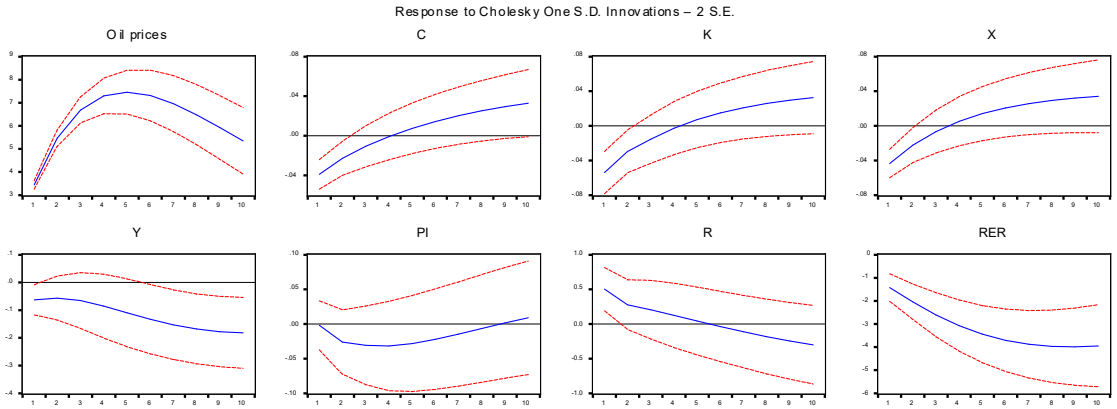
(a) Minerals endowed



(b) Oil exporting



(c) Less resource endowed



run, oil price shocks can account for about 5 percent movement in interest rates in minerals exporting countries and more than 2 percent variation in output in oil and minerals exporting economies.

Moreover, the robustness of our results is tested by repeating our analysis using US interest rates in the next section. This is an innovative approach that examines a different source of external shock to emerging economies.

5.1. Additional analysis

A study by Delpachitra et al. (2020) highlights that there are speculations the Canadian economy is impacted by adjustments of U.S. monetary policy. When U.S. monetary policy changes, it affects the dollar value and consequently impacting oil prices. Furthermore, the spillover of U.S. monetary policy to other economies is reported by (Rey, 2015). In addition to oil price shocks, other world factors such as global interest rate shocks cause cyclical fluctuations observed in developed and developing economies (Altug and Bildirici, 2010). These findings forms the basis of our motivation to use U.S. monetary policy as an alternative source of external shock in emerging economies.

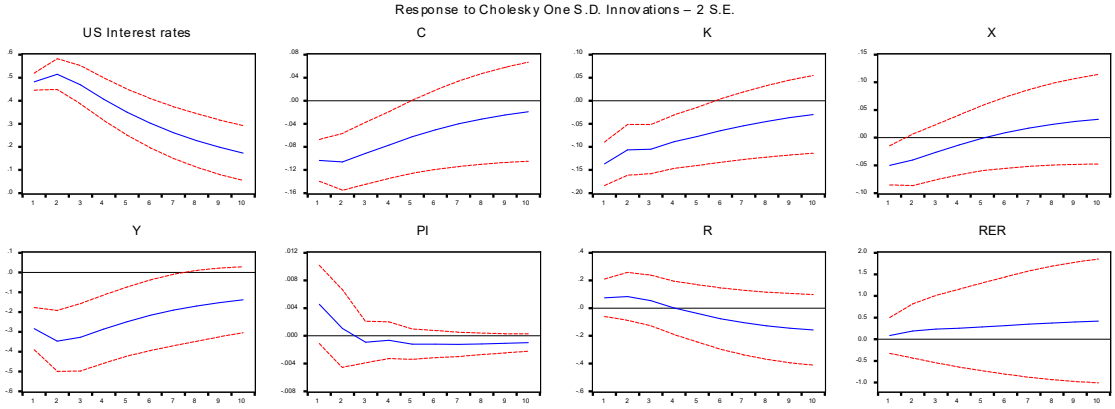
Varying responses of macroeconomic variables to external shocks is further confirmed by innovations to the global interest rate. Figure 5 shows that US interest rate shock has a negative and significant impact on capital in emerging economies. On the one hand, if global interest rates (US interest rates) increase relative to emerging economies, the emerging economies receive less capital inflows as investors searching for high yield lose the incentive to invest in EMEs. A reduction in inflows affects investment, thus leading to a decline in output growth as EMEs get less financing for development projects. On the other hand, increased capital inflows also raise demand for the local currencies, thus appreciating the exchange rate. Consequently, the demand for exports declines as the real exchange rate appreciates. A stark difference in interest rate responses to US interest rate is captured in Europe and Central Asia, and in inflation in Latin America and the Caribbean.

Regardless of resource endowment, the response of output growth and capital to a positive US interest rate shock is negative and significant in EMEs. This can be attributed to the impact of changes in the US interest rate on capital flows to EMEs. As seen from Figure 6, the response of interest rate is only negative, and inflation positive and significant in minerals endowed economies.

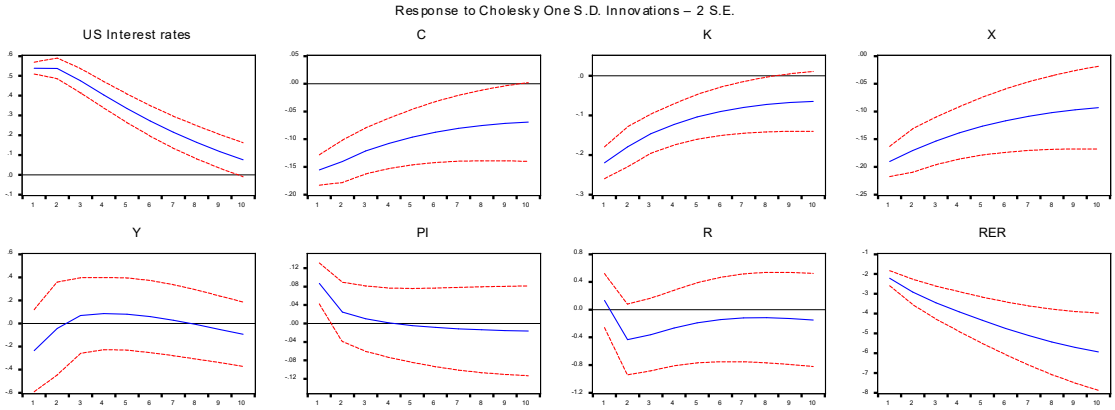
In the short run, one standard deviation in the US interest rate can explain a more than 3 percent change in consumption in oil exporting and less resource intensive economies, and about 5 and 2 percent change in output growth and interest rate respectively in minerals

Figure 5: Response to global interest policy shocks

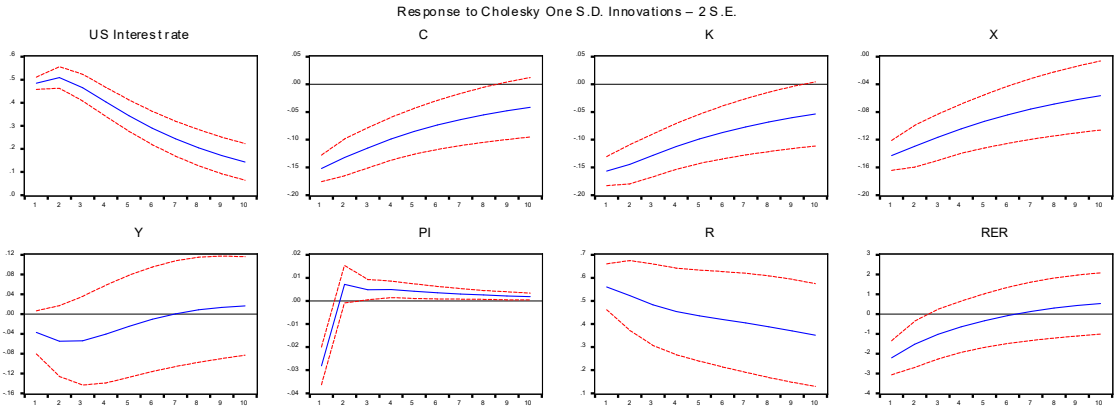
(a) East Asia and Pacific



(b) Europe and Central Asia



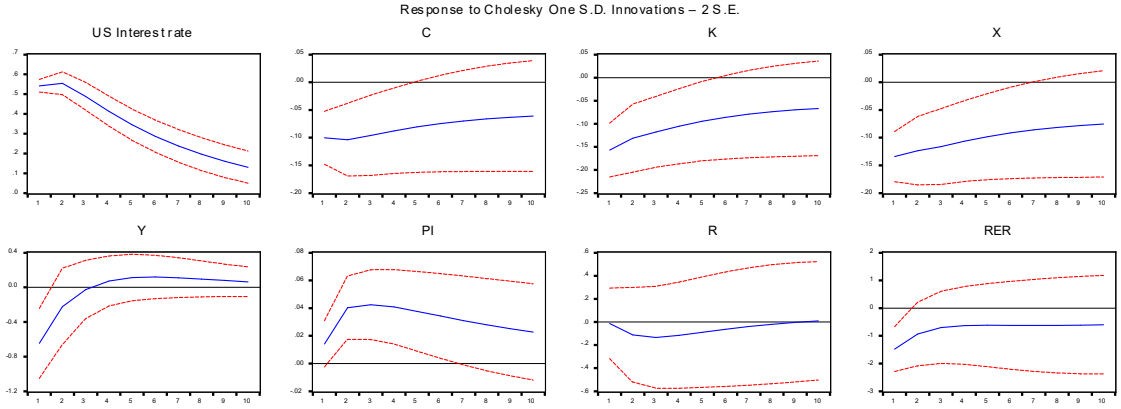
(c) Latin America and Caribbean



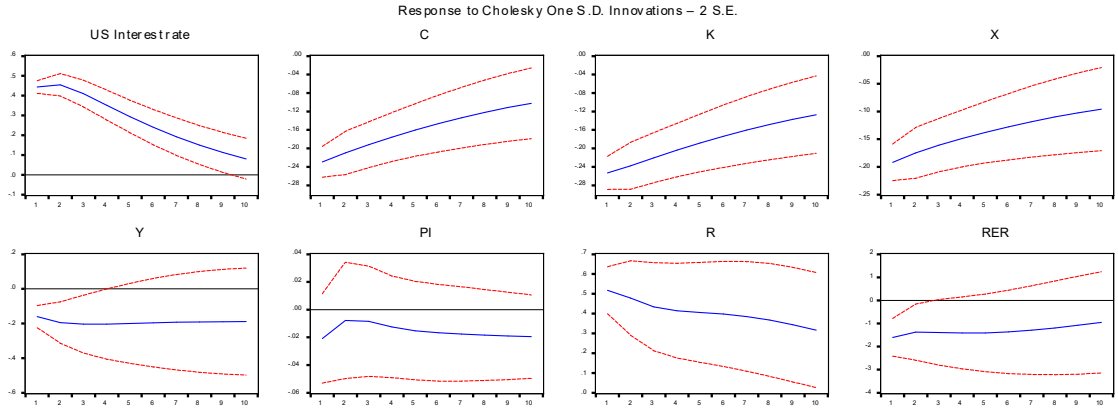
exporting economies. EVDs from Figure 6 further indicates that in the medium run, US interest rate shock can explain about 10 percent for output and 7 percent for interest in minerals exporting economies, about 15 percent for consumption, 7 percent for output, and

Figure 6: Response to global interest policy shocks

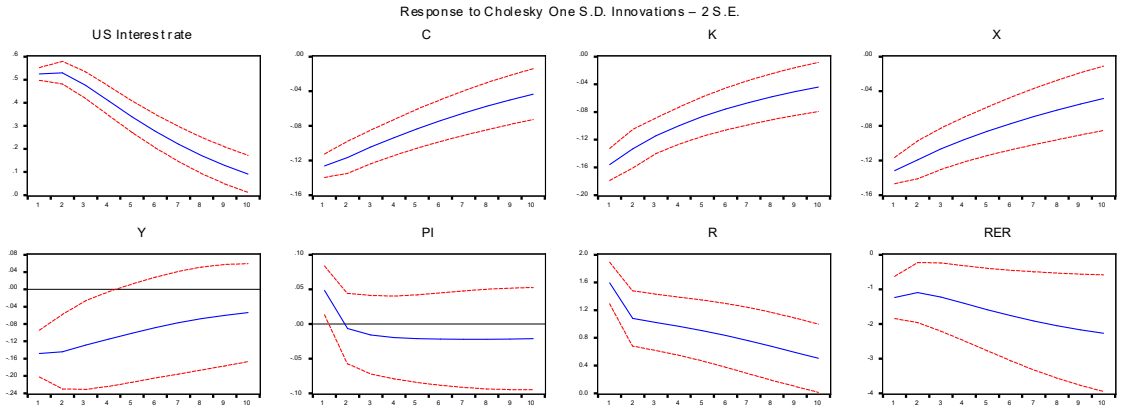
(a) Minerals endowed



(b) Oil exporting



(c) Less resource endowed



3 percent for interest rate in oil exporting economies, and about 10 percent for consumption, and 3 percent for output and interest rate in less resource intensive economies.

6. Conclusion

In summary, this study finds that dynamic responses of macroeconomic variables in EMES to external shocks vary from one region to the other. These responses also vary depending on resources exported by a country, for instance, oil and other minerals.

We establish that Latin America and the Caribbean are least affected by oil price shocks, while in East Asia and the Pacific, the response of inflation and interest rate to oil price shocks is positive, and output growth is negative. Our analysis by resources endowment fails to show the ability of oil price shocks to explain huge variations in macroeconomic variables in oil importing economies. In minerals exporting and less resource intensive economies one standard deviation in oil prices can explain about 2 percent variation in consumption in the short run. In the medium run, oil price shocks can account for about 5 percent movement in interest rates in minerals exporting countries and more than 2 percent variation in output in oil and minerals exporting economies. However, in minerals intensive economies, output growth has a negative and short-lived response to oil price shocks while a negative and persistent response is experienced in less resource intensive economies. This is an indication that minerals exports cushion oil importing economies from oil price shocks.

Comparison across regions shows a stark difference in interest rate responses to US interest rate in Europe and Central Asia, and in inflation in Latin America and the Caribbean. We also find that regardless of resource endowment, the response of output growth and capital to a positive US interest rate shock is negative and significant in EMEs. We also establish that in the medium run, US interest rate shock can explain about 10 percent for output and 7 percent for interest in minerals exporting economies, about 15 percent for consumption, 7 percent for output, and 3 percent for interest rate in oil exporting economies, and about 10 percent for consumption, and 3 percent for output and interest rate in less resource intensive economies.

In conclusion, our findings contribute to the literature by confirming that external shocks, such as oil prices affect regions differently. The response of macroeconomic variables to external shocks also supports our analysis by resource classification.

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Appendices

A. Countries used in the analysis

Table A.3: List by region, resource profile, and interest rate

Country name	Region	Resource profile	Type of interest rate available
Thailand	East Asia and Pacific	none	Treasury bill rates
Malaysia	East Asia and Pacific	none	Treasury bill rates
Brunei Darussalam	East Asia and Pacific	oil	Deposit rate
Philippines	East Asia and Pacific	none	Deposit rate
Mongolia	East Asia and Pacific	minerals	Deposit rate
Indonesia	East Asia and Pacific	oil	Deposit rate
Turkey	Europe and Central Asia	none	Monetary policy related
Georgia	Europe and Central Asia	minerals	Deposit rate
Kazakhstan	Europe and Central Asia	minerals	Treasury bill rates
Romania	Europe and Central Asia	none	Monetary policy related
Albania	Europe and Central Asia	minerals	Treasury bill rates
Russian Federation	Europe and Central Asia	oil	Monetary policy related
Armenia	Europe and Central Asia	minerals	Treasury bill rates
Azerbaijan	Europe and Central Asia	oil	Treasury bill rates
Poland	Europe and Central Asia	none	Treasury bill rates
Ukraine	Europe and Central Asia	none	Deposit rate
Hungary	Europe and Central Asia	none	Treasury bill rates
Bosnia and Herzegovina	Europe and Central Asia	minerals	Deposit rate
Bolivia	Latin America and Caribbean	minerals	Treasury bill rates
Brazil	Latin America and Caribbean	minerals	Treasury bill rates
Colombia	Latin America and Caribbean	oil	Monetary policy related
Chile	Latin America and Caribbean	minerals	Monetary policy related
Paraguay	Latin America and Caribbean	oil	Deposit rate
Costa Rica	Latin America and Caribbean	none	Deposit rate
Guatemala	Latin America and Caribbean	none	Deposit rate
Ecuador	Latin America and Caribbean	oil	Savings rate
Peru	Latin America and Caribbean	minerals	Deposit rate
Mexico	Latin America and Caribbean	oil	Treasury bill rates

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