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How do oil prices affect emerging market sovereign bond spreads?

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ABSTRACT

This paper examines whether oil price changes have significant impacts on emerging market sovereign bond spreads. In particular, we focus on how different structural shocks to oil prices affect the bond spreads. Using monthly data for 15 emerging market countries from 1998 to 2019, we show evidence that shocks to oil supply play an insignificant role in determining the bond spreads. In contrast, oil-specific demand shocks have both statistically and economically significant impacts on emerging market sovereign bond spreads. Global aggregate demand shocks are of secondary importance. As oil-specific demand shocks are associated with financial market speculative activity, such activity may lead to search-for-yield behavior in emerging market bond markets, and thus reduce emerging market sovereign spreads.

1. Introduction

Since the 1990s, long-term government bond yields in developed economies have been declining. Indeed, in some countries, debts have even been traded at negative yields in recent years (see Fig. 1).[1] As a result of search-for-yield strategies, bond markets have become a vital and increasingly indispensable source of finance for emerging economies since the mid-1990s (see, e.g., Guscina et al., 2014; Becker and Ivashina, 2015). In particular, Arslanalp and Tsuda (2014) show that emerging market sovereign debt has become an important asset class for investors. With the growing reliance of emerging economies on external financing, and with global investors increasingly holding emerging market debt, it is becoming more and more critical for both policy makers and investors to understand the main determinants of sovereign bond yields. Moreover, as Uribe and Yue (2006) argue, business cycles in emerging market economies are highly correlated with the costs of borrowing that these countries face in international financial markets. Therefore, there is an abundant empirical literature focusing on the determinants of the sovereign bond yield spread in emerging markets, as this spread is a common measure of a country's borrowing cost in international capital markets. The sovereign bond yield spread, as one of the standard proxies of sovereign risk, is defined as the difference between a country's government bond yield (bonds denominated in US dollars) and the US treasury bond yield with comparable maturity.

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[1] For example, in June/July 2019, yields on 10-year government bonds were −0.10% for Austria, −0.22% for Denmark, −0.09% for Finland, −0.39% for Germany, −0.16% for Japan, −0.21% for the Netherlands, −0.12% for Sweden, and −0.65% for Switzerland.

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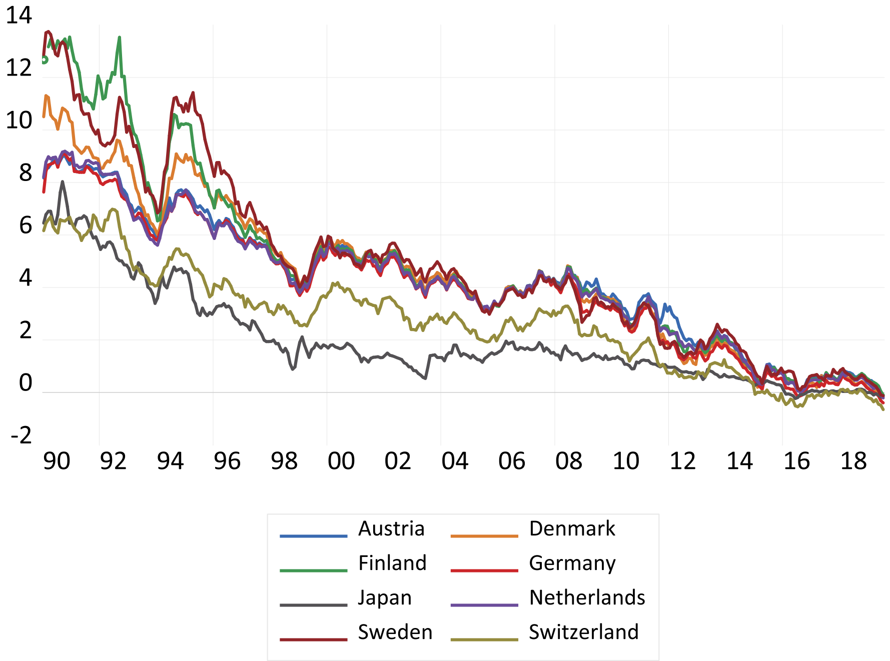

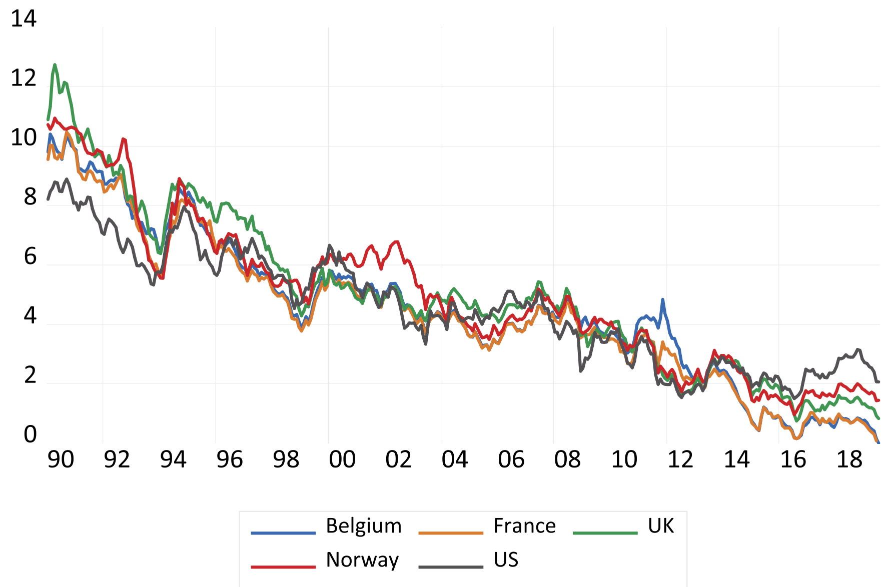

Fig. 1. Long-Term Government Bond Yields: 10-year.

In addition to domestic fundamentals, Longstaff et al. (2011) and Amstad et al. (2016) provide evidence that the majority of sovereign credit risk can be linked to global factors. The existing literature shows that several external factors, including US monetary policy (Arora and Cerisola, 2001; Uribe and Yue, 2006; Foley-Fisher and Guimaraes, 2013), global risk aversion (Kennedy and Palerm, 2014; González-Rozada and Yeyati, 2008), and international liquidity (González-Rozada and Yeyati, 2008), are important drivers of emerging market sovereign spreads.

Among the various global factors that influence sovereign credit risk, in this paper we are particularly interested in the effect of oil prices. There are several reasons why oil prices may play an important role in determining the emerging market sovereign bond spreads. First, as oil price movements are a major source of instability for the global economy, economic conditions and market sentiment on sovereign risk are likely to shift with oil price swings. Moreover, most of the big issuers of sovereign debt in emerging markets are either significant crude oil exporters (e.g., Brazil, Colombia, Malaysia, Mexico, Nigeria, and Russia) or large crude oil importers (e.g., China, Peru, the Philippines, Poland, South Africa, and Turkey). Oil prices may affect the exporters directly through the revenue channel (greater ability to repay), and indirectly through the so-called "resource curse" channel, which refers to the paradox that countries with an abundance of natural resources often have low economic growth as a result of resource misallocation (see e.g., Van der Ploeg, 2011; Hamann et al., 2018; Sarr et al., 2011). Regarding the importers, these emerging countries are more vulnerable to oil price changes than developed countries because their economic development paths involve more energy-intensive production structures. Arezki and Blanchard (2014) argue that oil price hikes may influence oil importers through the rising cost of production and inflation rates, but that oil importers also depend heavily on what happens to oil exporters, and thus they may benefit from an export boom because of income growth in their oil-exporting neighbors. Finally, Hilscher and Nosbusch (2010) argue that the volatility of the terms of trade, which is greatly affected by oil price fluctuations, has a significant effect on emerging market sovereign credit spreads.

Although it is generally considered that emerging market economies may be hurt by higher oil prices, crude oil price spikes are not necessary positively correlated with emerging market sovereign spreads. If the rise in oil prices reflects improved demand conditions in the global economy and/or improved sentiment concerning financial markets, then the underlying cause of higher energy prices (increased aggregate and speculative demand) is positive for emerging markets. As a result, emerging market sovereign spreads may narrow in the case of higher oil prices. This is encapsulated by Kilian (2009)'s statement that "not all oil price shocks are alike.".

As oil prices have both positive and negative effects on emerging markets, it is unsurprising that the empirical evidence regarding their impact on emerging market sovereign bond spreads is somewhat mixed. For example, Longstaff et al. (2011) find that with the exception of several Latin American countries (e.g., Venezuela), changes in global oil or commodity prices have little explanatory power for sovereign credit spread changes. Presbitero et al. (2016) show that energy prices have no significant impact on sovereign bond spreads in developing countries. In contrast, Wegener et al. (2016) find that positive oil price shocks lead to lower sovereign credit default swap risk in oil-producing countries.

Rather than simply examining the effects of oil prices on emerging market sovereign spreads, this paper investigates whether different sources of oil price shocks have different impacts on spreads. As shown in Kilian (2009), the persistence, shape, and magnitude of the response of the real oil prices may differ substantially depending on the composition of the underlying oil demand and supply shocks. Hence, it is of interest to study the dynamic correlation between oil prices and emerging market sovereign spreads and how it evolves with changes in the composition of the oil demand and supply shocks.

Kilian and Zhou (2020) remark that although Kilian (2009) imposes a recursive structure to identify economic shocks in the crude oil market, the structure is not atheoretical. Every exclusion restriction is motivated on economic grounds. Nevertheless, several alternative identification schemes have been proposed for the oil market vector autoregressive (VAR) models. For example, Jacks and Stuermer (2020) apply a long-run restriction, which is suitable for their long-dated annual data, covering the period from 1870 to 2013. Moreover, sign restrictions are used in Kilian and Murphy (2012). After imposing a reasonable oil supply elasticity bound, Kilian and Murphy (2012) report results consistent with Kilian (2009). We do not intend to claim that the approach of Kilian (2009) is superior to alternative identification methods. The recursive structure is used because it has a sound economic basis and is widely applied,[2] which makes our empirical results comparable with the previous studies.

We first augment the structural VAR (SVAR) model proposed in Kilian (2009) with sovereign bond spreads to examine the dynamics of the spreads in response to different oil price shocks for each individual country. Then, we conduct a panel analysis by pooling the data so that we can control for more global and local factors that may affect the sovereign bond spreads. The contribution of the current paper is twofold. First, as the relationship between emerging market sovereign spreads and oil prices has been explored in the previous literature, this paper takes the further step of investigating how oil prices affect spreads by considering the underlying shocks (demand or supply shocks) in the crude oil market responsible for driving the oil price changes. Second, although the oil market VAR models have been utilized to link the bond markets to the crude oil market (see e.g., Kang et al., 2014; Filippidis et al., 2020), we provide more concrete evidence by pooling the data to conduct a panel analysis incorporating more global and local factors.

Using monthly data for 15 emerging market countries from 1998 to 2019, we present evidence that shocks to the supply of oil play an insignificant role in determining bond spreads. In contrast, oil-specific demand shocks have both statistically and economically significant impacts on the emerging market sovereign bond spreads. Global aggregate demand shocks are of secondary importance. As oil-specific demand shocks are associated with financial market speculative activity, such activity may cause search-for-yield behavior in emerging market bond markets, and thus reduce emerging market sovereign spreads. Our empirical results are robust to various specifications.

[2] For example, see Mu and Ye (2011),Degiannakis et al. (2013), Carstensen et al. (2013),Abhyankar et al. (2013), Ratti and Vespignani (2013),Kang et al. (2014), Plante (2014),Jo (2014), Güntner (2014),Atems et al. (2015), Kang et al. (2016),Kang et al. (2017), Kang et al. (2017),Sotoudeh and Worthington (2017), Lambertides et al. (2017),Foroni et al. (2017), Enders and Enders (2017),Qadan and Nama (2018), Bastianin and Manera (2018),Güntner and Linsbauer (2018), Ioannidis and Ka (2018),Karaki (2018), Byrne et al. (2019),Kang et al. (2019), Hoang et al. (2019),Atems and Melichar (2019), Alsalman and Karaki (2019),Qadan and Idilbi-Bayaa (2020), Filippidis et al. (2020),Alsalman (2021).

2. Econometric Framework

2.1. Structural VAR Analysis

To examine how different oil price shocks affect the emerging market sovereign bond spread, we augment the SVAR model of the global market for crude oil proposed by Kilian (2009) to include the spreads. Consider the following SVAR model:

$$A(L)y_t = e_t, \tag{1}$$

where $A(L) = I - A_0 - A_1L - \cdots - A_pL^p$ is the lag polynomial. Vector y_t is:

$$y_t = \begin{bmatrix} \Delta prod_t \\ rea_t \\ op_t \\ spread_t \end{bmatrix}, \tag{2}$$

where $\Delta prod_t$ is the percentage change in global crude oil production and rea_t represents global economic activity, which is the measure proposed by Kilian (2009) and Kilian (2019). Moreover, op_t is the real price of oil and $spread_t$ is the emerging market sovereign bond spread. Real oil prices and spreads are expressed in logarithms. Term e_t represents the vector of serially and mutually uncorrelated structural shocks.

In addition, as the crude oil price is determined by the global oil market, but may not be affected by the emerging sovereign bond spread, we further impose a block exogeneity restriction in the SVAR model. To be more precise, we rewrite vector y_t in two blocks, and assume block exogeneity, which suggests that:

$$y_t = \begin{bmatrix} y_{1t} \\ y_{2t} \end{bmatrix}, \quad A(L) = \begin{bmatrix} A_{11}(L) & 0 \\ A_{21}(L) & A_{22}(L) \end{bmatrix}, \quad e_t = \begin{bmatrix} e_{1t} \\ e_{2t} \end{bmatrix},$$

where y_{1t} is a 3×1 vector containing $\Delta prod_t, rea_t$, and op_t, whereas y_{2t} is simply $spread_t$. The block exogeneity restriction $A_{12}(L) = 0$ implies that the emerging market sovereign spread does not enter the global oil market block y_{1t} either contemporaneously, or for lagged values of $spread_t$ in the structural form (1).

For the structural identification of our SVAR model, we follow Kilian (2009) and Kilian and Park (2009) to consider a short-run identification with a block-recursive structure on the contemporaneous relationship between the reduced-form residuals ε_t and the underlying structural shocks e_t. Letting ε_t denote the vector of the reduced-form VAR residuals, we have the following short-run identification assumptions concerning $A(0)^{-1} = (I - A_0)^{-1}$:

$$\begin{bmatrix} \varepsilon_t^1 \\ \varepsilon_t^2 \\ \varepsilon_t^3 \\ \varepsilon_t^4 \end{bmatrix} = \begin{bmatrix} a_{11} & 0 & 0 & 0 \\ a_{12} & a_{22} & 0 & 0 \\ a_{31} & a_{32} & a_{33} & 0 \\ a_{41} & a_{42} & a_{43} & a_{44} \end{bmatrix} \begin{bmatrix} e_t^{os} \\ e_t^{gd} \\ e_t^{od} \\ e_t^{sp} \end{bmatrix}. \tag{3}$$

The first block constitutes a model of the global crude oil market and the second block is the emerging sovereign bond spread. According to Kilian (2009), e_t^{os} represents shocks to the global supply of crude oil ("oil supply shocks"). The second structural shock e_t^{gd} captures shocks to the global real economic activity ("global demand shocks"). Shock e_t^{od} is the oil-market-specific demand disturbance, which captures the shift in precautionary and speculative demand for crude oil driven by financial market speculation ("oil-market-specific demand shocks"). That is, it reflects expectations of future oil prices. Finally, we denote the last structural disturbance e_t^{sp} as the spread shock. However, it is worth noting that it is not a truly structural shock. It is simply an innovations to spreads that is not caused by global crude oil demand or crude oil supply shocks. In the global oil market block, the identification scheme assumes a vertical short-run supply curve in the crude oil market; therefore, we assume that crude oil production does not respond to shocks to global aggregate demand and oil-market-specific demand that occur within the same month. The intuition behind the assumption is that crude oil production has reached its near-to-capacity level.[3] Moreover, increases in oil prices driven by shocks that are specific to the oil market do not affect global real economic activity immediately, which suggests a sluggish adjustment of the global real economy. Finally, innovations to the real price of oil that cannot be explained by oil supply shocks or shocks to global aggregate demand are deemed demand shocks that are specific to the oil market. Clearly, the block-recursive structure of the model implies that the spread shock does not affect global crude oil production, global real activity, and the real price of oil within a given month. That is, global crude oil production, global real activity, and the real price of oil are treated as predetermined with respect to the emerging bond markets.

[3] This assumption has been challenged by Baumeister and Hamilton (2019). Later, in Section 6, we use the structural shock series constructed by Baumeister and Hamilton (2019) to check the robustness of our empirical results.

In the emerging bond market block, the emerging market sovereign spreads respond to all three shocks from the global crude oil market. Thus, we can examine whether different shocks to the global crude oil market have different impacts on emerging market spreads.

3. Data

To examine the relationship between oil prices and emerging market sovereign bond spreads, we use monthly data for sovereign bond spreads from the Emerging Market Bond Index (EMBI) Global database constructed by J.P. Morgan. The EMBI Global tracks the US dollar-denominated debt instruments issued by emerging market sovereign and quasi-sovereign entities, and the spreads are defined as weighted averages of bond yield spreads over US government debt securities. As the EMBI Global was introduced in January 1998, we examine monthly data from 1998:M1 to 2019:M4 for 15 emerging market countries, namely: Argentina, Brazil, China, Colombia, Ecuador, Malaysia, Mexico, Nigeria, Panama, Peru, the Philippines, Poland, Russia, South Africa, and Turkey. The sample countries were selected to obtain the longest sample period. Data for global crude oil production (barrels per day) are obtained from the Monthly Energy Review published by the Energy Information Administration of the US Department of Energy. The real price of oil is the world average crude oil price deflated by the US consumer price index (CPI); the world average crude oil price is obtained from the World Bank Commodity Price Data (The Pink Sheet) and the US CPI is from the Federal Reserve Economic Data (FRED) constructed by the Federal Reserve Bank of St. Louis. To measure the global economic activity (rea_t), we use the index of global real economic activity in industrial commodity markets proposed in Kilian (2009), which is known as the Kilian index.

Fig. 2 displays plots of the EMBI sovereign bond spreads series for each country, and Fig. 3 shows the data series of global crude oil production, the Kilian index, and the real oil price.

4. Empirical Results

4.1. Impulse Responses

Figs. 4–6 show the impulse responses of the emerging market sovereign spreads to oil supply shocks, global aggregate demand shocks, and oil-specific demand shocks, respectively. The optimal number of lags for the VAR model is chosen using the Akaike information criterion (AIC), and the 95% confidence bands are constructed using the bootstrap method with 2,000 replications. All three shocks have been normalized to represent one standard deviation shock causing a rise in the real price of oil. That is, the supply shocks are negative, whereas the demand shocks are positive.

As Fig. 4 shows, a negative oil supply shock, which raises the oil price, causes the bond spread to drop in most countries. For oil producers, oil price increases would reduce the bond spread as a result of a balance of payment improvement. Conversely, an increase in the price of oil may hurt oil importers because the cost of production and inflation rates rise. However, this effect may be offset by the fact that oil importers depend heavily on what happens to oil exporters; thus, they may benefit from a boom in exports resulting from income growth in their oil-exporting neighbors (see Arezki and Blanchard, 2014). However, in all countries, the unanticipated cutoffs of global crude oil production do not have statistically significant effects on emerging market sovereign spreads.

Fig. 5 provides a slightly different picture regarding the responses of spreads to an unanticipated increase in global real economic activity. Although for most countries there is no significant impact from global aggregate demand shocks, there are some exceptions, including Brazil, China, Mexico, and Peru. The responses to a positive global aggregate demand shock are negative, which is in line with expectation: stronger global aggregate demand will improve the balance of payments of the emerging market economies and lead to spread tightening in the emerging market sovereign bond markets.

In contrast, Fig. 6 shows that an oil-market-specific shock driven by speculative demand causes a statistically significant decline in emerging market sovereign spreads on impact for all countries except Nigeria. The responses are very persistent (lasting more than six months) for 11 out of 15 countries, including Argentina, Brazil, Colombia, Ecuador, Malaysia, Mexico, Panama, Peru, the Philippines, Russia, and Turkey.

The finding that speculative demand in the crude oil market has a significant impact on emerging market sovereign spreads can be explained as follows. A positive speculative demand shock that drives up oil prices may represent an improvement in sentiment concerning the emerging financial market and increase investor risk appetite. It is evident that the estimated oil-specific demand (speculative) shocks ($\hat{e}^{od}$) are correlated with the emerging market equity returns measured by the Morgan Stanley Capital International (MSCI) emerging markets index, as indicated by a correlation coefficient equal to 0.34. [4] Therefore, as the estimated shocks are able to capture speculative activity, such activity may cause search-for-yield activity in emerging market bond markets and reduce emerging market sovereign spreads because the sovereign bonds of these markets are considered to be a highly risky asset class.

It is worth noting that our results are consistent with the finding in Kilian and Park (2009) that oil supply shocks do not significantly affect financial variables such as US stock returns because an unanticipated oil production disruption causes a

[4] The emerging markets index constructed by MSCI covers more than 800 securities across large and mid-cap-sized segments and across style and sector segments in 26 emerging markets.

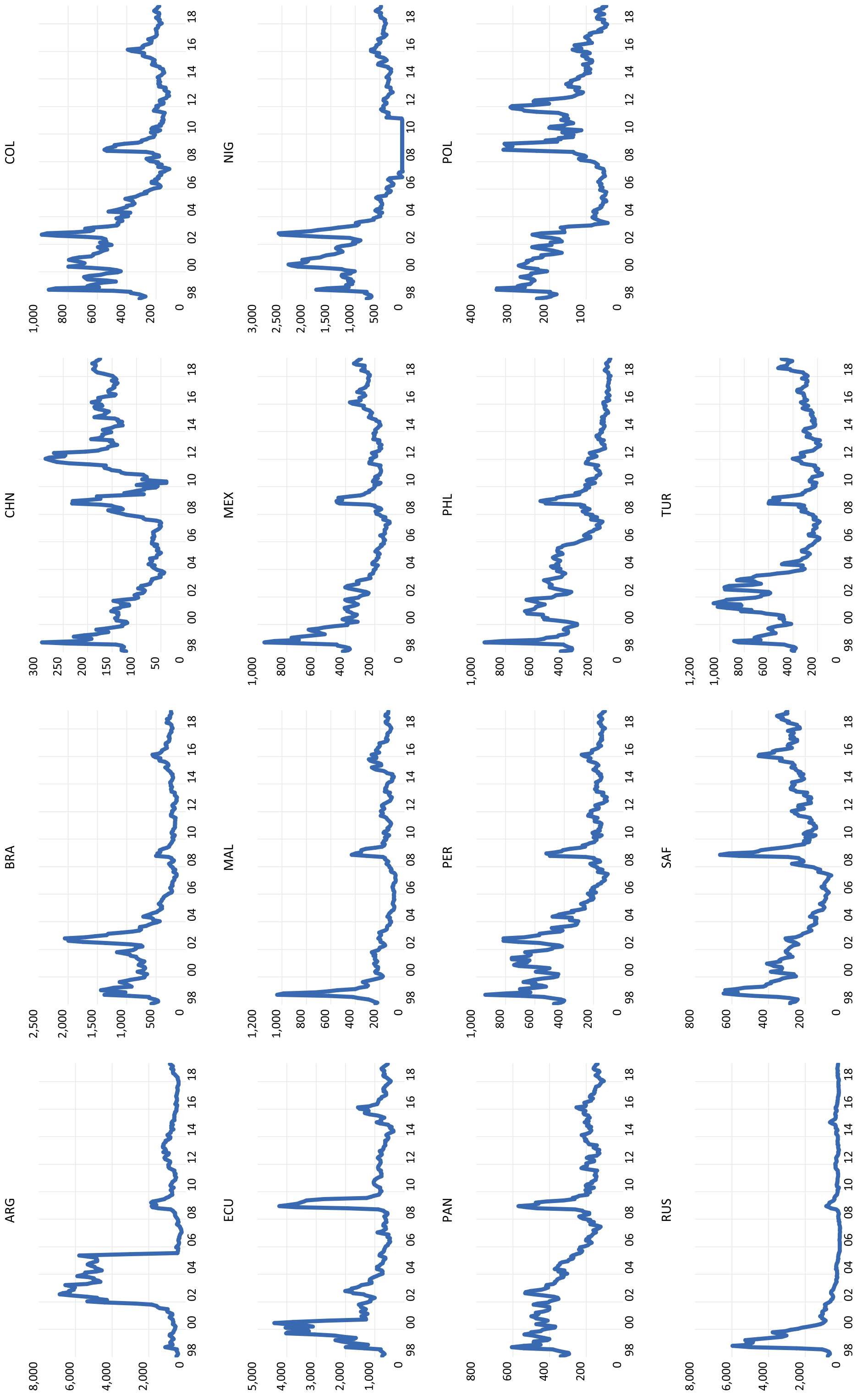

Fig. 2. EMBI Global Sovereign Bond Spreads (basis points).

small and transitory increase in real oil prices (see Kilian, 2009). Moreover, it is found that an unexpected increase in the global demand causes a sustained increase in U.S. stock returns in Kilian and Park (2009), while such an impact reduces sovereign bond spreads of some emerging economies such as Brazil, China, Mexico, and Peru. Finally, as Kilian and Park

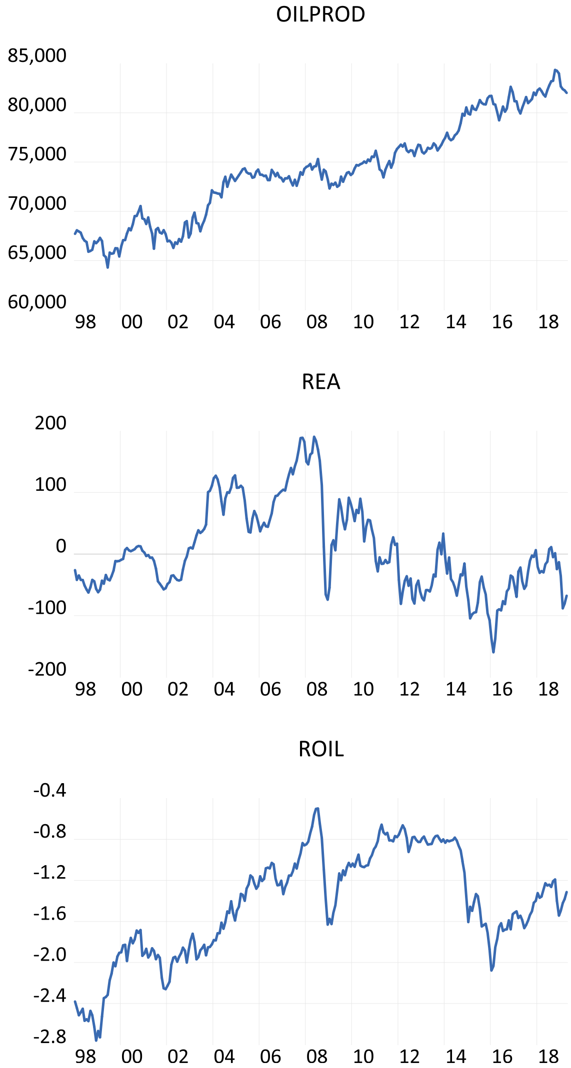

Fig. 3. World Crude Oil Production, Kilian Index, and Real Oil Prices.

(2009) show that a positive oil-specific shock causes US stock returns to decline, the emerging market sovereign bond spreads are found to be narrower in response to such a shock.

4.2. Variance Decompositions

In Table 1, we use the forecast-error variance decompositions to show the percentage contributions of different shocks to the overall variability of emerging market sovereign bond spreads. We report the decomposition for different forecasting horizons $h = 1, 6, 12$, and ∞, where ∞ is approximated by a forecasting horizon of $h = 1,000$, which is the number at which no further increments to the horizon can change the results, when measured at the desired degree of accuracy.

As the table indicates, in the short run, the variations in the sovereign bond spread can be largely explained by its own shock. However, the explanatory power of different oil price shocks increases as the horizon is lengthened. In the long run ($h = \infty$), some countries have high percentages for the variation of the emerging market sovereign bond spread that can be accounted for by oil supply shocks, global aggregate demand shocks, and oil-specific demand shocks. For example, the percentages are 63.58% for Brazil, 60.64% for Columbia, and 48.26% for Mexico.

It is clear that oil-specific demand (speculative demand) in the crude oil market has substantial explanatory power compared with oil supply and global aggregate demand shocks. In the long run, oil-specific demand shocks are able to explain about 55.23% of the variation for Brazil, 56.38% for Colombia, 34.84% for Ecuador, 31.47% for Mexico, 42.69% for Panama, and 38.69% for Peru. In 11 of the 15 countries, oil-specific demand shocks dominate other shocks in the crude oil market.

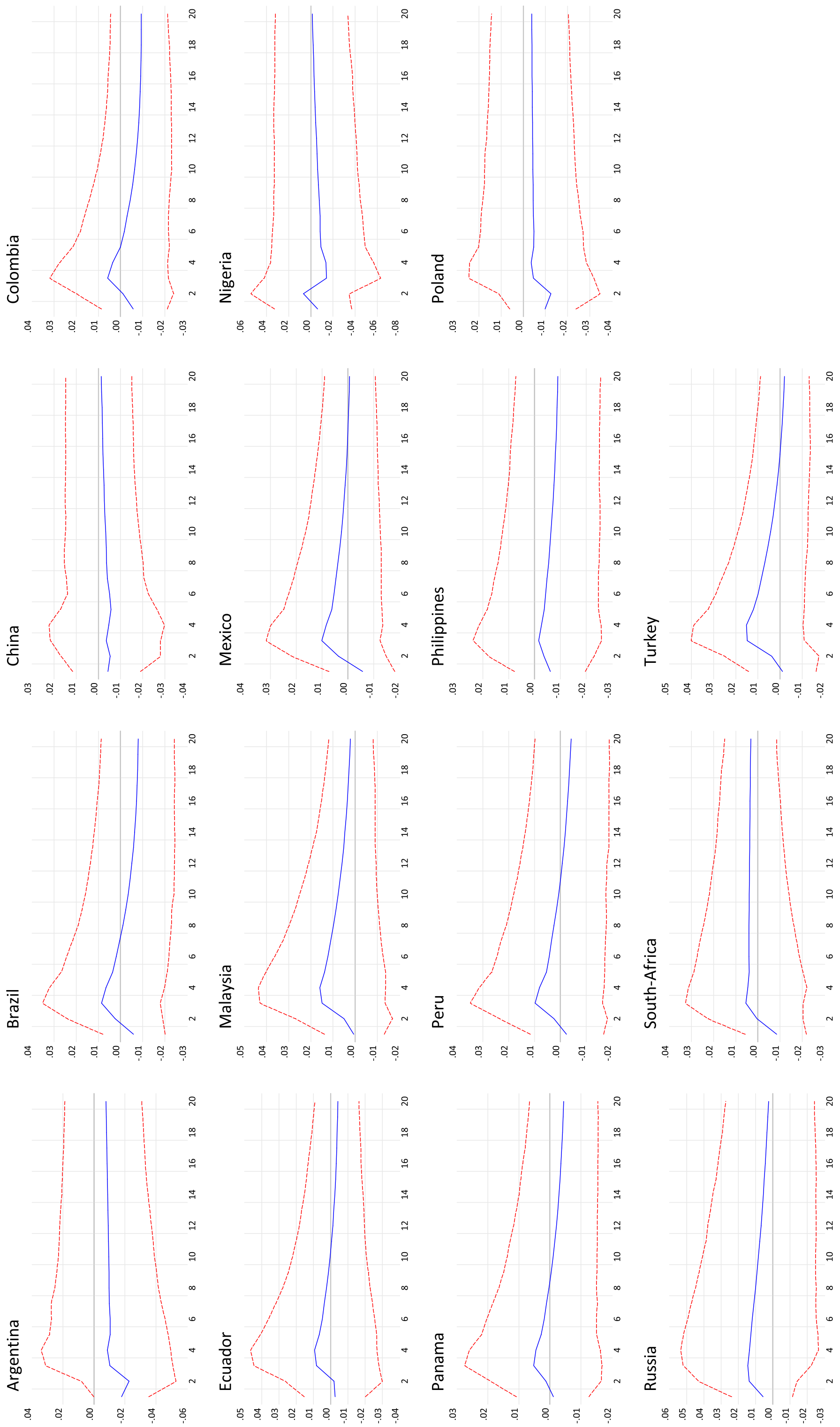

Fig. 4. Impulse Responses of Emerging Market Bond Spreads: Negative Oil Supply Shock.

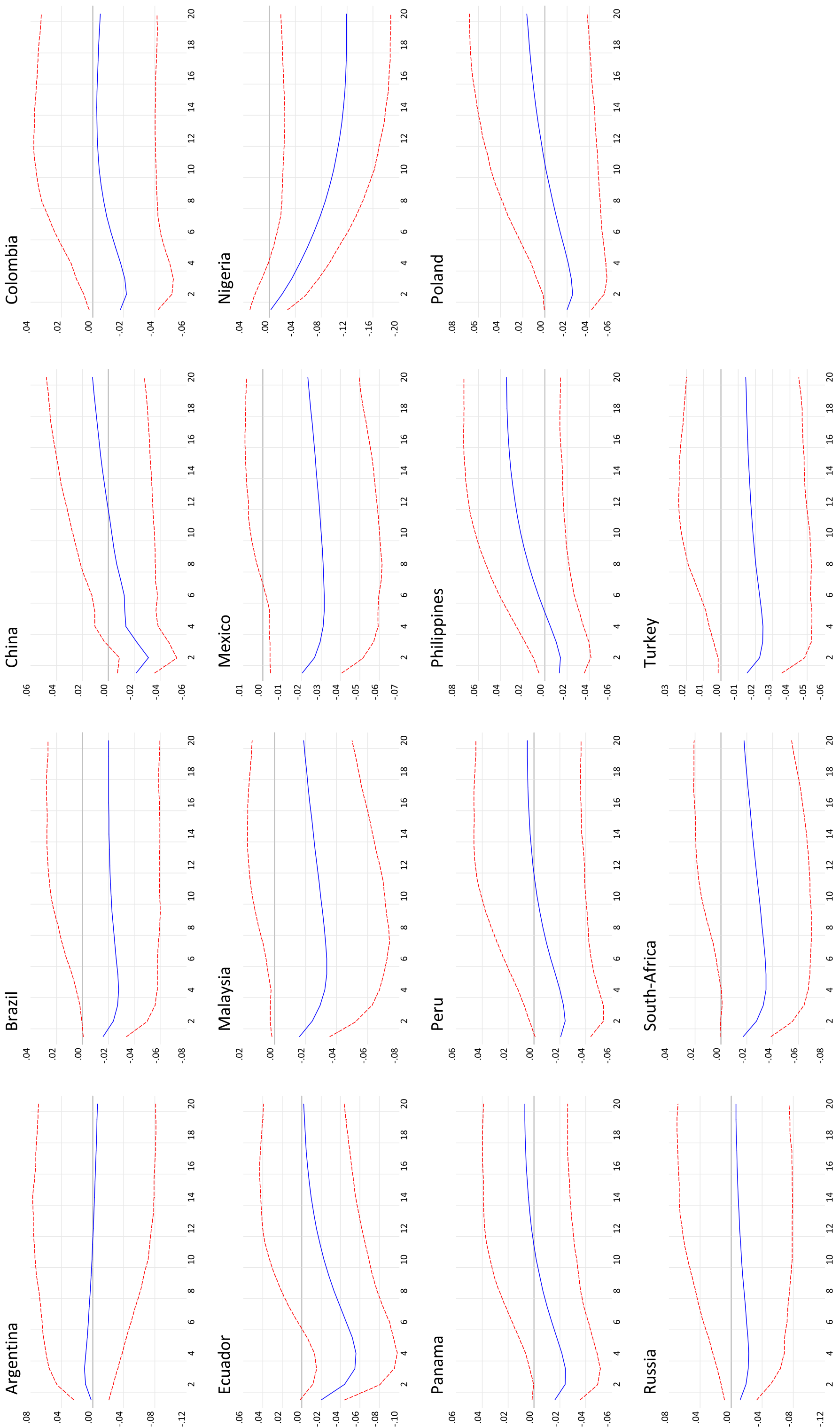

Fig. 5. Impulse Responses of Emerging Market Bond Spreads: Positive Global Aggregate Demand Shock.

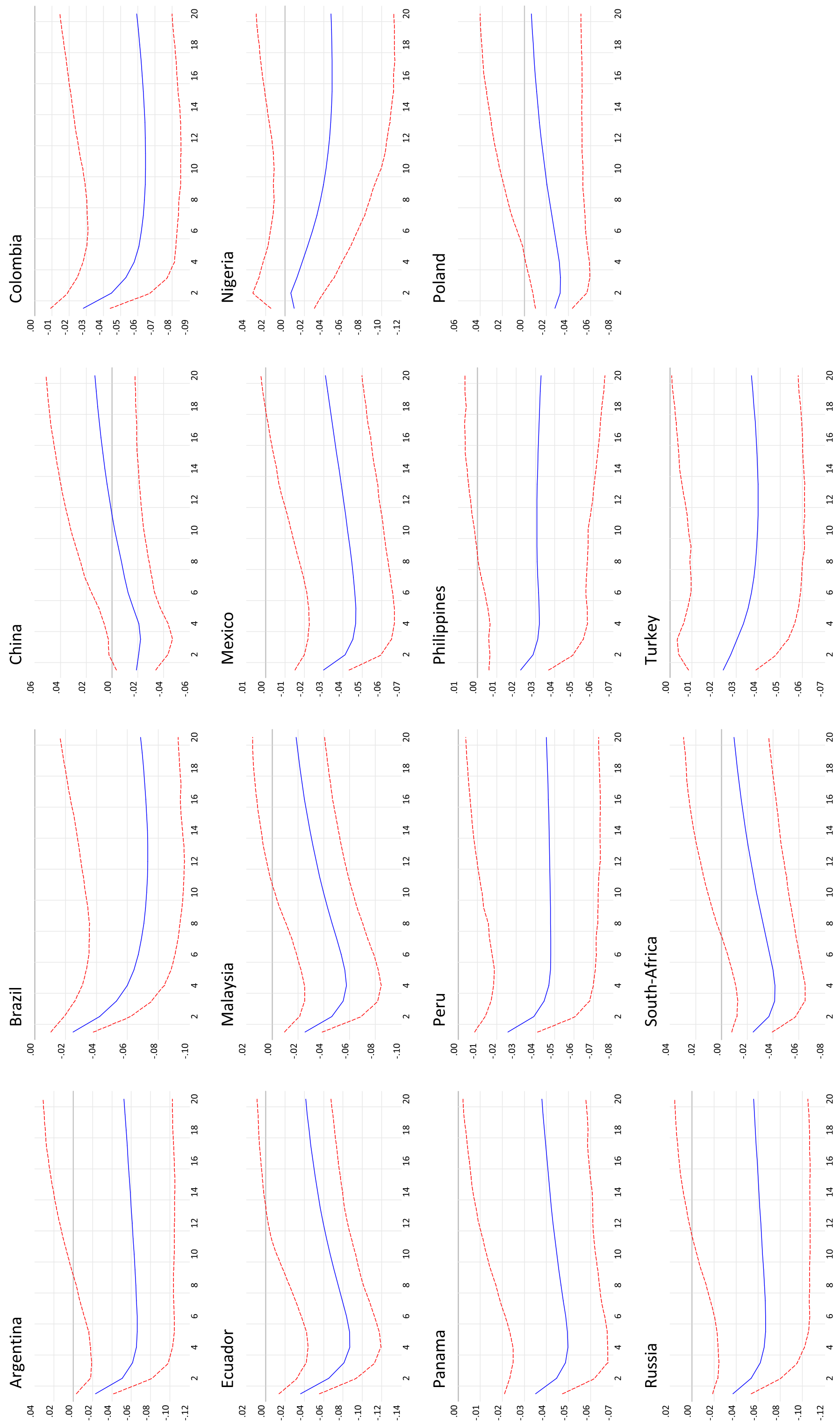

Fig. 6. Impulse Responses of Emerging Market Bond Spreads: Positive Oil-Specific Demand Shock.

Table 1
Percent Contributions of Different Shocks to the Overall Variability of Emerging Market Sovereign Bond Spreads.

	Argentina				Malaysia				Philippines			
	e_t^{os}	e_t^{gd}	e_t^{od}	e_t^{sp}	e_t^{os}	e_t^{gd}	e_t^{od}	e_t^{sp}	e_t^{os}	e_t^{gd}	e_t^{od}	e_t^{sp}
$h=1$	1.14	0.02	1.87	96.97	0.00	2.33	5.80	91.87	0.33	1.45	4.34	93.87
6	0.48	0.14	7.74	91.65	0.79	4.70	14.23	80.28	0.12	0.67	6.78	92.43
12	0.40	0.09	9.83	89.68	0.83	6.84	16.80	75.53	0.24	2.21	8.09	89.46
∞	0.44	0.56	15.81	83.19	0.79	9.88	18.57	70.76	1.33	9.95	24.92	63.79
	Brazil				Mexico				Poland			
	e_t^{os}	e_t^{gd}	e_t^{od}	e_t^{sp}	e_t^{os}	e_t^{gd}	e_t^{od}	e_t^{sp}	e_t^{os}	e_t^{gd}	e_t^{od}	e_t^{sp}
$h=1$	0.31	2.35	5.53	91.81	0.37	4.54	9.75	85.35	0.54	2.25	4.23	92.98
6	0.18	4.07	18.60	77.14	0.45	7.80	17.49	74.27	0.29	2.18	4.76	92.77
12	0.15	4.45	30.90	64.50	0.35	10.78	22.89	65.98	0.22	1.34	3.93	94.51
∞	0.67	7.68	55.23	36.42	0.28	16.51	31.47	51.74	0.22	5.02	1.95	92.81
	China				Nigeria				Russia			
	e_t^{os}	e_t^{gd}	e_t^{od}	e_t^{sp}	e_t^{os}	e_t^{gd}	e_t^{od}	e_t^{sp}	e_t^{os}	e_t^{gd}	e_t^{od}	e_t^{sp}
$h=1$	0.12	3.18	2.47	94.22	0.07	0.01	0.16	99.76	0.20	0.90	8.99	89.91
6	0.21	3.56	3.18	93.06	0.22	4.34	0.70	94.73	0.47	1.22	10.99	87.32
12	0.19	2.38	2.16	95.26	0.18	13.59	2.40	83.82	0.38	1.01	12.84	85.76
∞	0.11	10.10	6.82	82.98	0.11	40.12	5.23	54.53	0.25	0.98	22.07	76.71
	Colombia				Panama				South Africa			
	e_t^{os}	e_t^{gd}	e_t^{od}	e_t^{sp}	e_t^{os}	e_t^{gd}	e_t^{od}	e_t^{sp}	e_t^{os}	e_t^{gd}	e_t^{od}	e_t^{sp}
$h=1$	0.23	2.24	5.60	91.92	0.01	2.86	13.29	83.84	0.63	2.60	5.28	91.48
6	0.10	2.18	19.06	78.67	0.10	3.83	20.39	75.69	0.17	6.15	9.02	84.67
12	0.22	1.59	31.32	66.87	0.07	2.61	25.30	72.02	0.17	7.60	9.13	83.10
∞	1.03	3.23	56.38	39.36	0.56	2.33	42.69	54.42	0.27	8.94	8.30	82.50
	Ecuador				Peru				Turkey			
	e_t^{os}	e_t^{gd}	e_t^{od}	e_t^{sp}	e_t^{os}	e_t^{gd}	e_t^{od}	e_t^{sp}	e_t^{os}	e_t^{gd}	e_t^{od}	e_t^{sp}
$h=1$	0.04	2.33	7.50	90.13	0.04	3.25	4.99	91.72	0.01	2.03	5.07	92.89
6	0.14	8.07	20.68	71.11	0.25	2.76	12.66	84.33	0.88	3.71	7.46	87.94
12	0.10	7.37	25.92	66.61	0.17	1.84	17.64	80.35	0.76	4.40	12.93	81.92
∞	0.28	6.27	34.84	58.61	0.52	1.67	38.69	59.12	0.67	7.02	29.37	62.94

Note: The table shows the percent contributions of supply shocks (e_t^{os}), global aggregate demand shocks (e_t^{gd}), oil-specific demand shocks (e_t^{od}) and spread shocks (e_t^{sp}) to the overall variability of emerging market sovereign bond spreads based on variance decomposition of the structural VAR model in Eq. (1).

5. Panel Regression Analysis

Although structural VAR analysis proposed by Kilian and Park (2009) provides a useful insight into the dynamic responses of emerging market sovereign spreads to all three oil supply and oil demand shocks on impact, an apparent weakness is that many other important determinants of emerging market spreads are omitted from the model. However, adding more variables may cause model over-fitting and identification difficulty, which undermines the credibility of the VAR analysis. Hence, to further provide more concrete and robust evidence regarding the effects of different oil price shocks on the emerging market sovereign bond spreads, we pool the data to conduct a panel data analysis incorporating more covariates as additional control variables in the empirical model.

We include several country-specific covariates based on the literature on the determinants of sovereign risk. First, we consider total foreign reserves, which are traditionally used to assess the capacity of a country to serve its external debt (see e.g., Arora and Cerisola, 2001; Hilscher and Nosbusch, 2010; Baldacci et al., 2008; Longstaff et al., 2011; Kennedy and Palerm, 2014; Capelle-Blancard et al., 2019). Second, inflation influences economic activity and is viewed as an indicator of macroeconomic stability (see e.g., Baldacci et al., 2008; Maltritz, 2012; Capelle-Blancard et al., 2019). An additional candidate is the exchange rate (see e.g., Amstad et al., 2016; Longstaff et al., 2011; Hofmann et al., 2020). Finally, the sovereign credit rating reflects a country's probability of default (see e.g., González-Rozada and Yeyati, 2008; Capelle-Blancard et al., 2019).

We re-estimate a three-variable SVAR model of crude oil market proposed by Kilian (2009). After obtaining the structural shocks, we consider the following panel regression model:

$$\Delta spread_{i,t} = \alpha_i + \beta_1 \hat{e}_t^{os} + \beta_2 \hat{e}_t^{gd} + \beta_3 \hat{e}_t^{od} + \gamma' \boldsymbol{X}_{i,t} + \theta' \boldsymbol{Y}_t + u_{i,t}, \quad (4)$$

where $\hat{e}_t^{os}, \hat{e}_t^{gd}$, and $\hat{e}_t^{od}$ refer to the estimated structural shocks on oil supply, global demand, and oil-market-specific demand, respectively. The vector $\boldsymbol{X}_{i,t}$ consists of country-specific controls, including changes in total foreign reserves (ΔFR_{it}), CPI inflation rates (INF_{it}), exchange rate changes (ΔS_{it}), and changes in sovereign bond ratings ($\Delta RATING_{it}$). A decrease in foreign reserves ($\Delta FR_{it} < 0$, which suggests a low ability to repay the foreign debt), an exchange rate depreciation ($\Delta S_{it} > 0$, which raises the debt burden in terms of the domestic currency), and a high inflation rate (which is generally associated with political and fiscal instability), are expected to lead to a higher default risk and a larger sovereign bond spread. The sovereign

Table 2
Baseline Results

	(1)	(2)	(3)	(4)	(5)
e_t^{os}	0.498	0.550	0.465	0.688	
	(0.622)	(0.518)	(0.555)	(0.561)	
e_t^{gd}	−1.646*	−1.503*	−1.420*	−1.308**	
	(0.909)	(0.837)	(0.740)	(0.595)	
e_t^{od}	−2.619***	−2.366***	−1.978***	−2.073***	
	(0.780)	(0.675)	(0.589)	(0.537)	
ΔFR_{it}		−0.134***	−0.118***	−0.130***	−0.126***
		(0.0389)	(0.0357)	(0.0366)	(0.0367)
ΔS_{it}		0.751***	0.714***	0.730***	0.713***
		(0.104)	(0.0907)	(0.0888)	(0.0873)
INF_{it}		0.00246	−0.107	−0.0930	0.0643
		(0.346)	(0.334)	(0.336)	(0.321)
$\Delta RATING_{it}$		−4.090**	−3.992**	−4.165**	−4.005**
		(1.882)	(1.875)	(1.932)	(1.950)
ΔFF_t			1.698	0.735	1.448
			(2.803)	(1.799)	(1.756)
VIX_t			0.293**		
			(0.126)		
TED_t				5.622***	5.741***
				(1.972)	(1.992)
Δop_t					−0.301***
					(0.0650)
$\overline{R}^2$	0.0525	0.125	0.151	0.150	0.150
Observations	3795	3592	3592	3592	3592
Country	15	15	15	15	15

Note: The panel regression model is $\Delta spread_{i,t} = \alpha_i + \beta_1 \hat{e}_t^{os} + \beta_2 \hat{e}_t^{gd} + \beta_3 \hat{e}_t^{od} + \gamma' \mathbf{X}_{i,t} + \theta' \mathbf{Y}_t + u_{i,t}$, where $\Delta spread$ is the percentage change in the emerging market sovereign bond spreads. The terms e_t^{os}, e_t^{gd}, and $e_t^{od}$are structural shocks to oil supply, global aggregate demand, and oil-specific demand, respectively. The vector $\mathbf{X}_{it}$ contains country-specific control variables including changes in official foreign reserves (ΔFR_{it}), exchange rate depreciation rates (ΔS_{it}), inflation rates (INF_{it}), and changes in bond rating ($\Delta RATING_{it}$). The vector $\mathbf{Y}_t$ contains global control variables such as changes in the US federal funds rates (ΔFF_t), CBOE VIX index (VIX_t), and TED spreads (TED_t). Δop_t is the changes in real price of crude oil. Asterisks ***, ** and * indicate the bootstrap p-value is less than 1%, 5% and 10%, respectively.

bond rating is the numerical values based on the Fitch sovereign credit rating, with $RATING_{it} = 21$ (AAA, prime), $RATING_{it} = 20$ (AA+),. . ., and $RATING_{it} = 1$ (DDD/DD/D or RD/D, in default).[5] It is clear that $\Delta RATING_{it} > 0$ indicates an increase in the bond rating, which causes a decrease in the bond spreads.

The vector $\mathbf{Y}_t$ contains global variables, including changes in the federal funds rates (ΔFF_t), the Chicago Board Options Exchange's volatility index (CBOE VIX) (VIX_t), and the TED spread (TED_t), which is the difference between the interest rates on interbank loans and on the 3-month US Treasury rate. The higher the global financial market risk is, measured by VIX_t and TED_t, the larger is the emerging market bond spread. The term ΔFF_t denotes the federal funds rate minus its k-month moving average:

$$\Delta FF_t = FF_t - \frac{FF_{t-1} + FF_{t-2} + \cdots + FF_{t-k}}{k},$$

which aims to determine if current monetary policy is tight or loose relative to the previous average. It is worth noting that ΔFF_t represents the conventional measure of monetary policy when $k = 1$. In our benchmark case, k is set to equal three, but different values of k will not substantially affect our results.

We expect the coefficient on ΔFF_t to be positive because a loose US monetary policy ($\Delta FF_t < 0$) will cause search-for-yield activity, and thus lower the spreads in emerging market bond markets. Data for total reserves (excluding gold), the CPI, and nominal exchange rates are available from the International Monetary Fund's International Financial Statistics (IFS).[6] The federal funds rates, the CBOE VIX, and TED spreads are obtained from the FRED database.

Table 2 reports our baseline results from Eq. (4) with fixed effects using the least squares dummy variables method. The standard errors are calculated using the Driscoll and Kraay (1998) estimator, which is robust to panel heteroscedasticity, cross-sectional dependence, and serial correlation.

Column (1) shows that without other controls, a positive oil supply shock, which reduces oil prices, will raise the sovereign bond spread. However, it is statistically insignificant, which is consistent with the results of impulse response analysis. Moreover, a positive global demand shock has a negative impact on the spreads. This is because in general, emerging market economies would receive a tremendous boost in growth from rising global demand for commodities and final goods. Hence, the sovereign bond spread would be lower. The estimate is statistically significant, but somewhat weak.

[5] Note that the Fitch default rating categories were DDD/DD/D until 2005 and were RD/D thereafter.
[6] As the CPI for Argentina is not available in the IFS, we obtain Argentina's CPI inflation series from the Banco Central de la República Argentina.

Table 3
Robustness Check: Alternative Measures of Global Economic Activity.

	Hamilton Index		World IP	
	(1)	(2)	(3)	(4)
e_t^{os}	0.257	0.560	0.344	0.559
	(0.568)	(0.570)	(0.544)	(0.553)
e_t^{gd}	−0.547	−0.618	−0.431	−0.299
	(0.659)	(0.511)	(0.552)	(0.535)
e_t^{od}	−2.107***	−2.210***	−2.330***	−2.438***
	(0.637)	(0.561)	(0.670)	(0.585)
ΔFR_{it}	−0.117***	−0.128***	−0.118***	−0.130***
	(0.0360)	(0.0369)	(0.0360)	(0.0368)
ΔS_{it}	0.716***	0.729***	0.716***	0.731***
	(0.0937)	(0.0888)	(0.0930)	(0.0884)
INF_{it}	−0.0816	−0.0710	−0.0791	−0.0697
	(0.335)	(0.336)	(0.334)	(0.334)
$\Delta RATING_{it}$	−3.909**	−4.109**	−3.874**	−4.073**
	(1.868)	(1.926)	(1.903)	(1.955)
ΔFF_t	1.675	0.851	1.720	0.749
	(2.880)	(1.815)	(2.728)	(1.784)
VIX_t	0.295**		0.306**	
	(0.138)		(0.126)	
TED_t		5.911***		6.089***
		(2.137)		(2.188)
$\overline{R}^2$	0.143	0.145	0.149	0.150
Observations	3592	3592	3592	3592
Country	15	15	15	15

Note: The three different structural shocks to oil prices are obtained using alternative measures of global real economic activity in the SVAR model of crude oil market. The alternative measures are the Hamilton Index and percentage changes in world industrial production (World IP), respectively. For panel data empirical model specifications, see notes to Table 2. Asterisks ***, ** and * indicate the bootstrap p-value is less than 1%, 5% and 10%, respectively.

Finally, the emerging market sovereign bond spreads shrink in response to a positive oil-specific demand shock, and the coefficient estimate is statistically significant at high levels of confidence. Consistent with the impulse response functions, a positive oil-specific demand shock captures active speculation, which may cause search-for-yield activity in emerging market bond markets, thus lowering the emerging market sovereign spreads.

Columns (2) to (4) consider country-specific and global covariates as controls. After controlling for other determinants of the emerging market sovereign bond spreads, it is clear that, as was the case for different oil market shocks, the global aggregate demand and oil-specific demand shocks have significant effects, whereas the oil supply shock continues to have no significant role in spread determination. The results are robust to adding a host of control variables.

It is worth noting that all the statistically significant coefficient estimates of the covariates have the expected signs. When official foreign reserves increase, the spread declines as the country becomes more capable of repaying its foreign debt. A depreciation of a domestic currency leads to a rise in bond spreads, while an improvement in bond ratings will have a significant impact on reducing the bond spread. Finally, the global financial market risk measured by either the VIX or TED spread will widen the emerging market spreads.

In column (5), we replace the structural shocks in the crude oil market with the real oil price change (Δop_t), and find that changes in the real oil price have a significant negative impact on the spreads. Clearly, such a negative effect is mainly caused by positive shocks to global aggregate demand and oil-specific demand, as is evident in columns (1) to (4).

6. Robustness

6.1. Alternative Measure of Global Economic Activity

In our SVAR model, global real economic activity is measured by the Kilian index proposed by Kilian (2009) and Kilian (2019), which is constructed using the linear detrended cost of bulk dry cargo shipping. Alternatively, Hamilton (2021) proposes using a two-year difference in real shipping costs to construct the cyclical component as an alternative measure of global economic activity, which we refer to as the Hamilton index. Moreover, we use the percentage changes in world industrial production, which are proxied by industrial production for the OECD plus six other major countries (Brazil, China, India, Indonesia, the Russian Federation, and South Africa).[7]

We report the empirical results using alternative measures of global real economic activity in Table 3. The results using the Hamilton index are shown in columns (1) and (2), whereas those using world industrial production growth are in

[7] Both the Hamilton index and industrial production for the OECD plus six other major countries are available at James Hamilton's webpage: https://econweb.ucsd.edu/jhamilton/.

Table 4
Robustness Check: Alternative Measures of US Monetary Policy.

	FF6		FF1		Wu-Xia	
	(1)	(2)	(3)	(4)	(5)	(6)
e_t^{os}	0.442	0.690	0.534	0.723	0.517	0.713
	(0.540)	(0.555)	(0.571)	(0.567)	(0.524)	(0.549)
e_t^{gd}	−1.371*	−1.283**	−1.396**	−1.288**	−1.412*	−1.310**
	(0.732)	(0.587)	(0.682)	(0.576)	(0.729)	(0.594)
e_t^{od}	−1.931***	−2.046***	−1.930***	−2.016***	−1.948***	−2.049***
	(0.603)	(0.545)	(0.570)	(0.531)	(0.593)	(0.542)
ΔFR_{it}	−0.117***	−0.130***	−0.119***	−0.130***	−0.119***	−0.131***
	(0.0360)	(0.0369)	(0.0357)	(0.0365)	(0.0350)	(0.0365)
ΔS_{it}	0.715***	0.733***	0.716***	0.729***	0.716***	0.735***
	(0.0904)	(0.0891)	(0.0900)	(0.0885)	(0.0892)	(0.0907)
INF_{it}	−0.0952	−0.0889	−0.125	−0.109	−0.123	−0.116
	(0.333)	(0.338)	(0.338)	(0.338)	(0.333)	(0.333)
$\Delta RATING_{it}$	−3.997**	−4.143**	−3.918**	−4.095**	−3.928**	−4.066**
	(1.861)	(1.918)	(1.869)	(1.924)	(1.844)	(1.883)
ΔFF_t	1.881	0.764	−1.099	−1.750		
	(1.622)	(1.099)	(5.385)	(3.493)		
VIX_t	0.319***		0.254**		0.263**	
	(0.121)		(0.119)		(0.106)	
TED_t		5.712***		5.124***		5.249***
		(1.985)		(1.820)		(1.937)
$\Delta Shadow_t$					−0.131	−1.159
					(3.289)	(2.914)
$\overline{R}^2$	0.151	0.149	0.150	0.150	0.150	0.150
Observations	3565	3565	3592	3592	3592	3592
Country	15	15	15	15	15	15

Note: For panel data empirical model specifications, see notes to Table 2. FF6 represents that ΔFF_t is the difference between the federal funds rate (FF_t) and its 6-month moving average, while $\Delta FF_t = FF_t - FF_{t-1}$ for FF1. $\Delta Shadow_t$ is the change in Wu-Xia shadow federal funds rates. Asterisks ***, ** and * indicate the bootstrap p-value is less than 1%, 5% and 10%, respectively.

columns (3) and (4). Table 3 shows that our main finding—that oil-specific demand shocks dominate the emerging market sovereign bond spread— remains unchanged when we adopt alternative measures of global real economic activity.

6.2. Alternative Measures of US Monetary Policy

To measure US monetary policy, we use the federal funds rate (FF_t) minus its k-month moving average: $(FF_{t-1} + FF_{t-2} + \cdots + FF_{t-k})/k$. In the baseline case, we assumed that $k = 3$. We now consider $k = 6$ and $k = 1$ as robustness checks, and report the results in columns (1) to (4) of Table 4. Moreover, it is possible that during the zero lower bound period, the federal funds rate is not able to capture the features of monetary policy because it is almost constant at slightly above zero. To address this concern, we consider the Wu–Xia shadow rate proposed by Wu and Xia (2016). We replace ΔFF_t with the changes in the shadow rate: $\Delta Shadow_t = Shadow_t - Shadow_{t-1}$, and show the results in columns (5) and (6) of Table 4. Clearly, the empirical results remain unchanged when considering alternative measures of US monetary policy.

6.3. Alternative Credit Ratings

In our baseline results, the numerical values of the sovereign bond rating are based on the Fitch sovereign credit rating. To check if the empirical results are robust to ratings by different credit rating agencies (CRAs), we consider the sovereign rating by S&P Global Ratings (S&P). We follow Gaillard (2012) to transform the Fitch and S&P rating scales into a unified 21-point numerical scale (see Table 5).

Moreover, although the credit ratings by CRAs are widely utilized by the capital markets, the five-year credit default swap (CDS) spread is also used as a market-based rating. Thus, we consider changes in the 5-year sovereign CDS spread as a robustness check.[8]

Empirical results using the S&P rating and the CDS spread are reported in Table 6. It is worth noting that a higher value of the CDS spread corresponds to a lower credit rating because a higher fee is charged to protect against default. It is evident that our main findings remain intact even when considering alternative credit ratings.

[8] Due to data availability limitations for the 5-year sovereign CDS spread, Ecuador and Nigeria are excluded from the sample. The start dates are October 2000 (Russia, South Africa, and Turkey), November 2001 (Brazil, Malaysia, and Mexico), April 2002 (the Philippines), January 2003 (China and Colombia), October 2003 (Peru), November 2003 (Panama), June 2005 (Argentina), and July 2012 (Poland).

Table 5
Numerical Transformation of Ratings.

S&P	Fitch	Numerical scale
AAA	AAA	21
AA+	AA+	20
AA	AA	19
AA−	AA−	18
A+	A+	17
A	A	16
A−	A−	15
BBB+	BBB+	14
BBB	BBB	13
BBB−	BBB−	12
BB+	BB+	11
BB	BB	10
BB−	BB−	9
B+	B+	8
B	B	7
B−	B−	6
CCC+	CCC+	5
CCC	CCC	4
CCC−	CCC−	3
CC	CC/C	2
SD/D	DDD/DD/D or RD/D	1

Note: Fitch default rating categories were DDD/DD/D until 2005 and were RD/D thereafter.

Table 6
Robustness Check: Alternative Credit Ratings.

	S&P		CDS	
	(1)	(2)	(3)	(4)
e_t^{os}	0.405	0.632	0.285	0.416
	(0.564)	(0.569)	(0.268)	(0.299)
e_t^{gd}	−1.381*	−1.270**	−0.762*	−0.711*
	(0.734)	(0.590)	(0.459)	(0.420)
e_t^{od}	−1.973***	−2.079***	−1.151***	−1.141***
	(0.593)	(0.542)	(0.333)	(0.339)
ΔFR_{it}	−0.115***	−0.127***	−0.0336	−0.0402
	(0.0345)	(0.0350)	(0.0383)	(0.0400)
ΔS_{it}	0.705***	0.720***	0.244**	0.254***
	(0.0925)	(0.0903)	(0.0950)	(0.0947)
INF_{it}	−0.358	−0.330	−0.211	−0.131
	(0.410)	(0.392)	(0.362)	(0.364)
ΔFF_t	2.010	0.871	0.662	1.535*
	(2.854)	(1.785)	(1.347)	(0.915)
VIX_t	0.301**		0.0915	
	(0.127)		(0.0680)	
TED_t		5.604***		2.900***
		(1.965)		(0.903)
ΔSP_{it}	−4.418***	−4.581***		
	(1.289)	(1.308)		
ΔCDS_{it}			0.514***	0.506***
			(0.0639)	(0.0639)
$\overline{R}^2$	0.144	0.142	0.536	0.539
Observations	3626	3626	2503	2503
Country	15	15	13	13

Note: For panel data empirical model specifications, see notes to Table 2. ΔSP_{it} is the change in sovereign bond ratings based on S&P Global ratings. ΔCDS_{it} denotes the change in the CDS spreads. Asterisks ***, ** and * indicate the bootstrap p-value is less than 1%, 5% and 10%, respectively.

6.4. Alternative Structural Shocks to Oil Prices

A recent study by Baumeister and Hamilton (2019) considers a four-variable SVAR model to describe the global crude oil market. The variables included are percentage changes in world oil production, global real economic activity, real prices of oil, and changes in global inventories. That is, the oil-specific demand shock is further disentangled into oil consumption demand shocks and oil inventory demand shocks. In particular, the shock to inventory demand can be interpreted as a "speculative demand shock" (see Baumeister and Hamilton, 2019).

Table 7
Robustness Check: Alternative Structural Shocks of Oil Prices.

	(1)	(2)	(3)	(4)
Oil supply shock	0.238	0.276	−0.143	0.118
	(0.928)	(0.762)	(0.660)	(0.643)
Economic activity shock	−0.981	−1.006	−0.508	−0.169
	(1.113)	(1.022)	(1.031)	(1.065)
Oil consumption demand shock	−0.622***	−0.564***	−0.597***	−0.577***
	(0.188)	(0.168)	(0.183)	(0.179)
Oil inventory demand shock	−1.279**	−1.126**	−1.151**	−1.088**
	(0.605)	(0.531)	(0.511)	(0.512)
ΔFR_{it}		−0.141***	−0.120***	−0.133***
		(0.0405)	(0.0367)	(0.0375)
ΔS_{it}		0.790***	0.741***	0.761***
		(0.113)	(0.0960)	(0.0891)
INF_{it}		0.00966	−0.0955	−0.0764
		(0.310)	(0.305)	(0.306)
$\Delta RATING_{it}$		−3.944**	−3.838**	−4.029**
		(1.931)	(1.903)	(1.960)
ΔFF_t			2.085	0.859
			(2.714)	(1.743)
VIX_t			0.331***	
			(0.125)	
TED_t				6.210***
				(2.268)
$\overline{R}^2$	0.0320	0.109	0.141	0.140
Observations	3825	3610	3592	3592
Country	15	15	15	15

Note: The foue different structural shocks to oil prices are constructed by Baumeister and Hamilton (2019). For panel data empirical model specifications, see notes to Table 2. Asterisks ***, ** and * indicate the bootstrap p-value is less than 1%, 5% and 10%, respectively.

Table 7 shows the results using the structural shocks identified in Baumeister and Hamilton (2019).[9] Both oil consumption and oil inventory demand shocks are statistically significant determinants of the emerging market sovereign bond spread. However, it is worth noting that in terms of economic significance, the oil inventory demand shock (i.e., a speculative demand shock) has a larger impact on bond spreads than does an oil consumption demand shock. In sum, considering alternative structural shocks to oil prices does not change our main finding that speculative demand shocks play the most important role in determining the emerging market sovereign bond spreads.

6.5. Dynamic Panel Data Model

To check the robustness of our empirical model specifications, we adopt a dynamic panel approach in which the lagged dependent variable is included:

$$\Delta spread_{it} = \alpha + \rho \Delta spread_{it-1} + \beta_1 \hat{e}_t^{os} + \beta_2 \hat{e}_t^{gd} + \beta_3 \hat{e}_t^{od} + \gamma' \boldsymbol{X}_{i,t} + \theta' \boldsymbol{Y}_t + u_{i,t}. \tag{5}$$

It is well known that the exogeneity of the regressors no longer holds when the lagged dependent variable appears as an explanatory variable, which is referred to as Nickell's bias. The literature suggests that when we have long panel data, the bias is relatively small, and the fixed effect estimator can be applied. Nevertheless, we complement our analysis by using the Arellano–Bond generalized method of moments (GMM) estimator. The instruments used for the GMM estimation are lagged values of the dependent variable and the regressors.

We present the results in Table 8, which contains coefficient estimates, the number of instruments, Hansen's test statistics, and associated p-values. We can observe that the Hansen's J statistics for overidentifying restrictions show that the instrument exogeneity is plausible. According to Table 8, we can observe that the findings are consistent with the baseline empirical results, which indicates that the baseline results are robust with the different panel data model specification.

7. Conclusion

In this paper, we examine the impact of crude oil prices on emerging market sovereign bond spreads. There are several reasons why oil prices may play an important role in determining the bond spreads. First, as oil price movements are a major source of instability for the global economy, economic conditions and market sentiment on sovereign risk are likely to shift

[9] The series for the four structural shocks are available at James Hamilton's webpage: https://econweb.ucsd.edu/jhamilton/.

Table 8
Robustness Check: Dynamic Panel Data Model.

	FE		GMM	
	(1)	(2)	(3)	(4)
$\Delta Spread_{t-1}$	0.127***	0.128***	0.107**	0.160***
	(0.0457)	(0.0463)	(0.0492)	(0.0548)
e_t^{os}	0.370	0.562	0.908	1.027
	(0.561)	(0.577)	(0.676)	(0.715)
e_t^{gd}	−1.325*	−1.227**	−1.635***	−1.261**
	(0.688)	(0.563)	(0.439)	(0.522)
e_t^{od}	−1.973***	−2.054***	−1.017***	−0.963**
	(0.577)	(0.535)	(0.362)	(0.414)
ΔFR_{it}	−0.104***	−0.114***	−0.115*	−0.133**
	(0.0340)	(0.0350)	(0.0631)	(0.0618)
ΔS_{it}	0.705***	0.719***	−0.0190	−0.168
	(0.0922)	(0.0904)	(0.140)	(0.150)
INF_{it}	−0.222	−0.211	1.513	1.894
	(0.291)	(0.291)	(1.331)	(1.230)
$\Delta RATING_{it}$	−3.675**	−3.823**	−2.144**	−2.561**
	(1.792)	(1.832)	(0.885)	(1.057)
ΔFF_t	1.996	1.179	13.73***	7.062***
	(2.552)	(1.723)	(1.377)	(1.367)
VIX_t	0.254**		1.442***	
	(0.117)		(0.0751)	
TED		4.876**		11.60***
		(1.979)		(1.174)
Hansen			9.463	10.88
PV			0.221	0.144
# of Instruments			17	17
Observations	3592	3592	3568	3568
Country	15	15	15	15

Note: The dynamic panel regression model is $\Delta spread_{i,t} = \alpha_i + \rho spread_{i,t-1} + \beta_1 \hat{e}_t^{os} + \beta_2 \hat{e}_t^{gd} + \beta_3 \hat{e}_t^{od} + \gamma' \boldsymbol{X}_{i,t} + \theta' \boldsymbol{Y}_t + u_{i,t}$, where $\Delta spread$ is the percentage change in the emerging market sovereign bond spreads. See notes to Table 2 for the list of independent variables. FE and GMM are the fixed-effect and the Arellano-Bond general method of moments (GMM) estimators, respectively. Hensen and *PV* are Hensen's test statistic and associated *p*-value for over-identifying restrictions. Asterisks ***, ** and * indicate rejection of the null at 1%, 5% and 10%, respectively.

with oil price swings. Moreover, most big issuers of sovereign debt in emerging markets are either significant crude oil exporters or large crude oil importers. As emerging market sovereign debt has been an increasingly important asset class for international investors, and emerging market sovereign bond spreads represent the cost of external borrowing for a particular emerging market economy, it is helpful for policy makers and market participants to know whether oil price changes have an important influence on the bond spreads.

Rather than simply focusing on a single oil price shock, we disentangle the oil price shock into oil supply shocks, global aggregate demand shocks, and oil-specific demand shocks. In particular, we are interested in how different structural shocks affect the bond spreads.

Using monthly data for 15 emerging market countries from 1998 to 2019, our empirical results show that not all oil price shocks are alike. First, shocks to oil supply play an insignificant role in determining the bond spreads. In contrast with oil supply shocks, oil-specific demand shocks have both statistically and economically significant impacts on the emerging market sovereign bond spreads. Global aggregate demand shocks are of secondary importance. As oil-specific demand shocks are associated with financial market speculative activity, such activity may cause search-for-yield activity in emerging market bond markets and reduce emerging market sovereign spreads, given that emerging market sovereign bonds are considered to be a highly risky asset class.

Other variables, including inflation and US monetary policy, fail to have a significant impact on the bond spreads. Conversely, changes in international reserves, exchange rates, bond ratings, and financial market volatility, measured by either the CBOE VIX or TED spreads, are found to be additional drivers of the emerging market sovereign bond spreads.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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