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Evidence from Emerging Market and Developing Economies

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Abstract: This paper investigates the effects of real energy price shocks on current account balances of 45 emerging market and developing economies. The investigation is based on country-specific structural vector autoregression models, where alternative specifications and identification schemes are considered for robustness purposes. The empirical results suggest that one percent of a positive real oil price shock results in up to 0.11 (0.08) percentage points of a cumulative improvement (deterioration) in current account balances of oil exporters (importers) after five years, whereas one percent of a positive real natural gas price shock results in up to 0.06 (0.04) percentage points of a cumulative improvement (deterioration) in current account balances of natural gas exporters (importers) after five years. Real coal price shocks result in higher current account balances of oil exporters and natural gas exporters, suggesting substitution of coal with oil and natural gas in such cases. When contributions of alternative real energy prices to the variance of current account balances are compared, real oil price shocks dominate those of real natural gas and real coal prices. The empirical results investigating the effects of oil demand versus oil supply shocks on current account balances suggest that oil demand shocks (rather than oil supply shocks) result in similar reactions of current account balances to real oil price shocks, supporting the view that the effects of oil demand shocks are different from those of oil supply shocks. The results are robust to the consideration of country-specific changes in real GDP and real effective exchange rates.

Keywords: Current account balance; Oil prices; Natural gas prices; Coal prices; Energy prices.
JEL Classification: F32, F41, Q41, Q43

1. Introduction

The gyrations in energy prices seen in recent years—triggered by geopolitical events, such as Russia's invasion of Ukraine, as well as more erratic global weather patterns—have once again brought to the fore the challenges that swings in commodity prices pose for commodity exporting countries, especially emerging market and developing economies (EMDEs). Energy price shocks have important macroeconomic effects, particularly in terms of economic growth, inflation, and fiscal and current account positions. For instance, the surge in oil prices in the 2000s was regarded as a major contributing factor to the worsening of global imbalances during this period (Rebucci and Spatafora, 2006; Blanchard and Milesi-Ferretti, 2010; Arezki and Hasanov, 2013). As current account imbalances are associated with the sustainability of external borrowing and lending through saving-investment decisions, they can result in volatility of exchange rates and thus transfer of wealth, especially when there are productivity gaps, between countries. Yet relatively few empirical studies have systematically examined the empirical link between current account balances and energy prices.[2] Furthermore, although energy price fluctuations are expected to have varying impacts on the external balances of energy-exporting and energy-importing countries, very few studies examine these differential impacts of energy price shocks on a large sample of countries.

This paper attempts to fill this gap in the literature by focusing on the impact of energy price shocks on current account balances for a large sample of EMDEs and analyzing differences in the impacts of such shocks across countries. Specifically, through this paper, we address the following questions: What are the effects of real energy price shocks on current account balances of EMDEs? How do these effects differ across energy-exporting and energy-importing EMDEs? How do these effects differ across energy commodities (oil, natural gas, and coal)? How do these effects differ across countries depending on certain country characteristics? Examining these issues is more important now than ever not least because the challenges posed by energy price fluctuations are likely to be compounded by the effects on energy prices of the transition away from fossil fuels.

We use country-specific structural vector autoregression (SVAR) models to quantify the effects of real energy price shocks (oil, gas, and coal) on current account balances for 45 EMDEs (determined by data availability), where alternative specifications and identification schemes are considered for robustness purposes. The analysis also controls for country-specific changes in real GDP and real effective exchange rates. These real energy price shocks are identified by using alternative *recursive identification* schemes. In a complementary framework, we also distinguish between oil demand and oil supply shocks by using *sign restrictions*.

The empirical results suggest that the effects differ substantially across energy-exporting and energy-importing EMDEs. First, a one percent positive real oil price shock results in up to 0.11 (0.08) percentage points of a cumulative improvement (deterioration) in current account balances of oil exporters (importers) after five years. Second, these effects differ across energy commodities—oil, gas, and coal. A one percent positive real natural gas price shock results in up to 0.06 (0.04) percentage points of a cumulative improvement (deterioration) in current account balances of natural gas exporters (importers) after five years. Third, real coal price shocks result in higher current account balances of oil exporters and natural gas exporters, suggesting substitution of coal with oil and natural gas in such cases. When contributions of alternative real energy prices to the variance of current account balances are compared, real oil price shocks dominate those of real natural gas and real coal prices.

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[2] Earlier theoretical contributions include Bruno and Sachs (1982), Ostry and Reinhart (1992), Gavin (1990, 1992), Backus and Crucini (2000), and Bodenstein et al. (2011).

Following the ample empirical evidence that the nature of the shock – demand-driven or supply-driven – matters in understanding the effects of oil price shocks, the paper then imposes sign restrictions to distinguish between oil demand and oil supply shocks (see, for example, Kilian 2009; Kilian et al., 2009). Results suggest that the impact of oil demand shocks (rather than oil supply shocks) on current account balances is similar to that of real oil price shocks, supporting the view that the effects of oil demand shocks are different from those of oil supply shocks, as in studies such as Cashin et al. (2014), Allegret et al. (2015) and Gnimassoun et al. (2017).

Finally, the paper finds evidence of substantial heterogeneity across countries in the response of current account balances to real energy price shocks. For example, after a one percent positive real oil price shock, the current account balance of Azerbaijan improves the most (0.93 percentage points), followed by that of Saudi Arabia (0.62 percentage points). In contrast, current account balances of Mongolia and Ukraine deteriorate the most (0.47 and 0.36 percentage points, respectively). Similarly, after a one percent positive real natural gas price shock, the current account balance of Azerbaijan improves the most (0.66 percentage points), followed by that of Saudi Arabia (0.38 percentage points), whereas current account balances of Mongolia and Ukraine deteriorate the most (0.56 and 0.33 percentage points, respectively). Overall, besides energy exporters (importers), positive real oil price shocks also improve (deteriorate) current account balances of countries with historical current account surpluses (deficits), relatively smaller (larger) service sectors, and relatively less (more) capital-open countries.

As detailed in the next section, this paper contributes to the literature in three dimensions. First, while the existing literature focuses exclusively on the impact of oil price shocks, we expand the analysis to include natural gas and coal price shocks to provide a richer understanding of the impacts of energy price shocks. Second, while most studies focus only on individual oil importers or exporters or on a small set of importers/exporters in a geographical region, we examine the impact of energy price shocks for a sample of 45 major EMDEs to get a better understanding of the heterogenous impacts of energy prices. Third, we examine the role of a much richer set of country characteristics in driving the effects of energy price shocks than previously considered.

The rest of the paper is organized as follows. The next section presents a literature review, where the contribution of this paper is clearly connected to existing studies with a discussion on the channels that are important for understanding the linkages between energy prices and current account balances. Section 3 introduces the empirical methodology and the data set used in the estimations. Section 4 depicts the empirical results for country groups, while Section 5 depicts them for individual countries. Section 6 concludes with certain policy suggestions.

2. Literature review

2.1. Current account balance and energy prices – the channels

The impact of energy price fluctuations, particularly those of oil, on a country's current account position works through two main channels: the trade channel and the financial channel. The former works through changes in prices and quantities of tradable goods, while the latter plays out via asset prices and external portfolio positions (Kilian et al., 2009). We discuss both channels next, with a special focus on the trade channel.

For net oil-exporting economies, the direct impact of an increase in oil prices works through an increase in revenues. An increase in oil prices improves the terms-of-trade, leading to higher oil revenues, an improvement in the trade balance, and increased consumption and investment (Korhonen and Ledyaeva, 2010). At the same time, two indirect effects are likely to work in the opposite direction (Le and Chang, 2013). First, higher global oil prices result in inflationary

pressures, raising the domestic price of imports for both oil-exporting and oil-importing countries. This could prompt monetary authorities to raise policy interest rates, resulting in lower consumption, investment, and growth. In turn, this decreases demand for exports for both oil-exporters and -importers. Second, an increase in oil prices represents a negative supply shock for oil-importing countries, which could result in slower growth, reduced imports, and ultimately a worsening of the trade balance of oil exporters. Overall, the net effect of a positive oil price shock on the trade balance of an oil-exporting country depends on the relative magnitudes of the above three effects (Le and Chang, 2013; Rafiq et al., 2019). Additionally, the currencies of oil-importing countries depreciate, while that of oil-exporting countries may appreciate (Kilian et al., 2009).

For net oil-importing economies, an increase in global oil prices is generally considered to be a negative terms-of trade shock. Since imported oil is an intermediate input in the domestic production process, an increase in oil prices results in an increase in the price of inputs, which, in turn, leads to a decline in GDP, at least in the short run (for example, Kim and Loungani, 1992; Backus and Crucini, 2000). Exports also decline as a result, although the economy may not necessarily consume less of imported goods. Therefore, the overall impact of a rise in oil prices on the trade balance is expected to be negative (Le and Chang, 2013). However, this interpretation is subject to certain caveats. First, when global oil prices increase due to global demand shocks, global demand for oil would increase together with higher economic activity (Kilian, 2009). Accordingly, following a positive global oil price shock, oil importing economies may import more oil (due to higher global demand) and thus have negative current account balances. Second, the cost share of oil in domestic production could be very small for some oil-importing countries. Oil price shocks cannot explain large fluctuations in real GDP and, hence, real trade (Kilian, 2010). Third, although the direct effect of a positive oil price shock on the current account of oil importers is negative, policy responses may mitigate or amplify these effects. Oil importers can, over time, modify the composition of trade by increasing non-oil exports to oil-exporting countries, thus improving their trade balance (Kilian et al., 2009).

The financial (or valuation) channel works through changes in asset prices in response to oil price shocks and is reflected in income flows and valuation changes, with the magnitude of these effects depending on the initial gross foreign asset holdings of oil exporters and importers (Kilian et al., 2009). If an increase in oil prices results in higher profits and asset prices in oil exporters (and the opposite in oil importers), one can expect some transfer of wealth from oil exporters to oil importers, according to standard diversification arguments. Thus, from a theoretical standpoint, a positive oil price shock should be associated with a temporary capital loss in oil exporting countries and a capital gain in the rest of the world. However, the magnitude of these valuation effects will depend on the asymmetries in the gross asset and liability positions of oil exporters and importers.

2.2. Empirical evidence on the role of energy prices in current account balances

As noted above, the existing studies on the impact of energy price shocks on external accounts focus exclusively on one energy commodity – oil. Even this literature is rather limited. A small strand of this literature analyzes this issue using SVAR models for specific oil-importing countries or countries in a particular geographical region. Ozlale and Pekkurnaz (2010) find significant short-run effects of oil price shocks on external balances for Turkey. Goyal and Kumar (2018) estimate the relationship between the current account and fiscal deficit, and the real exchange rate, in the presence of oil price shocks for India. Results show that a positive oil price shock increases the current account deficit, pointing to an inelastic demand for oil.

Among recent cross-country studies, Le and Chang (2013) examine the relationship between oil prices and trade balances for three economies with different oil trade characteristics – Malaysia,

Singapore, and Japan. They find trade to be an important channel of transmission of oil price shocks to the economy and that oil prices impact trade performances of importers and exporters differently. In a similar vein, Nasir et al. (2019) analyze the impact of oil price shocks on trade balances (along with growth and inflation) for the GCC member countries. They find evidence of substantial heterogeneity in the responses of these countries to oil shocks depending on their underlying economic structures and degree of dependence on oil revenues. A positive oil price shock results in a trade surplus in the short-run but not in the long-run. Using panel estimations, Rafiq et al. (2016) examine the impact of oil price shocks for a large sample of major oil exporting and oil-importing countries. Results show that a decline in oil prices is beneficial for oil exporters as the quantity effect outweighs the price effect, while a stable oil price is more beneficial for oil importers than a price decline.

Our paper contributes significantly to the above literature by expanding it along two dimensions. First, we go beyond oil and analyze the impact of natural gas and coal price shocks to provide a richer understanding of the impacts of energy price shocks. Accounting for the interactions between these commodities is important because other forms of energy could play a role in driving the cross-country dynamics of the impact of oil shocks on external balances (Peersman and Van Robays, 2012). For instance, when oil prices rise due to increased global economic activity, the prices of other sources of energy, such as natural gas, also increase due to generally higher demand for energy. Second, we examine the impact of energy price shocks for a sample of 45 major EMDEs. Utilizing a much larger sample of countries than in existing studies enables a richer understanding of the heterogenous impacts of energy prices across countries.

A strand of the literature on oil price shocks, pioneered by Kilian (2009), has argued that the impact of oil price shocks depends on the source of the shocks. Kilian et al. (2009) extended the analysis in Kilian (2009) to investigate the effects of oil-supply and oil-demand driven shocks on the external accounts of oil exporters and oil importers. Using a VAR framework, they find that oil-supply and oil-demand shocks have different effects on external accounts and that trade and valuation channels exert a significant influence on the global adjustment process. Balli et al. (2021) examine the effects of oil supply and demand shocks on the current account balances of China and Russia using a TVP-VAR with stochastic volatility. Results show that identifying the sources of shocks plays an important role in understanding the impact of oil price shocks on trade balances. Oil demand shocks have a much larger effect on trade balances and are more attributable to oil price shocks than oil supply shocks.

A set of studies has also focused on capturing the interlinkages between countries by using global VAR models. In this vein, Cashin et al. (2014) investigate the macroeconomic consequences of oil price fluctuations across different countries and find that supply- and demand-driven shocks have specific impacts on macroeconomic variables, and that oil importers and exporters react differently. Allegret et al. (2015) study the effects of oil price shocks on global imbalances and the associated transmission channels for a panel of 30 oil exporters and importers. Accounting for trade and financial linkages between countries, they find that the nature of the shock (demand versus supply) matters for understanding the effects of oil price shocks. Their results also show that the main adjustment mechanism to oil shocks is based on the trade channel, while the valuation channel only matters in the short run.

Although no clear consensus has emerged on the impact of oil price fluctuations on external balances, a common finding of this literature is that the impact of oil prices depends on whether the economy considered is an oil-importer or an oil-exporter, the degree of domestic financial development, the extent of international financial market integration, and the management of foreign exchange reserves (Buetzer et al., 2012; Gnimassoun et al., 2017). The structure of the economy is a main factor that affects the response of economies to commodity price fluctuations.

Emerging and developed economies differ systematically both along the cross section and in their dynamics (Kohn et al, 2021). For example, the impact of oil price shocks on oil exporting countries' current account depends on their level of economic diversification. Economies that are more dependent on the oil sector will have a stronger link between their current account and oil prices. We build on and expand this literature by examining the role of a much richer set of country characteristics in driving the effects of oil price shocks than previously examined.

3. Empirical Methodology and Data

This section introduces the empirical methodology and data used to investigate the effects of energy price shocks on current account balances of EMDEs. The country-specific estimations are based on SVAR models that are useful to consider the endogeneity between the variables considered. Although country-specific estimations are based on linear relationships between the variables considered for each country, we explore nonlinearities across countries by depicting the empirical results for country groups, based on certain country characteristics. Within this framework, first, we introduce a SVAR model to estimate the effects of real oil price shocks on current account balances, where recursive identification is used. Second, we introduce a SVAR model to estimate the effects of alternative real energy price shocks (of oil, gas, coal) on current account balances, where, again, recursive identification is used. Third, we introduce a SVAR model to distinguish between the effects of oil demand and oil supply shocks on current account balances, where identification is achieved by sign restrictions.

All SVAR models (in quarterly frequency) are formally represented as follows:

$$A_0 z_t = \alpha + \sum_{k=1}^{4} A_k z_{t-k} + u_t \tag{1}$$

where z_t consists of alternative endogenous variables (to be introduced below, based on the model specification), and u_t consists of the corresponding shocks that represent serially and mutually uncorrelated structural innovations.[3] For estimation purposes, the model in its reduced form is expressed as follows:

$$z_t = b + \sum_{k=1}^{4} B_k z_{t-k} + e_t \tag{2}$$

where $b = A_0^{-1}\alpha$, $B_k = A_0^{-1}A_k$ for all k. It is postulated that the structural impact multiplier matrix of A_0^{-1} has a recursive structure such that the reduced form errors of e_t can be decomposed according to $e_t = A_0^{-1}u_t$, where shock sizes are standardized to unity.

All SVAR models are estimated by using quarterly data on a country-by-country basis. The country-specific estimations are based on a Bayesian approach with the Minnesota priors proposed by Litterman (1986). For models with recursive identification, a total of 2,000 samples are drawn, and a burn-in sample of 1,000 draws is discarded. For models identified by sign restrictions, we search for 1,000 successful draws (satisfying our sign restrictions) of at least 2,000 iterations with 1,000 burn-ins. In all models, the remaining 1,000 draws are used to determine the cumulative impulse responses and forecast error variance decompositions for each country as well as for each

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[3] The number of lags in the quarterly model, which is four, has been determined as the one minimizing the Deviance Information Criterion across different countries.

country group. For example, when empirical results are presented for oil exporters as a group, 1,000 draws coming from all oil exporting countries are pooled together, and the corresponding measures (e.g., median or interquartile range) are calculated out of this pool. Following Fry and Pagan (2005, 2011), rather than directly calculating the corresponding measures (e.g., median, or interquartile range) across all draws for a particular horizon, we search for the draw that produces impulses closest to these measures by minimizing the distance between a measure and the selected draw for a horizon of five years.

3.1. Real oil price shocks and current account balances

The purpose of this investigation is to estimate the effects of real oil price shocks on current account balances, where recursive identification is used.

Benchmark model. In the benchmark model, z_t consists of year-on-year change in log real crude oil prices (global variable), year-on-year change in log real GDP (country-specific variable), and current account balance as percentage of GDP (country-specific variable). The recursive structure imposed on A_0^{-1} requires an ordering of the variables used in the estimation. Accordingly, real crude oil prices growth is ordered first as oil prices are mainly determined in the global economy. Real GDP growth is ordered second as it represents country-specific developments that can have an immediate impact on country-specific current account balances, but they cannot have an immediate impact on globally determined real crude oil prices. Current account balance is ordered last because it is not only the variable of interest but also can be affected immediately by changes in globally-determined crude oil prices or country-specific real GDP; however, the current account balance does not have an immediate impact on global real crude oil prices or real GDP. All variables can impact other variables after one quarter. Based on data availability, this model is estimated individually for 45 EMDEs by using quarterly data.[4]

Robustness check. As a robustness check, we include the country-specific real effective exchange rate as an additional endogenous variable. Accordingly, in this model, z_t consists of year-on-year changes in log real crude oil prices (global variable), log real GDP (country-specific variable), current account balance as percentage of GDP (country-specific variable), and log real effective exchange rate (country-specific variable). We follow a similar ordering of variables as in the benchmark model, with the real effective exchange rate ordered last since it can be affected immediately by any changes in the other variables. All variables can impact other variables after one quarter. As data for real effective exchange rates are not available for certain countries, this model is estimated individually for 29 EMDEs by using quarterly data.

3.2. Alternative real energy price shocks and current account balances

The purpose of this investigation is to provide a richer understanding of the effects of energy price shocks by incorporating the prices of alternative source of energy (oil, natural gas, and coal) on current account balances, where recursive identification is used.

Benchmark model. In this model, z_t consists of year-on-year changes in log real crude oil prices (global variable), log real natural gas prices (global variable), log real coal prices (global variable), log real GDP (country-specific variable), and current account balance as percentage of GDP (country-specific variable). We follow a similar ordering of variables as in earlier models, where growth rates of real natural gas prices and real coal prices are, respectively, ordered right after real oil prices growth and right before country-specific real GDP growth. The motivation behind

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[4] See Section 3.4 for a detailed description of the data.

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this ordering is due to the market share of these commodities in global energy exports, although we also consider an alternative ordering of these variables below.[5] All variables can impact other variables after one quarter.

Robustness #1. We check the robustness of the benchmark results to an alternative ordering of the energy price variables, where real coal prices are ordered before real natural gas prices. This way, we control for the possibility of real natural gas prices being immediately affected by shocks to real coal prices, although shocks to real natural gas prices can have an impact on real coal prices after one quarter. All other details are the same as in the benchmark model.

Robustness #2. As in Section 3.1, we check the robustness of the benchmark results to the inclusion of country-specific real effective exchange rates as an additional endogenous variable. We follow a similar ordering of variables as in the benchmark model, with the new real effective exchange rate variable ordered last, as it can be affected immediately by any changes in other variables. All other details are the same as in the benchmark model. As data for real effective exchange rates are not available for certain countries, this model is estimated individually for 29 EMDEs by using quarterly data.

3.3. Disentangling oil price shocks: demand versus supply

The earlier literature (with the exception of Kilian et al., 2009) generally treated oil price shocks as the same regardless of the source of the shock. More recently, there is growing recognition that the macroeconomic effects of supply and demand shocks in the crude oil market are different, depending on whether the oil price increase is caused by disruption in oil production, demand from global economic activity, or precautionary demand (Gnimassoun et al., 2017). There is empirical evidence that commodity prices in general, and oil prices in particular, are determined not only by supply side factors but also by demand-side factors related to the global business cycle (for example, Hamilton, 2009; Kilian, 2009; Alquist et al., 2013; Kilian and Murphy, 2014). Therefore, in this section, we examine the impact of oil price shocks on the current account while accounting for the source of the oil price fluctuations.

We distinguish between the effects of oil demand and oil supply shocks on current account balances by using data on both global oil prices and global oil production, where oil demand and oil supply shocks result in impulse responses of oil prices and oil production with different signs.[6] In technical terms, we use the algorithm introduced by Arias, Rubio-Ramirez, and Waggoner (2018) to search for 1,000 successful draws satisfying our sign restrictions. To allow an appropriate comparison with the models with recursive identification, the shock sizes (of oil demand and oil supply) are normalized such that they result in a one percent increase in real crude oil prices.

Benchmark model. In this model, z_t consists of year-on-year changes in log crude oil production (global variable), log real crude oil prices (global variable), log real GDP (country-specific variable), and current account balance as percentage of GDP (country-specific variable). Following studies such as by Cashin et al. (2014), Allegret et al. (2015) and Gnimassoun et al. (2017), the following sign restrictions are imposed for four quarters to distinguish between oil demand and oil supply shocks in country-specific estimations:

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[5] According to https://www.worldstopexports.com/, the worldwide values of crude oil, natural gas, and coal exports in 2021 were \$982.6 billion, \$374.6 billion, and \$122.9 billion, respectively.
[6] As data for production of natural gas and coal are not available in quarterly frequency for our sample period, the investigation is restricted to the effects of oil demand versus oil supply shocks on current account balances.

- Following a positive oil demand shock:
  - o Real oil prices increase.
  - o Oil production increases.
  - o Real GDP increases for all countries.
- Following a negative oil supply shock:
  - o Real oil prices increase.
  - o Oil production decreases.
  - o Real GDP decreases for only oil importing countries.

All other responses, including those of current account balances, are unrestricted. We also test the robustness of the benchmark model to an alternative identification scheme and model specification.

Robustness #1. Sign restrictions may not be sufficient to exactly identify the macroeconomic effects of oil-demand and oil-supply shocks because some permissible models based on sign restrictions can involve responses that are not economically plausible (for example, a large instantaneous increase in oil production in response to higher oil prices). We, therefore, check the robustness of the benchmark model for an alternative identification scheme, where, on top of the sign restrictions in the benchmark model, we follow Kilian and Murphy (2014) and Cashin et al. (2014) by imposing restrictions on the impact price elasticities of oil demand and oil supply. This is achieved by having a lower bound of -0.8 on the impact price elasticity of oil demand (measured by the ratio of the impact responses of oil production and of the real price of oil to an oil supply shock) and an upper bound of 0.025 on the impact price elasticity of oil supply (measured by the ratio of the impact responses of oil production and of the real price of oil to an oil demand shock).

Robustness #2. As before, we check the robustness of the benchmark model for the inclusion of country-specific real effective exchange rates as an additional endogenous variable. The real effective exchange rate variable is ordered last in the SVAR while all other details are the same as in the benchmark model.

3.4. Database and descriptive statistics

The quarterly data cover the period between 1991Q1 and 2022Q3 for 45 EMDEs for the models without the real effective exchange rates and 29 EMDEs for the models with real effective exchange rates (both due to data availability).[7] After considering year-on-year changes, the sample period reduces to 1992Q2-2022Q3, although it can change across countries due to data availability (with at least forty quarters of observations).

All energy prices are taken from the World Bank Commodities Price Data (*'The Pink Sheet'*). Global crude oil prices are measured as the average between Brent, Dubai and West Texas Intermediate crude oil prices, represented as U.S. dollars per barrel. Global natural gas prices are measured by the natural gas index. Global coal prices are measured as the average between South Africa and Australia coal prices, represented as U.S. dollars per metric ton. All prices are converted into real terms by using the U.S. consumer price index obtained from the Bureau of Economic Analysis. World oil production, obtained from the International Energy Agency, is measured as millions of barrels. Figure 1 plots the growth of oil price and production over the period 1992-2022.

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[7] The list of countries and country groups is available in the Online Appendix Table A.1.

Country-specific real GDP series are obtained from Haver Analytics or International Financial Statistics (International Monetary Fund), and are measured in billions of U.S. dollars, at 2010 prices and exchange rates. Current account balances (as percentage of GDP) are calculated using net current account balances data (excluding exceptional financing) from the International Financial Statistics database in U.S. dollars and gross domestic product data in U.S. dollars (from Haver Analytics). Country-specific real effective exchange rates are obtained from the World Bank.

Since we would like to distinguish between the effects of energy price shocks on current account balances of commodity exporters and commodity importers within EMDEs, we identify countries as oil exporters or oil importers by using the World Bank criteria. Specifically, a country is classified as an oil exporter when, on average in 2017-19, exports of crude oil accounted for about 20 percent or more of total exports. Countries for which this threshold is met because of re-exports are excluded.[8] When data are not available, judgment is used. Other countries are considered as oil importers. Natural gas exporters are identified as those having natural gas exports account for at least 5 percent of their total exports based on data obtained from the United Nations Comtrade database; other countries are considered as natural gas importers. Similarly, coal exporters are identified as those having coal exports account for at least 5 percent of their total exports based on data obtained from the United Nations Comtrade database; other countries are considered as coal importers.

Current account surplus countries are identified as those having a positive median current account balance over the sample period; other countries are considered as current account deficit countries. Countries with larger service sectors are identified as those in which the service sector as percentages of GDP (obtained from the World Bank) over the sample period (measured by the median over time) is larger than the median country; other countries are considered as those with smaller service sectors. Countries with more capital account openness are identified as those having capital account openness (obtained from the Chinn-Ito index) over the sample period (measured by the median over time) higher than that of the median country; other countries are considered as those with less capital account openness.

Based on this database, current account balances (as percentages of GDP) are shown for different country groups of EMDEs in Figure 2. Three stylized facts stand out. First, oil exporters and gas exporters have historically higher current account surpluses compared to oil importers and gas importers, respectively, whereas there is no significant difference between current account balances of coal exporters and coal importers. Second, larger service-sector sizes are associated with current account deficits, whereas countries with smaller service-sector sizes can have positive or negative current account balances. Finally, current account deficits are more prevalent in countries with more open capital accounts compared to countries with less open capital accounts. Although these descriptive statistics provide evidence on the pattern of current account balances of certain country groups, they are silent about the effects of energy price shocks on current account balances, which we focus on next.

4. Empirical Results Based on Country Groups

We would like to distinguish between the effects of energy price shocks on current account balances of different country groups within EMDEs. To obtain such results, the Bayesian estimation of models is achieved for each country individually, and the empirical results (of impulse response

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[8] Note that this taxonomy results in the classification of some well-diversified economies as importers, even if they are exporters of oil.

functions and forecast error variance decompositions) based on 1,000 draws (coming from each country) are pooled together to obtain the results for country groups. As an example, cumulative impulse responses of oil exporters are measured by the median cumulative impulse in the pooled version of 1,000 draws across all oil exporting countries, where we use the methodology introduced by Fry and Pagan (2005, 2011) as detailed above. The empirical results based on the benchmark models are presented in the main text, whereas those based on robustness checks are presented in the Online Appendix.

4.1. Real oil price shocks and current account balances

This subsection is based on cumulative impulse responses of current account balances to real oil price shocks and the contribution of these shocks to the forecast error variance decomposition of current account balances obtained from the models described in Section 3.1.

Impact of real oil price shocks on current account balances. Cumulative impulse responses of current account balances (as percentages of GDP) to a one percent positive real oil price shock over five years are given in Figure 3. Independent of the model considered, a positive real oil price shock results in a current account surplus in oil exporters, whereas it results in a current account deficit in oil importers. The interquartile ranges (based on the pooled version of 1,000 draws across the relevant countries) support these results. Based on different models, the corresponding magnitudes after five years suggest that one percent of a positive real oil price shock results in up to 0.09 percentage points of an improvement in current account balances of oil exporters, whereas it results in up to 0.08 percentage points of a deterioration in current account balances of oil importers.

In order to understand the reasons behind the results in Figure 3, cumulative impulse responses of real GDP (growth) to one percent of a positive real oil price shock over five years are given in Figure 4. As is evident, real GDP (growth) of both oil exporters and oil importers reacts positively to an increase in real oil prices, consistent with the trade and financial channels in the case of a positive global demand shock as discussed in Section 2.1 (Kilian, 2009; Kilian et al., 2009). Therefore, a positive real oil price shock acts like a global demand shock, reflected here as a positive oil demand shock. We further investigate this below by distinguishing between oil demand and oil supply shocks. Intuitively, a positive global demand shock increases the demand for oil in all countries, which results in higher exports for oil exporters (and thus positive current account balances) and higher imports for oil importers (and thus negative current account balances).

To better understand the behavior of current account balances in response to oil price shocks, we also examine the association between the impacts on the current account and certain country characteristics. Figure 5 presents the results of the benchmark model for different country groups. As is evident, impulse responses based on median countries are positive (negative) for oil and gas exporters (importers), which is mostly supported by interquartile ranges across countries. However, the impulse responses are negative for both coal exporters and importers. Positive real oil price shocks tend to improve (deteriorate) current account balances of countries with historical current account surpluses (deficits), relatively smaller (larger) service sectors, and relatively less (more) capital-open countries. This is consistent with earlier studies, such as by Gruhle and Harms (2022), who show that countries with a larger expansion of services exhibit lower current account balances due to higher aggregate productivity.

As shown in the Online Appendix, robustness checks based on alternative ordering of variables or inclusion of real exchange rates highly support the results of the benchmark model.

Relative contribution of real oil price shocks to current account balances. Next, we examine how the relative contribution of oil price shocks to current account balances is associated with certain country characteristics. The results suggest that real oil price shocks explain between 6 and 8 percent of the variance of current account balances, although certain country groups have wider interquartile ranges (Figure 6). Specifically, interquartile ranges representing the contribution of real oil price shocks to current account balances are wider for oil exporters, gas exporters, coal importers, and countries with historical current account surpluses, smaller service sectors, and less capital account openness. As shown in the Online Appendix, robustness checks based on alternative ordering of variables or inclusion of real exchange rates highly support the results of the benchmark model.

4.2. Alternative real energy price shocks and current account balances

This subsection presents the results of the models described in Section 3.2 where we extend the analysis beyond oil to include shocks to the real prices of coal and natural gas.

Impact of alternative real energy price shocks on current account balances. The impact of an oil price shock on current account balances of the different types of energy exporters is very similar to that from the model with only oil prices. As shown in Figure 7, the cumulative impulse responses of current account balances to one percent of a positive real oil price shock are positive (negative) for oil and gas exporters (importers). The corresponding magnitudes (based on median countries) suggest that one percent of a positive real oil price shock results in a 0.11 percentage point improvement in current account balances of oil exporters, whereas it results in a 0.07 percentage point deterioration in current account balances of oil importers. However, the impulse responses are negative for both coal exporters and importers. Positive real oil price shocks are associated with an improvement (deterioration) in current account balances of countries with historical current account surpluses (deficits), relatively smaller (larger) service sectors, and relatively less (more) open capital accounts. These results are highly consistent with those based on the models described in Section 3.1 and are robust to the exclusion of real natural gas and real coal prices from the estimations.

The corresponding results for a natural gas price shock of the same magnitude are given in Figure 8. Once again, the impulse responses are positive (negative) for oil and gas exporters (importers), but they are negative for both coal exporters and importers. The magnitude of the impact is smaller relative to that of oil price shocks: one percent of a positive natural gas price shock results in a 0.06 percentage point improvement in current account balances of natural gas exporters, while it results in a 0.04 percentage point deterioration in current account balances of natural gas importers. As in the case of oil price shocks, positive natural gas price shocks improve (deteriorate) current account balances of countries with historical current account surpluses (deficits) and relatively less (more) capital account openness.

The results for coal price shocks are given in Figure 9. Impulse responses based on median countries are positive (negative) for oil and gas exporters (importers), but they are negative for both coal exporters and importers. The corresponding magnitudes suggest that one percent of a positive real coal price shock results in a 0.08 (0.17) percentage point improvement in current account balances of oil (natural gas) exporters, whereas it results in a 0.02 percentage point deterioration in current account balances of oil (natural gas) importers. The results suggest that due to substitution between commodities, positive coal price shocks may be leading oil and natural gas exporters to export more of their commodity (thus resulting in an improvement of their current account balances).

As shown in the Online Appendix, results from the robustness checks based on the inclusion of real exchange rates are highly consistent with the results of the benchmark model.

Relative contribution of alternative real energy price shocks to current account balances. The contributions of oil, natural gas, and coal price shocks to the variance of current account balances of alternative country groups are given in Figure 10. The main observation is that oil price shocks contribute the most among energy price shocks; this contribution is higher for oil exporters (versus importers), countries with smaller service sectors, and with relatively less open capital accounts. The contribution of natural gas price shocks is higher for energy importers relative to exporters, countries with historical current account deficits, and relatively more capital-open countries. Finally, the contribution of coal price shocks is higher for energy exporters relative to importers, countries with historical current account surpluses, smaller service sectors, and relatively less open capital accounts.

Overall, these results imply that alternative energy price shocks have quite different effects on and contributions to the variance of current account balances of countries. As shown in the Online Appendix, robustness checks based on alternative ordering of variables or inclusion of real exchange rates highly support the results of the benchmark model. However, certain results are slightly different when country-specific real exchange rates are included, which can partly be due to the smaller sample size because of limited data on country-specific real exchange rates.

4.3. Oil demand versus oil supply shocks and current account balances

As described in Section 3.3, there is overwhelming evidence in the literature that the effect of oil price shocks on macroeconomic aggregates depends on the source of the shocks. This subsection discusses the responses of current account balances to oil demand versus oil supply shocks.

4.3.1. Role of oil demand shocks in current account balances

Impact of oil demand shocks on current account balances. A positive oil demand shock (normalized such that it results in a one percent increase in real oil prices) results in a current account surplus in oil exporters, whereas it results in a current account deficit in oil importers (Figure 11). This result is consistent with country-specific studies of oil exporters and oil importers (for example, Le and Chang, 2013; Balli et al., 2021). The corresponding magnitudes suggest that a positive oil demand shock improves the current account balances of oil exporters by 0.11 percentage points while it results in a 0.09 percentage point deterioration in the balances of oil importers. The same shock improves (deteriorates) current account balances of natural gas exporters by 0.21 (0.07) percentage points, whereas it improves (deteriorates) current account balances of countries with historical current account surpluses (deficits) by 0.07 (0.08) percentage points. As shown in the Online Appendix, robustness checks based on additional elasticity restrictions or inclusion of real exchange rates highly support results of the benchmark model.

Relative contribution of oil demand shocks to current account balances. Real oil price shocks explain between 15 and 17 percent of the variance of current account balances (Figure 12). The interquartile ranges are very similar across country groups. As shown in the Online Appendix, these results are robust to the inclusion of additional elasticity restrictions as well as real exchange rates.

4.3.2. Role of oil supply shocks in current account balances

Impact of oil supply shocks on current account balances. Cumulative impulse responses of current account balances (as percentages of GDP) to negative oil supply shocks (normalized such that they result in a one percent increase in real oil prices) are given in Figure 13. As is evident, based on median countries, a negative oil supply shock results in a current account surplus of all country groups, although interquartile ranges across countries are wider for oil exporters, gas exporters, coal importers, countries with historical current account surpluses, and countries with smaller service sectors. The corresponding magnitudes suggest that a negative oil supply shock results in a 0.24 (0.04) percentage points improvement in current account balances of oil exporters (importers). A negative oil supply shock also results in a 0.45 (0.06) percentage point improvement in current account balances of natural gas exporters (importers). As shown in the Online Appendix, robustness checks based on additional elasticity restrictions or inclusion of real exchange rates highly support the results of the benchmark model.

The difference between the impacts of oil demand and supply shocks, even when both shocks are normalized to result in a one percent increase in real oil prices, merits further discussion. A negative oil supply shock corresponds to a reduction in the oil revenue of oil exporters (due to lower quantities of oil exported), whereas a positive oil demand shock corresponds to an increase in their oil revenue (due to higher quantities of oil exported). Therefore, one may expect the current account balances of oil exporters to improve more following a positive oil demand shock. However, current account balances of oil exporters depend not only on their oil revenue (i.e., the income effect through oil exports) but also on their consumption of domestic versus foreign goods (i.e., through imports of non-oil goods and services). Accordingly, if oil exporters import relative more when the global economy booms (i.e., when there is a higher demand for oil and thus a higher income for oil exporters) compared to when they decide to supply less oil (i.e., lower income for oil exporters), their current account balance may well improve more following a negative oil supply shock. This mechanism would be particularly prominent when global prices of non-oil goods and services that are imported by oil exporters are higher due to higher global demand resulting from a booming global economy.

Relative contribution of oil supply shocks to current account balances. The results suggest that real oil price shocks explain between 12 and 15 percent of the variance of current account balances, where interquartile ranges are very similar across country groups (Figure 14). As shown in the Online Appendix, robustness checks based on additional elasticity restrictions or inclusion of real exchange rates support the results of the benchmark model. However, as before, certain interquartile ranges are slightly different when country-specific real exchange rates are included, which can partly be explained by the smaller sample size.

5. Country-Specific Empirical Results

After distinguishing between the effects of energy price shocks on current account balances of different country groups within EMDEs in the previous section, we focus on country-specific results in this section. These results are based on the same Bayesian estimation of models for each individual country, as in the previous section. The empirical results (of impulse response functions and forecast error variance decompositions) are based on 1,000 draws coming from each country, where we again use the methodology introduced by Fry and Pagan (2005, 2011) as detailed above.

5.1. Real oil price shocks and current account balances

This subsection is based on the models described in Section 3.1.

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Impact of real oil price shocks to current account balances. Cumulative impulse responses of current account balances of individual countries to a one percent positive real oil price shock are given in Figure 15. The same positive oil price shock results in highly different responses of current account balances across countries. The current account balance of Azerbaijan improves the most by 0.93 percentage points, followed by that of Saudi Arabia by 0.62 percentage points; both countries are major oil exporters. In contrast, following the same shock, current account balances of Mongolia and Ukraine deteriorate the most, by 0.47 and 0.36 percentage points, respectively; both countries are oil importers. These results show that for oil exporting countries the relation between oil prices and the current account is also a function of the propensity of the economies to absorb (positive or negative) oil shocks, which, in turn, depends on their degree of economic diversification. That is, a country with a less-diversified export structure and a more prominent oil sector (such as Azerbaijan and Saudi Arabia) will have a current account more closely linked to the oil balance (see, for example Gnimassoun et al., 2017). It is important to emphasize that these country-specific results are statistically significant based on 68 percent credible sets. Robustness checks based on alternative ordering of variables or inclusion of real exchange rates support the results of the benchmark model, especially when 68 percent credible sets are considered (see Online Appendix).

Relative contribution of real oil price shocks to current account balances. The contribution of real oil price shocks to the variance of current account balances of individual countries is given in Figure 16. Saudi Arabia, Ukraine, Azerbaijan, Ecuador, Guatemala, and Honduras are the countries with the highest contribution of real oil price shocks to the variance of their current account balances, with contributions ranging between 19 percent and 62 percent. Since only some of these countries are oil exporters, it is implied that real oil price shocks can have significant impacts on the variance of current account balances for both oil exporters and oil importers. Once again, these results are robust to alternative model specifications, especially when 68 percent credible sets are considered (see the Online Appendix for details).

5.2. Alternative real energy price shocks and current account balances

This subsection discusses the impact of shocks to the real price of oil, natural gas, and coal on current account balances, obtained by the models described in Section 3.2.

Impact of alternative real energy price shocks on current account balances. The responses of current account balances of individual countries to alternative energy price shocks vary substantially depending on whether a country is an energy exporter or importer. Looking first at the impact of a one percent positive oil price shock, the current account balance of Azerbaijan improves the most, by 0.97 percentage points, followed by that of Saudi Arabia, by 0.58 percentage points; both countries are oil exporters (Figure 17). In contrast, following the same shock, current account balances of Ukraine and Serbia— both countries are oil importers—deteriorate the most (in a statistically significant way based on 68 percent credible sets) by 0.36 and 0.30 percentage points, respectively.

Figure 18 presents the results for the impact of a one percent positive natural gas price shock. As is evident, the current account balance of Azerbaijan improves the most by 0.66 percentage points, followed by that of Saudi Arabia by 0.38 percentage points; both countries are oil exporters, although Saudi Arabia is a natural gas importer. In contrast, following the same shock, current account balances of Mongolia and Ukraine deteriorate the most by 0.56 and 0.33 percentage points, respectively; both countries are oil and gas importers.

The corresponding results for a one percent positive coal price shock are given in Figure 19. Results show that the current account balance of Brunei Darussalam improves the most, by 0.83 percentage points, followed by that of Saudi Arabia, by 0.57 percentage points; both countries are oil exporters. In contrast, the current account balance of Mongolia (a coal exporter) deteriorates the most (in a statistically significant way based on 68 percent credible sets) by 0.79 percentage points. These results suggest that substitution between energy commodities may be at play. That is, positive real coal price shocks could result in a decline in coal exports and, thus, a deterioration in the current account positions of coal exporters. On the other hand, current account balances of oil/gas exporters could improve as they export more oil/gas.

As shown in the Online Appendix, robustness checks based on inclusion of real exchange rates highly support results of the benchmark model, especially when 68 percent credible sets are considered.

Relative contribution of alternative real energy price shocks to current account balances. Contributions of alternative energy price shocks to the variance of current account balances of individual countries are given in Figure 20. Total contribution of the three real energy price shocks takes its highest values for Saudi Arabia, Ghana, Azerbaijan, Ukraine, Vietnam, and Ecuador, ranging between 58 percent and 38 percent for these countries. Once again, we observe that the contribution of real energy prices can be significantly different across countries, independent of their categorization. As shown in the Online Appendix, robustness checks based on alternative ordering of variables or inclusion of real exchange rates highly support results of the benchmark model.

5.3. Oil demand versus oil supply shocks and current account balances

In this subsection, we describe the country-specific results for the responses of current account balances to oil demand versus oil supply shocks obtained by the models described in Section 3.3.

5.3.1. Role of oil demand shocks

Impact of oil demand shocks. When statistically significant results are considered based on 68 percent credible sets, current account balances of Saudi Arabia (an oil exporter) and Albania (an oil importer) improve the most by 0.69 and 0.30 percentage points, respectively, following a positive oil demand shock (Figure 21). In contrast, following the same shock, current account balances of Ukraine and South Africa (both oil importers) deteriorate the most, by 0.57 and 0.13 percentage points, respectively.

Relative contribution of oil demand shocks to current account balances. The contribution of oil demand shocks to the variance of current account balances of individual countries is given in Figure 22. Ukraine, Saudi Arabia, Albania, South Africa, Azerbaijan, and Guatemala are the countries with the highest contribution of oil demand shocks to the variance of their current account balances, with contributions of ranging between 23 percent and 43 percent. Overall, these results show that the contribution of oil demand shocks can be significantly different across countries, independent of their categorization.

The above results are robust to alternative model specifications, as shown in the Online Appendix.

5.3.2. Role of oil supply shocks

Impact of oil supply shocks. Cumulative impulse responses of current account balances of individual countries to negative oil supply shocks (normalized such that they result in a one percent increase in real oil prices) are given in Figure 23. As is evident, cumulative impulse responses are not statistically significant for any country based on 68 percent credible sets, although Saudi Arabia and Azerbaijan have the highest impacts, based on their median values.

Relative contribution of oil supply shocks to current account balances. The contribution of oil supply shocks to the variance of current account balances of individual countries is given in Figure 24. Different from the case of oil demand shocks, Colombia, Peru, Belarus, Dominican Republic, South Africa, and Bolivia are the countries with the highest contribution of oil supply shocks to the variance of their current account balances, with contributions of ranging between 15 percent and 18 percent. As an interesting observation, the contribution of oil supply shocks to the variance of current account balance is the lowest for Ukraine, which is also the country with the highest contribution of oil demand shocks to the variance of the current account balance. This highlights that oil supply shocks can have significantly different contributions to the variance of current account balances compared to oil demand shocks.

Taken together, these results are consistent with earlier studies demonstrating that the effects of oil price shocks depend on the source of the shock (for example, Allegret et al., 2015 and Gnimassoun et al., 2017). The results are robust to alternative model specifications, as shown in the Online Appendix.

6. Concluding Remarks and Policy Suggestions

This paper analyzes the effects of real energy prices on current account balances of 45 EMDEs. The investigation is based on country-specific structural vector autoregression models, which include real energy prices (of oil, natural gas, and coal), current account balances, real GDP, and real effective exchange rates. Alternative model specifications and identification schemes are considered for robustness purposes.

The empirical results suggest that a one percent positive real oil price shock results in up to 0.11 (0.08) percentage points of a cumulative improvement (deterioration) in current account balances of oil exporters (importers) after five years. A one percent positive real natural gas price shock results in up to 0.06 (0.04) percentage point of a cumulative improvement (deterioration) in current account balances of natural gas exporters (importers) after five years. The analysis also shows that real coal price shocks result in higher current account balances of oil exporters and natural gas exporters, suggesting substitution of coal with oil and natural gas in such cases.

When contributions of alternative real energy prices to the variance of current account balances are compared, the effects of real oil price shocks dominate those of real natural gas and real coal prices. The paper also finds evidence of substantial heterogeneity across countries in the response of current account balances to real energy price shocks, where, besides energy exporters (importers), positive real oil price shocks also improve (deteriorate) current account balances of countries with historical current account surpluses (deficits), relatively smaller (larger) service sectors, and relatively less (more) open capital accounts. The empirical results comparing the effects of oil demand versus oil supply shocks on current account balances suggest that oil demand shocks (rather than oil supply shocks) result in similar reactions of current account balances to real oil price shocks, supporting earlier findings by Allegret et al. (2015) and Gnimassoun et al. (2017) on the different effects of oil demand and supply shocks.

More research is needed to understand the fundamental drivers behind the different impacts of commodity price shocks on the current accounts of developing countries. The findings suggest that the level of diversification and the structure of the economy can help explain the differences in the impacts of energy price shocks. A different approach, such as a structural model, is required to isolate the impacts of each channel.

Regarding policy implications, the empirical results of this paper suggest that countries need to react to energy price shocks by using alternative policy tools based on country-specific characteristics. Specifically, current account balances of countries have been shown to improve when their fiscal balance improves, as in studies such as by Abbas et al. (2011) and Afonso and Opoku (2022). Current account balances of countries (especially with more liberalized financial markets) have been shown to deteriorate following a monetary policy expansion, such as in Hjortsoe et al. (2018). Accordingly, as current account balances of certain countries (that are energy importers, those with historical current account deficits, relatively larger service sectors, and relatively more capital account openness) deteriorate following positive energy price shocks, these countries may want to react by strengthening their fiscal or monetary policies (especially if they have liberalized financial markets). In contrast, as current account balances of certain other countries (that are energy exporters, those with historical current account surpluses, relatively smaller service sectors, and relatively less capital account openness) improve following the same energy price shocks, these countries may want to react by loosening their fiscal or monetary policies. Such fiscal and monetary policies would help smooth-out the effects of energy price shocks on current account balances (Pieschacón, 2012; Berg et al., 2013; and García-Cicco and Kawamura, 2015). Institutional frameworks, such as sovereign wealth funds in energy exporters, can also be used to buffer against future energy price volatility.

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Figure 1. Oil price and production growth, 1992-2022

Note: All energy prices are taken from the World Bank Commodities Price Data ('*The Pink Sheet*'). Global crude oil prices are measured as the average between Brent, Dubai and West Texas Intermediate crude oil prices, represented as U.S. dollars per barrel. World oil production, obtained from the International Energy Agency, is measured as millions of barrels.

Figure 2. Descriptive statistics: current account balances as percentages of GDP

A. Current account surplus versus current account deficit countries

B. Oil exporters versus oil importers

C. Gas exporters versus gas importers

D. Coal exporters versus coal importers

E. Service-sector size

F. Capital account openness

Notes: Descriptive statistics are based on the sample of 45 EMDEs for 1992-2022. The calculations are based on average current account balances (as percentages of GDP) of the corresponding countries over the sample period.

Figure 3. Cumulative impulse responses of current account balances to real oil price shocks for oil exporters versus oil importers: benchmark model with oil prices

A. Benchmark model: oil exporters

B. Benchmark model: oil importers
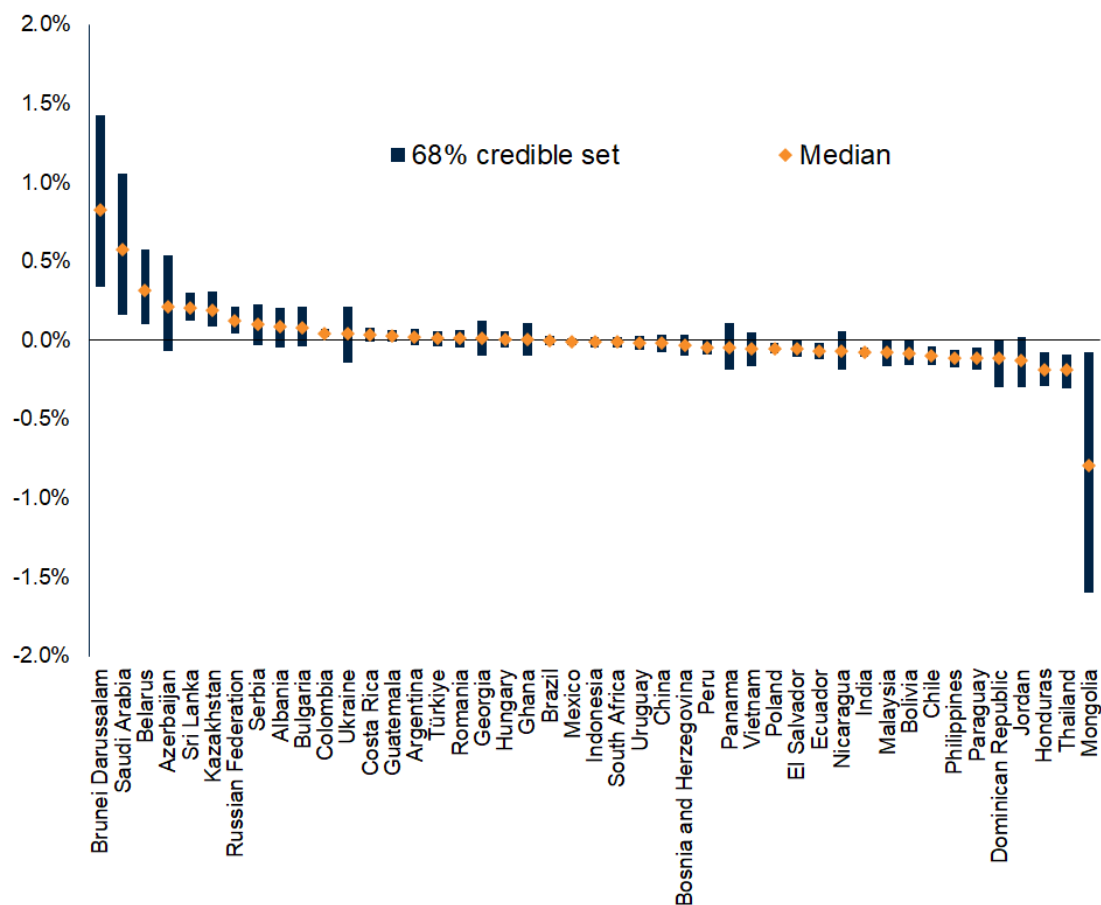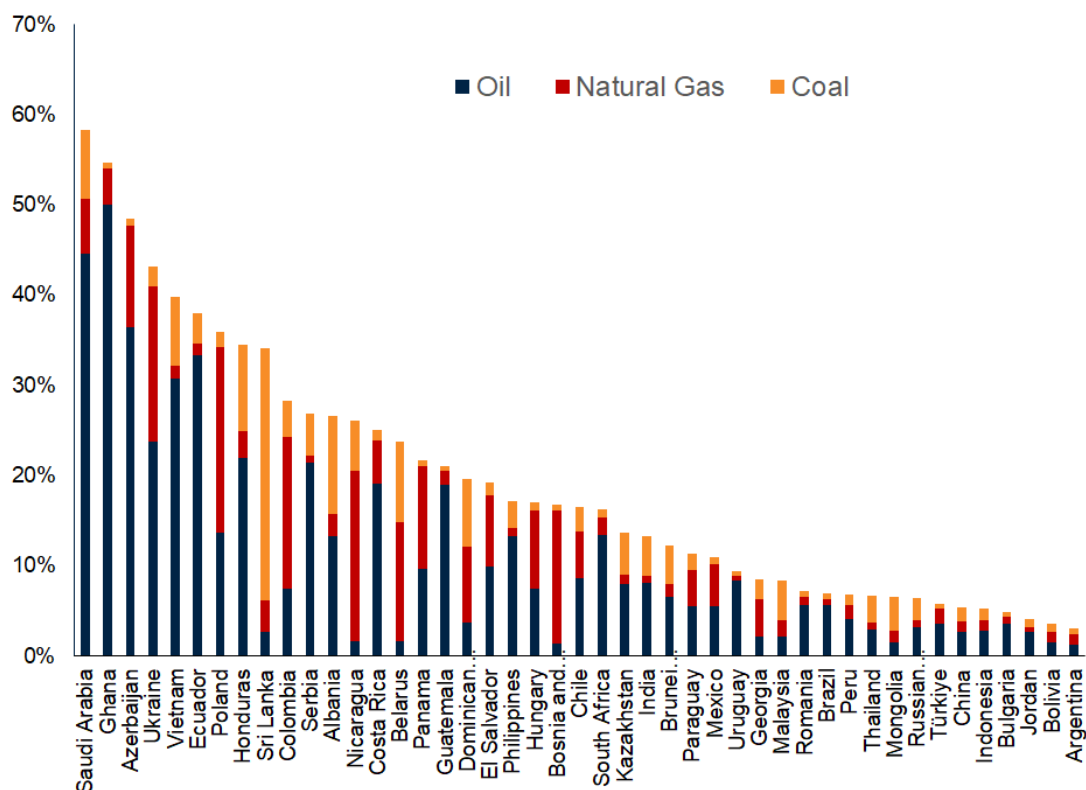
C. Robustness: oil exporters

D. Robustness: oil importers

Notes: Cumulative impulse responses of current account balances (percent of GDP) to one percentage point of a positive real oil price shock based on country-specific structural vector autoregression models, estimated for up to 45 EMDEs for 1992-2022. Solid lines show median (50th percentile), and dotted lines indicate 25th-75th percentiles of country-specific results (based on pooling all 1,000 draws across corresponding countries). The model used in Figure 3C-3D are as described in the robustness analysis in Section 3.1.

Figure 4. Cumulative impulse responses of real GDP to real oil price shocks for oil exporters versus oil importers: benchmark model with oil prices

A. Benchmark model: oil exporters

B. Benchmark model: oil importers

C. Robustness: oil exporters

D. Robustness: oil importers

Notes: Cumulative impulse responses of real GDP (growth) to one percentage point of a positive real oil price shock based on country-specific structural vector autoregression models, estimated for up to 45 EMDEs for 1992-2022. Solid lines show median (50th percentile), and dotted lines indicate 25th-75th percentiles of country-specific results (based on pooling all 1,000 draws across corresponding countries). The model used in Figure 4C-4D are as described in the robustness analysis in Section 3.1.

Figure 5. Cumulative impulse responses of current account balances to real oil price shocks for country groups: benchmark model with oil prices

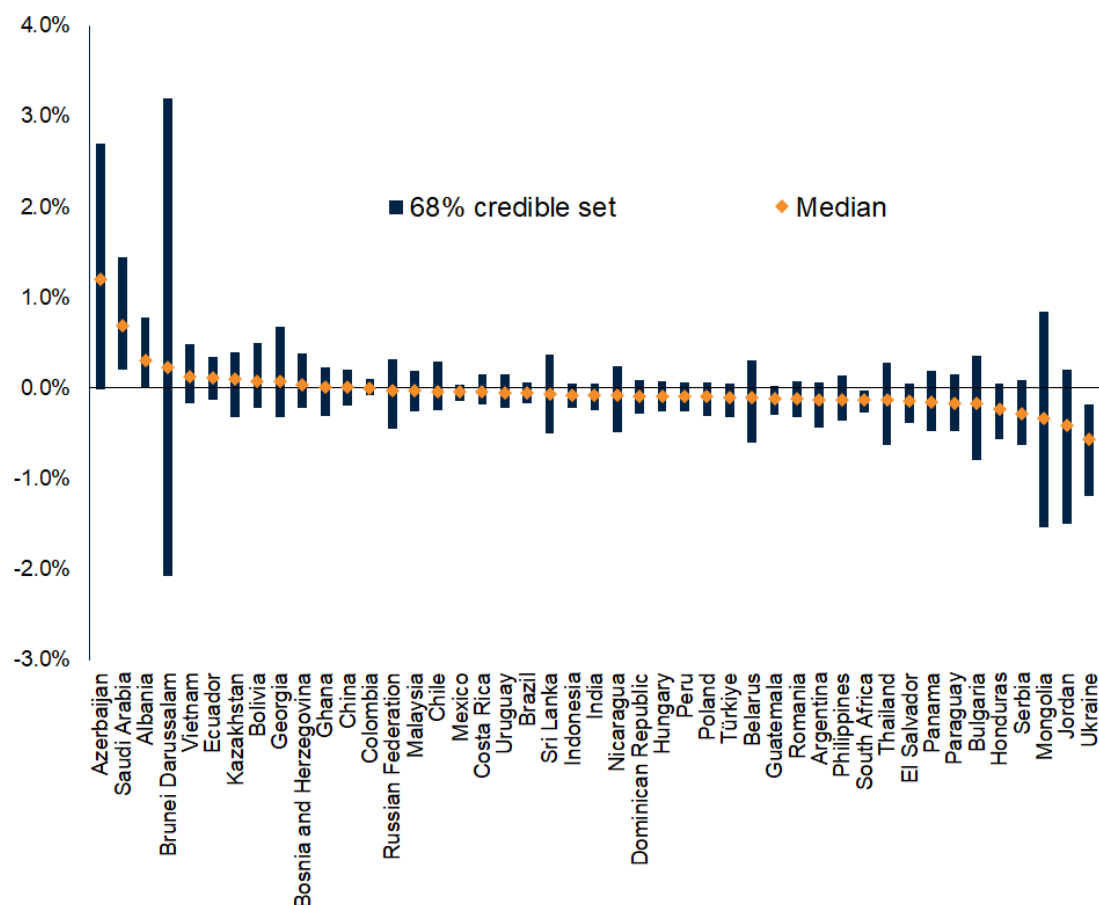### A. Oil exporters versus oil importers

B. Gas exporters versus gas importers

C. Coal exporters versus coal importers

D. Current account surplus versus current account deficit countries

E. Service-sector size

F. Capital account openness

Notes: Cumulative impulse responses of current account balances (percent of GDP) to one percentage point of a positive real oil price shock after five years based on country-specific structural vector autoregression models, estimated for 45 EMDEs for 1992-2022. Calculations are based on pooling all 1,000 draws across corresponding countries.

Figure 6. Contribution of real oil price shocks to the variance of current account balances
for country groups: benchmark model with oil prices

A. Oil exporters versus oil importers

B. Gas exporters versus gas importers

C. Coal exporters versus coal importers

D. Current account surplus versus current account deficit countries

E. Service-sector size
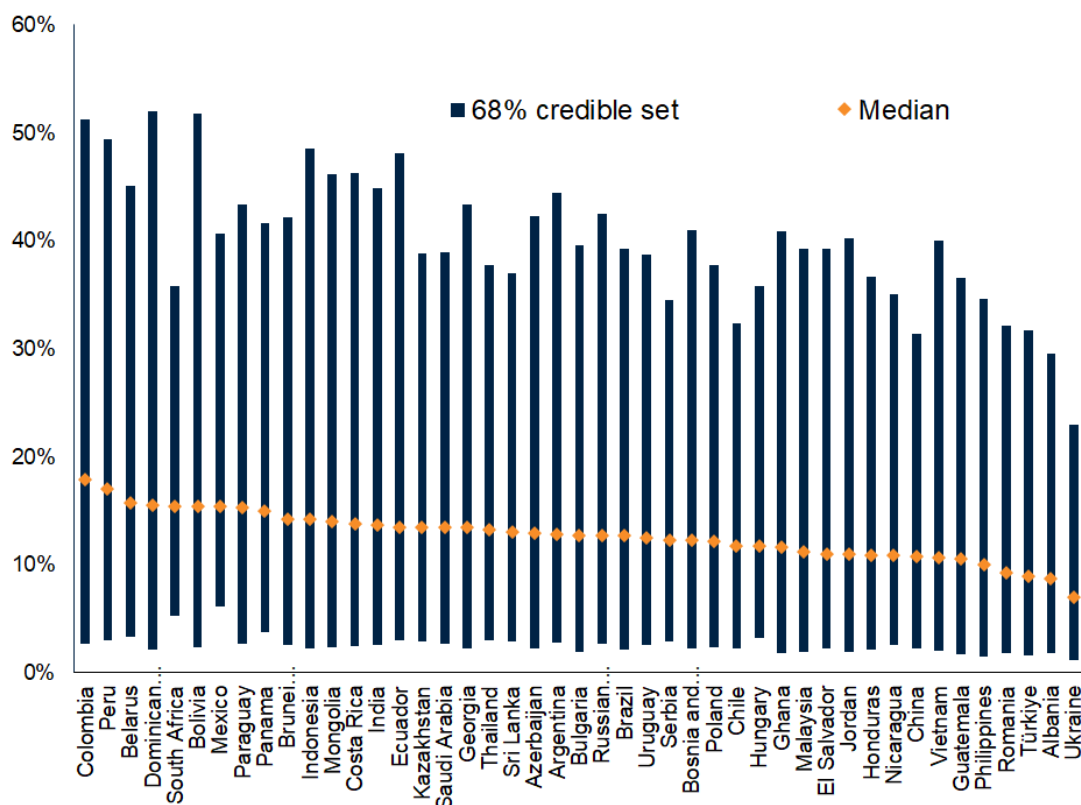

F. Capital account openness
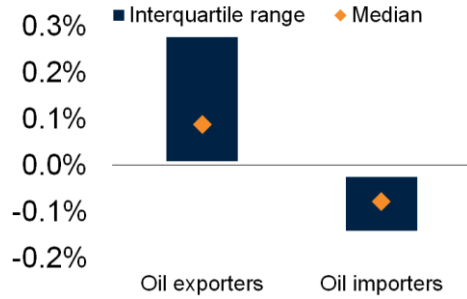

Notes: Median shares of country-specific variances of current account balances (percent of GDP) accounted for by real oil price shocks based on country-specific structural vector autoregression models, estimated for 45 EMDEs for 1992-2022. The calculations are based on forecast error variance decompositions after five years (by pooling all 1,000 draws across corresponding countries).
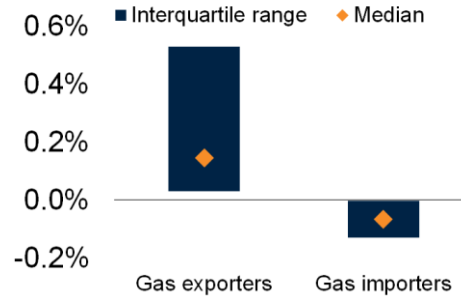
Figure 7. Cumulative impulse responses of current account balances to real oil price shocks for country groups: benchmark model with all energy prices

A. Oil exporters versus oil importers

B. Gas exporters versus gas importers

C. Coal exporters versus coal importers

D. Current account surplus versus current account deficit countries

E. Service-sector size

F. Capital account openness

Notes: Cumulative impulse responses of current account balances (percent of GDP) to one percentage point of a positive real oil price shock after five years based on country-specific structural vector autoregression models, estimated for 45 EMDEs for 1992-2022. Calculations are based on pooling all 1,000 draws across corresponding countries.

Figure 8. Cumulative impulse responses of current account balances to real natural gas price shocks for country groups: benchmark model with all energy prices
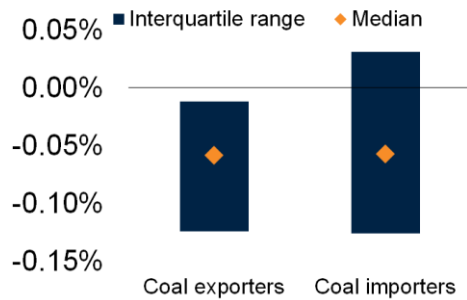
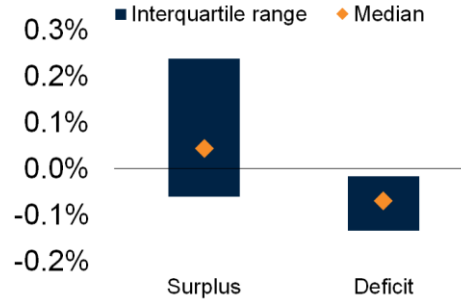A. Oil exporters versus oil importers
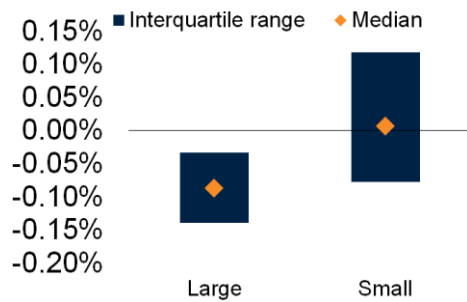

B. Gas exporters versus gas importers

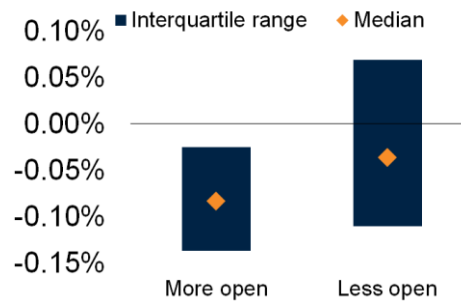C. Coal exporters versus coal importers

D. Current account surplus versus current account deficit countries

E. Service-sector size

F. Capital account openness

Notes: Cumulative impulse responses of current account balances (percent of GDP) to one percentage point of a positive real natural gas price shock after five years based on country-specific structural vector autoregression models, estimated for 45 EMDEs for 1992-2022. Calculations are based on pooling all 1,000 draws across corresponding countries.

Figure 9. Cumulative impulse responses of current account balances to real coal price shocks for country groups: benchmark model with all energy prices

A. Oil exporters versus oil importers

B. Gas exporters versus gas importers

C. Coal exporters versus coal importers

D. Current account surplus versus current account deficit countries
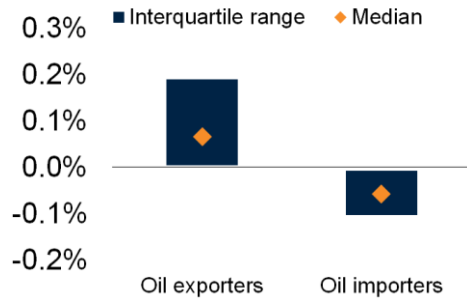

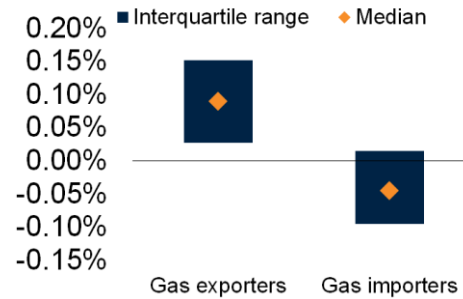### E. Service-sector size

F. Capital account openness

Notes: Cumulative impulse responses of current account balances (percent of GDP) to one percentage point of a positive real coal price shock after five years based on country-specific structural vector autoregression models, estimated for 45 EMDEs for 1992-2022. Calculations are based on pooling all 1,000 draws across corresponding countries.

Figure 10. Contribution of alternative real energy price shocks to current account balances of country groups: benchmark model with all energy prices
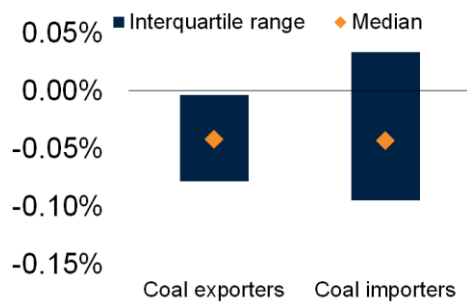
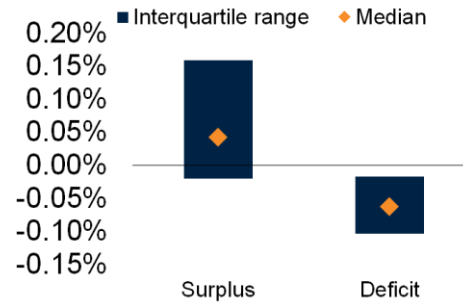### A. Oil exporters versus oil importers

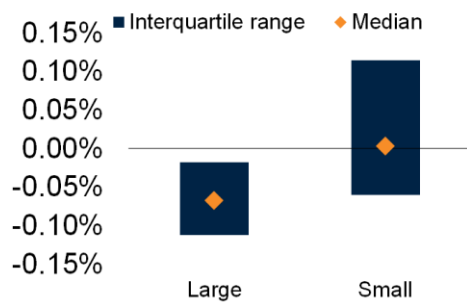### B. Gas exporters versus gas importers

C. Coal exporters versus coal importers

D. Current account surplus versus current account deficit countries

E. Service-sector size

F. Capital account openness

Notes: Median shares of country-specific variances of current account balances (percent of GDP) accounted for by alternative real energy price shocks based on country-specific structural vector autoregression models, estimated for 45 EMDEs for 1992-2022. The calculations are based on forecast error variance decompositions after five years (by pooling all 1,000 draws across corresponding countries).

Figure 11. Cumulative impulse responses of current account balances to oil demand shocks for country groups: benchmark model

A. Oil exporters versus oil importers

B. Gas exporters versus gas importers

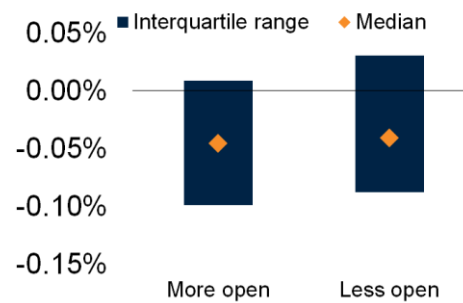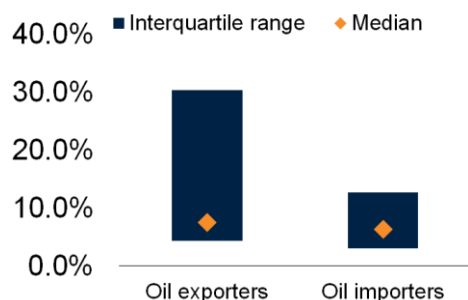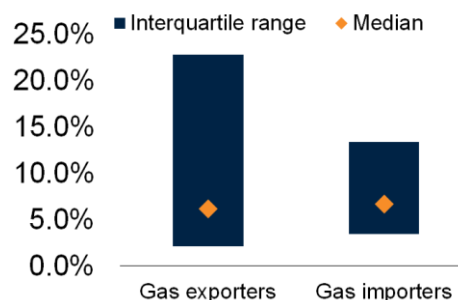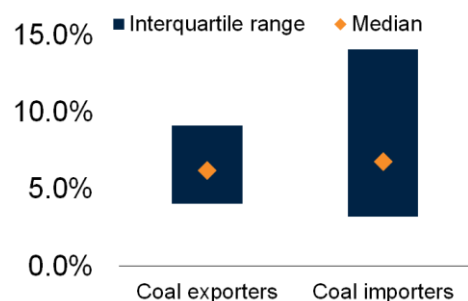### C. Coal exporters versus coal importers

D. Current account surplus versus current account deficit countries

E. Service-sector size

F. Capital account openness

Notes: Cumulative impulse responses of current account balances (percent of GDP) to oil demand shocks (after normalizing them to the equivalent of one percentage point of an increase in real oil prices) after five years based on country-specific structural vector autoregression models, estimated for 45 EMDEs for 1992-2022. Calculations are based on pooling all 1,000 draws across corresponding countries.

Figure 12. Contribution of oil demand shocks to the variance of current account balances for country groups: benchmark model

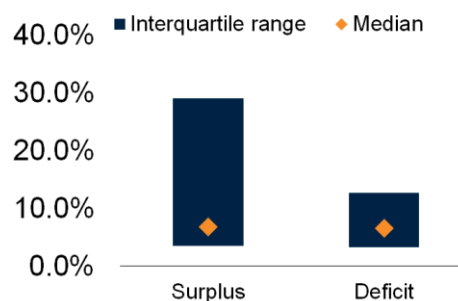### A. Oil exporters versus oil importers

B. Gas exporters versus gas importers
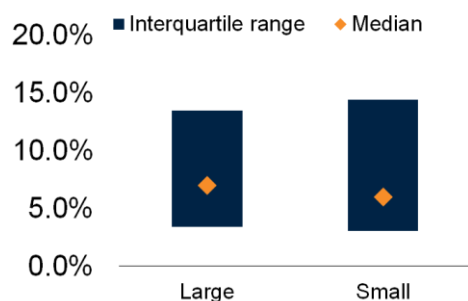

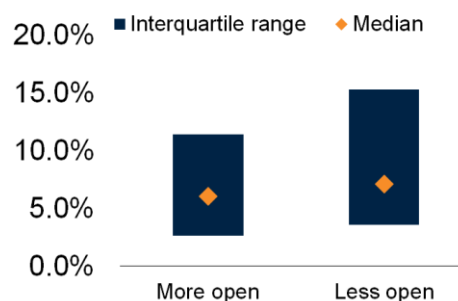### C. Coal exporters versus coal importers

D. Current account surplus versus current account deficit countries
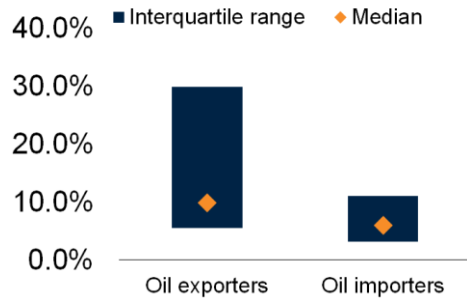

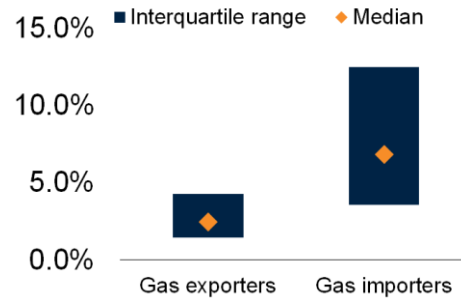### E. Service-sector size

F. Capital account openness

Notes: Median shares of country-specific variances of current account balances (percent of GDP) accounted for by oil demand shocks based on country-specific structural vector autoregression models, estimated for 45 EMDEs for 1992-2022. The calculations are based on forecast error variance decompositions after five years (by pooling all 1,000 draws across corresponding countries).

Figure 13. Cumulative impulse responses of current account balances to oil supply shocks for country groups: benchmark model
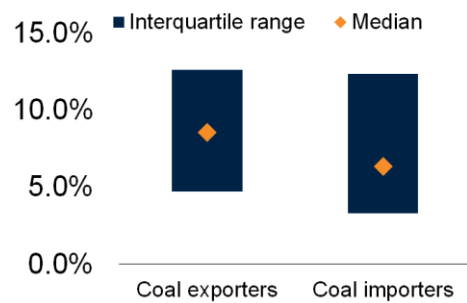
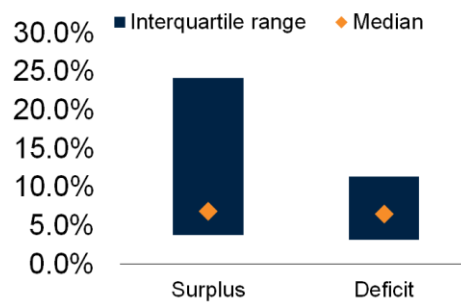### A. Oil exporters versus oil importers

B. Gas exporters versus gas importers
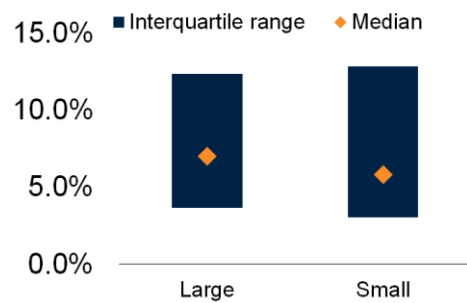

C. Coal exporters versus coal importers

D. Current account surplus versus current account deficit countries

E. Service-sector size

F. Capital account openness

Notes: Cumulative impulse responses of current account balances (percent of GDP) to oil supply shocks (after normalizing them to the equivalent of one percentage point of an increase in real oil prices) after five years based on country-specific structural vector autoregression models, estimated for 45 EMDEs for 1992-2022. Calculations are based on pooling all 1,000 draws across corresponding countries.

Figure 14. Contribution of oil supply shocks to the variance of current account balances for country groups: benchmark model

A. Oil exporters versus oil importers

B. Gas exporters versus gas importers

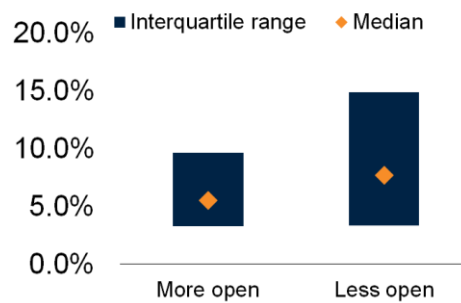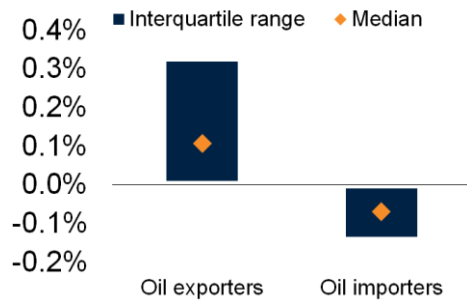### C. Coal exporters versus coal importers

D. Current account surplus versus current account deficit countries

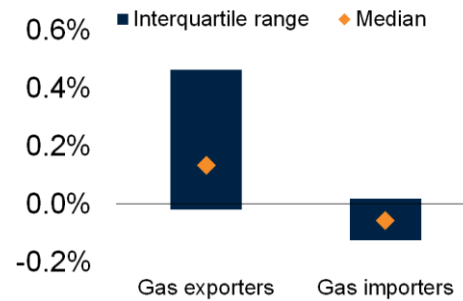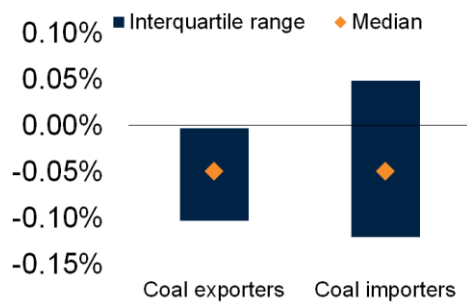### E. Service-sector size

F. Capital account openness

Notes: Median shares of country-specific variances of current account balances (percent of GDP) accounted for by oil supply shocks based on country-specific structural vector autoregression models, estimated for 45 EMDEs for 1992-2022. The calculations are based on forecast error variance decompositions after five years (by pooling all 1,000 draws across corresponding countries).

Figure 15. Cumulative impulse responses of current account balances to real oil price shocks for individual countries: benchmark model with oil prices

Notes: Cumulative impulse responses of current account balances (percent of GDP) to one percentage point of a positive real oil price shock after five years based on country-speci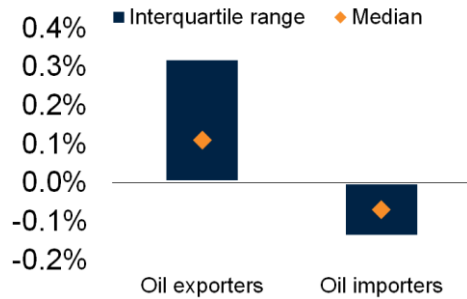fic structural vector autoregression models, estimated for 45 EMDEs for 1992-2022. Calculations are based on 1,000 draws for each country. Countries are ranked based on their median values.

Figure 16. Contribution of real oil price shocks to the variance of current account balances for individual countries: benchmark model with oil prices

Notes: Median shares of country-specific variances of current account balances (percent of GDP) accounted for by real oil price shocks based on country-specific structural vector autoregression models, estimated for 45 EMDEs for 1992-2022. The calculations are based on forecast error variance decompositions after five years (1,000 for each country). Countries are ranked based on their median values.

Figure 17. Cumulative impulse responses of current account balances to real oil price shocks for individual countries: benchmark model with all energy prices
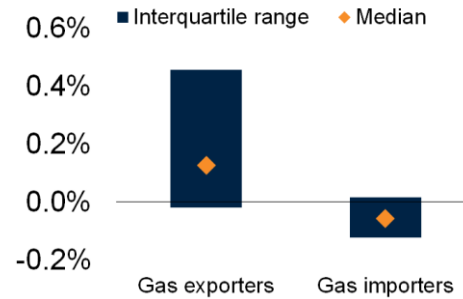

Notes: Cumulative impulse responses of current account balances (percent of GDP) to one percentage point of a positive real oil price shock after five years based on country-specific structural vector autoregression models, estimated for 45 EMDEs for 1992-2022. Calculations are based on 1,000 draws for each country. Countries are ranked based on their median values.

Figure 18. Cumulative impulse responses of current account balances to real natural gas price shocks for individual countries: benchmark model with all energy prices
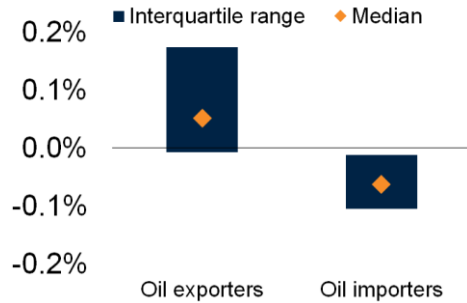

Notes: Cumulative impulse responses of current account balances (percent of GDP) to one percentage point of a positive real natural gas price shock after five years based on country-specific structural vector autoregression models, estimated for 45 EMDEs for 1992-2022. Calculations are based on 1,000 draws for each country. Countries are ranked based on their median values.

Figure 19. Cumulative impulse responses of current account balances to real coal price shocks for individual countries: benchmark model with all energy prices
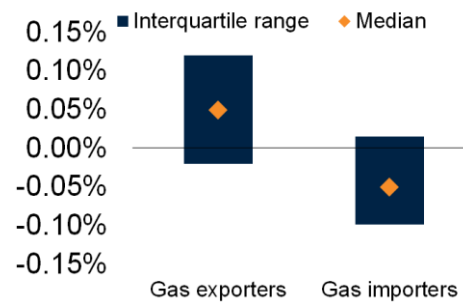

Notes: Cumulative impulse responses of current account balances (percent of GDP) to one percentage point of a positive real coal price shock after five years based on country-specific structural vector autoregression models, estimated for 45 EMDEs for 1992-2022. Calculations are based on 1,000 draws for each country. Countries are ranked based on their median values.

Figure 20. Contribution of alternative energy price shocks to current account balances of individual countries: benchmark model with all energy prices

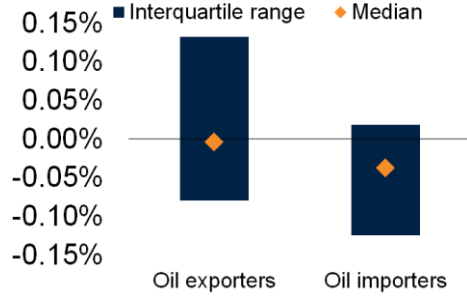Notes: Median shares of country-specific variances of current account balances (percent of GDP) accounted for by alternative real energy price shocks based on country-specific structural vector autoregression models, estimated for 45 EMDEs for 1992-2022. The calculations are based on forecast error variance decompositions after five years (1,000 for each country). Countries are ranked based on their total median values.

Figure 21. Cumulative impulse responses of current account balances to oil demand shocks for individual countries: benchmark model

Notes: Cumulative impulse responses of current account balances (percent of GDP) to oil demand shocks (after normalizing them to the equivalent of one percentage point of an increase in real oil prices) after five years based on country-specific structural vector autoregression models, estimated for 45 EMDEs for 1992-2022. Calculations are based on 1,000 draws for each country. Countries are ranked based on their median values.

Figure 22. Contribution of oil demand shocks to the variance of current account balances
for individual countries: benchmark model

Notes: Median shares of country-specific variances of current account balances (percent of GDP) accounted for by oil demand shocks based on country-specific structural vector autoregression models, estimated for 45 EMDEs for 1992-2022. The calculations are based on forecast error variance decompositions after five years (1,000 draws for each country). Countries are ranked based on their median values.

Figure 23. Cumulative impulse responses of current account balances to oil supply shocks for individual countries: benchmark model

Notes: Cumulative impulse responses of current account balances (percent of GDP) to oil supply shocks (after normalizing them to the equivalent of one percentage point of an increase in real oil prices) after five years based on country-specific structural vector autoregression models, estimated for 45 EMDEs for 1992-2022. Calculations are based on 1,000 draws for each country. Countries are ranked based on their median values.

Figure 24. Contribution of oil supply shocks to the variance of current account balances for individual countries: benchmark model

Notes: Median shares of country-specific variances of current account balances (percent of GDP) accounted for by oil supply shocks based on country-specific structural vector autoregression models, estimated for 45 EMDEs for 1992-2022. The calculations are based on forecast error variance decompositions after five years (1,000 draws for each country). Countries are ranked based on their median values.

Figure A.1. Cumulative impulse responses of current account balances to real oil price shocks for country groups: robustness #1 with oil prices
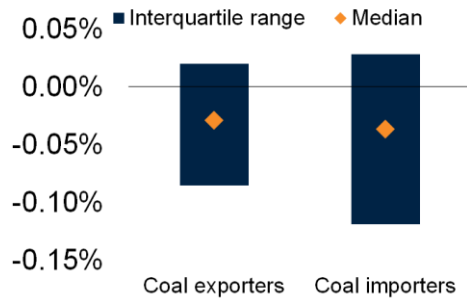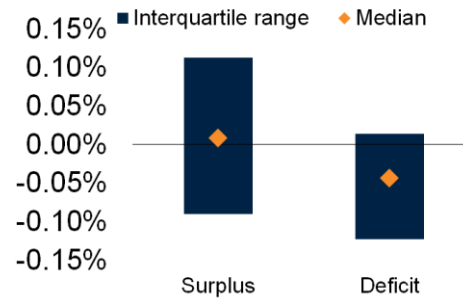
A. Oil exporters versus oil importers

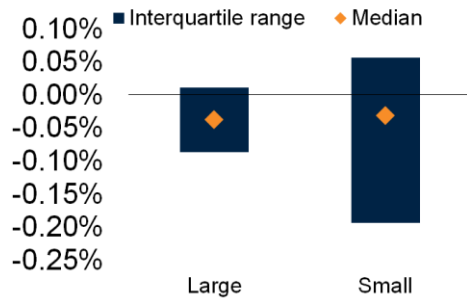B. Gas exporters versus gas importers

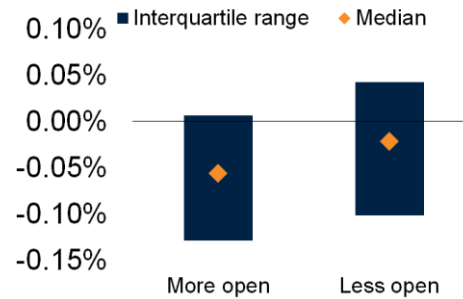C. Coal exporters versus coal importers

D. Current account surplus versus current account deficit countries
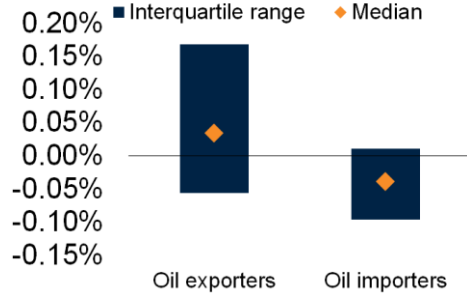

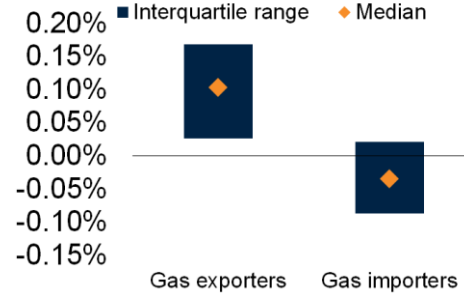E. Service-sector size

F. Capital account openness

Notes: Cumulative impulse responses of current account balances (percent of GDP) to one percentage point of a positive real oil price shock after five years based on country-specific structural vector autoregression models, estimated for 45 EMDEs for 1992-2022. Calculations are based on pooling all 1,000 draws across corresponding countries.

Figure A.2. Cumulative impulse responses of current account balances to real oil price shocks for country groups: robustness #2 with oil prices
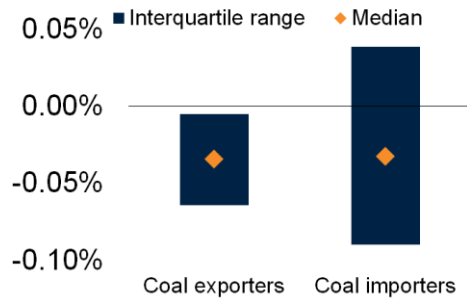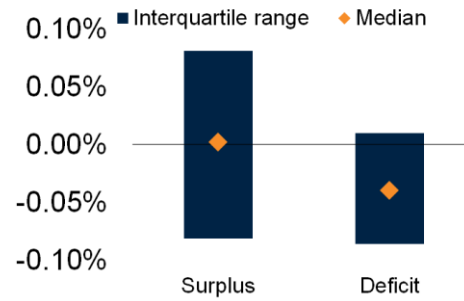
A. Oil exporters versus oil importers

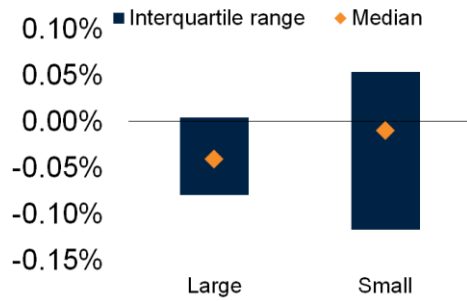B. Gas exporters versus gas importers

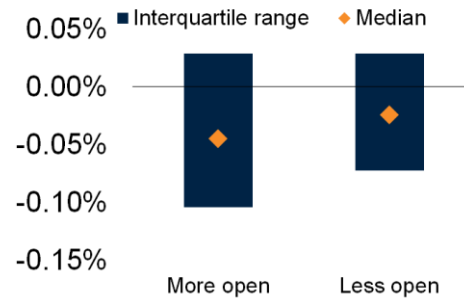C. Coal exporters versus coal importers

D. Current account surplus versus current account deficit countries

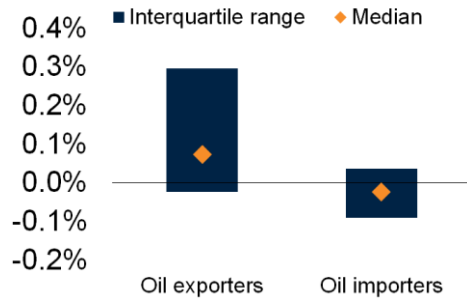E. Service-sector size

F. Capital account openness
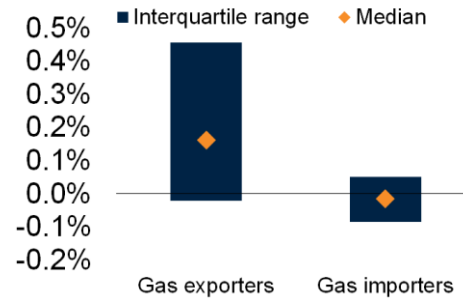

Notes: Cumulative impulse responses of current account balances (percent of GDP) to one percentage point of a positive real oil price shock after five years based on country-specific structural vector autoregression models, estimated for 29 EMDEs for 1992-2022. Calculations are based on pooling all 1,000 draws across corresponding countries.

Figure A.3. Contribution of real oil price shocks to the variance of current account balances for country groups: robustness #1 with oil prices

A. Oil exporters versus oil importers

B. Gas exporters versus gas importers

C. Coal exporters versus coal importers

D. Current account surplus versus current account deficit countries

E. Service-sector size

F. Capital account openness

Notes: Median shares of country-specific variances of current account balances (percent of GDP) accounted for by real oil price shocks based on country-specific structural vector autoregression models, estimated for 45 EMDEs for 1992-2022. The calculations are based on forecast error variance decompositions after five years (by pooling all 1,000 draws across corresponding countries).

Figure A.4. Contribution of real oil price shocks to the variance of current account balances for country groups: robustness #2 with oil prices
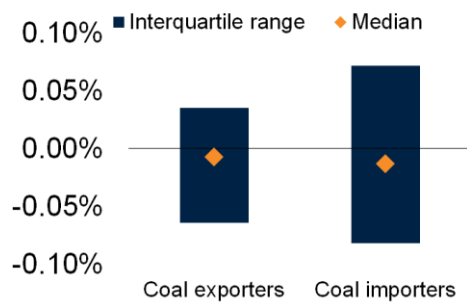
A. Oil exporters versus oil importers

B. Gas exporters versus gas importers

C. Coal exporters versus coal importers

D. Current account surplus versus current account deficit countries

E. Service-sector size

F. Capital account openness

Notes: Median shares of country-specific variances of current account balances (percent of GDP) accounted for by real oil price shocks based on country-specific structural vector autoregression models, estimated for 29 EMDEs for 1992-2022. The calculations are based on forecast error variance decompositions after five years (by pooling all 1,000 draws across corresponding countries).

Figure A.5. Cumulative impulse responses of current account balances to real oil price shocks for country groups: robustness #1 with all energy prices
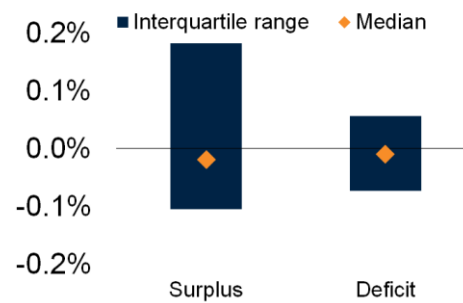
A. Oil exporters versus oil importers

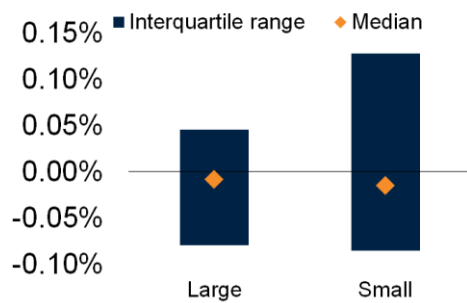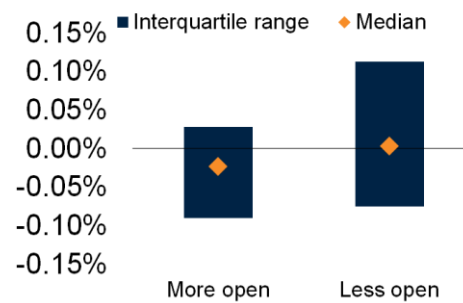
B. Gas exporters versus gas importers

C. Coal exporters versus coal importers

D. Current account surplus versus current account deficit countries
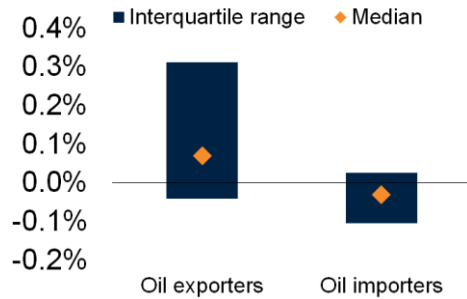

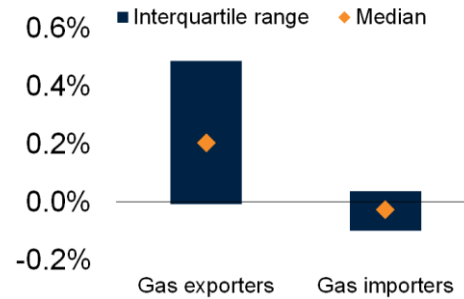### E. Service-sector size

F. Capital account openness

Notes: Cumulative impulse responses of current account balances (percent of GDP) to one percentage point of a positive real oil price shock after five years based on country-specific structural vector autoregression models, estimated for 45 EMDEs for 1992-2022. Calculations are based on pooling all 1,000 draws across corresponding countries.

Figure A.6. Cumulative impulse responses of current account balances to real oil price shocks for country groups: robustness #2 with all energy prices
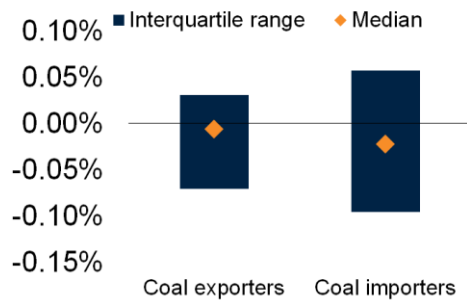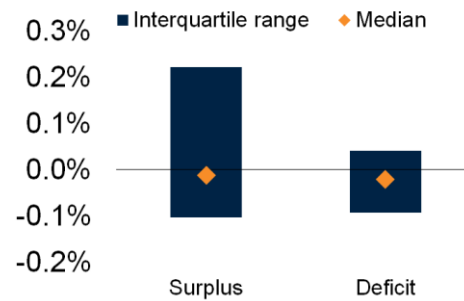
A. Oil exporters versus oil importers

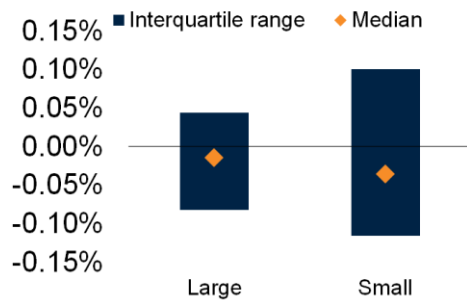### B. Gas exporters versus gas importers

C. Coal exporters versus coal importers

D. Current account surplus versus current account deficit countries

E. Service-sector size

F. Capital account openness

Notes: Cumulative impulse responses of current account balances (percent of GDP) to one percentage point of a positive real oil price shock after five years based on country-specific structural vector autoregression models, estimated for 45 EMDEs for 1992-2022. Calculations are based on pooling all 1,000 draws across corresponding countries.

Figure A.7. Cumulative impulse responses of current account balances to real oil price shocks for country groups: robustness #3 with all energy prices

A. Oil exporters versus oil importers

B. Gas exporters versus gas importers

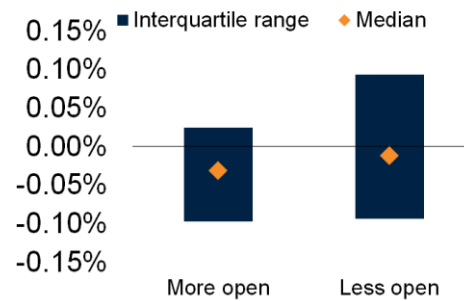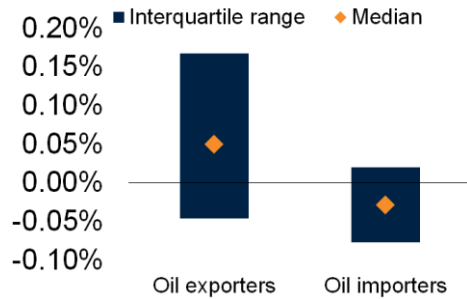

C. Coal exporters versus coal importers

D. Current account surplus versus current account deficit countries

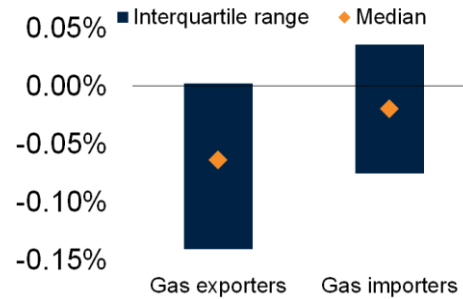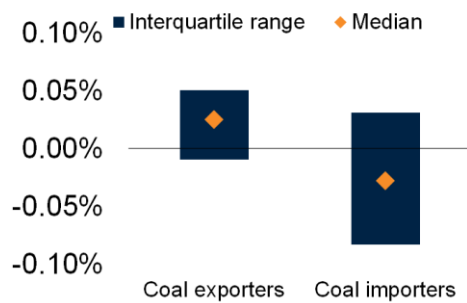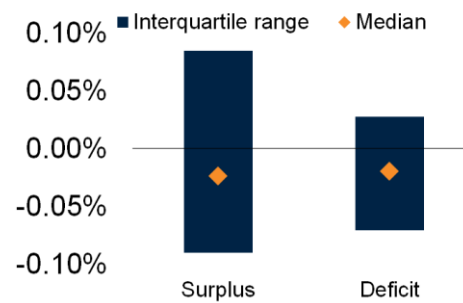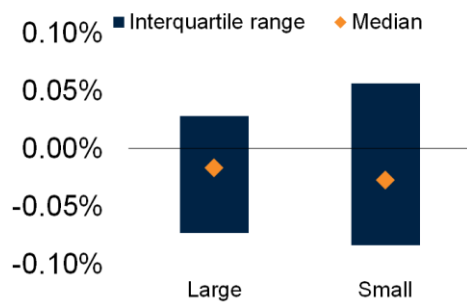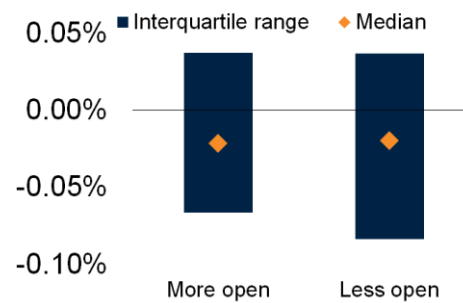E. Service-sector size

F. Capital account openness

Notes: Cumulative impulse responses of current account balances (percent of GDP) to one percentage point of a positive real oil price shock after five years based on country-specific structural vector autoregression models, estimated for 29 EMDEs for 1992-2022. Calculations are based on pooling all 1,000 draws across corresponding countries.

Figure A.8. Cumulative impulse responses of current account balances to real natural gas price shocks for country groups: robustness #1 with all energy prices

A. Oil exporters versus oil importers

B. Gas exporters versus gas importers

C. Coal exporters versus coal importers

D. Current account surplus versus current account deficit countries

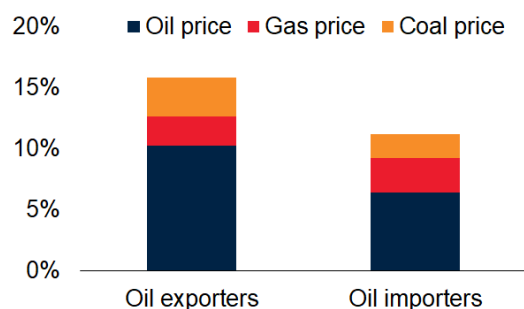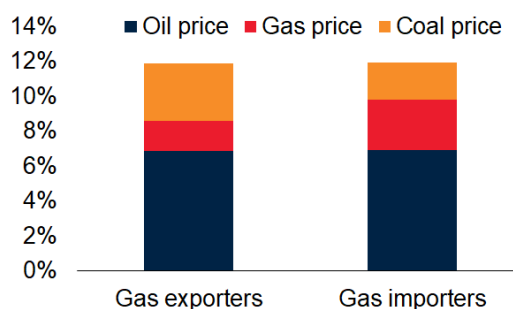### E. Service-sector size

F. Capital account openness

Notes: Cumulative impulse responses of current account balances (percent of GDP) to one percentage point of a positive real natural gas price shock after five years based on country-specific structural vector autoregression models, estimated for 45 EMDEs for 1992-2022. Calculations are based on pooling all 1,000 draws across corresponding countries.

Figure A.9. Cumulative impulse responses of current account balances to real natural gas price shocks for country groups: robustness #2 with all energy prices
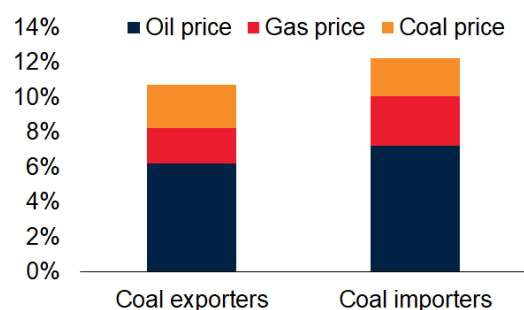
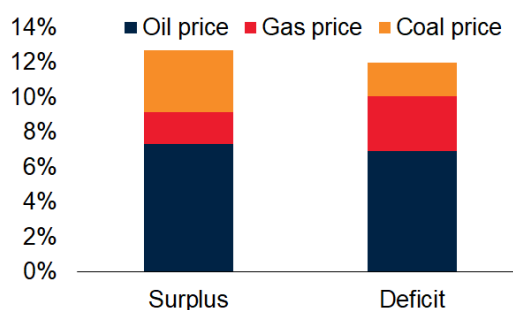### A. Oil exporters versus oil importers

B. Gas exporters versus gas importers
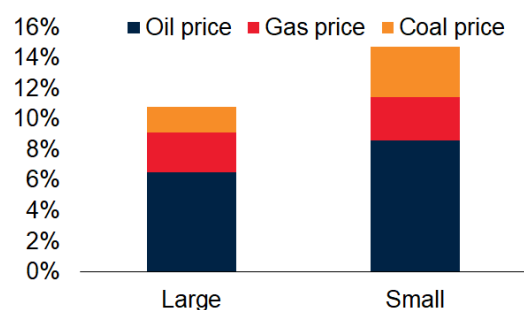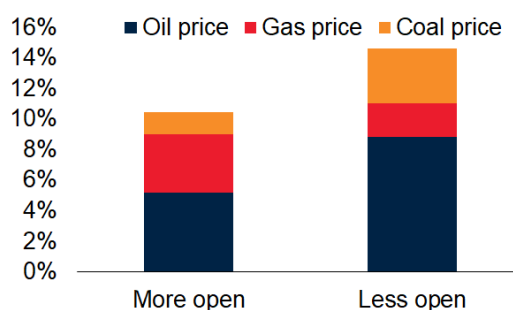

C. Coal exporters versus coal importers

D. Current account surplus versus current account deficit countries

E. Service-sector size

F. Capital account openness

Notes: Cumulative impulse responses of current account balances (percent of GDP) to one percentage point of a positive real natural gas price shock after five years based on country-specific structural vector autoregression models, estimated for 45 EMDEs for 1992-2022. Calculations are based on pooling all 1,000 draws across corresponding countries.

Figure A.10. Cumulative impulse responses of current account balances to real natural gas price shocks for country groups: robustness #3 with all energy prices

A. Oil exporters versus oil importers

B. Gas exporters versus gas importers

C. Coal exporters versus coal importers

D. Current account surplus versus current account deficit countries
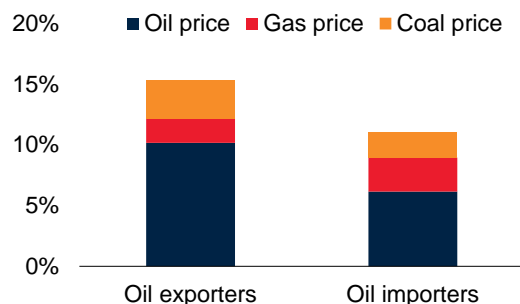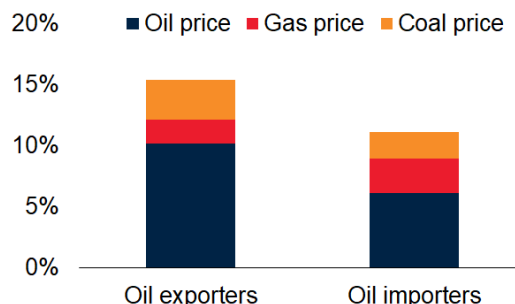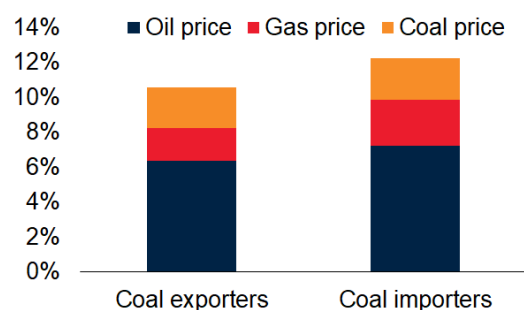

E. Service-sector size

F. Capital account openness

Notes: Cumulative impulse responses of current account balances (percent of GDP) to one percentage point of a positive real natural gas price shock after five years based on country-specific structural vector autoregression models, estimated for 29 EMDEs for 1992-2022. Calculations are based on pooling all 1,000 draws across corresponding countries.

Figure A.11. Cumulative impulse responses of current account balances to real coal price shocks for country groups: robustness #1 with all energy prices

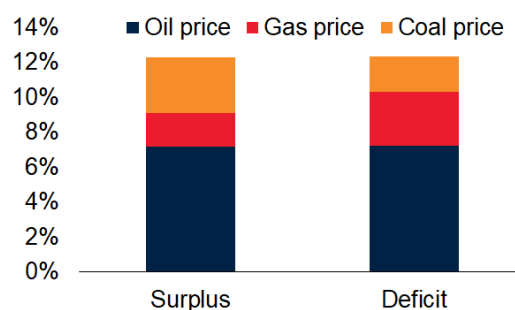### A. Oil exporters versus oil importers

B. Gas exporters versus gas importers

C. Coal exporters versus coal importers

D. Current account surplus versus current account deficit countries

E. Service-sector size

F. Capital account openness

Notes: Cumulative impulse responses of current account balances (percent of GDP) to one percentage point of a positive real coal price shock after five years based on country-specific structural vector autoregression models, estimated for 45 EMDEs for 1992-2022. Calculations are based on pooling all 1,000 draws across corresponding countries.

Figure A.12. Cumulative impulse responses of current account balances to real coal price shocks for country groups: robustness #2 with all energy prices

A. Oil exporters versus oil importers

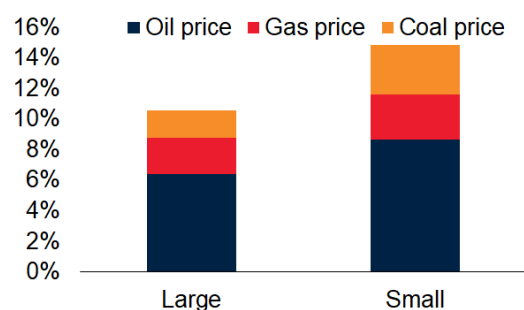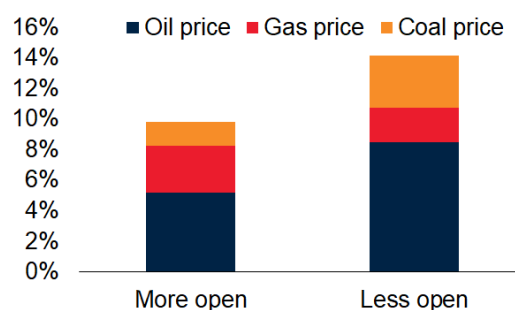B. Gas exporters versus gas importers

C. Coal exporters versus coal importers

D. Current account surplus versus current account deficit countries
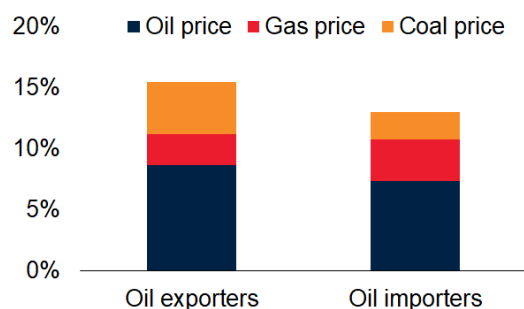

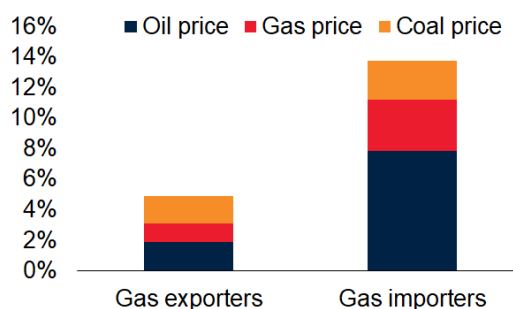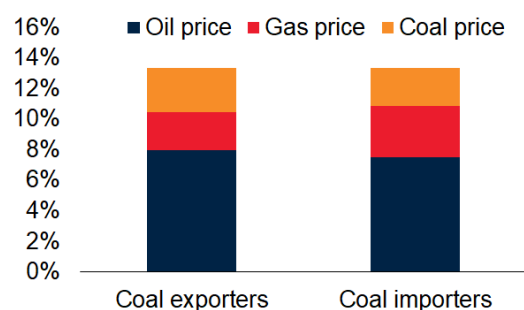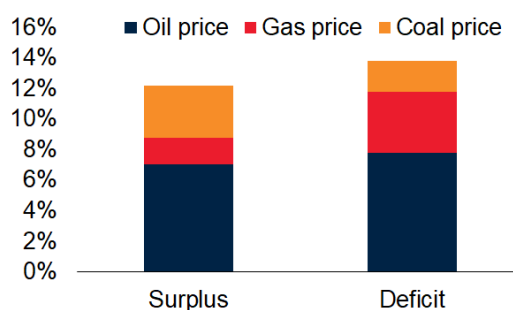E. Service-sector size

F. Capital account openness

Notes: Cumulative impulse responses of current account balances (percent of GDP) to one percentage point of a positive real coal price shock after five years based on country-specific structural vector autoregression models, estimated for 45 EMDEs for 1992-2022. Calculations are based on pooling all 1,000 draws across corresponding countries.

Figure A.13. Cumulative impulse responses of current account balances to real coal price shocks for country groups: robustness #3 with all energy prices

A. Oil exporters versus oil importers

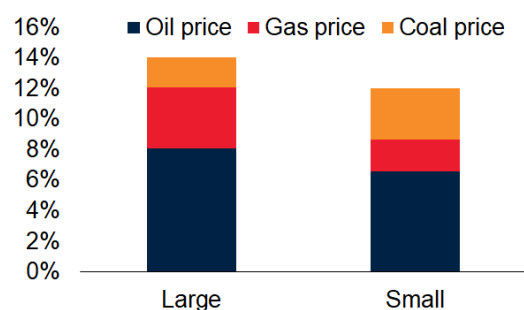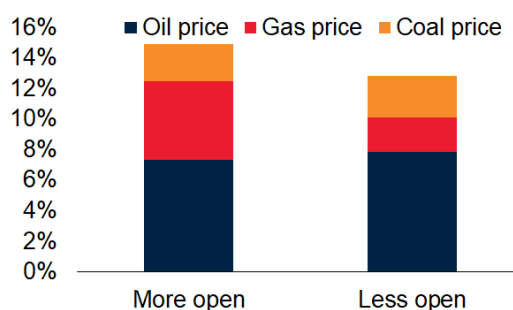B. Gas exporters versus gas importers

C. Coal exporters versus coal importers

D. Current account surplus versus current account deficit countries
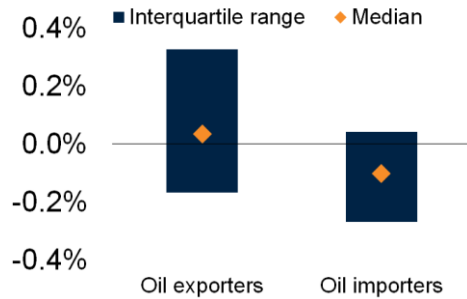

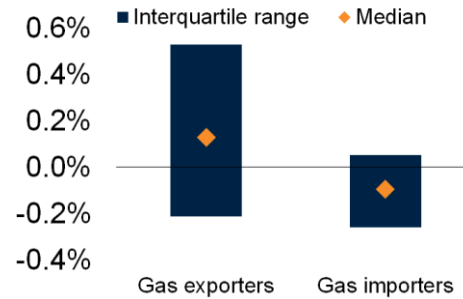E. Service-sector size

F. Capital account openness

Notes: Cumulative impulse responses of current account balances (percent of GDP) to one percentage point of a positive real coal price shock after five years based on country-specific structural vector autoregression models, estimated for 29 EMDEs for 1992-2022. Calculations are based on pooling all 1,000 draws across corresponding countries.

Figure A.14. Contribution of alternative energy price shocks to current account balances of country groups: robustness #1 with all energy prices
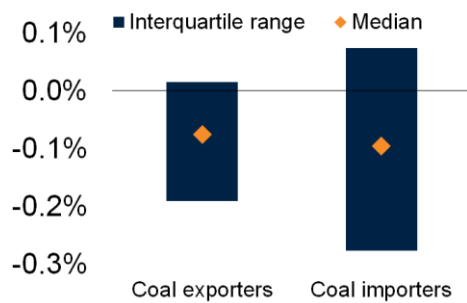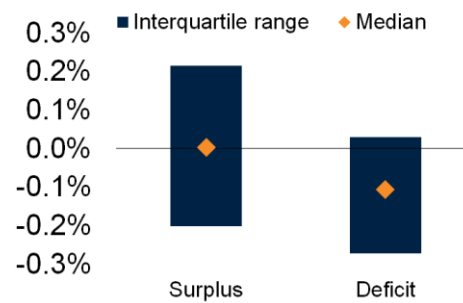
A. Oil exporters versus oil importers
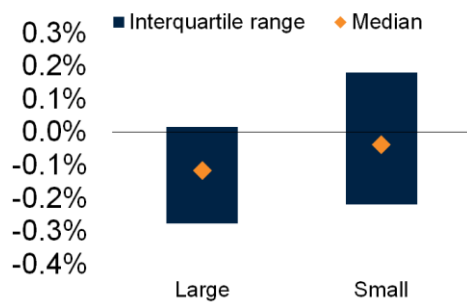
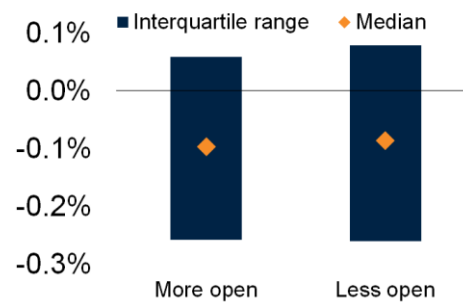B. Gas exporters versus gas importers

C. Coal exporters versus coal importers

D. Current account surplus versus current account deficit countries
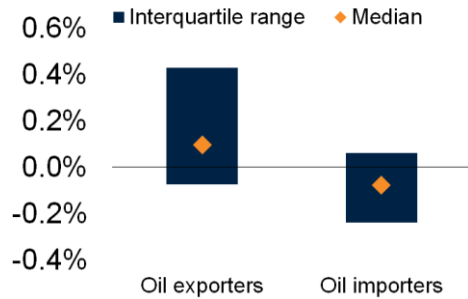
E. Service-sector size

F. Capital account openness

Notes: Median shares of country-specific variances of current account balances (percent of GDP) accounted for by alternative real energy price shocks based on country-specific structural vector autoregression models, estimated for 45 EMDEs for 1992-2022. The calculations are based on forecast error variance decompositions after five years (by pooling all 1,000 draws across corresponding countries).

Figure A.15. Contribution of alternative energy price shocks to current account balances of country groups: robustness #2 with all energy prices

A. Oil exporters versus oil importers

B. Gas exporters versus gas importers

C. Coal exporters versus coal importers

D. Current account surplus versus current account deficit countries
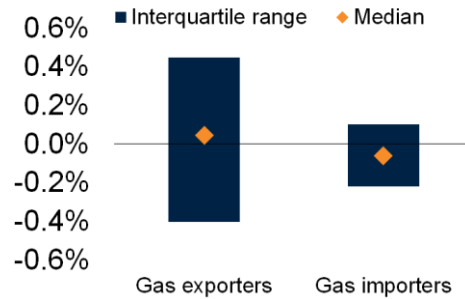

E. Service-sector size

F. Capital account openness

Notes: Median shares of country-specific variances of current account balances (percent of GDP) accounted for by alternative real energy price shocks based on country-specific structural vector autoregression models, estimated for 45 EMDEs for 1992-2022. The calculations are based on forecast error variance decompositions after five years (by pooling all 1,000 draws across corresponding countries).

Figure A.16. Contribution of alternative energy price shocks to current account balances of country groups: robustness #3 with all energy prices
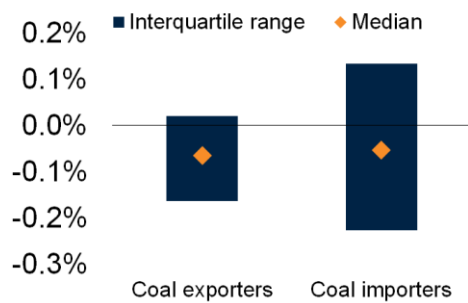
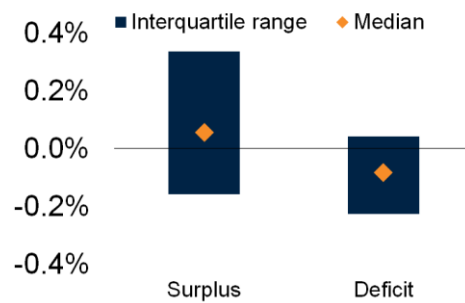### A. Oil exporters versus oil importers

B. Gas exporters versus gas importers

C. Coal exporters versus coal importers

D. Current account surplus versus current account deficit countries

E. Service-sector size

F. Capital account openness

Notes: Median shares of country-specific variances of current account balances (percent of GDP) accounted for by alternative real energy price shocks based on country-specific structural vector autoregression models, estimated for 29 EMDEs for 1992-2022. The calculations are based on forecast error variance decompositions after five years (by pooling all 1,000 draws across corresponding countries).

Figure A.17. Cumulative impulse responses of current account balances to oil demand shocks for country groups: robustness #1

A. Oil exporters versus oil importers
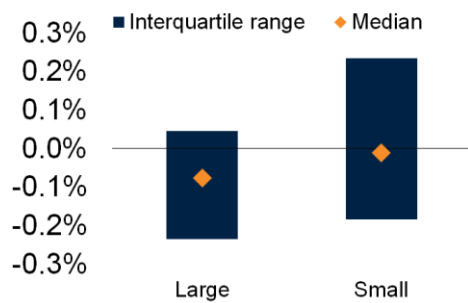

B. Gas exporters versus gas importers

C. Coal exporters versus coal importers
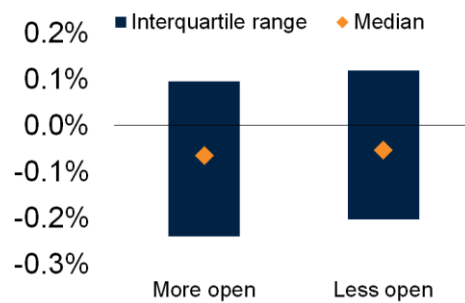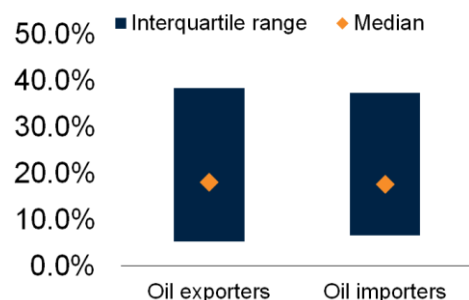

D. Current account surplus versus current account deficit countries
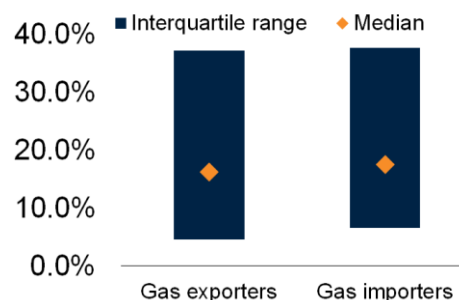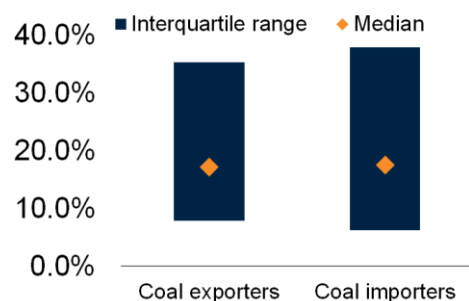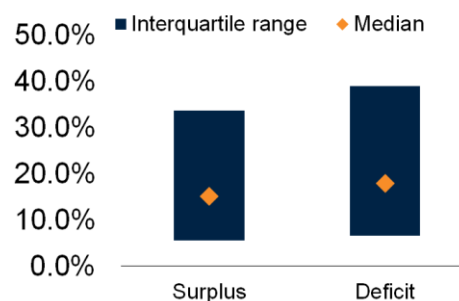

E. Service-sector size

F. Capital account openness

Notes: Cumulative impulse responses of current account balances (percent of GDP) oil demand shocks (after normalizing them to the equivalent of one percentage point of an increase in oil prices) after five years based on country-specific structural vector autoregression models, estimated for 45 EMDEs for 1992-2022. Calculations are based on pooling all 1,000 draws across corresponding countries.

Figure A.18. Cumulative impulse responses of current account balances to oil demand shocks for country groups: robustness #2

A. Oil exporters versus oil importers

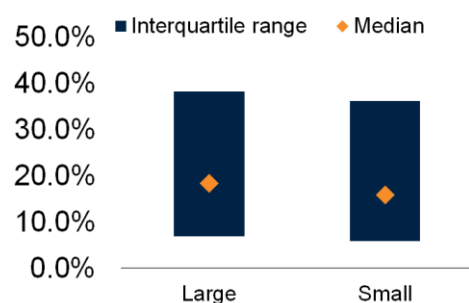### B. Gas exporters versus gas importers
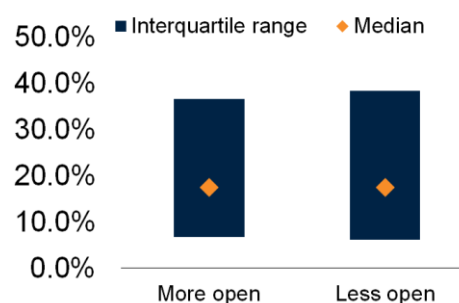

C. Coal exporters versus coal importers

D. Current account surplus versus current account deficit countries
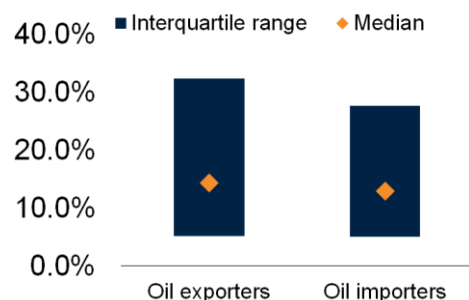

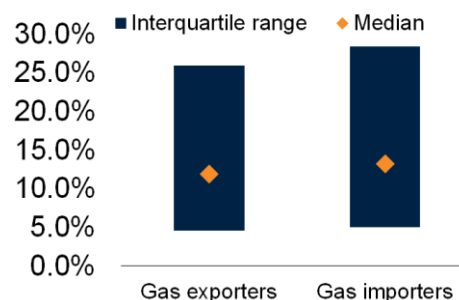### E. Service-sector size

F. Capital account openness

Notes: Cumulative impulse responses of current account balances (percent of GDP) oil demand shocks (after normalizing them to the equivalent of one percentage point of an increase in oil prices) after five years based on country-specific structural vector autoregression models, estimated for 29 EMDEs for 1992-2022. Calculations are based on pooling all 1,000 draws across corresponding countries.

Figure A.19. Contribution of oil demand shocks to the variance of current account balances for country groups: robustness #1
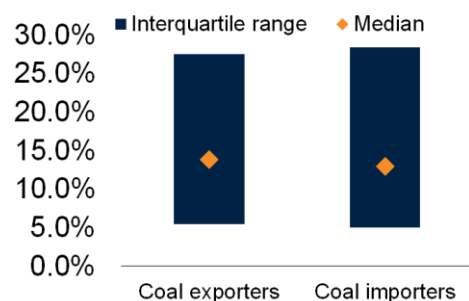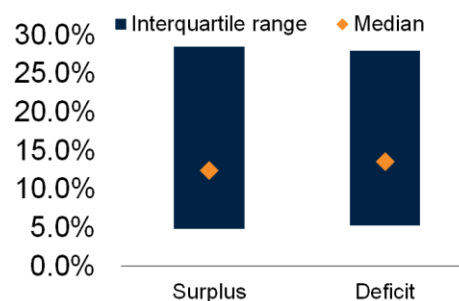
A. Oil exporters versus oil importers

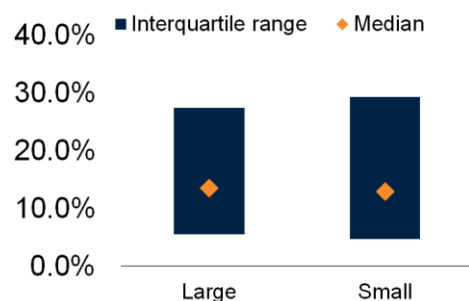

B. Gas exporters versus gas importers

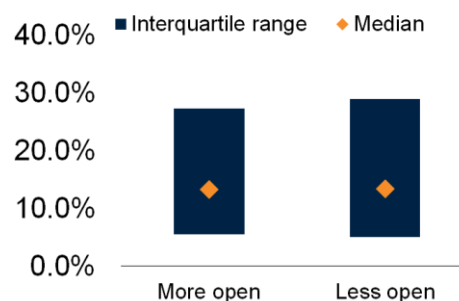### C. Coal exporters versus coal importers

D. Current account surplus versus current account deficit countries
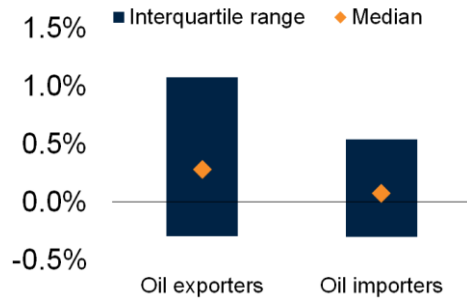

E. Service-sector size

F. Capital account openness

Notes: Median shares of country-specific variances of current account balances (percent of GDP) accounted for by oil demand shocks based on country-specific structural vector autoregression models, estimated for 45 EMDEs for 1992-2022. The calculations are based on forecast error variance decompositions after five years (by pooling all 1,000 draws across corresponding countries).

Figure A.20. Contribution of oil demand shocks to the variance of current account balances for country groups: robustness #2

A. Oil exporters versus oil importers

B. Gas exporters versus gas importers

C. Coal exporters versus coal importers

D. Current account surplus versus current account deficit countries

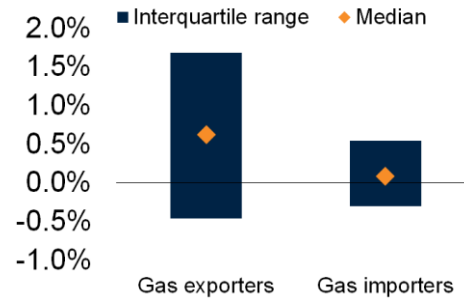### E. Service-sector size

F. Capital account openness

Notes: Median shares of country-specific variances of current account balances (percent of GDP) accounted for by oil demand shocks based on country-specific structural vector autoregression models, estimated for 29 EMDEs for 1992-2022. The calculations are based on forecast error variance decompositions after five years (by pooling all 1,000 draws across corresponding countries).

Figure A.21. Cumulative impulse responses of current account balances to oil supply shocks for country groups: robustness #1
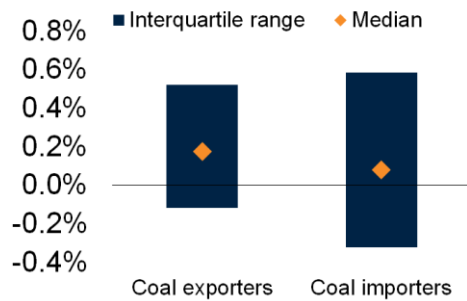
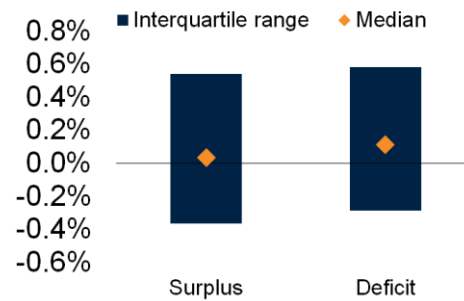### A. Oil exporters versus oil importers

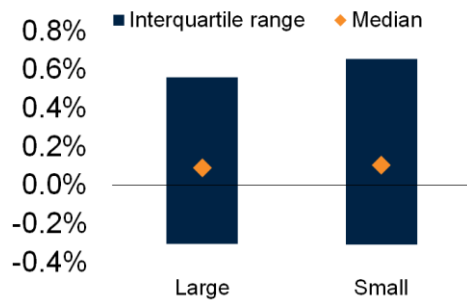

B. Gas exporters versus gas importers

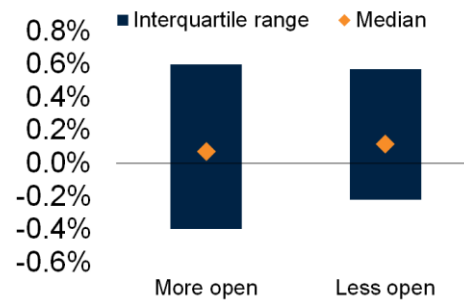### C. Coal exporters versus coal importers

D. Current account surplus versus current account deficit countries
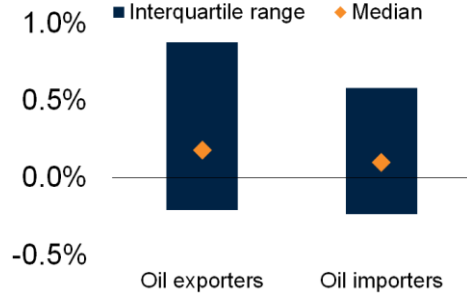

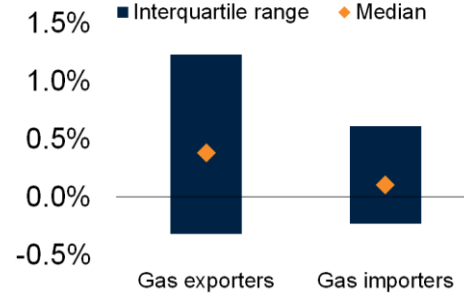### E. Service-sector size

F. Capital account openness

Notes: Cumulative impulse responses of current account balances (percent of GDP) to oil supply shocks (after normalizing them to the equivalent of one percentage point of an increase in oil prices) after five years based on country-specific structural vector autoregression models, estimated for 45 EMDEs for 1992-2022. Calculations are based on pooling all 1,000 draws across corresponding countries.

Figure A.22. Cumulative impulse responses of current account balances to oil supply shocks for country groups: robustness #2
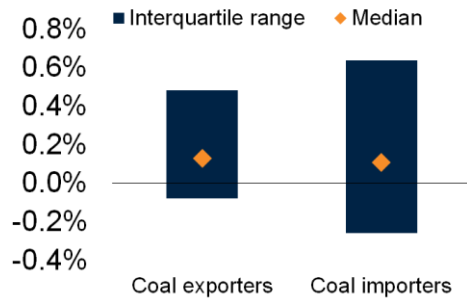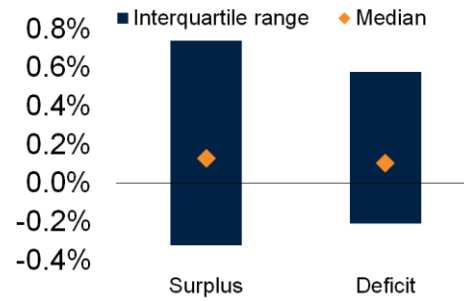
A. Oil exporters versus oil importers

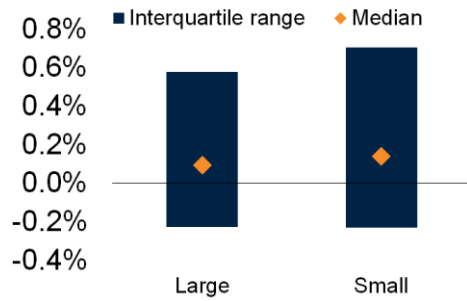

B. Gas exporters versus gas importers

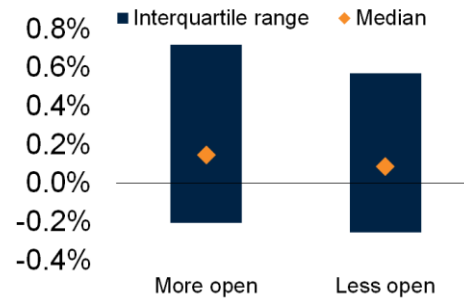### C. Coal exporters versus coal importers

D. Current account surplus versus current account deficit countries

E. Service-sector size

F. Capital account openness

Notes: Cumulative impulse responses of current account balances (percent of GDP) to oil supply shocks (after normalizing them to the equivalent of one percentage point of an increase in oil prices) after five years based on country-specific structural vector autoregression models, estimated for 29 EMDEs for 1992-2022. Calculations are based on pooling all 1,000 draws across corresponding countries.

Figure A.23. Contribution of oil supply shocks to the variance of current account balances for country groups: robustness #1

A. Oil exporters versus oil importers

B. Gas exporters versus gas importers

C. Coal exporters versus coal importers

D. Current account surplus versus current account deficit countries
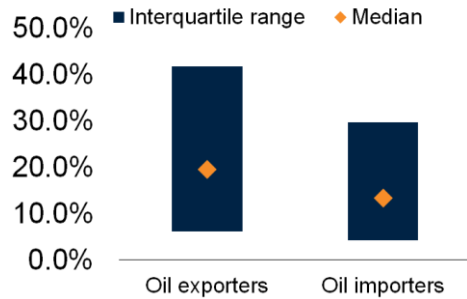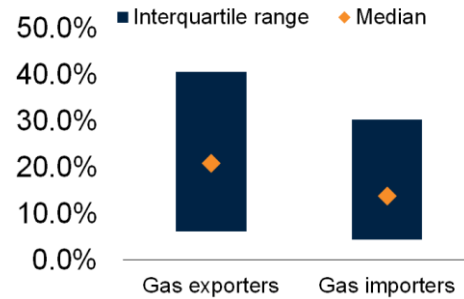

E. Service-sector size

F. Capital account openness

Notes: Median shares of country-specific variances of current account balances (percent of GDP) accounted for by oil supply shocks based on country-specific structural vector autoregression models, estimated for 45 EMDEs for 1992-2022. The calculations are based on forecast error variance decompositions after five years (by pooling all 1,000 draws across corresponding countries).

Figure A.24. Contribution of oil supply shocks to the variance of current account balances for country groups: robustness #2
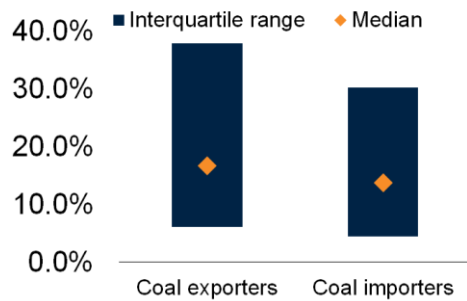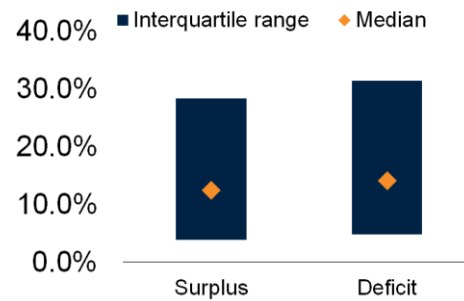
A. Oil exporters versus oil importers
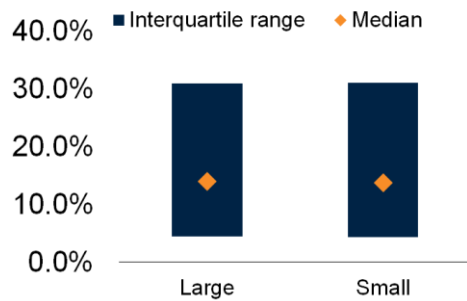

B. Gas exporters versus gas importers

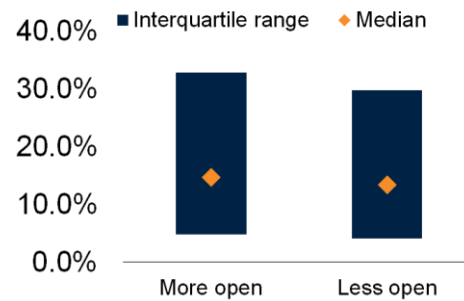### C. Coal exporters versus coal importers

D. Current account surplus versus current account deficit countries
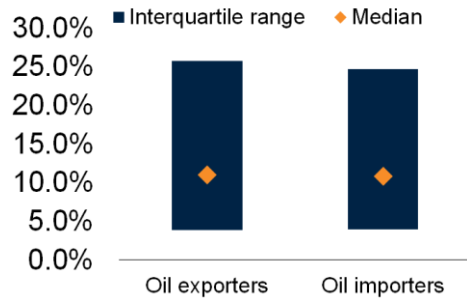

E. Service-sector size

F. Capital account openness
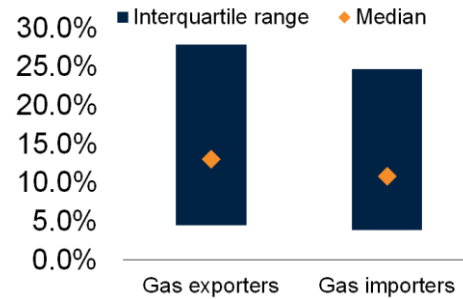

Notes: Median shares of country-specific variances of current account balances (percent of GDP) accounted for by oil supply shocks based on country-specific structural vector autoregression models, estimated for 29 EMDEs for 1992-2022. The calculations are based on forecast error variance decompositions after five years (by pooling all 1,000 draws across corresponding countries).

Figure A.25. Cumulative impulse responses of current account balances to real oil price shocks for individual countries: robustness #1 with oil prices

Notes: Cumulative impulse responses of current account balances (percent of GDP) to one percentage point of a positive real oil price shock after five years based on country-specific structural vector autoregression models, estimated for 45 EMDEs for 1992-2022. Calculations are based on 1,000 draws for each country. Countries are ranked based on their median values.

Figure A.26. Cumulative impulse responses of current account balances to real oil price shocks for individual countries: robustness #2 with oil prices

Notes: Cumulative impulse responses of current account balances (percent of GDP) to one percentage point of a positive real oil price shock after five years based on country-specific structural vector autoregression models, estimated for 29 EMDEs for 1992-2022. Calculations are based on 1,000 draws for each country. Countries are ranked based on their median values.

Figure A.27. Contribution of real oil price shocks to the variance of current account balances for individual countries: robustness #1 with oil prices
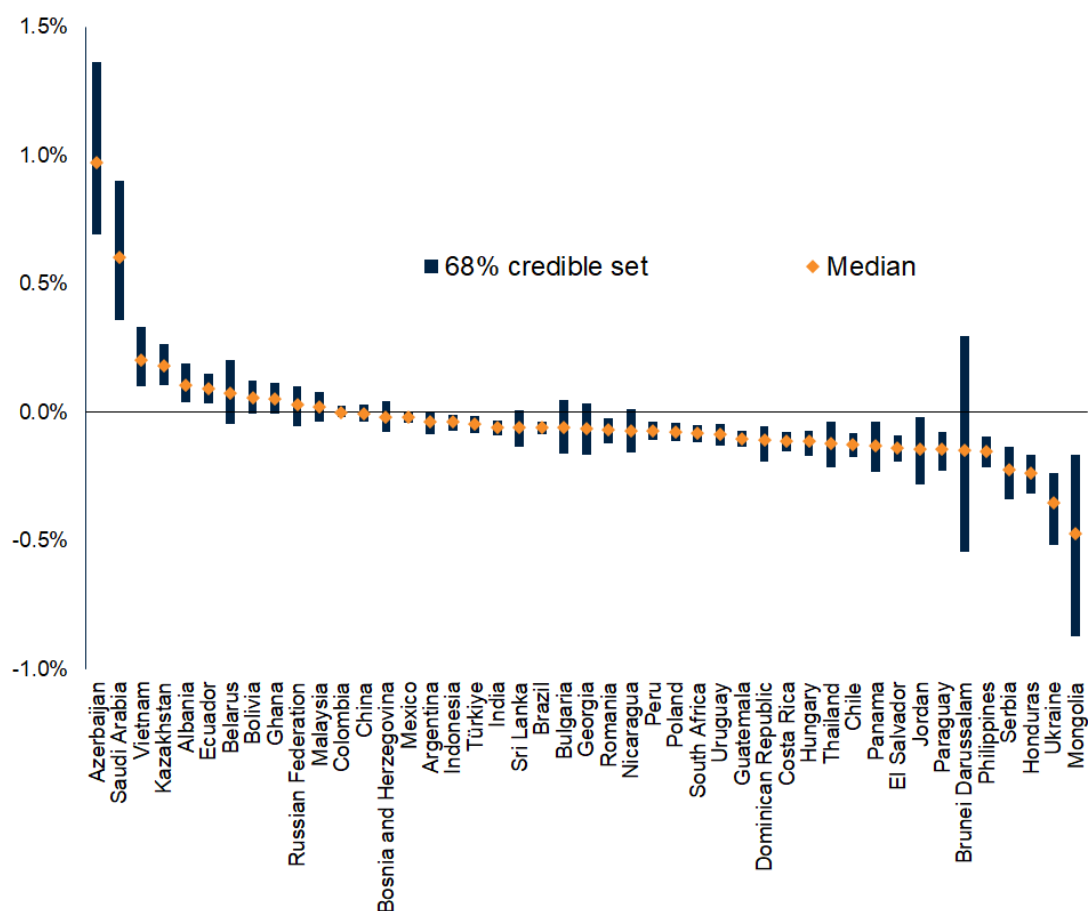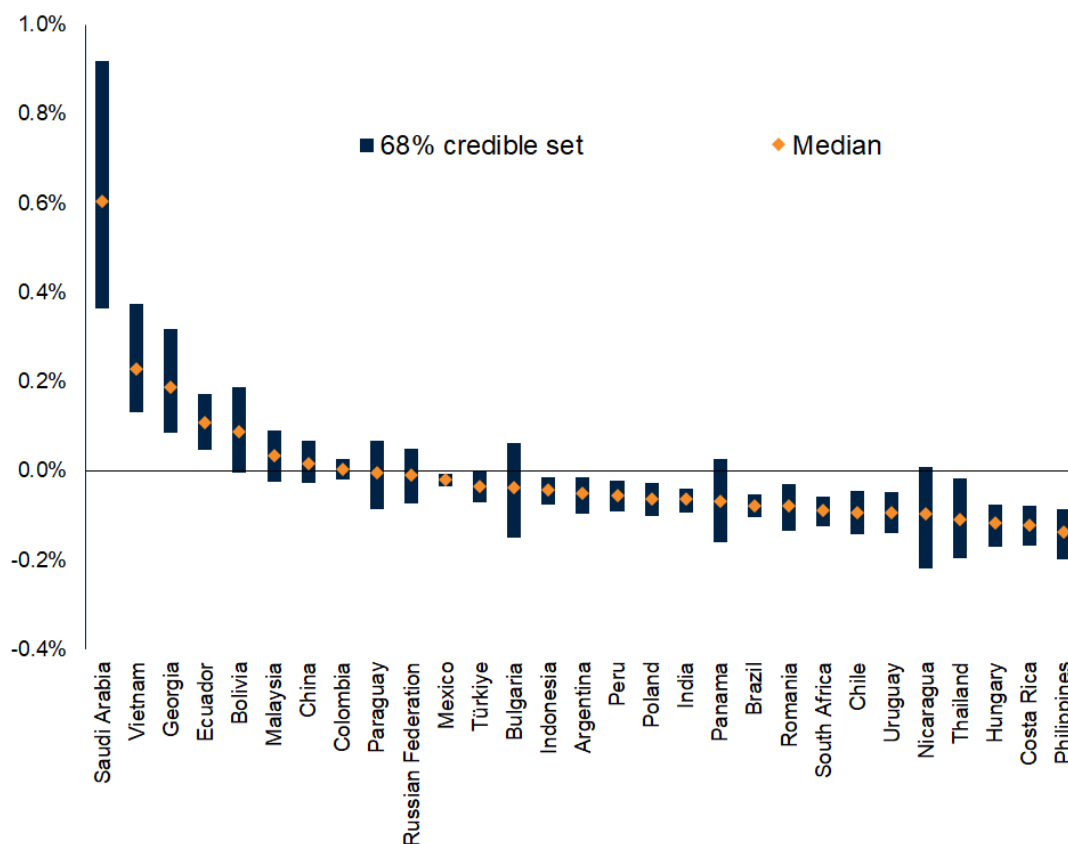

Notes: Median shares of country-specific variances of current account balances (percent of GDP) accounted for by real oil price shocks based on country-specific structural vector autoregression models, estimated for 45 EMDEs for 1992-2022. The calculations are based on forecast error variance decompositions after five years (1,000 draws for each country). Countries are ranked based on their median values.

Figure A.28. Contribution of real oil price shocks to the variance of current account balances for individual countries: robustness #2 with oil prices

Notes: Median shares of country-specific variances of current account balances (percent of GDP) accounted for by real oil price shocks based on country-specific structural vector autoregression models, estimated for 29 EMDEs for 1992-2022. The calculations are based on forecast error variance decompositions after five years (1,000 draws for each country). Countries are ranked based on their median values.

Figure A.29. Cumulative impulse responses of current account balances to real oil price shocks for individual countries: robustness #1 with all energy prices
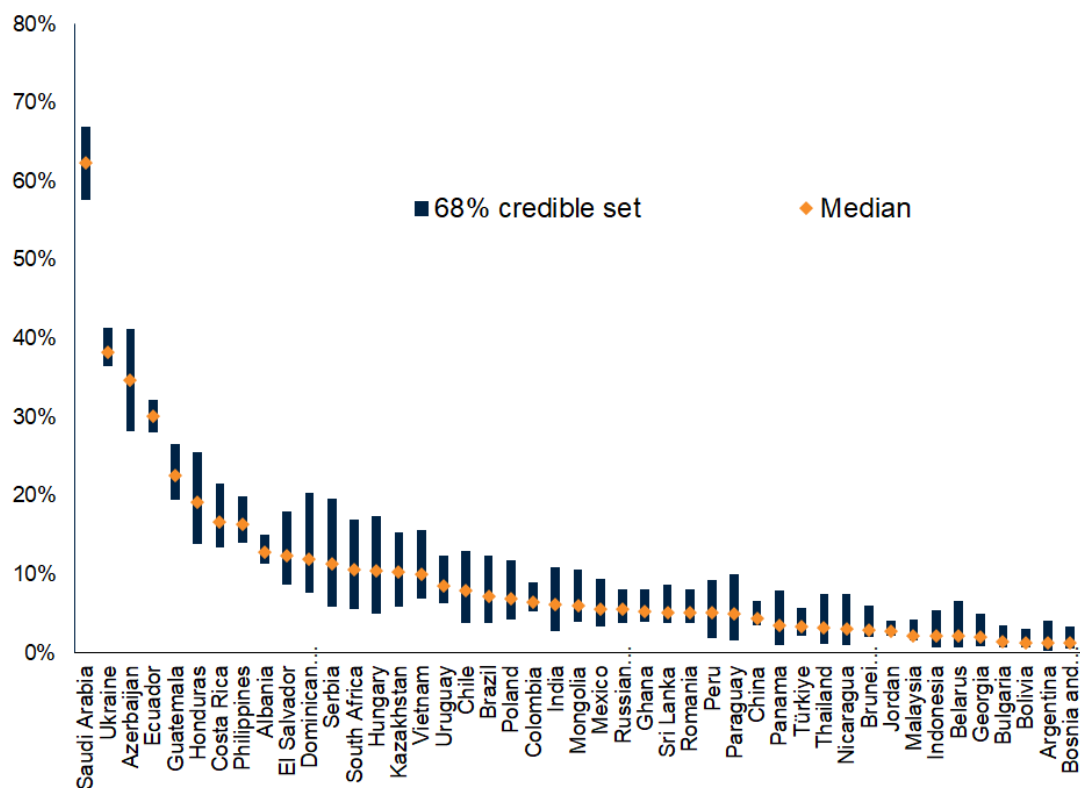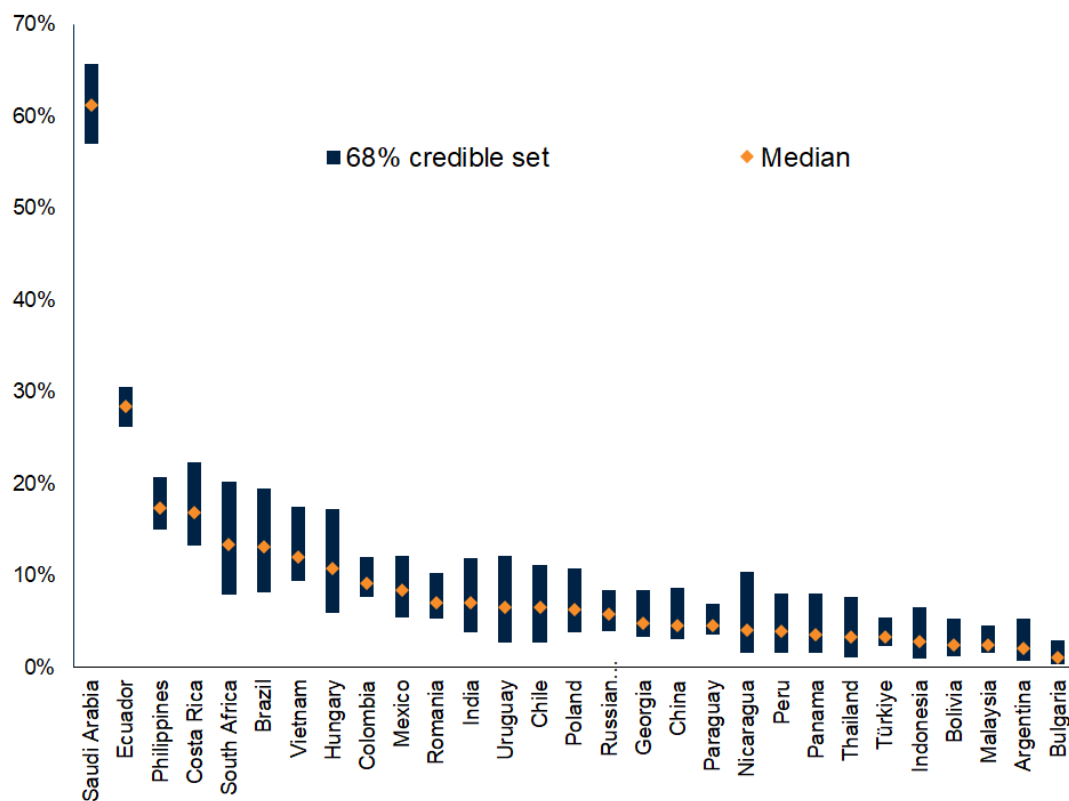

Notes: Cumulative impulse responses of current account balances (percent of GDP) to one percentage point of a positive real oil price shock after five years based on country-specific structural vector autoregression models, estimated for 45 EMDEs for 1992-2022. Calculations are based on 1,000 draws for each country. Countries are ranked based on their median values.

Figure A.30. Cumulative impulse responses of current account balances to real oil price shocks for individual countries: robustness #2 with all energy prices

Notes: Cumulative impulse responses of current account balances (percent of GDP) to one percentage point of a positive real oil price shock after five years based on country-specific structural vector autoregression models, estimated for 45 EMDEs for 1992-2022. Calculations are based on 1,000 draws for each country. Countries are ranked based on their median values.

Figure A.31. Cumulative impulse responses of current account balances to real oil price shocks for individual countries: robustness #3 with all energy prices

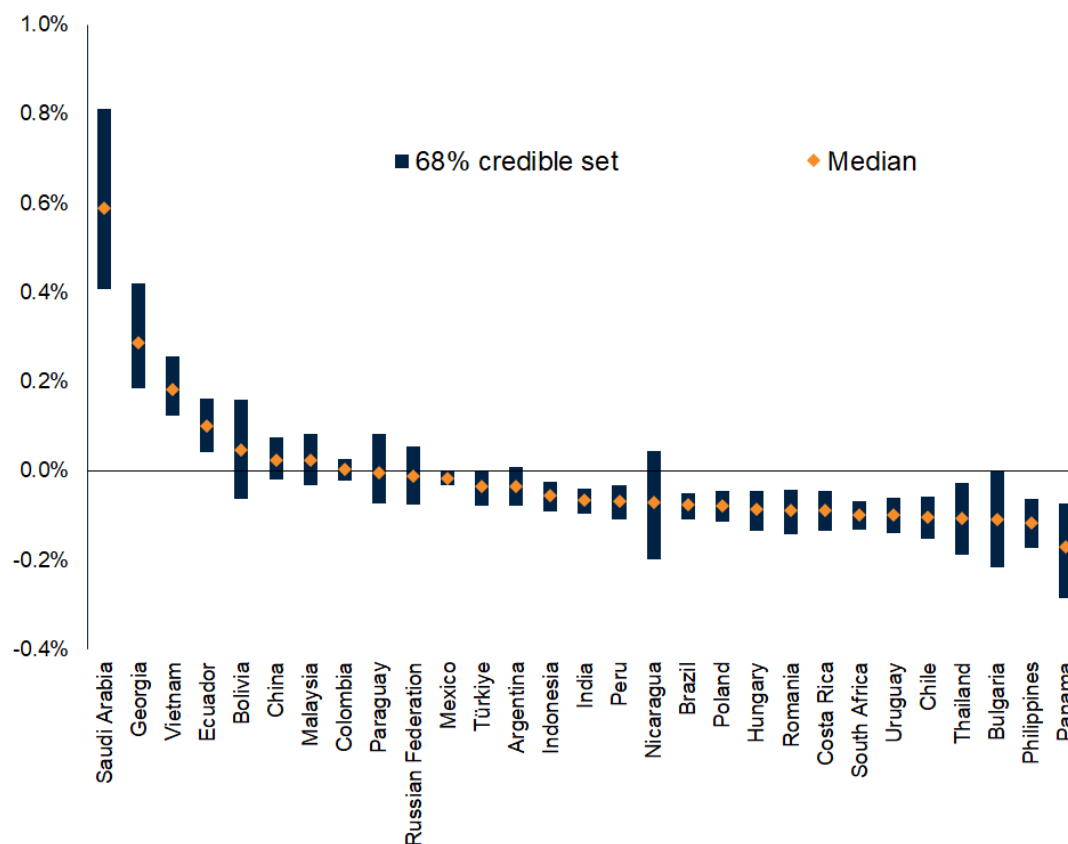Notes: Cumulative impulse responses of current account balances (percent of GDP) to one percentage point of a positive real oil price shock after five years based on country-specific structural vector autoregression models, estimated for 29 EMDEs for 1992-2022. Calculations are based on 1,000 draws for each country. Countries are ranked based on their median values.

Figure A.32. Cumulative impulse responses of current account balances to real natural gas price shocks for individual countries: robustness #1 with all energy prices

Notes: Cumulative impulse responses of current account balances (percent of GDP) to one percentage point of a positive real natural gas price shock after five years based on country-specific structural vector autoregression models, estimated for 45 EMDEs for 1992-2022. Calculations are based on 1,000 draws for each country. Countries are ranked based on their median values.

Figure A.33. Cumulative impulse responses of current account balances to real natural gas price shocks for individual countries: robustness #2 with all energy prices
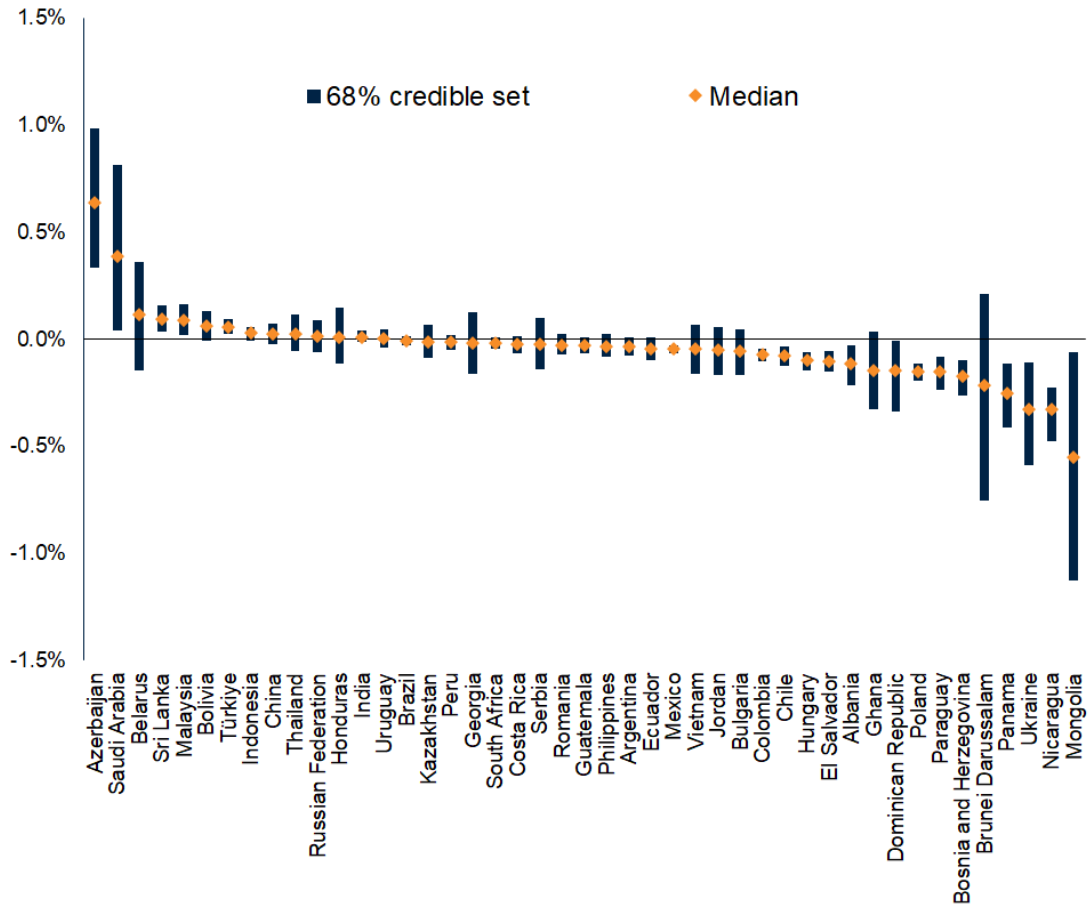

Notes: Cumulative impulse responses of current account balances (percent of GDP) to one percentage point of a positive real natural gas price shock after five years based on country-specific structural vector autoregression models, estimated for 45 EMDEs for 1992-2022. Calculations are based on 1,000 draws for each country. Countries are ranked based on their median values.

Figure A.34. Cumulative impulse responses of current account balances to real natural gas price shocks for individual countries: robustness #3 with all energy prices

Notes: Cumulative impulse responses of current account balances (percent of GDP) to one percentage point of a positive real natural gas price shock after five years based on country-specific structural vector autoregression models, estimated for 29 EMDEs for 1992-2022. Calculations are based on 1,000 draws for each country. Countries are ranked based on their median values.

Figure A.35. Cumulative impulse responses of current account balances to real coal price shocks for individual countries: robustness #1 with all energy prices
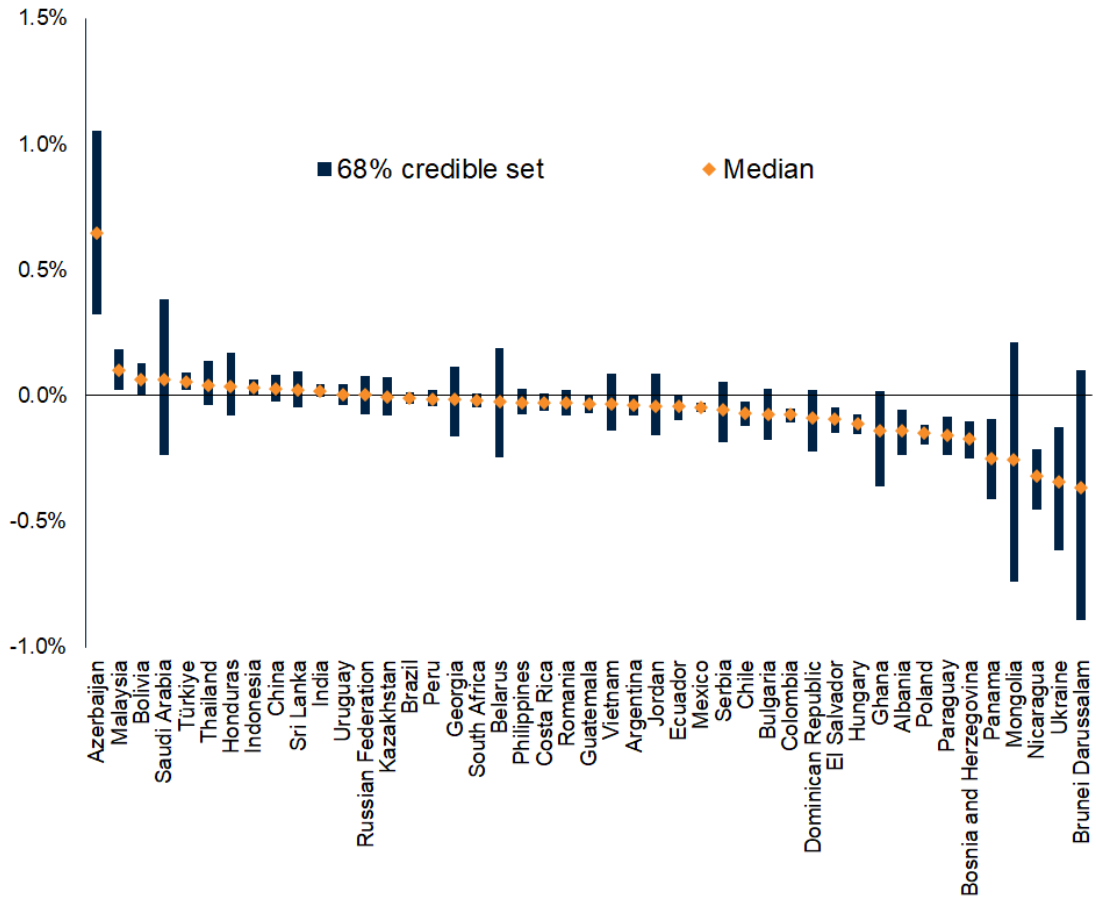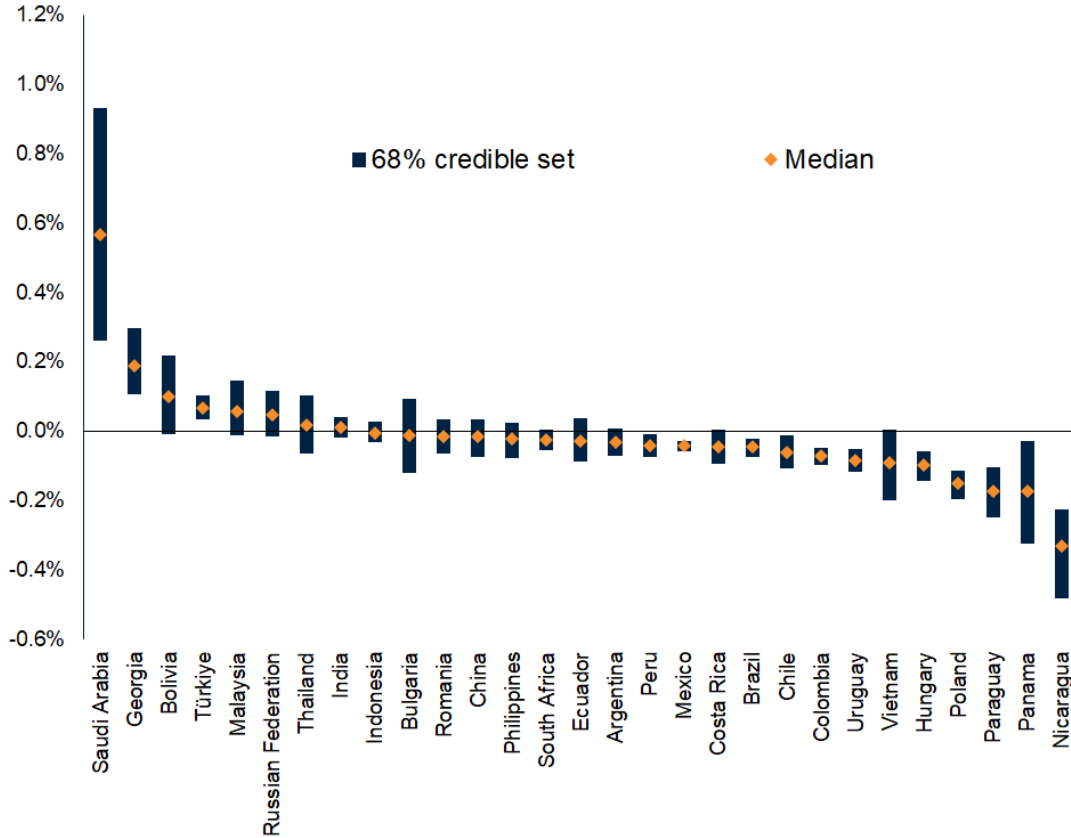

Notes: Cumulative impulse responses of current account balances (percent of GDP) to one percentage point of a positive real coal price shock after five years based on country-specific structural vector autoregression models, estimated for 45 EMDEs for 1992-2022. Calculations are based on 1,000 draws for each country. Countries are ranked based on their median values.

Figure A.36. Cumulative impulse responses of current account balances to real coal price shocks for individual countries: robustness #2 with all energy prices
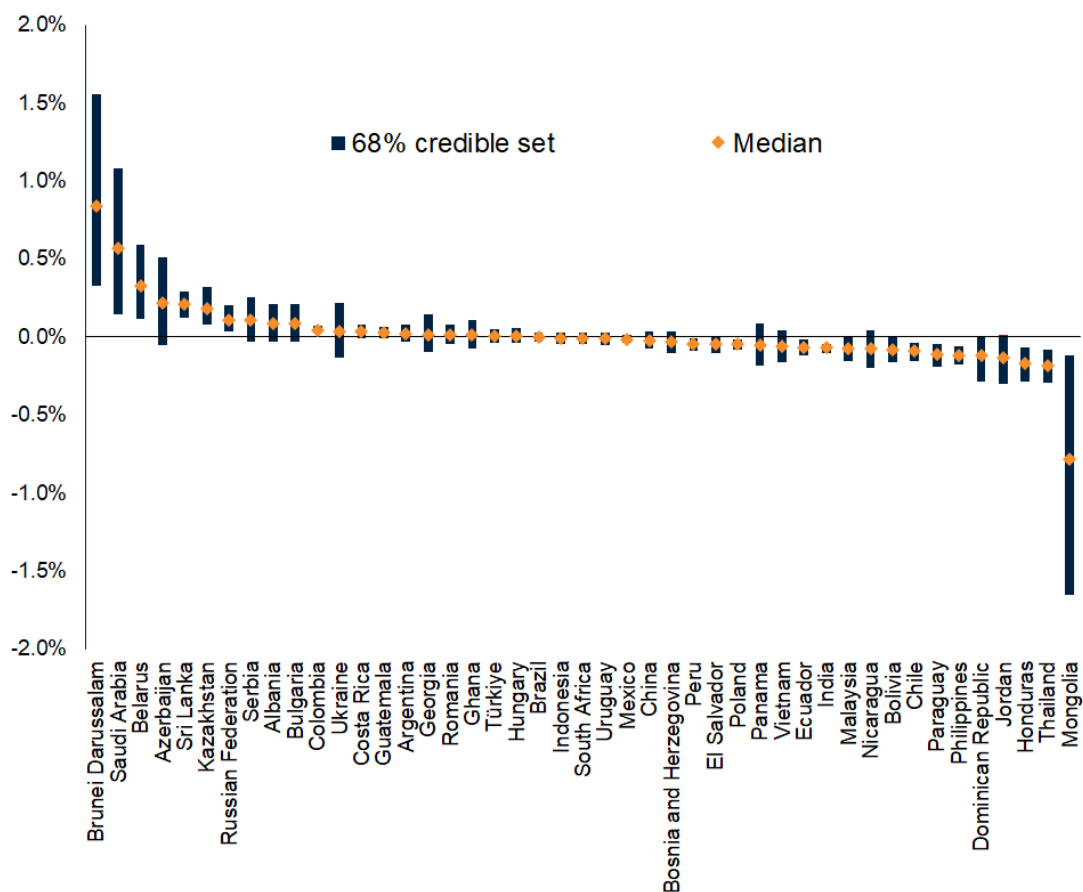

Notes: Cumulative impulse responses of current account balances (percent of GDP) to one percentage point of a positive real coal price shock after five years based on country-specific structural vector autoregression models, estimated for 45 EMDEs for 1992-2022. Calculations are based on 1,000 draws for each country. Countries are ranked based on their median values.

Figure A.37. Cumulative impulse responses of current account balances to real coal price shocks for individual countries: robustness #3 with all energy prices
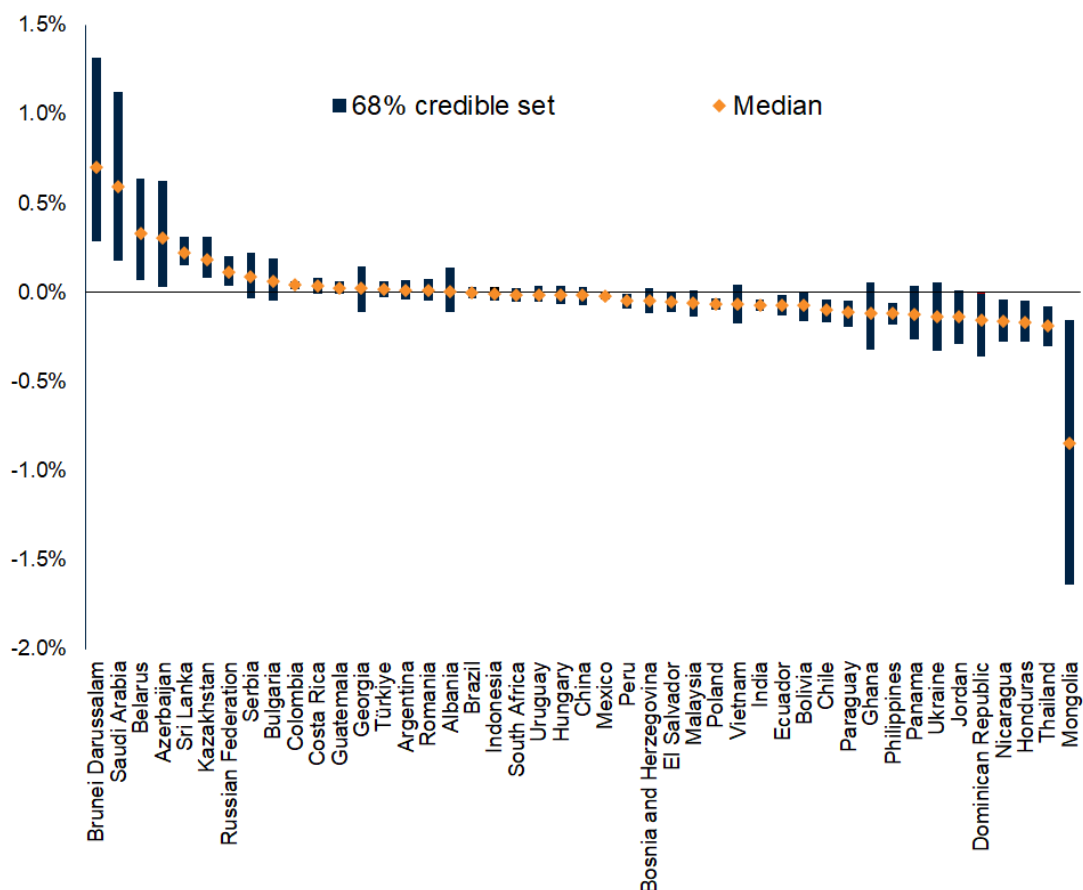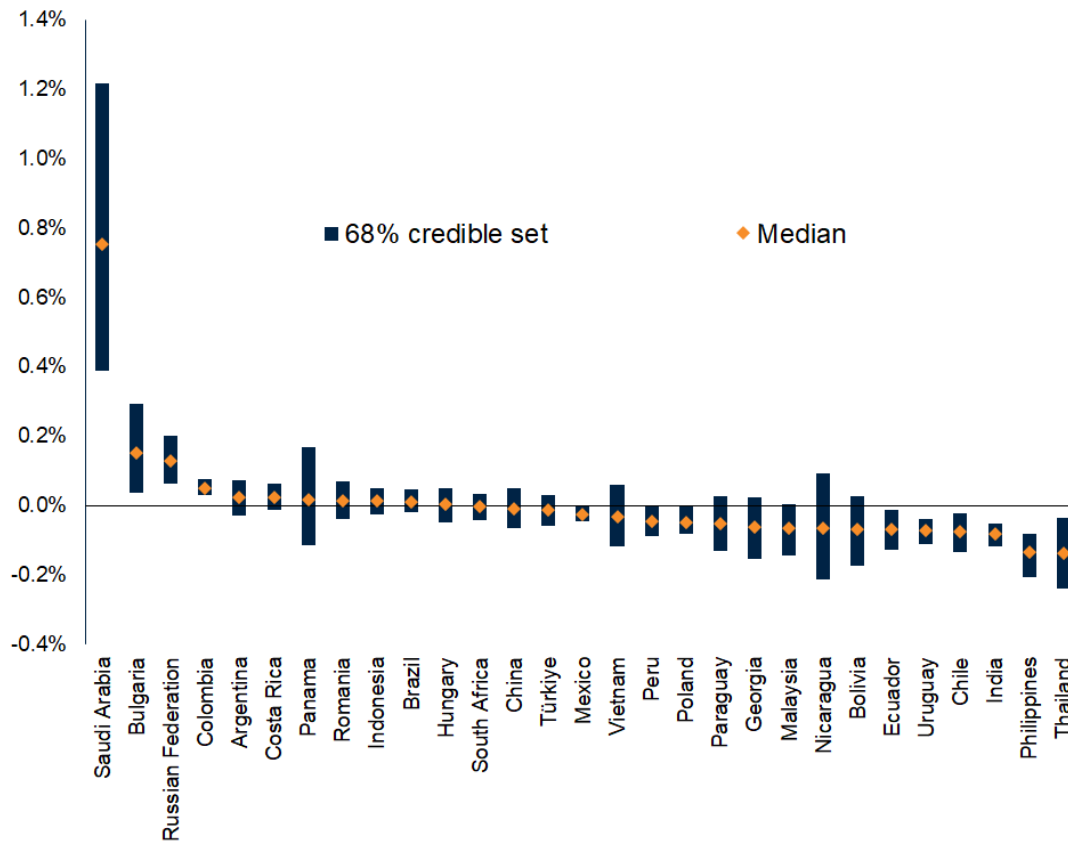

Notes: Cumulative impulse responses of current account balances (percent of GDP) to one percentage point of a positive real coal price shock after five years based on country-specific structural vector autoregression models, estimated for 29 EMDEs for 1992-2022. Calculations are based on 1,000 draws for each country. Countries are ranked based on their median values.

Figure A.38. Contribution of alternative energy price shocks to current account balances of individual countries: robustness #1 with all energy prices

Notes: Median shares of country-specific variances of current account balances (percent of GDP) accounted for by alternative real energy price shocks based on country-specific structural vector autoregression models, estimated for 45 EMDEs for 1992-2022. The calculations are based on forecast error variance decompositions after five years (1,000 draws for each country). Countries are ranked based on their total median values.

Figure A.39. Contribution of alternative energy price shocks to current account balances of individual countries: robustness #2 with all energy prices

Notes: Median shares of country-specific variances of current account balances (percent of GDP) accounted for by alternative real energy price shocks based on country-specific structural vector autoregression models, estimated for 45 EMDEs for 1992-2022. The calculations are based on forecast error variance decompositions after five years (1,000 draws for each country). Countries are ranked based on their total median values.

Figure A.40. Contribution of alternative energy price shocks to current account balances of individual countries: robustness #3 with all energy prices

Notes: Median shares of country-specific variances of current account balances (percent of GDP) accounted for by alternative real energy price shocks based on country-specific structural vector autoregression models, estimated for 29 EMDEs for 1992-2022. The calculations are based on forecast error variance decompositions after five years (1,000 draws for each country). Countries are ranked based on their total median values.

Figure A.41. Cumulative impulse responses of current account balances to oil demand shocks for individual countries: robustness #1
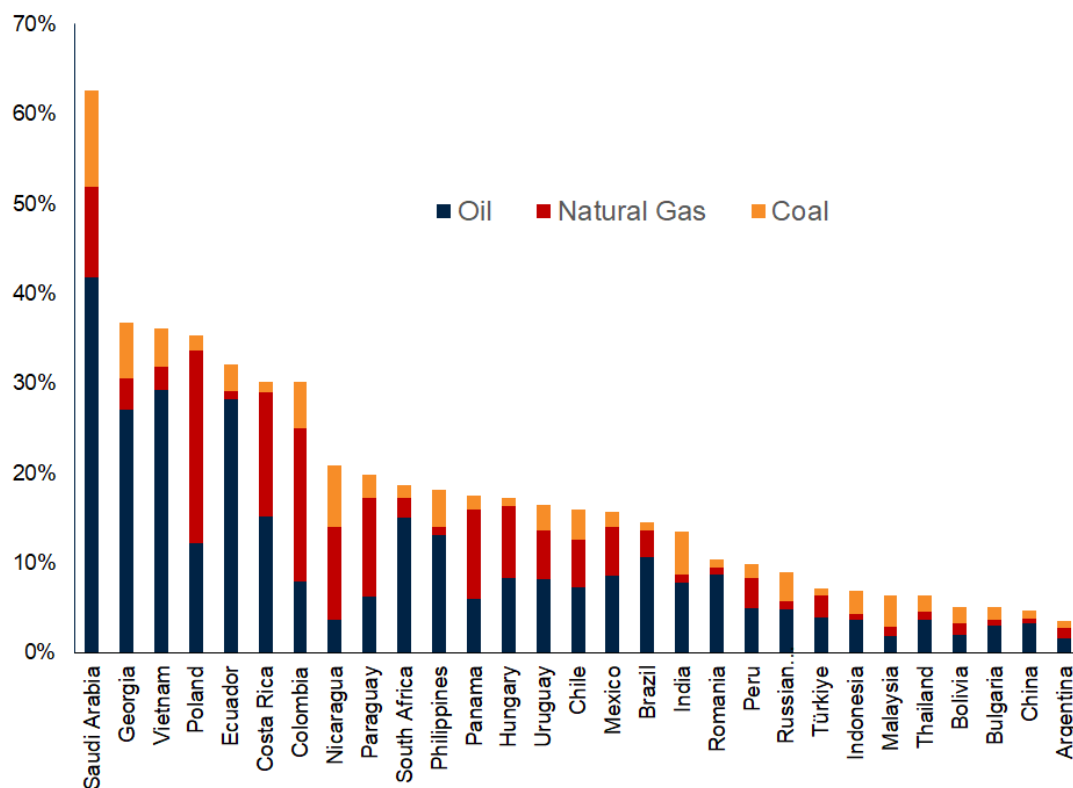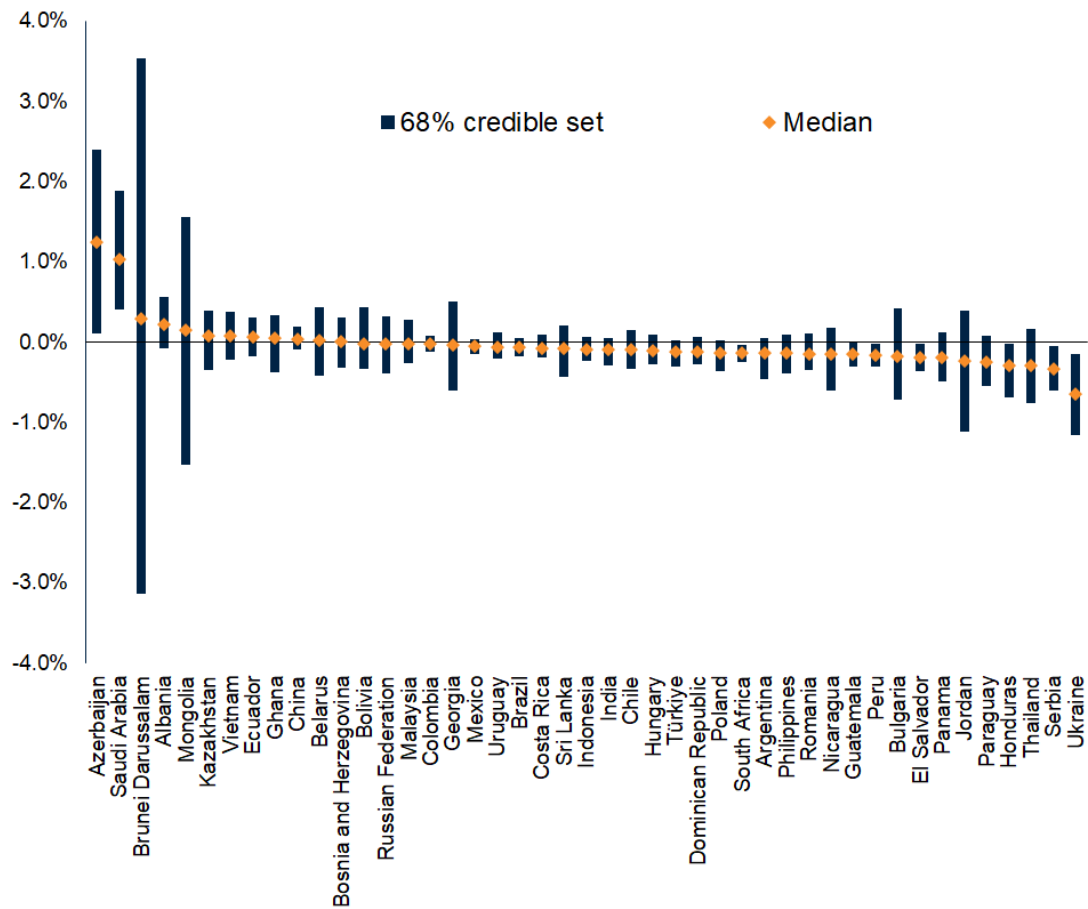

Notes: Cumulative impulse responses of current account balances (percent of GDP) to oil demand shocks (after normalizing them to the equivalent of one percentage point of an increase in oil prices) after five years based on country-specific structural vector autoregression models, estimated for 45 EMDEs for 1992-2022. Calculations are based on 1,000 draws for each country. Countries are ranked based on their median values.

Figure A.42. Cumulative impulse responses of current account balances to oil demand shocks for individual countries: robustness #2

Notes: Cumulative impulse responses of current account balances (percent of GDP) to oil demand shocks (after normalizing them to the equivalent of one percentage point of an increase in oil prices) after five years based on country-specific structural vector autoregression models, estimated for 29 EMDEs for 1992-2022. Calculations are based on 1,000 draws for each country. Countries are ranked based on their median values.

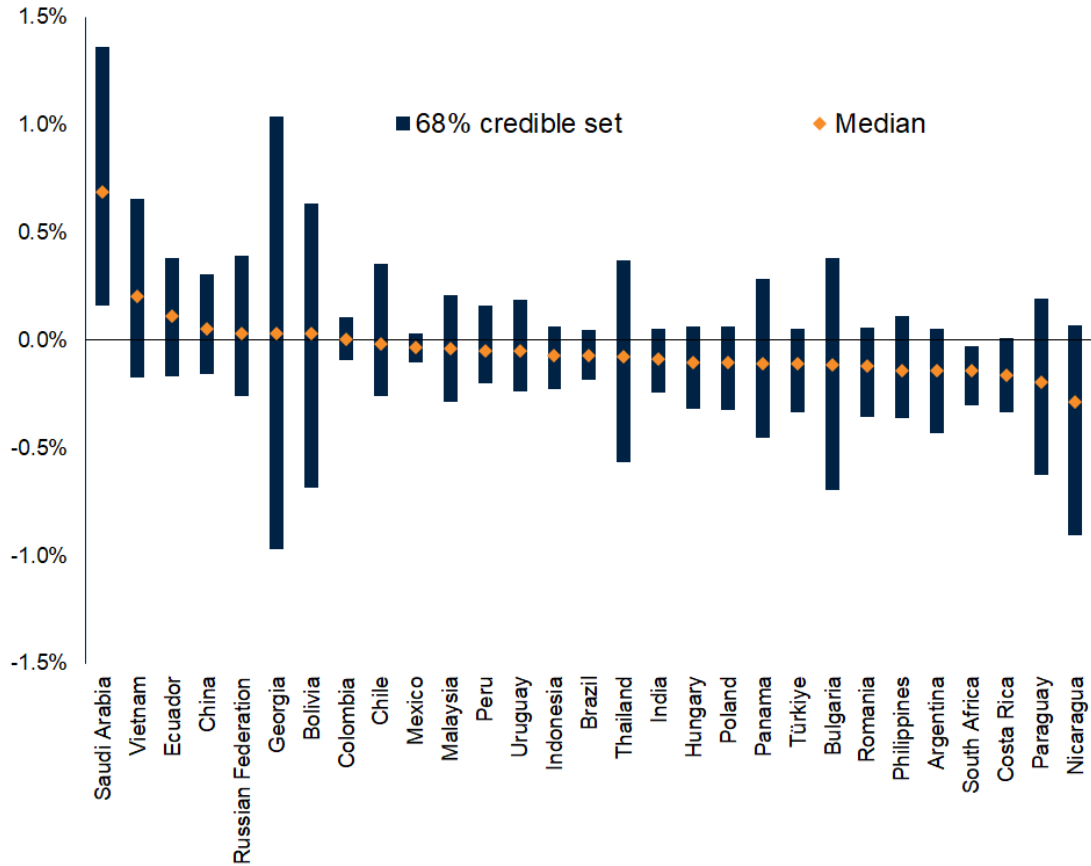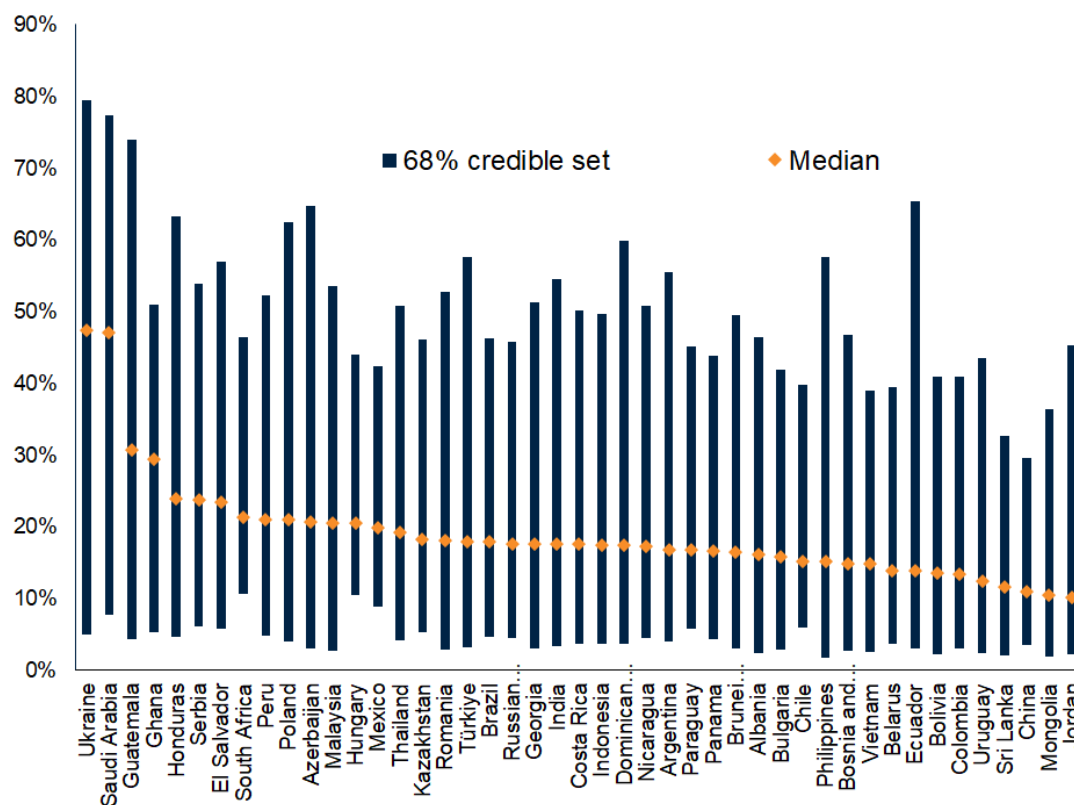**Figure A.43. Contribution of oil demand shocks to the variance of current account balances for individual countries: robustness #1**

Notes: Median shares of country-specific variances of current account balances (percent of GDP) accounted for by oil demand shocks based on country-specific structural vector autoregression models, estimated for 45 EMDEs for 1992-2022. The calculations are based on forecast error variance decompositions after five years (1,000 draws for each country). Countries are ranked based on their median values.

Figure A.44. Contribution of oil demand shocks to the variance of current account balances for individual countries: robustness #2

Notes: Median shares of country-specific variances of current account balances (percent of GDP) accounted for by oil demand shocks based on country-specific structural vector autoregression models, estimated for 29 EMDEs for 1992-2022. The calculations are based on forecast error variance decompositions after five years (1,000 draws for each country). Countries are ranked based on their median values.

Figure A.45. Cumulative impulse responses of current account balances to oil supply shocks for individual countries: robustness #1
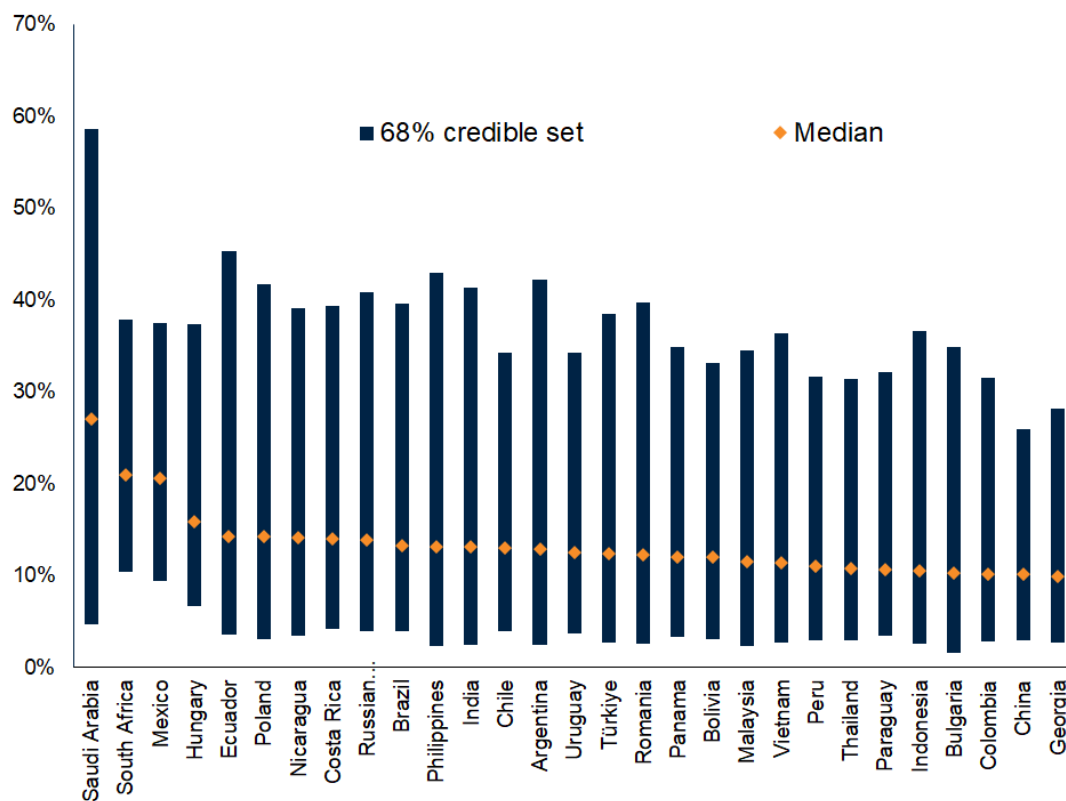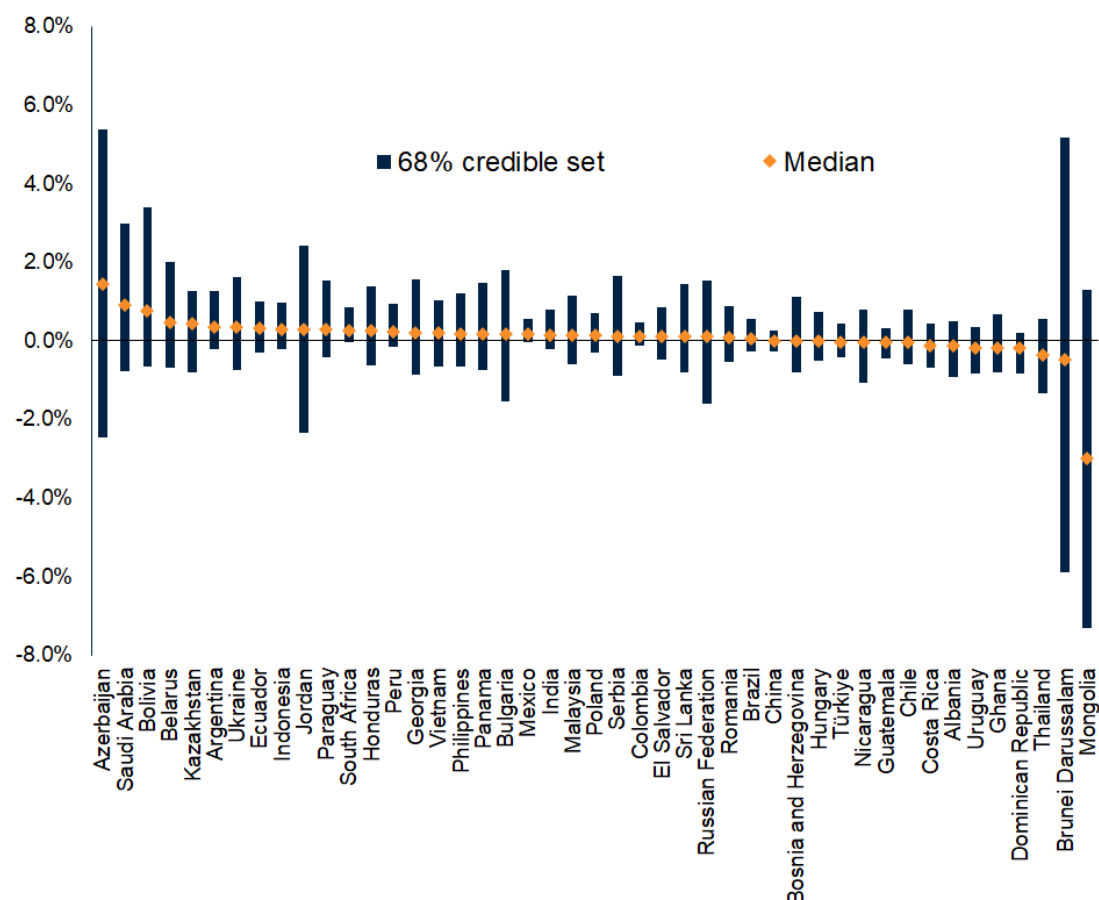

Notes: Cumulative impulse responses of current account balances (percent of GDP) to oil supply shocks (after normalizing them to the equivalent of one percentage point of an increase in oil prices) after five years based on country-specific structural vector autoregression models, estimated for 45 EMDEs for 1992-2022. Calculations are based on 1,000 draws for each country. Countries are ranked based on their median values.

Figure A.46. Cumulative impulse responses of current account balances to oil supply shocks for individual countries: robustness #2

Notes: Cumulative impulse responses of current account balances (percent of GDP) to oil supply shocks (after normalizing them to the equivalent of one percentage point of an increase in oil prices) after five years based on country-specific structural vector autoregression models, estimated for 29 EMDEs for 1992-2022. Calculations are based on 1,000 draws for each country. Countries are ranked based on their median values.

Figure A.47. Contribution of oil supply shocks to the variance of current account balances
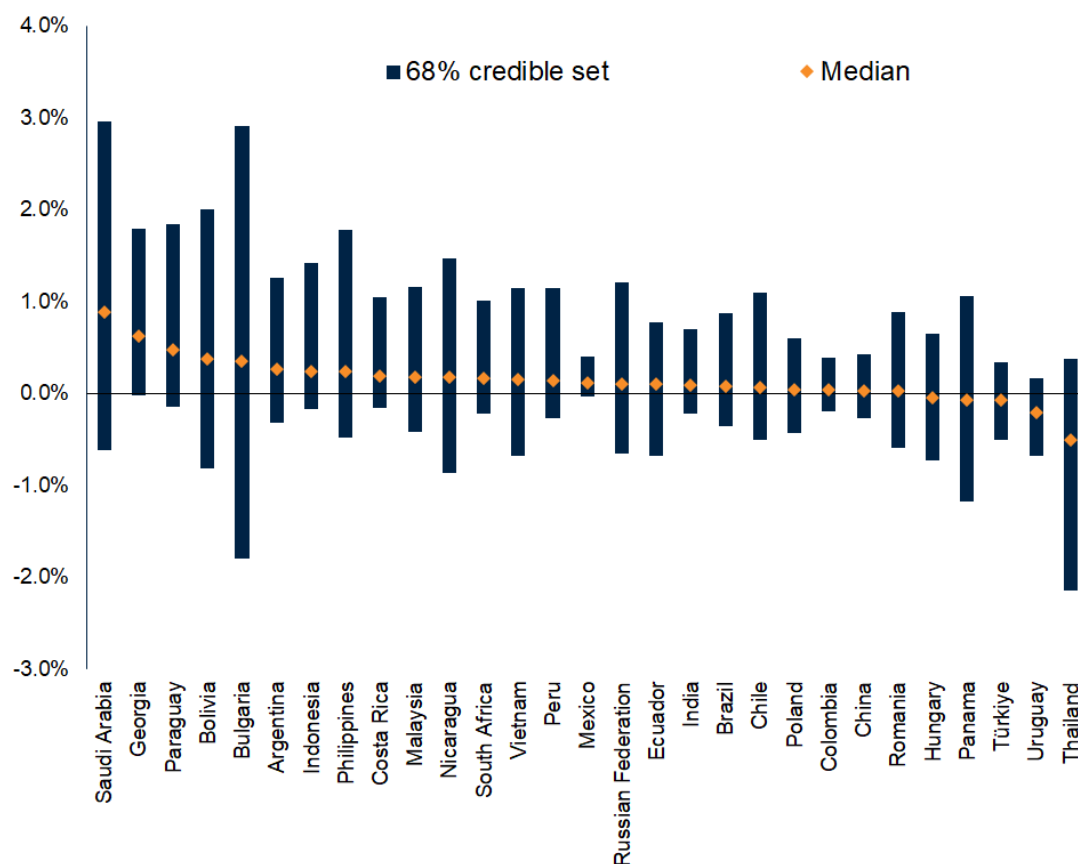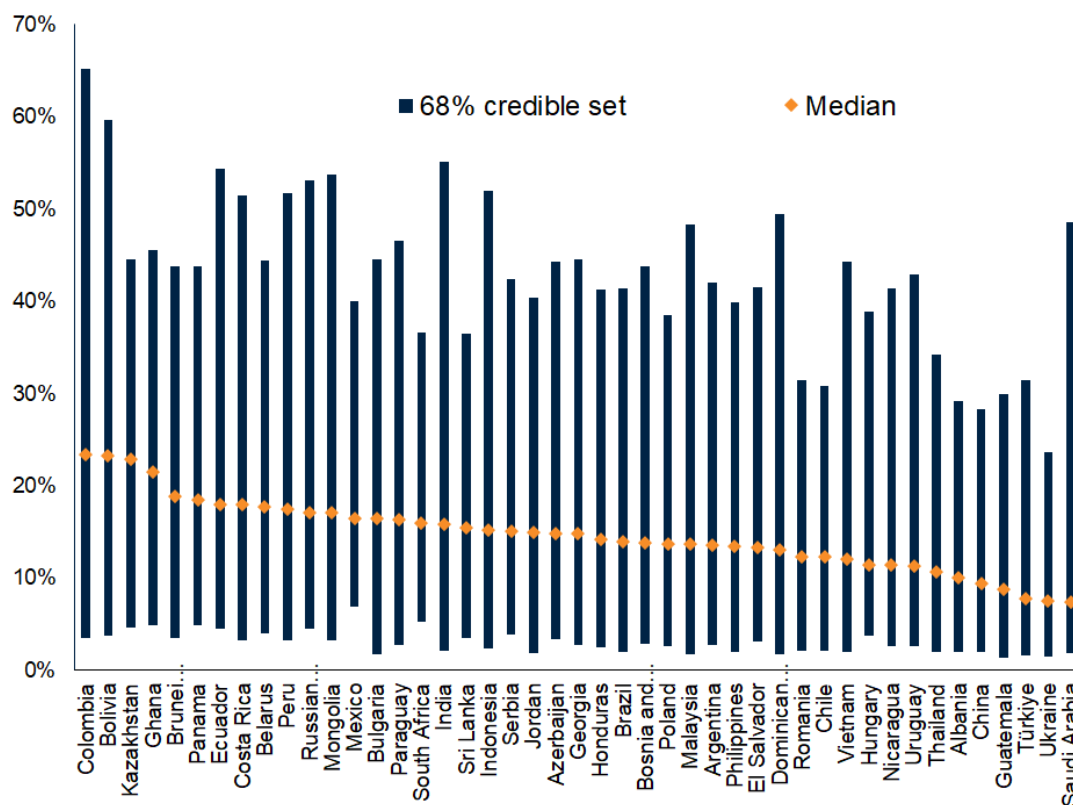for individual countries: robustness #1

Notes: Median shares of country-specific variances of current account balances (percent of GDP) accounted
for by oil supply shocks based on country-specific structural vector autoregression models, estimated for 45
EMDEs for 1992-2022. The calculations are based on forecast error variance decompositions after five years
(1,000 draws for each country). Countries are ranked based on their median values.

Figure A.48. Contribution of oil supply shocks to the variance of current account balances for individual countries: robustness #2

Notes: Median shares of country-specific variances of current account balances (percent of GDP) accounted for by oil supply shocks based on country-specific structural vector autoregression models, estimated for 29 EMDEs for 1992-2022. The calculations are based on forecast error variance decompositions after five years (1,000 draws for each country). Countries are ranked based on their median values.

Table A.1. List of countries used in estimations

Country	Oil exporter	Natural gas exporter	Coal exporter	Current account surplus	Larger service sector	Current account openness
Albania	0	0	0	0	0	0
Argentina	0	0	0	0	1	0
Azerbaijan	1	1	0	1	0	0
Belarus	0	0	0	0	0	0
Bolivia	1	1	0	0	0	1
Bosnia and Herzegovina	0	0	0	0	1	1
Brazil	0	0	0	0	1	0
Brunei Darussalam	1	1	0	1	0	0
Bulgaria	0	0	0	0	1	1
Chile	0	0	0	0	1	1
China	0	0	0	1	0	0
Colombia	1	0	1	0	1	0
Costa Rica	0	0	0	0	1	1
Dominican Republic	0	0	0	0	1	1
Ecuador	1	0	0	1	0	0
El Salvador	0	0	0	0	1	1
Georgia	0	0	0	0	1	1
Ghana	1	0	0	0	0	0
Guatemala	0	0	0	0	1	1
Honduras	0	0	0	0	1	0
Hungary	0	0	0	0	1	1
India	0	0	0	0	0	0
Indonesia	0	0	1	0	0	1
Jordan	0	0	0	0	1	1
Kazakhstan	1	1	0	0	1	0
Malaysia	0	0	0	1	0	0
Mexico	0	0	0	0	1	1
Mongolia	0	0	1	0	0	1
Nicaragua	0	0	0	0	0	0
Panama	0	0	0	0	0	0
Paraguay	0	0	0	1	1	1
Peru	0	0	0	0	1	0
Philippines	0	0	0	0	1	0
Poland	0	0	0	0	0	1
Romania	0	0	0	0	1	0
Russian Federation	1	0	0	1	0	1
Saudi Arabia	1	0	0	1	0	0
Serbia	0	0	0	0	1	0
South Africa	0	0	1	0	1	0
Sri Lanka	0	0	0	0	1	0
Thailand	0	0	0	1	1	0
Türkiye	0	0	0	0	1	0
Ukraine	0	0	0	0	0	0
Uruguay	0	0	0	0	1	1
Vietnam	0	0	0	1	0	0

Notes: Countries that are oil exporters, natural gas exporters, and coal exporters (identified as those exporting these commodities more than five percent of their GDP), as well as those that have a current account surplus (based on their average over time), a larger service sector (as percentage of their GDP above median country), and a higher current account openness (above median country) take a value of 1.