# Are Oil Price Hikes a Boon to the Korean Economy?*

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## Abstract

Contrary to the conventional view that oil price hikes hinder economic growth in Korea, a country heavily dependent on energy imports, our analysis shows that demand-driven global economic activity shocks can significantly boost industrial production. We find that other structural oil market shocks do not necessarily dampen aggregate economic activity. At the industry level, the mining and manufacturing sectors respond positively, while the construction sector is negatively affected only by oil supply shocks. These findings highlight the need to account for the structural sources of oil price fluctuations and sectoral differences when analyzing the oil-macro relationship in small open economies.

*JEL classification*: E31, Q41, Q43

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# 1 Introduction

An unexpected increase in oil prices can trigger economic recessions (Hamilton 1983). This suggests that South Korea, a country heavily reliant on imported energy sources, including crude oil, would be particularly vulnerable to oil price fluctuations.[1] Moreover, as a small open economy, South Korea is highly exposed to global economic fluctuations. For this reason, oil prices are regarded as one of the most critical external risk factors closely monitored by policymakers.[2] However, despite this conventional expectation, several empirical studies have failed to find significant negative effects of oil price increases on the Korean economy (see Baek and Kim (2020) and Cunado, Jo, and de Gracia (2015), for examples).

Recent literature on the relationship between oil prices and macroeconomic outcomes highlights the importance of distinguishing the sources of oil price shocks. Kilian (2009) and Baumeister and Hamilton (2019) demonstrate that the economic effects of oil price changes vary depending on the underlying causes. In particular, Baumeister and Hamilton (2019) find that supply-driven oil price shocks impose persistent negative effects on economic activity with some delay, whereas demand-driven shocks do not. These findings suggest that failing to account for the sources of oil price hikes may lead to imprecise estimates of their macroeconomic impact. This distinction is particularly relevant for Korea, given its deep integration into the global economy. For instance, if oil prices rise due to a global economic expansion, the positive effects of increased exports may outweigh the negative effects of higher energy import costs.

To reconcile the discrepancy between conventional expectations and previous empirical findings, this paper examines the impact of oil price shocks on Korea by explicitly incorporating the structural sources of oil price fluctuations. Cunado, Jo, and de Gracia (2015) provide evidence that the sources of oil price shocks matter for five Asian economies. Their study employs three types of structural oil shocks identified using an approach similar to that of Baumeister, Peersman, and Van Robays (2010) and focuses on aggregate indicators such as GDP and exchange rates. Our study differs in that we specifically analyze Korea's industrial production (IP) by utilizing four structural global oil market shocks identified by Baumeister and Hamilton (2019): oil supply shocks, economic activity shocks, oil consumption demand shocks, and inventory demand shocks. In particular, Baumeister and Hamilton (2019) assume that these structural oil market shocks drive real oil price hikes and empirically identify these shocks in a Vector Autoregressive model using informative sign restrictions. Building up on this research, we investigate how these shocks affect IP while controlling for key macroeconomic variables, including the consumer price index (CPI) and the Korean won (KRW)–US dollar (USD) exchange rate. According to the Yearbook of Energy Statistics published by the Korea Energy Economics Institute, the industrial sector

[1] In 2021, the share of imported energy in total energy consumption was 92.8 %, with crude oil accounting for approximately 40 % of Korea's total energy imports.

[2] For example, at the time of Russia's invasion to Ukraine, a number of newspaper articles highlighted downside risks that energy price hikes may pose on the Korean economy. For instance, see https://en.yna.co.kr/view/AEN20220310003800320.

consumed over 130 million tonnes of oil equivalent (TOE) in 2022, accounting for more than half of Korea's total final energy consumption. This is 3.5 to 5.7 times higher than the consumption of the other three end-use sectors: Transportation, Residential, and Commercial & Public. Additionally, we extend our analysis to assess the impact of these shocks on two energy-intensive sectors such as mining and manufacturing, and construction.[3] Our empirical framework employs the Local Projection method proposed by Jordà (2005), which enables us to examine the dynamic effects of the four structural oil market shocks on aggregate and sectoral IP in a consistent manner.

Our key findings are as follows. First, when examining non-structural oil price hikes using the real refiner acquisition cost (RAC) of oil, we find that oil price increases are associated with higher IP, consistent with previous literature (Baek and Kim 2020; Cunado, Jo, and de Gracia 2015). Further analysis incorporating structural oil shocks reveals that these increases in IP are primarily driven by economic activity shocks, which capture higher global business activity and subsequent surges in oil demand and prices. In contrast, IP does not exhibit significant responses to oil supply or inventory demand shocks.[4] These findings suggest that external demand effects dominate potential negative impacts arising from higher energy costs. Additionally, we find that exports and imports of Korea respond in a manner consistent with this hypothesis; both significantly increase when oil price surges are demand-driven.

Second, we identify substantial sectoral heterogeneity in response to oil price shocks. The mining and manufacturing sectors exhibit amplified responses, reinforcing the aggregate-level findings. In contrast, the construction sector responds differently; a shock to RAC has no significant effect on construction sector output, whereas supply-driven oil price shocks lead to a decline in production of the construction sector. We postulate that this difference in the two sectors may be related to their differing contribution to total exports of goods in Korea.

Our empirical findings challenge the conventional view that oil price hikes necessarily induce recessions in Korea. Instead, our results suggest that oil price surges can benefit the Korean economy when driven by increased global demand. A key policy implication is that properly identifying the sources of oil price fluctuations is crucial for understanding their macroeconomic effects. Furthermore, policymakers are often pressured to implement measures to counteract rising oil prices. However, our findings indicate that intervention may not always be necessary, as oil price increases can be a natural outcome of market activity. In such cases, policy interventions may introduce distortions without yielding significant economic gains. Also, our findings suggest that accounting for sectoral heterogeneity may help with implementing more targeted and effective policy measures.

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[3] Energy consumption by the mining and manufacturing sector accounts for approximately 97% of total industrial energy consumption, while the construction sector accounts for around 2%. In terms of energy intensity, measured as a thousand TOE per unit of annual real GDP, the former sector has an energy intensity of about 0.2, whereas the latter's is around 0.03.

[4] One possible explanation for this non-negative response is active policy intervention. For instance, the government may lower fuel taxes and import duties on oil during periods of significant oil price increases to mitigate negative economic impacts. We thank our referee for highlighting this possibility.

The remainder of this paper is organized as follows. Section 2 describes the data and empirical methodology. Section 3 presents the empirical findings. Section 4 concludes.

## 2 Data and Methodology

2.1 Data To examine the effects of structural oil shocks on the Korean economy, we use the structural oil market shocks identified in Baumeister and Hamilton (2019). The authors impose informative sign restrictions on a vector autoregressive model of the global oil market consisting of four variables: oil prices using RAC, industrial production of OECD+6 countries, world oil production, and OECD oil inventory changes as a proxy for global oil inventories. Four types of structural shocks are estimated in this framework, i.e., oil supply shocks, economic activity shocks, oil consumption demand shocks, and inventory demand shocks. An oil supply shock occurs when there is an unexpected disruption in oil supply such as a war or strike; an economic activity shock is associated with changes in the global business cycle; an oil consumption demand shock comes from changes in demand specifically for oil, not particularly due to the fluctuations in the global business cycle; and finally, an inventory demand shock incurs an unanticipated change in above-ground crude oil inventories.[5] Since these shocks are identified from a structural VAR describing the global oil market, they are exogenous and can be considered as structural shocks underlying observed oil price hikes. To gauge the differences between the observed oil price changes and underlying structural oil market shocks, we replace the structural oil shocks series with the real RAC at times; this helps us investigate and compare the magnitude of pass-through when the sources of oil price changes are not distinguished.

We focus on the responses of the aggregate Korean IP index to the above-mentioned structural shocks for the sample period spanning from January 1990 to February 2022. In the model detailed below, we also use other aggregate indicators of Korea, such as the Korean consumer price index (CPI), Korean Won-US Dollar exchange rates, and the Korean government bond rate, as control variables in our empirical models. The aggregate-level indicators, except the structural oil market shocks series and the disaggregated IP indices, are retrieved from the FRED and the Economic Statistics System of the Bank of Korea (BoK-ECOS) database. The FRED data codes are as follows: aggregate Korean IP index (KORPROINDMISMEI, index 2015=100), Korean CPI (KORCPIALLMINMEI, index 2015=100), Korean Won-US Dollar exchange rate (DEXKOUS), Korean government bond rate (INTGSBKRM193N). We also use i) exports of goods, ii) imports of goods, and uncollateralized call rate series from the BoK-ECOS.

We also extend our analysis to the sectoral level; for the sectoral analysis, We use a disaggregated Korean IP index for the sample period from February 2000 to February 2022.[6] To be more specific, we use the industry-level

[5] As noted in Baumeister and Hamilton (2019), the inventory demand shock has often been referred as a "speculative demand shock" in the literature.

[6] The beginning of the sample period is determined by the availability of the industry-level IP series.

IP indexes of the following two sectors, mining and manufacturing (AB00) and construction (AD00), to analyze how oil price shocks propagate to such relatively energy-intensive industries. According to the Input-Output Tables produced by the Bank of Korea (2019), most petroleum and coal products (C04) and chemical products (C05) are used in the above two sectors, while other sectors, including service sectors, do not directly use such products at all. These disaggregated IP series are obtained from the Statistics Korea.

**2.2 Methodology** We employ the Local Projection framework proposed by Jordà (2005) to examine the responses of IP to oil market structural shocks as well as oil price changes. By using this method, we are able to investigate the pass-through of different oil shocks in one step as follows:

$$y_{t+h} - y_{t-1} = \alpha_h + \Sigma_{i=1}^{4} \beta_{i,h} \tilde{u}_{i,t} + \Phi_h(L) z_{t-1} + \epsilon_{t+h}, \quad \text{where} \quad h = 0, \cdots, 18. \tag{1}$$

Here, $y_t$ denotes a dependent variable of interest in month $t$. In our benchmark model, $y$ is the logarithm of the IP index in month $t$. The shock variables $\tilde{u}_{i,t}$ are four types of structural shocks: oil supply shocks, economic activity shocks, oil consumption demand shocks, and inventory demand shocks.[7] It is important to note that we normalize all of the four structural oil market shocks so that all of them elicit *a 10-percent increase* in the real RAC of oil. In this way, impulse responses to the four shocks as well as to a 10-percent increase in the real RAC are comparable to each other. [8] A set of control variables, $z_t$, is also included in our baseline model. First, this contains 12 lags of a dependent variable. Second, we include the same number of lags of first-differenced logs of the CPI and Korean Won-US Dollar exchange rates as well as the government bond rate, to reflect the state of the economy and the financial conditions.

The dependent variables we examine ($y_t$'s) are of two types; one is those describing the Korean economy at the aggregate level (e.g., aggregate IP, export, exchange rate, and so on), and the other is several sector-level IPs. An alternative approach to consider, particularly for the sector-level analysis, is a factor-augmented VAR (FAVAR) model as in Baek, Noh, and Kim (2023), where we incorporate factors capturing common dynamics of sectoral variables into a VAR model similar to Baumeister, Peersman, and Van Robays (2010). In this case, however, one would need to impose additional (block) zero restrictions on the FAVAR model to restrict the feedback impact from the Korean economy to the global oil market, in addition to the informative sign restrictions as in Baumeister

[7] The historical realization of the four structural shocks before the normalization is available on Christiane Baumeister's website: https://sites.google.com/site/cjsbaumeister/datasets?authuser=0. Figure 9 in Baumeister and Hamilton (2019) shows the historical contributions of the estimated structural shocks on actual changes in RAC.

[8] To be more specific, we divide the Baumeister and Hamilton (2019)'s four structural shocks by their estimated standard deviation, i.e., 1.8934, 1.5460, 1.7011, 1.7011, respectively, and multiply them by 10, in order to adjust the shocks' size to represent a 10-percent increase in the real RAC. Wong (2015) and Aastveit, Bjørnland, and Cross (2023) also normalize the sizes of the shocks to increase real oil price by 10 %.

and Hamilton (2019), which will add a layer of complication in the estimation process. Exploiting the structural oil market shocks in the Local Projection model would provide a simple workaround to avoid such issues. The structural oil market shocks in the global oil market can be considered as exogenous shocks to the Korean economy both at the aggregate and industry levels in a given month conditional upon all information available up to the previous month. Hence, the local projection method becomes a concise and consistent way, through which we can investigate aggregate and sectoral effects of the global oil market shocks on the Korean economy. [9]

## 3 Empirical Findings

**3.1 Effects of Oil Price Hikes at the Aggregate Level** We first investigate the extent to which oil price shocks affect the Korean economy at the aggregate level. We estimate Equation (1) with the aggregate IP index as a dependent variable. The impulse responses of the aggregate IP to various types of oil price shocks are presented in Figure 1. Shaded regions refer to 90-percent error bands. To facilitate the comparison, all of the oil shocks are normalized to elicit a 10-percent increase in the real RAC of oil.[10]

The first panel exhibits the effect of non-structural oil shocks (shock to real RAC) on the aggregate IP index. The responses are obtained by plugging in the real RAC directly into equation (1) in the place of structural oil market shocks. Different from the conventional belief that higher oil prices generate a recession, the unexpected increase in oil prices by 10 percent boosts the IP for about six months after the impact in Korea. Although Korea depends entirely on imported crude oil, the unexpected oil price shocks do not render negative spillover to the aggregate-level industrial production since the 1990s. It should be noted that this finding is in line with the results from previous literature, i.e., Baek and Kim (2020) and Cunado, Jo, and de Gracia (2015).

We then move to impulse responses to structural oil market shocks, which may underlie the observed changes in RAC, using the structural shocks from Baumeister and Hamilton (2019) in equation (1). The next four panels of Figure 1 present impulse responses of the aggregate IP to oil supply shocks, economic activity shocks, oil consumption demand shocks, and inventory demand shocks, respectively. While the negative effect of oil price shocks on the Korean economy does not still appear, the results show a substantial degree of heterogeneity in the responses. To be more specific, the IP expands most notably in response to oil price hikes that are driven by economic activity shocks. That is, if oil price unexpectedly increases due to higher global economic activity, such increases will have a strong positive impact on the Korean IP; a 10-percent increase in real RAC driven only by the economic activity shocks would result in a 6-percentage point (p.p) higher IP, and the impacts would last

[9] Another alternative would be to use the structural oil market shocks as instruments for real RAC in the Local Projection model, similar to Kaminska, Mumtaz, and Šustek (2021)'s approach. The resulting impulse responses of RAC decomposed by the oil shocks are very close to our baseline result, and presented in Figure 10. We thank our anonymous referee for the suggestion.

[10] Impulse responses to one-standard deviation shocks, which are qualitatively very similar to the responses to our baseline normalization, are available upon request.

about 10 months after the impact. The oil consumption demand shocks also result in increases in IP, but this response is much weaker in magnitude. In addition, their impact is transitory, dissipating less than four months from the impact. In contrast, when the shock is supply-driven, i.e., global oil supply shocks, there is no significant impact on the aggregate IP. If there is any, a slightly negative response is observed on impact, while it is not statistically significant at the 90-% confidence interval. Similarly, only muted responses are observed in the case of inventory demand shocks.[11]

Our findings highlight substantial heterogeneity in the responses of IP to oil price increases depending on their sources. The positive responses of aggregate IP to real RAC increases appear to be the result of economic activity shocks. Other shocks may lead to rather muted, but not at all negative, responses. We postulate that this heterogeneity is likely due to changes in exports. Since the Korean War, the country has focused strategically on boosting its exports as a small, open economy. As a result, exports and imports take a large share of the Korean GDP. For example, the share of exports and imports in GDP amounted to 88.9 % in 2023, according to the data from the Korean national account.[12] This implies that potential hikes in production costs for overall industries could be more than offset by higher global economic growth, which, in turn, likely leads to higher demand for products from Korea. Hence, we further estimate the impulse responses of export and import in Figures 2 and 3. Both export and import increase in response to demand-side shocks but remain muted in the face of supply-side shocks. Notably, the responses to the economic activity shocks are larger than other shocks, raising exports and imports by approximately 18 percentage points at their peak. In the case of the supply shocks, export dips initially, in line with the conventional belief. However, this negative impact quickly disappears after two months since the impact, while import does not exhibit any significant responses. This clear contrast between oil supply- and demand-side shocks offers insight into the transmission mechanism for both aggregate IP, and later in the mining and manufacturing IP.[13] As will be detailed in the next section, the demand-side shocks substantially boost Korea's overall trade, thereby stimulating the mining and manufacturing sectors and the aggregate economy, which are heavily reliant on external demand. Related, we examine the impacts of oil price hikes on the nominal exchange rate of Korea. Figure 4 shows that the KRW-USD exchange rate does not exhibit significant changes in the presence of oil shocks. This implies that Korea does not face additional costs related to international trade as trade volumes expand.

We then illustrate how CPI reacts to structural oil shocks in Figure 5. The economic activity shocks significantly and most largely increase the CPI, while other demand-side shocks also increase the CPI but relatively in a small magnitude. These imply that we can interpret the oil price shock playing the role as a demand shock

[11] These results are similar to the estimated impulse responses of global IP from the baseline model of Baumeister and Hamilton (2019) provided in Figure 8; the economic activity shocks have the most notable and persistent responses.

[12] https://www.index.go.kr/unify/idx-info.do?idxCd=4207&clasCd=7

[13] It should be noted that 99 % of goods exports come from the mining and manufacturing sector, according to the data from the Ministry of Trade, Industry, and Energy in Korea. Thus, the impulse responses of exports should be reflecting mainly the responses of the exports by the mining and manufacturing sector.

to the Korean economy. Notably, supply shocks significantly affect CPI, which is not observed in the variables related to international trade.

We finally investigate whether the interaction between monetary policy and oil shocks drives our main findings. For instance, a contractionary monetary policy might be implemented in response to an inflationary oil supply shock, which can affect the aggregate economy in a general equilibrium manner. However, Figure 6 indicates that the call rate—the Bank of Korea's target rate—does not react significantly to any of the oil shocks. These muted responses suggest that the Bank of Korea does not actively adjust monetary policy in response to oil shocks, ruling out monetary tightening as a primary reason for the IP responses observed.

In sum, our findings suggest that unexpected increases in oil prices may not necessarily result in a negative impact on Korea, especially when one focuses on the aggregate-level IP dynamics. More importantly, our findings imply that it is crucial to distinguish the sources of oil price hikes to precisely assess their impacts.

**3.2 Effects of Oil Price Hikes at the Sectoral Level** Why do supply-driven oil price hikes have a muted impact on the overall economy in Korea while demand-driven oil price hike generates an economy-wide boom, in contrast to common prior beliefs? In order to answer this question, we further analyze the effects of oil price shocks on two sectors: the mining and manufacturing as well as construction sectors. As shown in Figure 7, these two sectors accounted for more than 30% of Korea's GDP as of the first quarter of 2022. While both sectors are relatively energy intensive, they differ in terms of the degree of dependence on trade. Specifically, the mining and manufacturing sector depends heavily on trade, while the construction sector does not. For instance, the share of the mining and manufacturing sector amounts to almost 99 % of total exports of goods in Korea.[14] Hence, if our argument in the previous section that the worldwide boom is the key to understand our finding is correct, we would observe similar impulse responses for the manufacturing sector while such responses would not be observed in the construction sector. In particular, we estimate Equation (1) using the two sectoral IP indexes as a dependent variable. As sectoral IP indices are available since February 2000, the sample for this exercise covers the period after 2000.

The estimated impulse responses of the two sectors are presented in Figures 8 and 9. Two points stand out. First, we find substantial heterogeneity in these industries' responses to real RAC of oil shocks. That is, the responses of the mining and manufacturing sector largely mimic those of the aggregate-level IP and are positive for about seven months since the impact (Fig 8-(a)). However, the construction sector does not appear to respond much initially to the RAC changes, but eventually shows a significant decline with the largest impact at a $-2$ p.p drop (Fig 9-(a)). Second, distinguishing the sources of the oil price shocks highlights such sectoral heterogeneity even further. For instance, the finding that demand-driven oil market shocks are expansionary in Korea is observed only for the mining and manufacturing sector. [15] In the case of the construction sector, all

[14] https://www.istans.or.kr/su/newSuTab.do?scode=S105.

[15] Our analysis shares similarity with Baek, Noh, and Kim (2023) that use an Endogenously Clustered Dynamic Factor

of the oil market shocks prices do not yield any positive responses. In particular, the construction sector's IP declines notably in response to the oil supply shocks, while the responses of the mining and manufacturing sector decline initially, but start to recover soon.

These sectoral responses provide a way to reconcile our findings at the aggregate level with the conventional priors regarding the negative impacts of oil price hikes. In other words, our analyses suggest that the negative impacts of oil price hikes could appear intensively in a limited number of sectors. For instance, in the case of the construction sector, one can think of several reasons why this sector shows differing responses to oil market shocks, compared to the mining and manufacturing sector. First, this sector is heavily reliant on petroleum-based inputs such as plastics, insulation materials, and oil-consuming heavy machinery. Hence, oil price hikes regardless of any underlying causes may lead to higher input costs. In addition, almost all of the construction firms in Korea are small- and medium-sized; according to the data from the Ministry of Small and Medium Enterprises (SMEs) and Startups in Korea, 99.9 % of total construction companies in Korea are SMEs. These firms are likely more exposed to oil price changes and unable to take advantages of faster growth and/or higher demand of the global economy. Moreover, for those who are able to export, exports to the Middle East take about 30% of total exports in the construction sector.[16] Given that oil supply shocks usually arise from disruptions in such a region, this will make the construction sector even more exposed to geopolitical risks.

Putting our findings together, for a small open economy like Korea, oil price increases can be a boon if it is driven by higher global economic activity that generates greater demand for trade as well as oil. This is surprising, considering the fact that Korea imports almost all of its energy to consume. The common perception of the negative impacts of oil price shocks can only be observed once we account for heterogeneity across sectors as well as the sources of oil price hikes. The manufacturing sector, where a large share of its output is exported, seems to benefit from oil price hikes if it is driven by higher demand. In contrast, the construction sector of Korea, which produces output that is less tradable and is highly exposed to oil price hikes, oil market shocks do not generate positive responses. These findings indicate the importance of accounting for the sectoral heterogeneity in addition to the sources of the oil price shocks in order to better understand their economic impacts.

# 4 Conclusion

While oil shocks are generally known to hinder economic growth, previous studies have struggled to find supporting evidence for Korea, despite its heavy reliance on energy imports (see Baek and Kim (2020), Cunado, Jo, and de Gracia (2015), for example). This paper reexamines this issue by estimating the effects of structural

Model to examine the impacts of oil price shocks on the manufacturing sector. The authors find that the sub-manufacturing cluster, including high-tech goods (e.g., pharmaceuticals, computers, and communication devices) and artificial and synthetic fibers, responds more sensitively to global demand shocks.

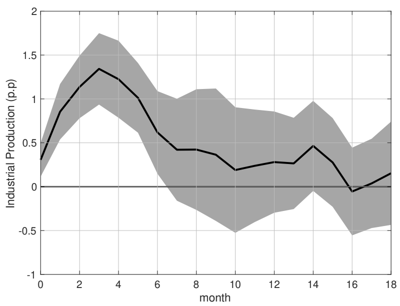
[16] https://www.korea.kr/news/policyNewsView.do?newsId=148910355

oil market shocks on the Korean economy using the Local Projection method. Our findings suggest that previous results can be better understood by distinguishing between different sources of oil price hikes using the structural market shocks of Baumeister and Hamilton (2019). Specifically, demand-driven oil shocks can have expansionary effects, whereas supply-driven shocks do not significantly impact the Korean economy.

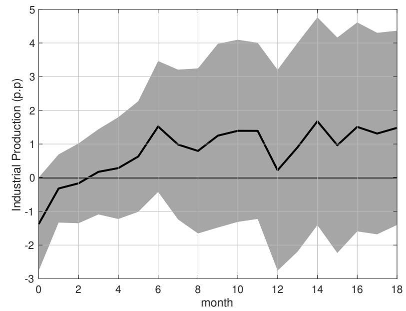
Furthermore, we identify substantial heterogeneity in industrial production responses across sectors, offering insight into the transmission mechanisms of structural oil market shocks. More specifically, the mining and manufacturing sector, which accounts for nearly 99% of Korea's total exports, experiences a temporary decline following an oil supply shock. However, similar to aggregate-level responses, this sector exhibits notable positive dynamics when oil prices rise due to a global economic activity shock. In contrast, the construction sector, which has minimal export contributions, experiences a prolonged negative response to oil supply shocks, while demand-driven shocks have no significant impact.

Our findings underscore the importance of understanding the underlying sources of oil price hikes and accounting for sectoral heterogeneity, particularly in terms of export shares, when assessing their economic impact. Taking these factors into account will help policymakers better evaluate the consequences of oil price fluctuations and design more effective policy measures.

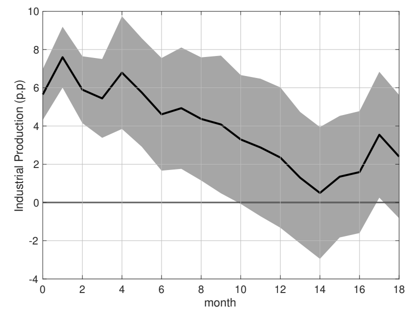
Potential extensions of our study include: (1) developing a dynamic stochastic general equilibrium (DSGE) model to capture the heterogeneous effects of structural shocks on the Korean economy, (2) examining whether government policy responses, such as reductions in fuel taxes, explain why supply shocks do not lead to recessions in Korea, (3) analyzing the effects of oil shocks on energy-intensive industries, and (4) exploring the extent to which oil price shocks influence price levels. We leave these as directions for future research.



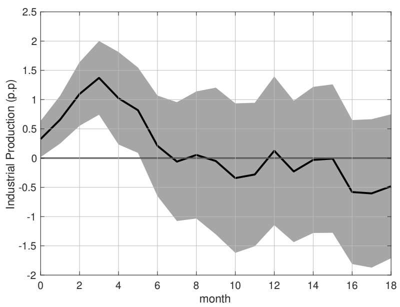

(a) RAC



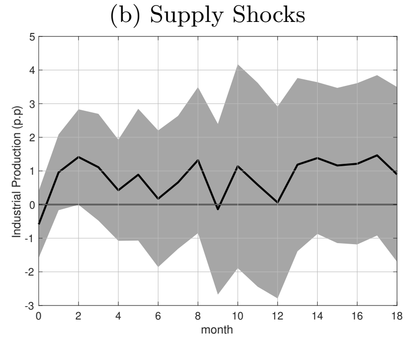

(b) Supply Shocks




(c) Economic Activity Shocks



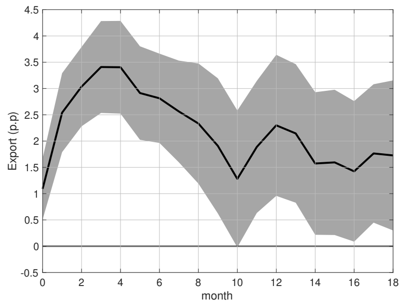

(d) Oil Demand Shock



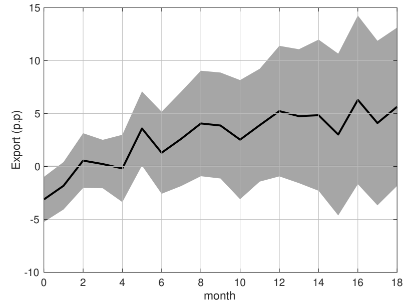

(e) Inventory Demand Shock

Figure 1: Responses of Aggregate IP to Oil Shocks (1990M01-2022M02)

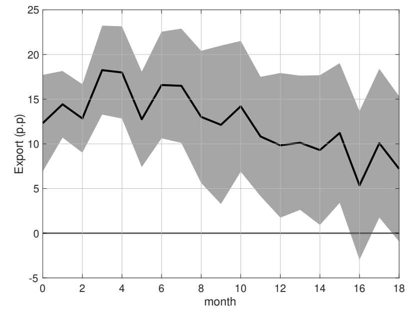
Note: This figure reports the impulse responses of aggregate industrial production to oil shocks, using data from 1990M01 to 2022M02. The grey-shaded area represents Newey and West (1987)-corrected 90% error bands of the corresponding impulse responses in solid black lines. All structural shocks are normalized to elicit a 10% increase in the real RAC.



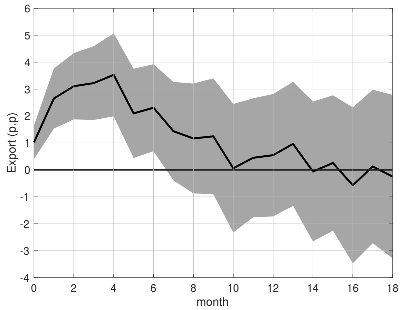

(a) RAC



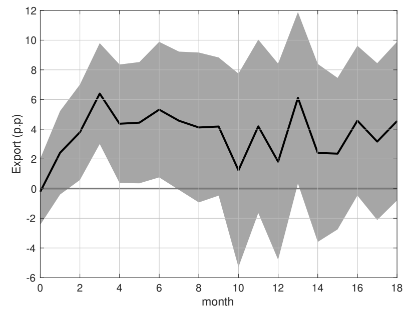

(b) Supply Shocks




(c) Economic Activity Shocks



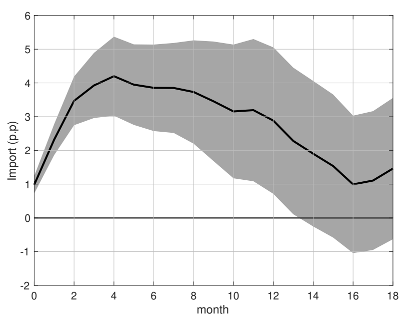

(d) Oil Demand Shock



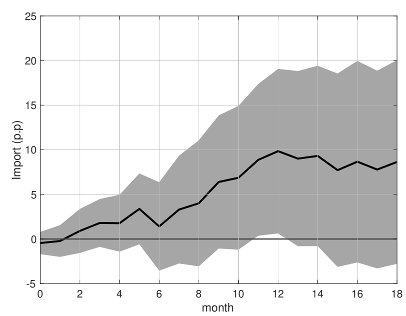

(e) Inventory Demand Shock

Figure 2: Responses of the Export to Oil Shocks (1990M01-2022M02)

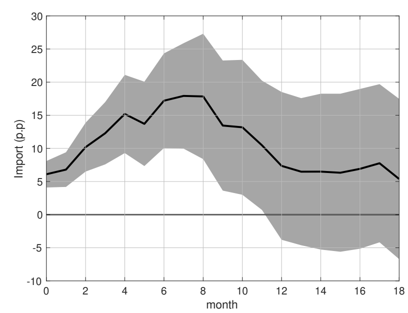
Note: This figure reports the impulse responses of the export to oil shocks, using data from 1990M01 to 2022M02. The grey-shaded area represents Newey and West (1987)-corrected 90% error bands of the corresponding impulse responses in solid black lines. All structural shocks are normalized to elicit a 10% increase in the real RAC.



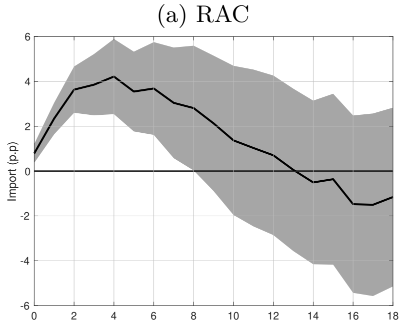

(a) RAC



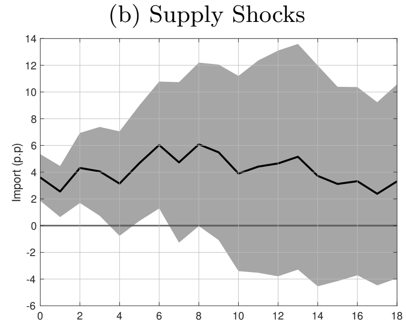

(b) Supply Shocks




(c) Economic Activity Shocks



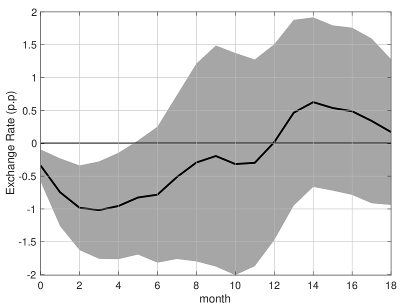

(d) Oil Demand Shock



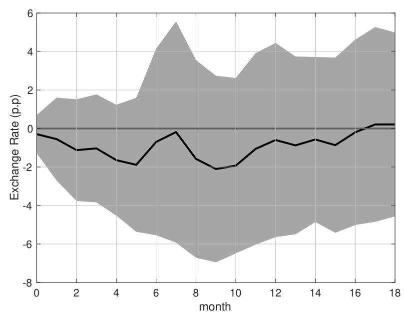

(e) Inventory Demand Shock

Figure 3: Responses of the Import to Oil Shocks (1990M01-2022M02)

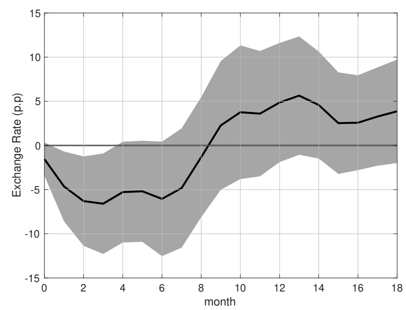
Note: This figure reports the impulse responses of the import to oil shocks, using data from 1990M01 to 2022M02. The grey-shaded area represents Newey and West (1987)-corrected 90% error bands of the corresponding impulse responses in solid black lines. All structural shocks are normalized to elicit a 10% increase in the real RAC.



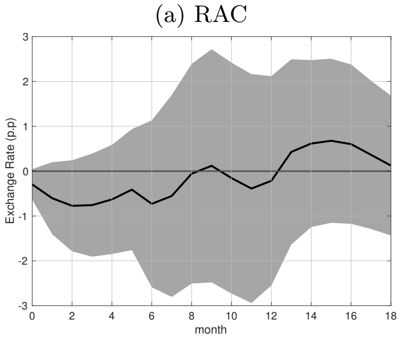

(a) RAC



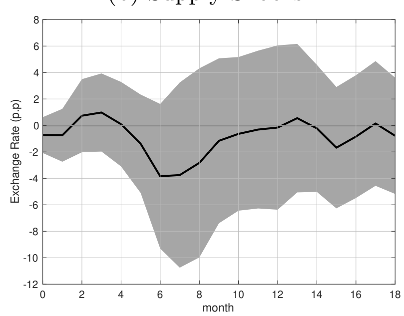

(b) Supply Shocks




(c) Economic Activity Shocks



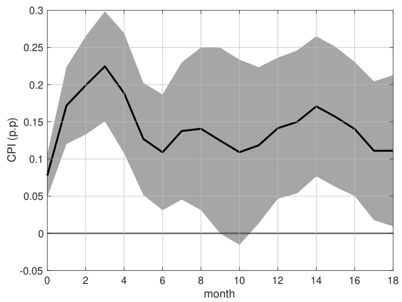

(d) Oil Demand Shock



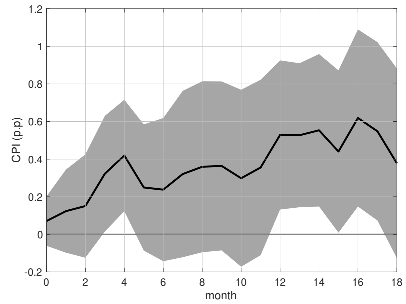

(e) Inventory Demand Shock

Figure 4: Responses of the Nominal Exchange Rate (Won to Dollar) to Oil Shocks (1990M01-2022M02)

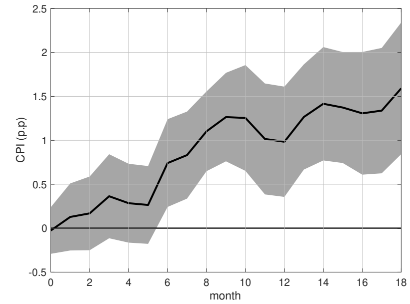
Note: This figure reports the impulse responses of the nominal exchange rate to oil shocks, using data from 1990M01 to 2022M02. An increase in the nominal exchange rate represents a depreciation in the Korean Won. The grey-shaded area represents Newey and West (1987)-corrected 90% error bands of the corresponding impulse responses in solid black lines. All structural shocks are normalized to elicit a 10% increase in the real RAC.



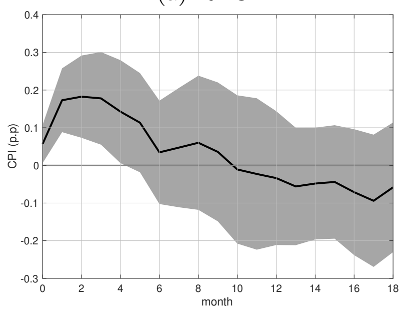

(a) RAC



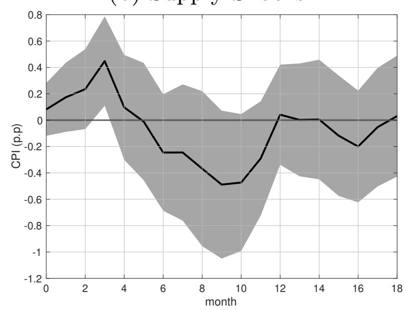

(b) Supply Shocks




(c) Economic Activity Shocks



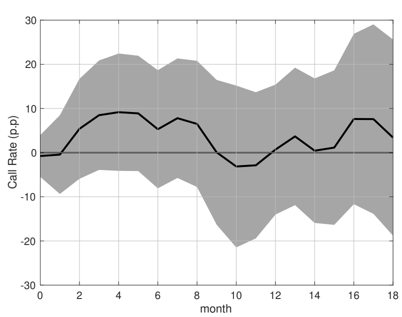

(d) Oil Demand Shock



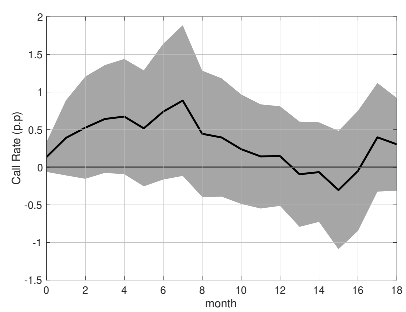

(e) Inventory Demand Shock

Figure 5: Responses of CPI to Oil Shocks (1990M01-2022M02)

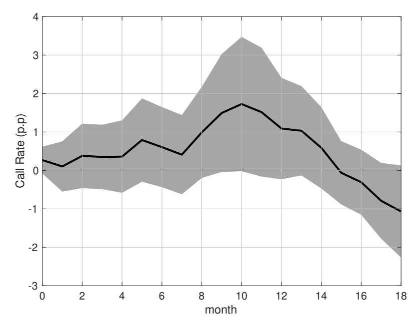
Note: This figure reports the impulse responses of the CPI to oil shocks, using data from 1990M01 to 2022M02. The grey-shaded area represents Newey and West (1987)-corrected 90% error bands of the corresponding impulse responses in solid black lines. All structural shocks are normalized to elicit a 10% increase in the real RAC.



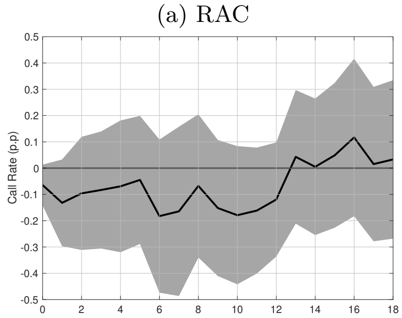

(a) RAC



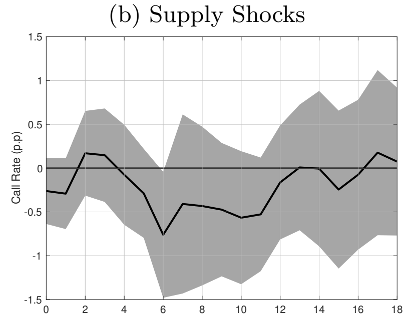

(b) Supply Shocks




(c) Economic Activity Shocks




(d) Oil Demand Shock




(e) Inventory Demand Shock

Figure 6: Responses of the Call Rate to Oil Shocks (1991M01-2022M02)

Note: This figure reports the impulse responses of the call rate to oil shocks, using data from 1991M01 to 2022M02. The grey-shaded area represents Newey and West (1987)-corrected 90% error bands of the corresponding impulse responses in solid black lines. All structural shocks are normalized to elicit a 10% increase in the real RAC.

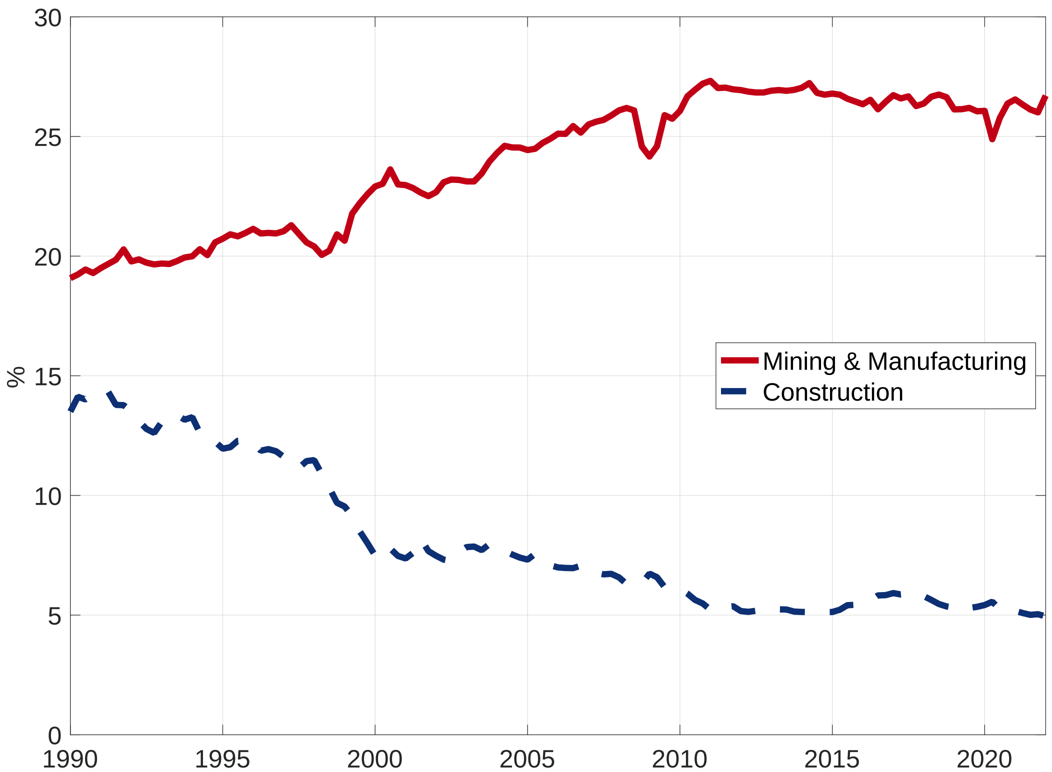
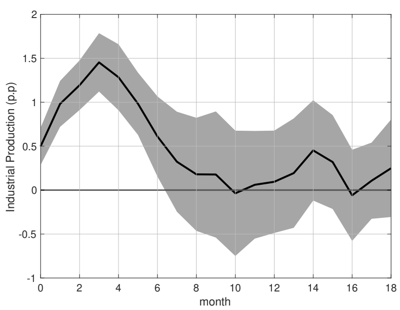
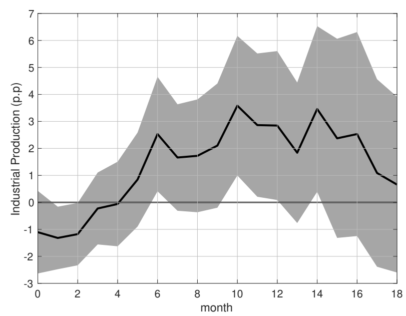



Figure 7: GDP Decomposition by Industries

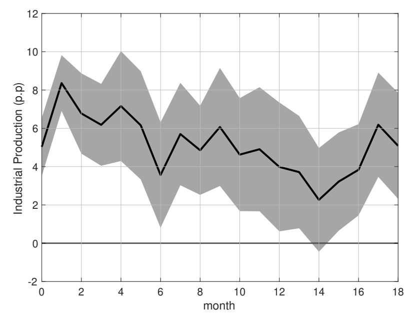
Note: This figure shows the shares of the mining/manufacturing and construction sectors in the aggregate GDP from 1990Q1 to 2022Q1. The shares are calculated by dividing the quarterly nominal industrial GDP by the quarterly nominal aggregate GDP.



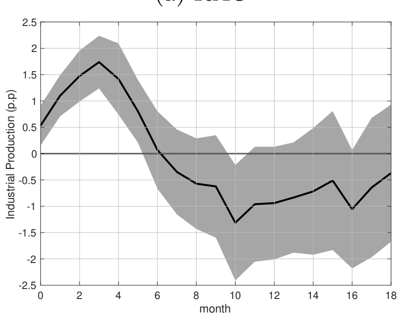

(a) RAC



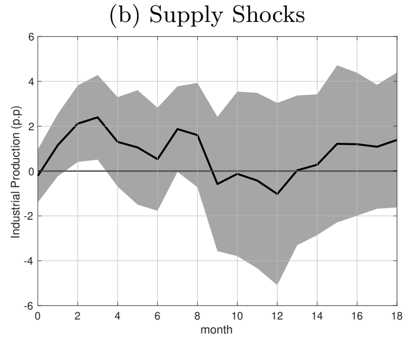

(b) Supply Shocks




(c) Economic Activity Shocks



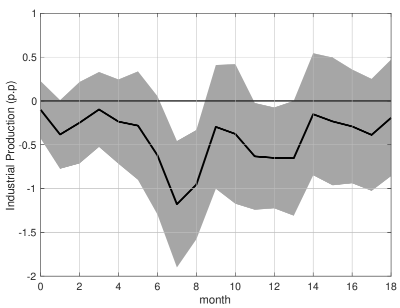

(d) Oil Demand Shock



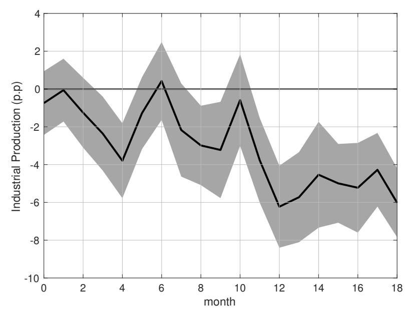

(e) Inventory Demand Shock

Figure 8: Responses of Mining and Manufacturing IP to Oil Shocks (2000M02-2022M02)

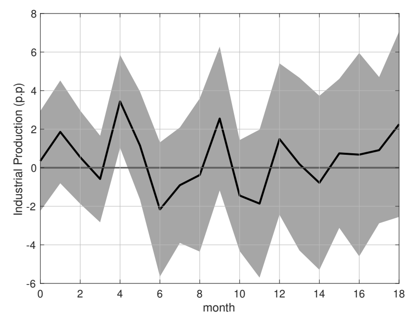
Note: This figure reports the impulse responses of mining & manufacturing industrial production to oil shocks, using data from 2000M02 to 2022M02. The grey-shaded area represents Newey and West (1987)-corrected 90% error bands of the corresponding impulse responses in solid black lines. All structural shocks are normalized to elicit a 10% increase in the real RAC.



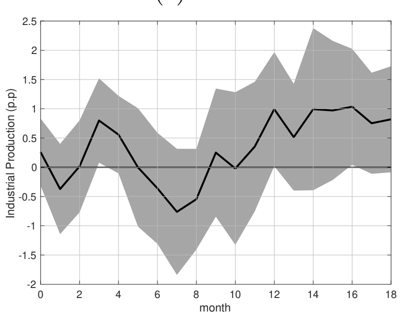

(a) RAC



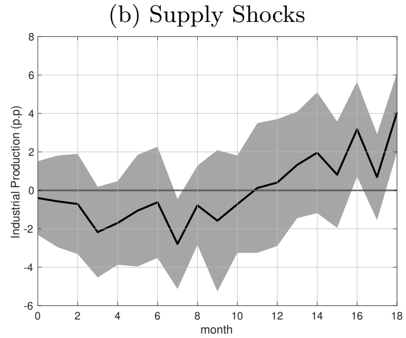

(b) Supply Shocks




(c) Economic Activity Shocks



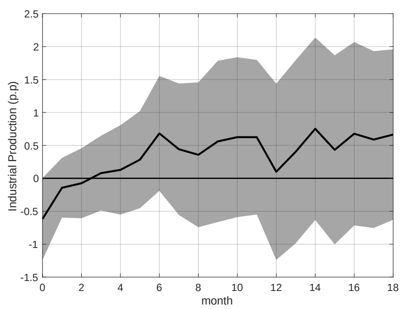

(d) Oil Demand Shock



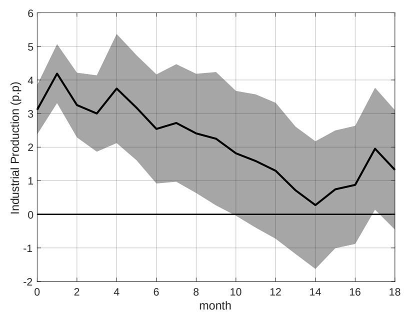

(e) Inventory Demand Shock

Figure 9: Responses of Construction IP to Oil Shocks (2000M02-2022M02)

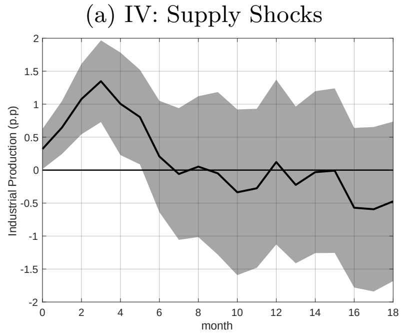
Note: This figure reports the impulse responses of construction industrial production to oil shocks, using data from 2000M02 to 2022M02. The grey-shaded area represents Newey and West (1987)-corrected 90% error bands of the corresponding impulse responses in solid black lines. All structural shocks are normalized to elicit a 10% increase in the real RAC.



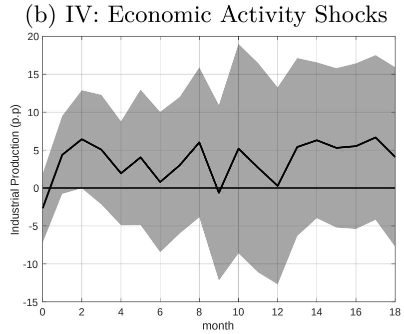

(a) IV: Supply Shocks




(b) IV: Economic Activity Shocks




(c) IV: Oil Demand Shock




(d) IV: Inventory Demand Shock

Figure 10: Responses of IP to RAC Hikes Using Structural Shocks as Instruments (1990M01-2022M02)

Note: This figure reports the impulse responses of industrial production to a 10-% increase in real RAC, using data from 1990M01 to 2022M02. Responses are estimated from a LP model using each structural oil shock used as an instrument variable (IV). The grey-shaded area represents Newey and West (1987)-corrected 90% error bands of the corresponding impulse responses in solid black lines.

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