INTERNATIONAL MONETARY FUND

# Oil Shocks and Labor Market Developments

Diego B. P. Gomes, Lisa Kolovich, and Hannah Yi Wei*

WP/25/145



**2025**
JUL

WORKING PAPER

 WP/25/145

**IMF Working Paper**
Strategy, Policy and Review Department

**Oil Shocks and Labor Market Developments**
**Prepared by Diego B. P. Gomes, Lisa Kolovich, and Hannah Yi Wei**

Authorized for distribution by Monique Newiak
July 2025



**ABSTRACT:** This paper examines how oil shocks shape labor market outcomes across 89 countries from 1975 to 2022. Leveraging a high-frequency oil supply shock series and a rich panel of quarterly labor market data, we find that shocks raising oil prices trigger sharp and persistent employment losses, particularly in oil-importing countries, oil-intensive sectors, and among male workers. Delayed but enduring employment declines also emerge in oil-moderate sectors and among female workers, revealing broader labor market implications. In contrast, employment gains in oil-exporting countries, and following expansionary supply shocks, are comparatively modest. Labor force participation responds less consistently, with patterns displaying higher variability. These findings highlight how oil shocks transmit unevenly through labor markets, with lasting impacts across countries, sectors, and demographic groups, extending well beyond short-term macroeconomic fluctuations.

**RECOMMENDED CITATION:** Diego B. P. Gomes, Lisa Kolovich, Hannah Yi Wei. 2025. “Oil Shocks and Labor Market Developments”, IMF Working Paper No. 2025/145

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|---|---|
| JEL Classification Numbers: | J21, Q43, E24 |
| Keywords: [Type Here] | labor market; oil supply shocks; employment heterogeneity; high-frequency identification; cross-country labor adjustment |
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WORKING PAPERS

# Oil Shocks and Labor Market Developments

Prepared by Diego B. P. Gomes, Lisa Kolovich, and Hannah Yi Wei[1]

[1] We are grateful to Monique Newiak, Axel Schimmelpfennig, Chie Aoyagi, and Marina Mendes Tavares for their constructive comments and valuable suggestions.

# Contents

# 1. Introduction

Oil shocks are among the most consequential global economic disturbances, with effects that extend well beyond output and inflation (Kilian, 2009; Barrell and others, 2011). Fluctuations in oil prices can lead to disruptions in labor market dynamics by altering production costs and shifting demand across sectors. While the macroeconomic consequences of oil shocks have been widely studied, their implications for labor market outcomes—such as employment, unemployment, and labor force participation—remain less well understood. This is particularly evident when considering cross-country heterogeneity, sectoral composition, and demographic differentials. A more granular understanding of these patterns is crucial for identifying and assessing the full economic and distributional impact of oil shocks and for designing targeted, context-sensitive policy responses.

Recent research has increasingly examined the labor market effects of oil and other energy shocks in various national and regional contexts. For instance, studies have analyzed the employment consequences of oil booms and busts in the United States (Maurer and Potlogea, 2017), oil price fluctuations in Nigeria (Ologbenla, 2020), the decline of the coal industry in the United Kingdom (Aragón and others, 2018), and oil and gas discoveries in Norway (Bennett and others, 2021). Other work has employed cross-country data to trace broader employment effects (Arezki and others, 2017; Jiménez-Rodríguez and Sánchez, 2005). These contributions have deepened insights into labor market impacts of energy shocks, but important questions remain about the channels through which these shocks operate and the contextual factors that shape their effects.

In this paper, we address this gap in the literature by providing a global, disaggregated analysis of labor market responses to oil supply shocks. Using a rich panel of quarterly labor market data across 89 countries from 1975 to 2022, we estimate the dynamic effects of oil shocks on employment-to-population ratios, unemployment rates, and labor force participation rates. Our analysis combines this extensive dataset with Känzig's (2021) innovative oil shock series, which leverages both the institutional nuances of OPEC and the benefits of high-frequency data. Through a local projection method (Jordà, 2005), we estimate the effects of oil supply shocks on labor market outcomes over a five-year horizon. A central contribution of our paper is the decomposition of labor market responses along four axes: (i) asymmetries between contractionary and expansionary oil shocks; (ii) differences between oil-importing and oil-exporting countries; (iii) variation across oil-intensive and oil-moderate sectors; and (iv) sex-disaggregated labor market effects. Such a disaggregated lens yields a richer understanding of how oil shocks are transmitted through the real economy, complementing existing research on macroeconomic and labor market dynamics (Blanchard and Galí, 2011; Ramey and Vine, 2010; Kilian, 2008).

Our results reveal several distinctive patterns in labor market adjustments. First, oil supply shocks generate both immediate disruption and lasting dislocation. Employment falls sharply and recovers only partially, while unemployment rises quickly and remains elevated, signaling prolonged weakness in labor demand. Labor force participation also declines, though more moderately and unevenly. These patterns suggest that most adjustment occurs through job loss rather than widespread labor market exit. Several mechanisms may underlie this response: elevated energy costs may pass through to higher wages and suppress hiring (Baba and Lee, 2022), sectoral reallocation with search and matching inefficiency may be slow and frictional (Herrera and Karaki, 2015), and limited social protections may keep workers in the labor force despite deteriorating job prospects (Ugargol and Parvathy, 2023).

Our analysis also reveals marked asymmetries in how contractionary and expansionary oil shocks affect labor market outcomes, with a focus on aggregate employment rather than oil-intensive sectors, which we will discuss later. Contractionary shocks, characterized by reductions in oil supply and rising oil prices, lead to delayed but persistent declines in employment and a rapid, sustained rise in unemployment. Labor force participation temporarily increases, likely reflecting an added worker effect or intensified job search as households respond to job loss. In contrast, expansionary shocks produce short-term employment gains and falling unemployment, but these improvements are not matched by a rise in participation. Instead, labor force participation declines in the medium run and recovers only gradually, possibly due to income effects that reduce the need for secondary earners to remain active in the labor market. These asymmetries highlight that negative shocks cause deeper and more prolonged damage, while the benefits of positive shocks are more uneven across labor market margins.

Further, we find that labor market responses vary significantly between oil-importing and oil-exporting countries. Importers experience sharp employment losses and rising unemployment, both with only partial recovery over time, alongside a persistent decline in labor force participation. In contrast, exporters see more gradual and modest gains: employment rises with a lag, unemployment increases slightly before returning to baseline, and labor force participation grows steadily. Importantly, the magnitude of employment gains in exporting countries is smaller than the losses faced by importers. Sectoral patterns offer further insight: employment in oil-intensive industries drops sharply and remains low, while even oil-moderate sectors experience delayed but sustained declines, indicating that oil shocks propagate beyond directly exposed sectors. These findings underscore the critical role of trade exposure and sectoral composition in shaping labor market vulnerability to oil shocks.

Finally, we provide novel evidence on disparities between men's and women's labor market responses to oil supply shocks, an area largely overlooked in existing research. These shocks affect men and women differently likely due to disparities in occupational distribution, sectoral exposure, and access to job security (Ologbenla, 2020; Bacon and Kojima, 2008). Our results show that men are more severely affected in the short run, but women experience more persistent employment losses over time. This may reflect men's concentration in oil-intensive sectors such as mining and construction that suffer immediate but front-loaded employment declines, while women are more likely to work in service-oriented or informal sectors that face slower but more prolonged disruption. Our results also show diverging trends in labor force participation: men's participation initially falls and stabilizes, while women's declines gradually and persistently. These findings highlight the need to consider differences in labor market structures between men and women when evaluating the broader impacts of oil shocks. Table 1 summarizes our findings.

**Table 1: Summary of Findings**

(Response to Oil Supply News Shock, Normalized to a 10 percent Oil Price Increase)

| | **Employment-to-Population Ratio** | **Unemployment Rate** | **Labor Force Participation Rate** |
|---|---|---|---|
| Baseline | Sharp decline with partial recovery; remains negative | Rapid rise with slow decline; remains elevated | Mild decline, unstable response, some eventual rebound |
| **Asymmetric Transmission** | | | |
| Contractionary Shocks | Delayed but persistent drop | Immediate and lasting rise | Temporary rise, peaks mid-horizon, returns to baseline |
| Expansionary Shocks | Short-run gain, then dip and recovery near baseline | Sharp drop, partial rebound, then declines again | Medium-run dip, slow recovery near baseline |
| **Net Oil Trade** | | | |
| Oil Importers | Sharp drop, partial rebound; ends below baseline | Rises quickly, slow recovery; stays elevated | Persistent decline |
| Oil Exporters | Gradual rise; peaks late | Mild uptick, returns to baseline | Steady increase over time |
| **Sectoral Analysis** | | | |
| Oil-Intensive | Immediate, sharp drop; remains below baseline long-term | Not available | Not available |
| Oil-Moderate | Delayed decline, medium- and long-term drop | Not available | Not available |
| **Sex-Disaggregated** | | | |
| Men | Sharp short-term drop but faster rebound | Mirrors employment; steep rise with faster recovery | Falls initially and stabilizes near baseline |
| Women | Less severe but persistent decline with limited recovery | Mirrors employment; milder increase with slow recovery | Gradual, sustained decline |

The remainder of the paper is organized as follows. Section 2 details the data and outlines the empirical strategy used in our analysis. Section 3 presents the main results, examining the effects of oil shocks on labor market outcomes. Section 4 provides a thorough discussion of robustness checks to validate our findings. Section 5 concludes.

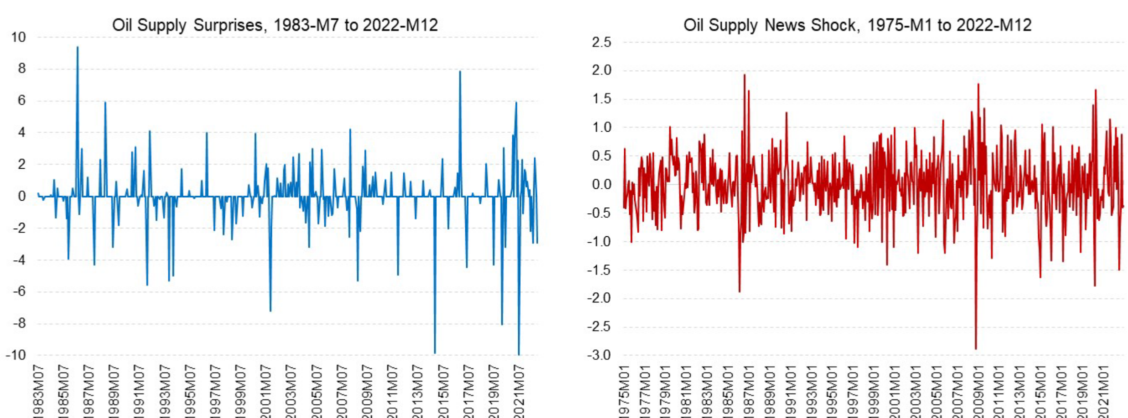
# 2. Data and Empirical Strategy

We first describe the oil shocks dataset constructed by Känzig (2021) and then discuss the quarterly country-panel data on employment, unemployment, and labor force participation from the International Labor Organization (ILO). Finally, we describe our local projection models to estimate the labor market impact of oil supply shocks.

## 2.1. Oil Supply News Shock

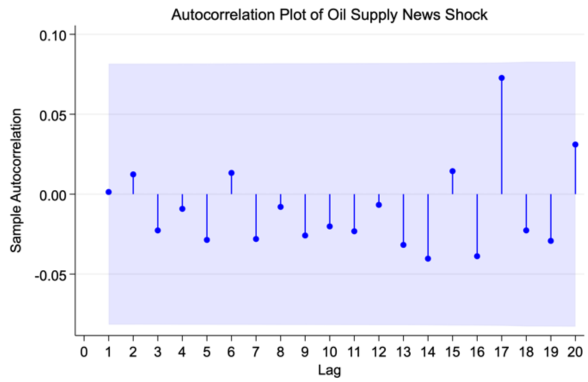
Känzig (2021) develops a novel “oil supply news shock” by building upon the strategy adopted by Gertler and Karadi (2015), among others, who use high-frequency identification techniques to compute monetary policy shocks around central bank announcements.[1] Exploiting a similar approach, Känzig (2021) first constructs oil supply surprises, proxied by changes in spot crude oil futures prices within tight windows around 119 OPEC announcements from 1983 to 2017. The author then uses the oil supply surprise series as an external instrument to identify oil supply news shocks in a SVAR model of the oil market.[2] We obtained an updated version of the series from the author, extending the data through 2022 and covering 150 OPEC announcements (Figure 1, left panel). The final estimated monthly shock series spans from January 1975 to December 2022 and is calibrated to reflect an unexpected 10 percent increase in the spot crude oil price (Figure 1, right panel).

**Figure 1. Results of the estimation process of oil supply news shocks**




[1] Känzig (2021) refers to the shock series as the “oil supply news shock” because it underscores the importance of oil supply news in shaping economic expectations and outcomes.

[2] The external IV approach allows for measurement error in the instrument (oil supply surprises). It also helps to trace out responses of financial and macro variables jointly. The SVAR model of Känzig (2021) is based on the real oil price, world oil production, world oil inventories, world industrial production, industrial production in the US, and the US consumer price index (CPI), with lag order of 12. The identification sample ranges from July 1983 to December 2022, and the estimation sample extends from January 1974 to December 2022.




**Notes:** Oil supply surprises series and oil supply news shock series estimated according to Känzig (2021). Autocorrelations calculated by the authors.

Känzig (2021) highlights several benefits of using the oil supply news shock, establishing it as a suitable exogenous shock for our study. First, the shock series aligns with key historical oil market events, particularly OPEC announcements that had a significant impact on expectations about future oil supply. Some of the episodes include major supply disruptions, such as the 1990 Gulf War and the 2008 global financial crisis, where OPEC's actions were pivotal. Second, it is not predictable by macroeconomic or financial variables. Third, other structural shocks, such as global demand or uncertainty shocks, show no correlation with this measure. Additionally, we found no evidence of autocorrelation in the shock series (Figure 1, bottom panel).

## 2.2. Panel Data

We use quarterly labor market data—employment-to-population ratios, unemployment rates, and labor force participation rates—from the ILO. We focus on the population aged 25 and older, with data disaggregated by sex, and cover 89 countries from 1975 to 2022. Using data for this population results in a larger number of countries with fewer missing data compared to other age groups. The list of countries along with their corresponding time span of data availability is provided in Annex I.[3] The ILO also provides data for 21 disaggregated sectors using the ISIC codes at the one-digit level, enabling us to test for sectoral heterogeneity.

Oil shocks are likely to affect countries based on their dependence on oil. To gauge the extent to which different countries react to oil supply news shocks, we match our panel with the net oil trade (in volume) for each country from the IMF's World Economic Outlook (WEO) database. The net oil trade is calculated as the difference between the volume of oil exports minus the volume of oil imports. For every quarter, we classify countries as oil exporters if their net oil trade is positive in that quarter, and as oil importers otherwise. In the matched sample, 84.4 percent of country-quarter observations are classified as oil importers and 15.6 percent as oil exporters.

## 2.3. Empirical Strategy

We use local projections *à la* Jordà (2005) to estimate the responses of labor market outcomes to oil supply news shocks. Countries are indexed by $c$ and time (quarter-year pairs) by $t$. Additionally, we denote by

[3] Our panel data is not balanced, meaning that it does not contain observations for each country and each time period uniformly. The number of observations varies by country and labor market variable, depending on the availability of data.

$h$ the horizon of the estimated response, which ranges up to twenty quarters ($h = 0, \dots, 19$) after the shock. Let $y_{c,t}$ be the labor market outcome of interest, $S_t$ the oil supply news shock, $\lambda_{h,c}$ country fixed effects, and $\theta_{h,t}$ time fixed effects. For each horizon $h$, we estimate a separate fixed-effects panel regression as follows:

$$y_{c,t+h} = \alpha_h + \beta_h S_t + \sum_{j=1}^{4} \varphi_{h,j} S_{t-j} + \sum_{j=1}^{4} \delta_{h,j} y_{c,t-j} + \lambda_{h,c} + \theta_{h,t} + \varepsilon_{c,t,h}, \quad (1)$$

where $\varepsilon_{c,t,h}$ is the residual term. Standard errors are robust and clustered at the country level. We control for up to four quarters of lags of the shock and outcome variables in the baseline. The estimated shock coefficients $\beta_h$ quantify the accumulated change at horizon $h$ in response to an oil supply news shock, normalized to reflect a 10 percent increase in the oil price. For the heterogeneity analyses, including the asymmetric transmission of shocks, oil importers versus oil exporters, sectoral impacts, and men and women, we use the same empirical approach but restrict the data to the relevant sub-samples to assess the heterogeneous effects of oil shocks. In the figures that follow, we present these results graphically by plotting the estimated coefficients with their confidence intervals on the vertical axis against their respective horizons on the horizontal axis.

# 3. Results

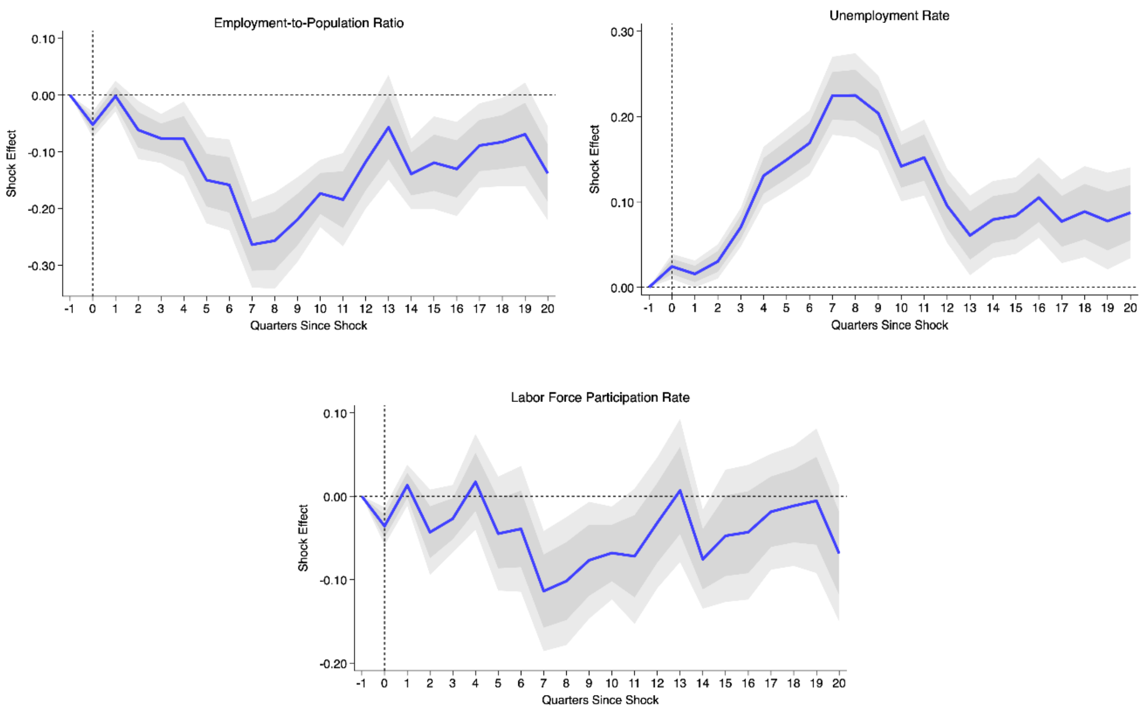
In this section we present the main results of our analysis on the labor market impacts of oil supply shocks. We begin by examining the effects of these shocks on the employment-to-population ratio, unemployment rate, and labor force participation rate. We then explore the asymmetric transmission of contractionary versus expansionary oil supply shocks to these labor market outcomes. Following this, we analyze the differentiated impacts on oil-importing and oil-exporting countries, offering insights into how the nature of a country’s relationship with oil shapes its labor market response. We further extend our investigation to the sectoral level, comparing the effects of oil shocks between oil-intensive and oil-moderate sectors. Finally, we present results separately for men and women, highlighting how oil shocks can affect their labor-market outcomes differently.

## 3.1. Baseline

Figure 2 presents the impulse responses for the employment-to-population ratio, unemployment rate, and labor force participation rate following an oil supply shock. The estimates indicate that a positive shock, normalized to reflect a 10 percent increase in oil prices, leads to a persistent weakening of aggregate labor market conditions. The employment-to-population ratio falls sharply in the initial quarters following the shock, reaching a trough of approximately 0.25 percentage points below baseline in the seventh quarter. While the decline slows in the second year, the ratio remains persistently negative and does not return to pre-shock levels. By the 20th quarter, it still sits roughly 0.14 percentage points below baseline, indicating lasting labor market scarring. In parallel, the unemployment rate rises rapidly, peaking at approximately 0.23 percentage points above baseline in the eighth quarter. This increase is consistent with weaker job creation or higher separation rates in the aftermath of the shock. Although the rate begins to decline after its peak, the adjustment is gradual, and unemployment remains elevated, hovering around 0.1 percentage points above baseline even 20 quarters later, indicating a protracted recovery.

The labor force participation rate exhibits a more muted and less stable response. It fluctuates in the short run and begins to decline more visibly around the fourth quarter, reaching a trough of approximately 0.11 percentage points below baseline by the seventh quarter. While the response is statistically significant in the medium term, the longer-run dynamics are more uncertain: labor force participation remains somewhat subdued but shows signs of partial recovery, with wide confidence intervals in later periods. This indicates that oil supply shocks not only diminish employment opportunities but also prompt some individuals to exit the labor force altogether. Taken together, these responses point to a broad-based deterioration of the labor market following oil supply shocks, highlighting how energy disruptions can reverberate through the wider economy, reshaping labor supply and demand dynamics.

**Figure 2. Impulse responses to oil supply shocks**




**Notes:** The solid lines represent the impulse response to an oil supply news shock that is normalized to reflect a 10 percent increase in the oil price. The light and dark gray shaded areas represent the 90 percent confidence interval and one standard deviation, respectively.

## 3.2. Asymmetric Transmission

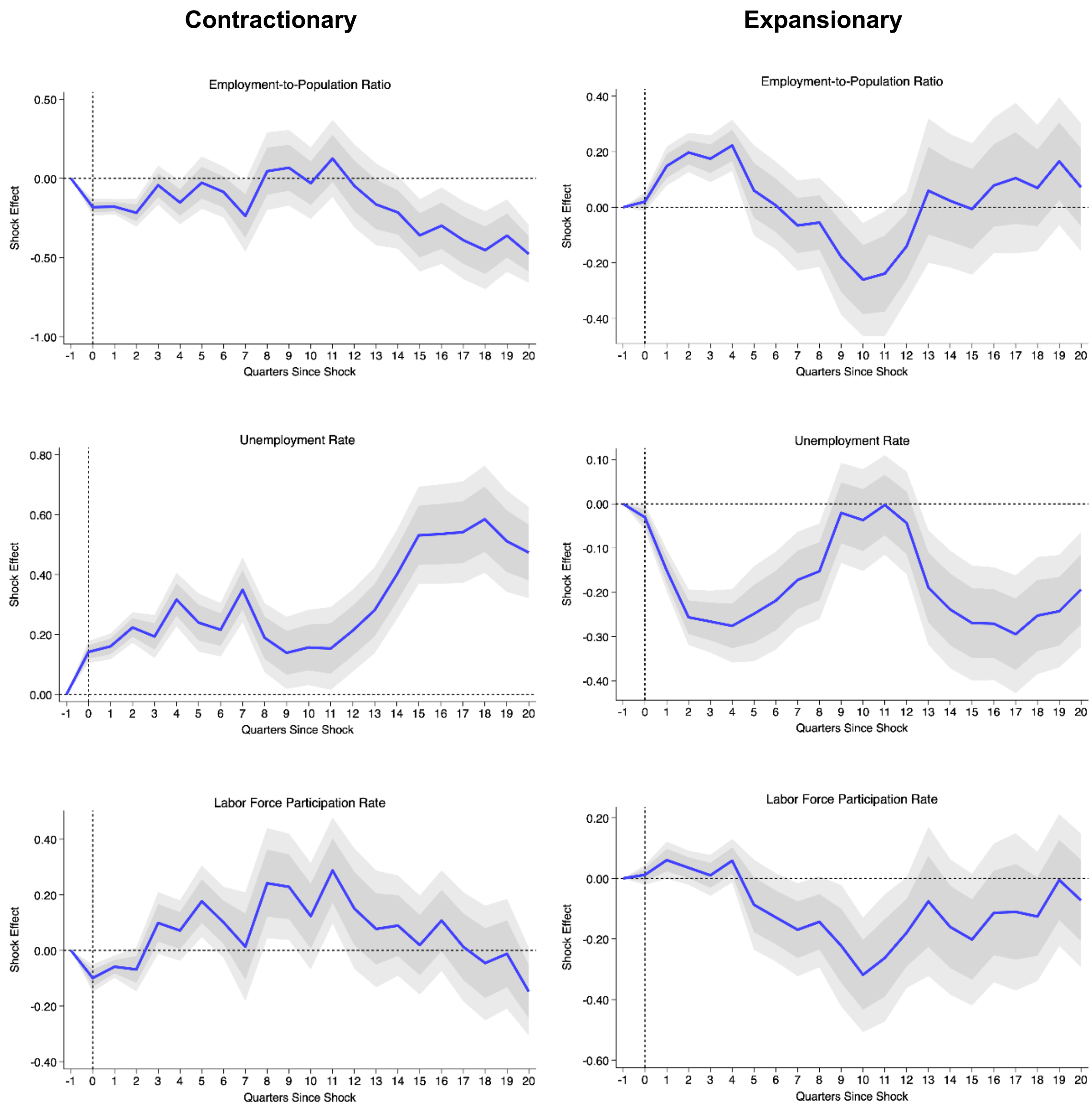
The literature on asymmetric effects of oil shocks has gained significant attention in both academic and policy-making circles. This growing interest is largely due to the complex and varied impacts that oil price fluctuations have on global economic stability and financial markets. Researchers have found that positive and negative oil price shocks can lead to markedly different outcomes in GDP growth (Jiménez-Rodríguez and Sánchez, 2005; Mork, 1989) and stock market returns (Zhu and others, 2016). We build on this burgeoning body of work by exploring the asymmetric effects of oil supply news shocks on labor market outcomes. Specifically, contractionary (expansionary) oil supply news shocks reflect OPEC's announcement of reduced (increased) oil supply and the accompanying increase (decrease) in oil price.

Interestingly, we find that labor market outcomes react rather differently to these two types of shocks. Figure 3 distinguishes between contractionary (left panels) and expansionary (right panels) oil supply shocks, offering a more nuanced view of their effects. Contractionary shocks, associated with OPEC tightening and rising oil prices, lead to a pronounced and persistent deterioration in labor market conditions. The employment-to-population ratio exhibits a modest initial dip in the first two quarters following the contractionary shock but quickly stabilizes and remains statistically indistinguishable from zero through quarter ten. Starting around the 11th quarter, the ratio begins to decline more noticeably, with effects becoming both larger and statistically significant. By the end of the 20-quarter horizon, the employment-to-population ratio stands nearly 0.45 percentage points below baseline, indicating that the adverse employment effects of contractionary oil shocks emerge with a delay but persist once they materialize. This delayed decline in employment contrasts with a more immediate response in unemployment. The unemployment rate increases sharply and persistently, peaking at around 0.6 percentage points above baseline in quarter 18, reflecting a prolonged weakening of job-finding prospects or increased separations. The labor force participation rate, on the other hand, rises in response, peaking at about 0.25 percentage points above baseline around the 11th quarter. However, this effect proves transitory: the series trends downward in the later quarters and returns close to baseline by the end of the forecast horizon. This pattern suggests a temporary increase in labor force engagement, possibly as households respond to rising living costs or income loss by seeking additional work, an adjustment that fades as job opportunities tighten.

In contrast, expansionary shocks generate smaller and more transitory improvements. The employment-to-population ratio increases modestly in the short term, peaking at approximately 0.22 percentage points above baseline around the fourth quarter. However, the gains prove fragile: the ratio subsequently declines, bottoming out near -0.22 percentage points by quarter ten, before rebounding to pre-shock levels toward the end of the horizon. This bounce-back pattern mirrors the trajectory of the unemployment rate, which falls sharply in the short term, reaching near -0.27 percentage points by quarter four. The rate then rises back toward baseline level in quarter 11, before declining again to roughly -0.2 percentage points by quarter 20. These oscillations suggest a more volatile and drawn-out adjustment in response to falling oil prices. The labor force participation rate, meanwhile, exhibits a significant decline in the medium term, reaching a trough of about -0.3 percentage points around the tenth quarter. While it gradually recovers over the remaining horizon, the series remains below baseline until the end of the projection window. This pattern may reflect weak follow-through in labor demand or broader macroeconomic uncertainty.

Taken together, these findings underscore a clear asymmetry in how labor markets respond to oil supply shocks. Contractionary shocks lead to more persistent and pronounced adverse effects, particularly in employment and unemployment. In contrast, expansionary shocks bring short-term improvements in both employment and unemployment. While employment gradually returns to baseline, the unemployment rate initially rebounds before improving further over the longer term. Labor force participation also responds asymmetrically. It rises temporarily after contractionary shocks, likely as households seek additional income in response to financial strain, but falls temporarily following expansionary shocks, possibly as economic pressures ease. In neither case do we observe sustained changes in participation.

**Figure 3. Asymmetric transmission**




**Notes:** The solid lines represent the impulse response to an oil supply news shock that is normalized to reflect a 10 percent increase in the oil price. The light and dark gray shaded areas represent the 90 percent confidence interval and one standard deviation, respectively. OPEC tightening (loosening) is defined as contractionary (expansionary) oil supply news.

## 3.3. Oil Importers versus Oil Exporters

A growing number of studies suggest that the macroeconomic effects of oil price fluctuations differ between oil-exporting and oil-importing countries. For example, for oil-importing countries, an increase in oil prices tends to negatively impact GDP growth (Darby, 1982; Gbatu and others, 2017; Hamilton, 1996) and stock market volatility (Aydoğan and others, 2017), whereas oil-exporting countries are likely to experience the opposite effect (Ayadi, 2005; Rafiq and others, 2009). Considering this crucial channel, we differentiate between oil exporters and oil importers in our sample and plot the impulse responses as in the baseline analysis.

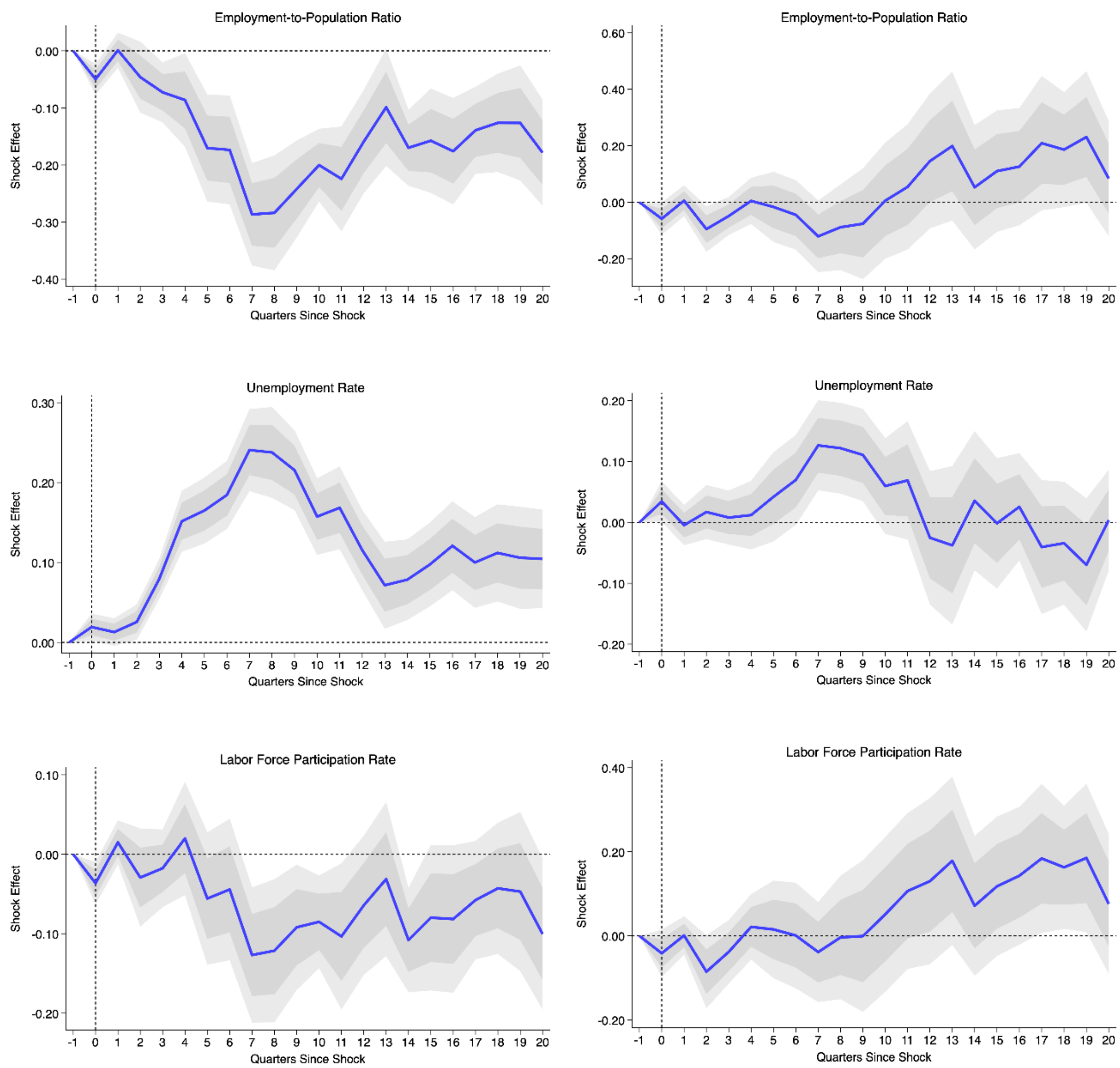
The results for oil-importing countries, shown in the left-hand panels of Figure 4, indicate a sharp and persistent deterioration in labor market conditions. The employment-to-population ratio declines notably in the first two years, reaching a trough of approximately 0.28 percentage points below baseline by the seventh quarter. This is followed by a partial recovery, though the ratio remains depressed, ending at around 0.16 percentage points below baseline by quarter 20. Similarly, the unemployment rate rises sharply, peaking at about 0.24 percentage points above baseline around the seventh quarter, before gradually declining. However, it remains elevated through the end of the horizon, settling at approximately 0.12 percentage points above baseline by quarter 20. The labor force participation rate also contracts, with a decline of about 0.1 percentage points that persists throughout the medium-term horizon. These patterns are consistent with the notion that higher oil prices tighten production budgets, raise input costs, and reduce overall labor demand in net oil-consuming economies. For households, elevated energy and transportation costs may also create barriers to job search and participation, particularly for lower-income or more geographically dispersed populations.

By contrast, labor market responses in oil-exporting countries (right-hand panels) are smaller in magnitude and more favorable in direction. Following an oil supply shock, the employment-to-population ratio in oil-exporting countries rises gradually, peaking at about 0.2 percentage points above baseline toward the end of the forecast horizon. The unemployment rate ticks up modestly, peaking at around 0.13 percentage points above baseline seven quarters after the shock, but gradually returns to baseline within three years, remaining stable over the long term with no sustained deviation. The labor force participation rate also trends upward, with an increase of nearly 0.2 percentage points by the third year after the shock.

These findings underscore the role of oil trade balance as a key determinant of labor market vulnerability to global energy disruptions. While oil-importing economies bear the brunt of price increases through reduced employment and participation, oil exporters tend to benefit, albeit more gradually, through improved labor market outcomes. This divergence highlights the need for country-specific policies that account for differing exposure to energy price volatility.

**Figure 4. Impulse responses to oil supply shocks by net oil trade**

**Oil Importers** **Oil Exporters**




**Notes:** The solid lines represent the impulse response to an oil supply news shock that is normalized to reflect a 10 percent increase in the oil price. The light and dark gray shaded areas represent the 90 percent confidence interval and one standard deviation, respectively. We classify countries as oil-importers (exporters) if their net trade of oil is negative (positive).

## 3.4. Sectoral Analysis

We use ISIC one-digit codes to split down broad sectors into more granular sub-sectors. As the sectoral employment data does not cover employment-to-population ratios, we take the logarithm of employment instead to facilitate comparability across sectors of different sizes. Furthermore, we classify sectors into "oil-intensive" and "oil-moderate" categories based on their reliance on oil, as follows: mining and quarrying, construction, and transportation and storage are categorized as oil-intensive sectors, while the others are classified as oil-moderate.[4] This classification is supported by prior literature that validates the oil-intensiveness nature of these sectors (Sadorsky, 1999; Kilian, 2008; Herrera and Pesavento, 2009; Taghizadeh-Hesary and others, 2016).

Figure 5 reveals that both oil-intensive and oil-moderate sectors experience meaningful employment declines in response to an oil supply shock, but the timing and short-run dynamics differ. For oil-intensive sectors, employment drops sharply almost immediately after the shock and continues to fall, reaching a trough of about one percent below baseline by the 11th quarter. This immediate response likely reflects the direct pass-through of energy cost increases into production decisions in sectors where fuel, transportation, or oil-based materials are key inputs.

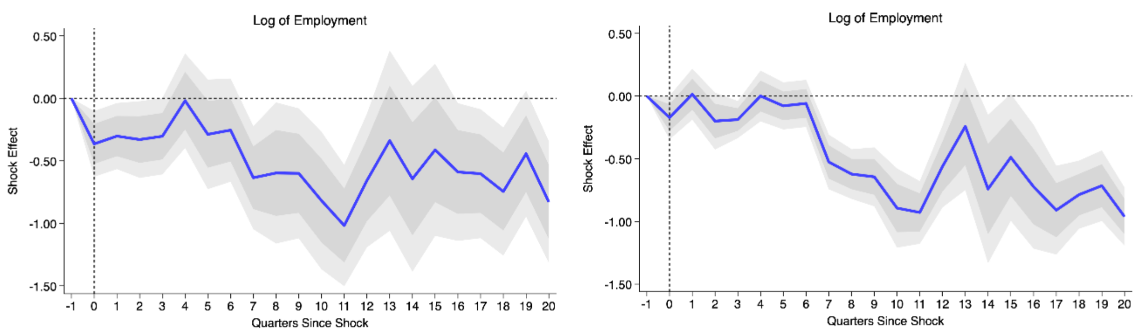
Oil-moderate sectors, by contrast, exhibit a more delayed response. Employment remains relatively stable in the first few quarters following the shock, with declines becoming more pronounced only from around quarter six onward. By the 11th quarter, however, these sectors also experience employment losses approaching one percent, broadly similar in magnitude to oil-intensive sectors. This suggests that while oil-moderate sectors are not immune to the effects of rising oil prices, the transmission operates more gradually, perhaps through second-round effects such as lower demand.

Interestingly, beyond the short-run differences, the medium- to long-term employment impacts appear remarkably similar across both groups. Crucially, employment in both oil-intensive and oil-moderate sectors remains below baseline toward the end of the forecast horizon. This convergence implies that even sectors with lower direct oil dependence eventually feel the macroeconomic consequences of oil shocks. These findings highlight that sectoral exposure to oil supply shocks is not only a function of direct energy use but also of timing and transmission mechanisms. While oil-intensive industries face immediate cost pressures that prompt rapid job cuts, oil-moderate sectors experience a slower but ultimately comparable erosion of employment over time.

[4] Although detailed data on oil demand by sector is limited, multiple sources show consistent oil consumption patterns across regions. The transportation sector remains the most oil-reliant, representing approximately 50 percent of oil demand in OECD countries and 43 percent across the world (OPEC, 2021). Petrochemicals, energy-related sectors, and industrial sectors also show significant oil reliance, collectively consuming over 26 million barrels per day globally, compared to 18 million barrels per day across other sectors (IEA, 2022). Together, the transportation, energy, and industrial sectors account for 72 percent of oil demand in OECD countries and a striking 94 percent in the United States (U.S. Energy Information Administration, 2022). On the other hand, agriculture, retail, and accommodation, which fall under the “residential/agricultural/commercial” broad category, have significantly lower oil demand compared to more oil-reliant sectors, accounting for just 8.5 percent of total oil consumption among OECD countries (OPEC, 2021) and 5.3 percent in the United States (U.S. Energy Information Administration, 2022).

**Figure 5. Impulse responses to oil supply shocks for employment by oil intensiveness**

**Oil-Intensive** **Oil-Moderate**

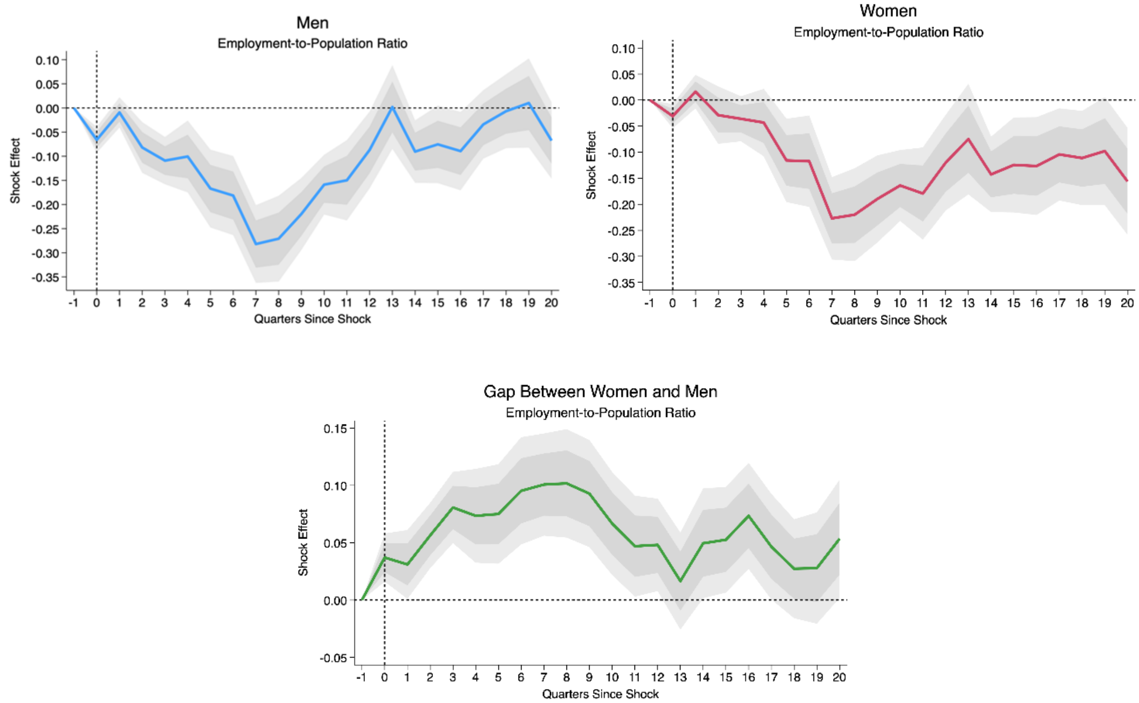



**Notes:** The solid lines represent the impulse response to an oil supply news shock that is normalized to reflect a 10 percent increase in the oil price. The light and dark gray shaded areas represent the 90 percent confidence interval and one standard deviation, respectively. We classify sectors into "oil-intensive" and "oil-moderate" categories based on their reliance on oil, as follows: mining and quarrying, construction, and transportation and storage are categorized as oil-intensive sectors, while the others are classified as oil-moderate.

## 3.5. Sex-Disaggregated Results

Figure 6 presents the impulse responses for employment-to-population ratios for men, women, and the resulting gap between women and men following an oil supply shock. Gaps are defined as the value for women minus the value for men for each variable. The top-left panel, which represents the employment-to-population ratio for men, shows a significant decline after the shock. The negative effect becomes more pronounced from the second quarter onward, reaching its lowest point around quarter eight with a shock effect of nearly -0.25 percentage points. After this trough, there is a gradual recovery as the effect moves toward zero by quarter 17, before stabilizing. The top-right panel, focusing on women's employment-to-population ratio, also reveals a deep decline following the oil shock. This effect intensifies between quarters two and eight after the shock, hitting a minimum between -0.2 and -0.25 percentage points. However, unlike the men's employment ratio, the women's ratio shows less recovery in the long term, as it remains negative throughout the 20-quarter horizon. The bottom panel displays the gap in the employment-to-population ratio, defined as the difference between the female and male ratios. The impulse response is mostly positive, indicating a narrowing of this gap post-shock. Consistent with the estimates for men and women, the gap response peaks at quarter eight, reflecting that the employment impact is relatively less severe for women than for men in the medium term. Following that, the effect fades and fluctuates closer to zero, reflecting men's recovery and women's more persistent negative response. In summary, these results reveal that both men and women experience declines in their employment-to-population ratios following an oil supply shock, but the impact is initially larger for men, leading to a temporary narrowing of the gap.

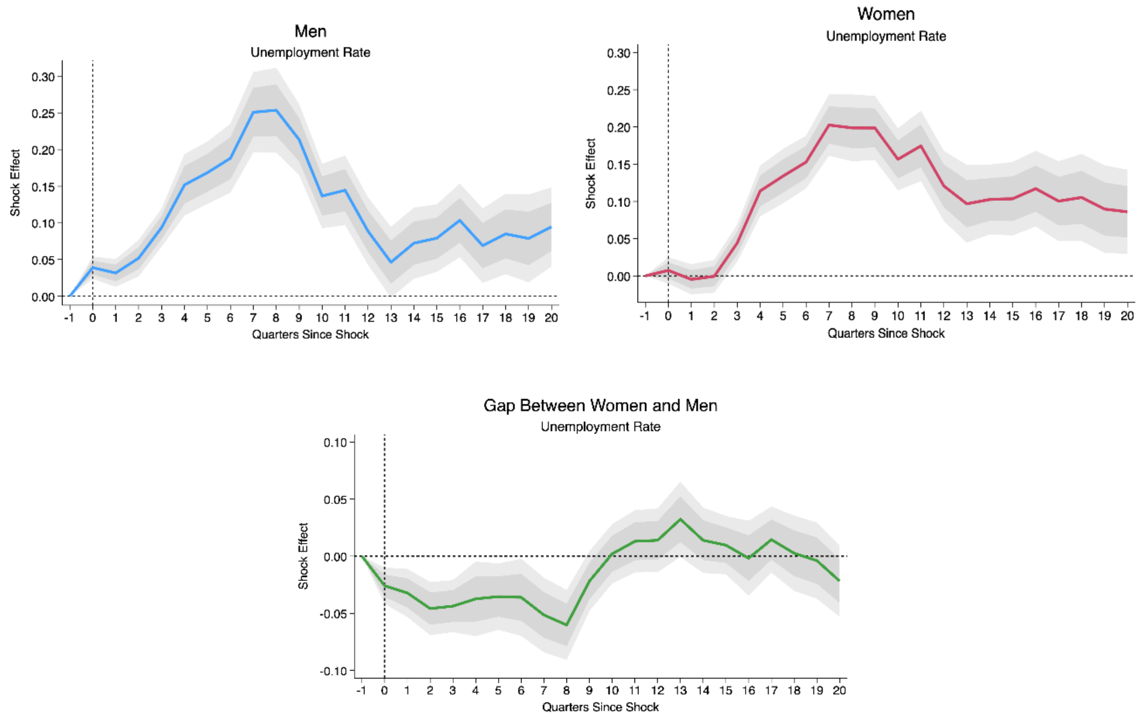
**Figure 6. Impulse responses to oil supply shocks for employment by sex**




**Notes:** The solid lines represent the impulse response to an oil supply news shock that is normalized to reflect a 10 percent increase in the oil price. The light and dark gray shaded areas represent the 90 percent confidence interval and one standard deviation, respectively. Gaps are defined as the female indicator minus the male indicator.

A similar story appears in the unemployment rate data (Figure 7). For men, the unemployment rate exhibits a sharp increase, peaking around quarter eight, with a shock effect of approximately 0.23 percentage points (top-left panel). This indicates that an oil supply shock leads to a considerable rise in male unemployment in the short to medium term. After reaching its peak, the unemployment rate begins to decline gradually, yet remains elevated throughout the 20-quarter period, suggesting that the shock has a persistent, though diminishing, impact on male unemployment. The response of women's unemployment rate follows a similar pattern, with a rapid increase and peaking also near quarter eight (top-right panel). However, the peak effect for women is smaller, around 0.2 percentage points, indicating that the oil shock's short-term impact on female unemployment is less significant than it is for men. Then, similarly to men, women's unemployment rate begins to fall and remains higher than the baseline for the entire 20-quarter period. Consequently, the gap in the unemployment rate, defined as the female rate minus the male rate, initially shows a negative response in the first few quarters, reflecting the more substantial increase in male unemployment relative to female unemployment (bottom panel). However, this trend reverses after quarter eight, where the gap starts to fluctuate around zero. This suggests that while the oil shock initially hits men harder, the effect becomes more balanced over time.

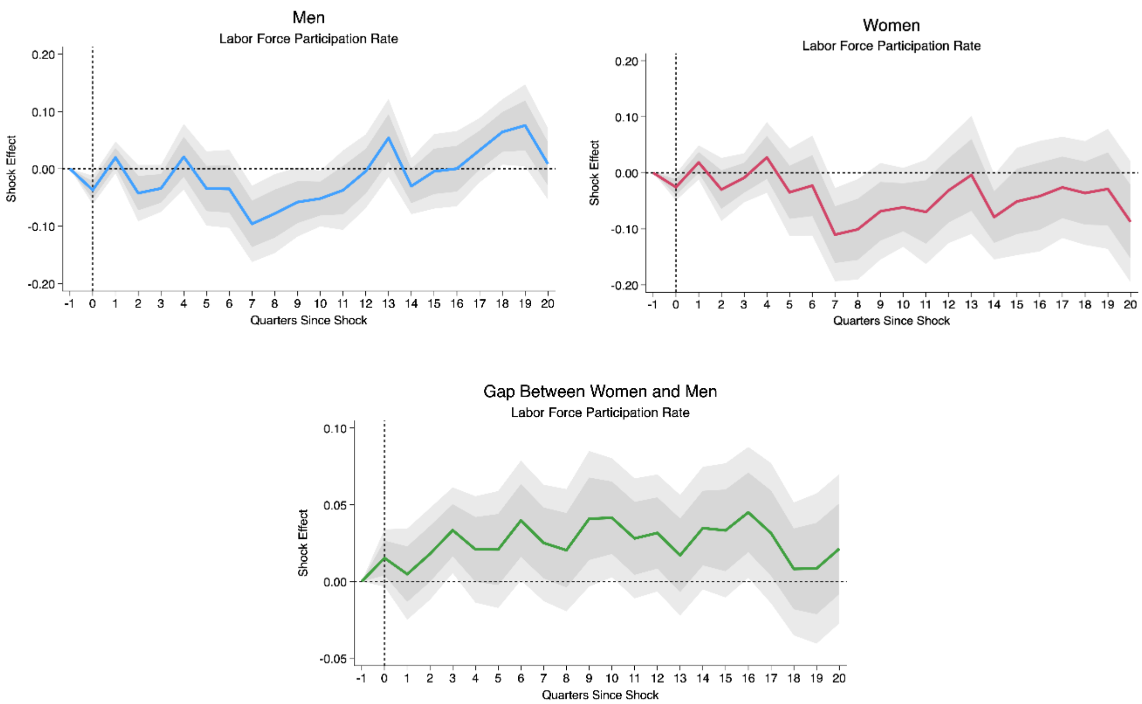
**Figure 7. Impulse responses to oil supply shock for unemployment by sex**




**Notes:** The solid lines represent the impulse response to an oil supply news shock that is normalized to reflect a 10 percent increase in the oil price. The light and dark gray shaded areas represent the 90 percent confidence interval and one standard deviation, respectively. Gaps are defined as the female indicator minus the male indicator.

The figures on labor force participation rates for men, women, and the gap between women and men add another layer to understanding the impact of an oil supply shock on labor market dynamics, complementing the earlier findings on employment and unemployment (Figure 8). Unlike the clear and pronounced effects observed in those previous metrics, the labor force participation results are more uncertain. For men, the labor force participation rate fluctuates around zero, indicating that the shock's impact on male participation is relatively modest and variable over time (top-left panel). In contrast, women's labor force participation displays a more notable downward trend after the shock, not showing a significant rebound, indicating a more persistent negative impact (top-right panel). As a result, the gap in labor force participation, defined as the female rate minus the male rate, shows a slight positive response, on average, over almost the entire period (bottom panel).

**Figure 8. Impulse responses to oil supply shock for labor force participation by sex**




**Notes:** The solid lines represent the impulse response to an oil supply news shock that is normalized to reflect a 10 percent increase in the oil price. The light and dark gray shaded areas represent the 90 percent confidence interval and one standard deviation, respectively. Gaps are defined as the female indicator minus the male indicator.

# 4. Robustness Checks

Our baseline conclusions survive a broad set of robustness checks, reported in Annex II, which help confirm the stability of our results across various specifications and assumptions. As a first robustness exercise, we tested the sensitivity of our results to the lag length in the local projections by extending the lag structure from four quarters (1 year) to six quarters (1.5 years). This adjustment applied to both the oil shock variable and the outcome variables, allowing us to assess whether a longer lag length alters the dynamics of the shock's impact. Second, we introduced additional controls in the local projections, specifically incorporating quarterly inflation, calculated from consumer price indexes, and the quarterly percent change in GDP (constant prices, national currency). These controls, both collected from the WEO database, allowed us to account for macroeconomic conditions that could influence labor market outcomes, while maintaining the original four-quarter lag structure as in the baseline analysis. Third, we tested an alternative age range for our sample by including individuals aged 15 and older, broadening the demographic scope compared to the baseline analysis.

Finally, we re-estimate the oil supply shock by focusing exclusively on global variables, removing the influence of U.S.-specific factors. This adjustment involves modifying the approach used by Känzig (2021), who estimated his shocks using a six-variable model that included four global variables—real oil price, world oil production, world oil inventories, and world industrial production—and two U.S.-specific variables, namely the U.S. CPI and U.S. industrial production. While Känzig (2021) included these U.S. variables to better capture the impacts on the U.S. economy, our aim is to examine the shock's global implications more broadly.

Therefore, we removed the two U.S. variables from the external-instrument VAR model, generating a new "global" oil shock estimate using only the four standard global variables. This adjustment allows us to assess whether the removal of U.S.-specific data materially changes the results, providing a more comprehensive view of the oil shock's effects on the global economy.

# 5. Conclusion

Our paper demonstrates that oil supply shocks resulting in higher oil prices reverberate through global labor markets in ways that are immediate, asymmetric, and persistently uneven. Rather than generating uniform macroeconomic effects, these shocks reshape labor market patterns across countries, sectors, and demographic groups. The magnitude and persistence of disruptions, especially in oil-importing countries, oil-intensive sectors, and among male workers, highlight the deep and unequal toll of energy volatility. Yet the effects reach further. Even oil-moderate sectors and female workers, though less exposed initially, experience delayed and lasting employment losses, revealing that no segment of the labor market is fully insulated. Importantly, the employment gains seen in oil-exporting countries are modest compared to the steep losses endured by oil importers, underscoring the imbalances across countries in labor market risks and rewards. Labor force participation patterns, meanwhile, are more variable, offering scope for future research into their underlying drivers. Oil shocks, in short, do not merely disturb short-run labor market conditions; they reshape the geography, composition, and inclusivity of employment, with consequences that are lasting, far-reaching, and unequally borne.

# Annex I. Baseline Sample

**Table 1. Baseline sample coverage**

| No. | Country | Start | End | No. | Country | Start | End |
|---|---|---|---|---|---|---|---|
| 1 | ALB | 2012Q1 | 2021Q4 | 46 | LCA | 2017Q1 | 2022Q4 |
| 2 | ARG | 2003Q3 | 2022Q4 | 47 | LKA | 2010Q1 | 2022Q4 |
| 3 | ARM | 2014Q1 | 2017Q4 | 48 | LTU | 1998Q2 | 2022Q4 |
| 4 | AUS | 1978Q2 | 2022Q4 | 49 | LUX | 1983Q2 | 2022Q4 |
| 5 | AUT | 1995Q1 | 2022Q4 | 50 | LVA | 1998Q2 | 2022Q4 |
| 6 | BEL | 1983Q2 | 2022Q4 | 51 | MAR | 2010Q1 | 2017Q3 |
| 7 | BGR | 2000Q1 | 2022Q4 | 52 | MDA | 2000Q1 | 2022Q4 |
| 8 | BIH | 2020Q1 | 2022Q4 | 53 | MEX | 1995Q2 | 2022Q4 |
| 9 | BOL | 1989Q1 | 2022Q4 | 54 | MKD | 2005Q1 | 2022Q4 |
| 10 | BRA | 2012Q1 | 2022Q4 | 55 | MLT | 2000Q2 | 2022Q4 |
| 11 | CAN | 1976Q1 | 2022Q4 | 56 | MNE | 2010Q1 | 2022Q4 |
| 12 | CHE | 1996Q2 | 2022Q4 | 57 | MNG | 2010Q1 | 2022Q4 |
| 13 | CHL | 2010Q1 | 2022Q4 | 58 | MUS | 2001Q1 | 2022Q4 |
| 14 | COL | 2001Q3 | 2022Q4 | 59 | NLD | 1983Q2 | 2022Q4 |
| 15 | CRI | 2010Q3 | 2022Q4 | 60 | NOR | 1995Q2 | 2022Q4 |
| 16 | CYP | 1999Q2 | 2022Q4 | 61 | NZL | 1986Q1 | 2022Q4 |
| 17 | CZE | 1993Q1 | 2022Q4 | 62 | PAK | 2012Q3 | 2021Q2 |
| 18 | DEU | 1983Q2 | 2022Q4 | 63 | PER | 2001Q2 | 2022Q4 |
| 19 | DNK | 1983Q2 | 2022Q4 | 64 | PHL | 2001Q1 | 2022Q4 |
| 20 | DOM | 2000Q2 | 2022Q4 | 65 | POL | 1997Q2 | 2022Q4 |
| 21 | ECU | 2003Q4 | 2022Q4 | 66 | PRT | 1986Q2 | 2022Q4 |
| 22 | EGY | 2008Q1 | 2022Q4 | 67 | PRY | 2010Q1 | 2022Q4 |
| 23 | ESP | 1986Q2 | 2022Q4 | 68 | QAT | 2013Q1 | 2019Q2 |
| 24 | EST | 1997Q2 | 2022Q4 | 69 | ROU | 1997Q2 | 2022Q4 |
| 25 | FIN | 1995Q2 | 2022Q4 | 70 | RUS | 2005Q4 | 2022Q4 |
| 26 | FRA | 1983Q1 | 2022Q4 | 71 | RWA | 2017Q1 | 2021Q4 |
| 27 | GBR | 1983Q2 | 2022Q4 | 72 | SAU | 2012Q1 | 2022Q4 |
| 28 | GEO | 2017Q1 | 2020Q4 | 73 | SGP | 2020Q3 | 2022Q4 |
| 29 | GRC | 1987Q2 | 2022Q4 | 74 | SRB | 2008Q2 | 2022Q4 |
| 30 | GRD | 2019Q1 | 2021Q2 | 75 | SVK | 1998Q1 | 2022Q4 |
| 31 | GUY | 2017Q3 | 2021Q3 | 76 | SVN | 1996Q2 | 2022Q4 |
| 32 | HRV | 2002Q1 | 2022Q4 | 77 | SWE | 1995Q2 | 2022Q4 |
| 33 | HUN | 1996Q2 | 2022Q4 | 78 | SYC | 2016Q1 | 2020Q4 |
| 34 | IND | 2017Q3 | 2022Q4 | 79 | THA | 2010Q1 | 2022Q4 |
| 35 | IRL | 1983Q2 | 2022Q4 | 80 | TTO | 2010Q1 | 2022Q4 |

| No. | Country | Start | End | No. | Country | Start | End |
|---|---|---|---|---|---|---|---|
| 36 | IRN | 2006Q1 | 2022Q4 | 81 | TUR | 2006Q1 | 2022Q4 |
| 37 | ISL | 1995Q2 | 2022Q4 | 82 | TWN | 1978Q1 | 2021Q1 |
| 38 | ISR | 2007Q1 | 2022Q4 | 83 | UKR | 2017Q1 | 2020Q2 |
| 39 | ITA | 1983Q2 | 2022Q4 | 84 | URY | 1998Q1 | 2022Q4 |
| 40 | JAM | 2008Q1 | 2022Q3 | 85 | USA | 1975Q1 | 2022Q4 |
| 41 | JOR | 2017Q1 | 2022Q4 | 86 | VNM | 2011Q1 | 2022Q4 |
| 42 | JPN | 1975Q1 | 2022Q4 | 87 | ZAF | 2000Q1 | 2022Q4 |
| 43 | KGZ | 2010Q1 | 2021Q4 | 88 | ZMB | 2017Q1 | 2022Q4 |
| 44 | KOR | 1999Q3 | 2022Q4 | 89 | ZWE | 2021Q3 | 2022Q4 |
| 45 | KOS | 2012Q1 | 2022Q4 | | | | |

**Notes:** The local projection model estimates each horizon using different time periods, meaning that not all quarterly data in this table were used across all horizons. The start and end dates reflect the full range for which we obtained the minimum number of non-missing observations required to include each country in at least one estimated horizon. Countries with fewer than five consecutive observations were automatically excluded due to insufficient sample size, as the baseline model includes four lags of the dependent variable.

# Annex II. Robustness Results

**Figure 9. Impulse responses using alternative lag length**

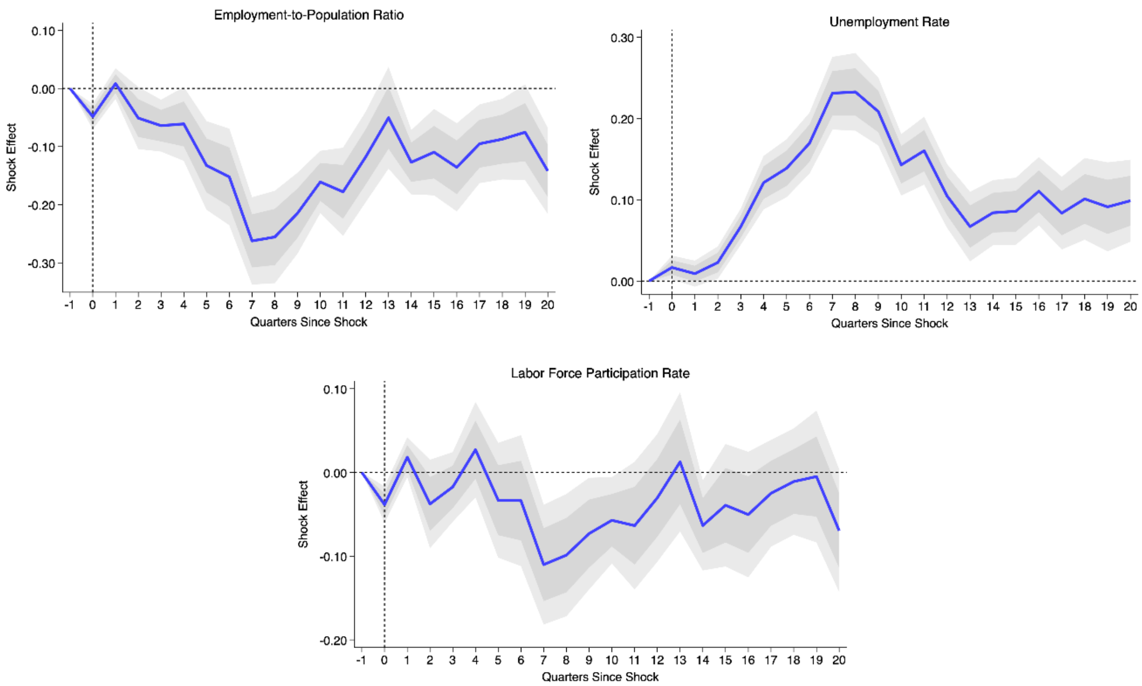



**Figure 10. Impulse responses using additional controls**

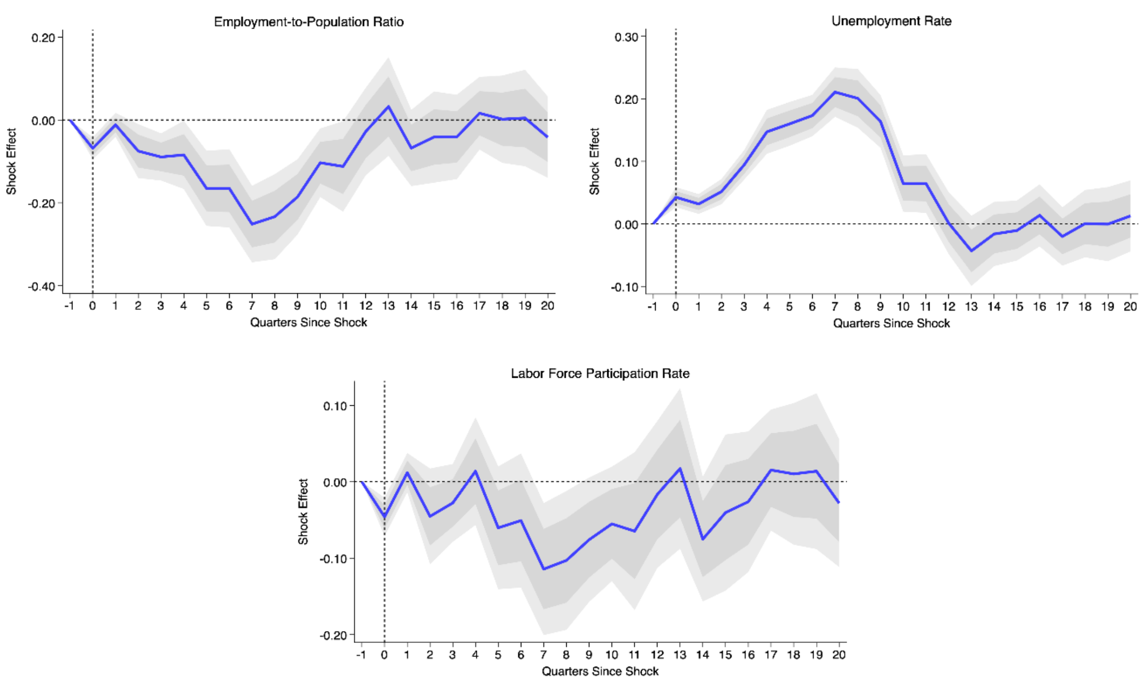


**Figure 11. Impulse responses using alternative age range**

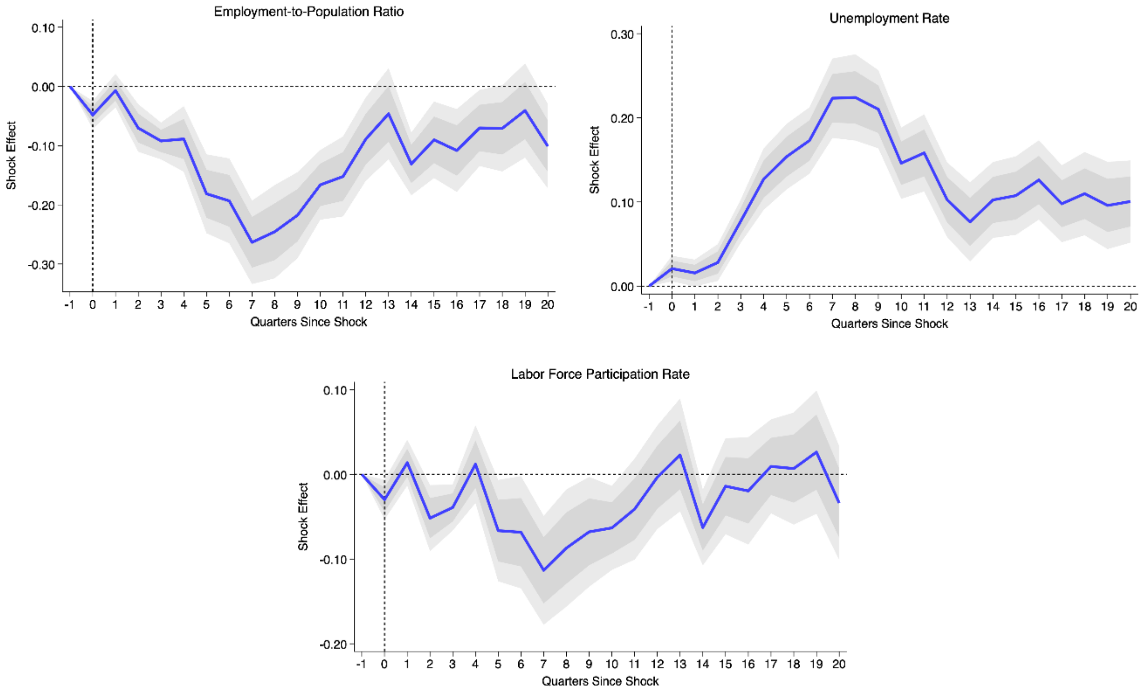
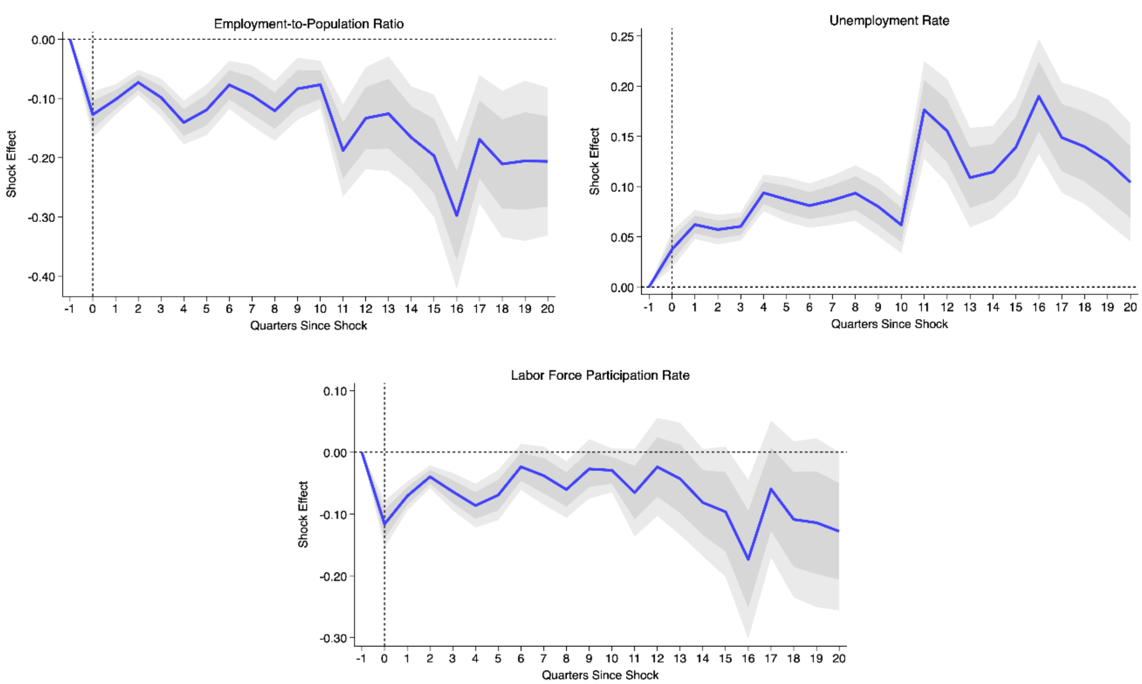



**Figure 12. Impulse responses using alternative shock estimates**



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**Oil Shocks and Labor Market Developments**

Working Paper No. WP/2025/145