Online Appendix to "Oil Shocks, External Adjustment, and Country Portfolio"

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July 16, 2023

1. **The size distribution of giant oil discoveries (1960-2011)**

   Figure A.I presents the size distribution of giant oil discoveries during 1960-2011.

2. **The impact of two oil shocks on GDP**

   Figure A.II presents the impulse responses of output to the two types of oil shocks.

3. **Cumulative IRFs of two oil shocks**

   Figure A.III presents the cumulative impulse responses of key macro variables to two types of oil shocks. We obtain the IRFs $B(L)/(1-A(L))$ and $C(L)/(1-A(L))$ using the Delta method, after estimating the dynamic panel model with distributed lags (Equation (2)). To further compute the cumulative IRFs, we add up those IRFs to horizon h and compute the corresponding confidence interval using the Delta method.

4. **Financial openness**
   Figure A.IV presents the impulse responses of key macro variables to the two types of oil shocks for countries with high and low financial openness.

5. **Selected giant oil discovery shocks and unanticipated oil revenue shocks**
   Figure A.V presents the impulse responses of key macro variables to the selected giant oil discovery shocks and unanticipated oil revenue shocks.

6. **Excluding the top ten oil producers and consumers**

   According to the U.S. Energy Information Administration (EIA), the top 10 largest producers in 2016 are the U.S., Saudi Arabia, Russia, China, Canada, Iraq, Iran, United Arab Emirates, Brazil, and Kuwait. The top 10 largest consumers are the U.S., China, India, Japan, Russia, Saudi Arabia, Brazil, South Korea, Canada, and Germany. Source: https://www.eia.gov/tools/faqs/faq.php?id=709&t=6. After we remove the top 10 largest oil producers, the next largest oil producer's share in the global oil production in 2016 is less than 3 percent, and thus we believe that other smaller oil exporters may have limited power on the international oil price. The results are also similar even if we drop all countries whose oil production share in the global oil production is more than 2 percent.

Figure A.VI presents the impulse responses of key macro variables to the two types of oil shocks for the sample without the top ten oil producers and consumers.

7. Excluding member countries in OPEC

OPEC has been historically notorious for manipulating the international oil price by adjusting its oil production level.[1] Its power was first demonstrated during the 1973 oil crisis. In resentment of the Western support of Israel in the Yom Kippur War, OPEC countries launched the oil embargo, which caused the international oil price to triple within a year. Thus, we also check whether the main results are robust if the member countries of OPEC are excluded from the sample.

Figure A.VII presents the impulse responses of key macro variables to the two types of oil shocks for the sample excluding member countries in **OPEC**.

8. Excluding countries in the Middle East and North Africa

Figure A.VIII presents the impulse responses of key macro variables to the two types of oil shocks for the sample without countries in the Middle East and North Africa.

9. Oil supply shock from OPEC announcements (Känzig, 2021)

In this part, we use the oil supply shocks from the OPEC announcement constructed by Känzig (2021) to construct the oil revenue shock. Känzig (2021) first constructs the oil supply surprises by taking the (log) difference between the futures price on the day of the OPEC announcement and the price on the last trading day before the announcement. To facilitate interpretation, he uses normalizes the shock corresponding to a 10 percent increase in the price of oil. Next, he computes the monthly surprise as the sum of the high-frequency daily surprises in the given month, and uses it as an instrument in an oil market VAR model to generate "oil supply news shocks". As our data are annual frequency, we further compute the annual oil supply shocks by taking the average of the monthly "oil supply news shocks". Note the OPEC announcements are usually about future oil supply but the horizon (typically 1-2 months) is much shorter than the discovery news shock Thus, at the annual frequency, we can treat oil supply surprises due to the OPEC announcement as contemporaneous shocks.

We find that the overall correlation between annual oil supply shocks and the change in (log) international oil prices are quite high before the global financial crisis in 2007. The correlation between them is 0.63 between 1975 and 2006 but turns to be negative between 2007 and 2011 possibly due to the global financial crisis during 2008-2009. Thus, we will focus on the period 1975-2006 for regression analysis. Moreover, the standard deviation of oil supply surprise is about 40 percent smaller than that of the changes in international oil price, indicating that oil supply surprises only account for parts of oil price volatilities.

As the oil supply surprise itself is computed as the (log) difference of the futures prices before and after the OPEC announcements, we can directly compute the corresponding oil revenue shocks by multiplying the annualized oil supply surprise with the country's lagged GDP share of net exports of oil and gas, and then conduct the regression specification (2) for the sample period between 1975 and 2006. Moreover, due

[1] See Barsky and Kilian (2004) for a detailed discussion on the market power of the OPEC. However, they argued that the conventional view may overstate the market power of OPEC in the international oil market.

to the high-frequency nature and less variation feature of oil supply surprises, we expect that the corresponding oil revenue shocks may have less significant effects on the country's external adjustment and country portfolio.

Figure A.IX shows that our baseline results largely hold with a noticeable exception in the change in the NFA. The oil revenue shocks arising from OPEC announcements lead to an immediate significant improvement in the current account in two years, and then the positive effect declines quickly, indicating that the effects are short-lived. However, it also leads to a significant decrease in the valuation effect, which largely offsets the positive effect on the current account, and thus leads to an insignificant increase in the NFA. This is possible because our oil supply surprises are measured based on the changes in oil future price before and after the OPEC announcement, and oil exporters (importers) may hold large positions in oil future put (call) contracts to hedge the risk of oil price fluctuations due to the OPEC announcements.

In addition, consistent with our baseline results, oil revenue shocks arising from OPEC announcements have no effects on FDI flows, but a slightly positive effect on the changes in net foreign debt holding. This is largely expected because the oil supply surprises arising from OPEC announcements are of high frequency by its nature and have fewer variations, and thus their effects on country portfolio might be short-lived and limited, and thus our annual data in foreign debt holdings and FDI flows may not be able to capture them.

10. Post first oil crisis period (1984-2011)

Figure A.X presents the impulse responses of key macro variables to the two types of oil shocks for the sample in a shorter period (1984-2011).

11. Additional control variables

In the baseline specification, we adopt a parsimonious specification by only including country and year-fixed effects and relying on the exogeneity of two oil shocks. At present, we include other macroeconomic variables that may affect the countries' external balance. First, poor countries are usually less open than advanced economies, and their external adjustment might be limited. Thus, we include the log GDP per capita to capture the development level. Second, to control for the cyclicality in external adjustment, the GDP growth rate and inflation rate are included to capture the business cycle. Third, oil price shocks are not pure-income shocks, but also indicate changes in relative prices which may affect a country's terms of trade. To capture the possible contagious effects on external balance through the terms of trade, we also include the changes in terms of trade and official exchange rates in regressions.

Moreover, the oil price may be driven by global demand, as shown in Kilian (2009). High global demand is likely to be associated with high inflation or real interest rate given that central banks attempt to stabilize inflation, which in turn affects saving and investment decisions and countries' external balance. Thus, ignoring the global demand may lead to an omitted variable bias. The time-fixed effects included in our regression appropriately control for the global demand, assuming that the effects of global demand are homogeneous across countries. This assumption may not hold because the degree of openness varies across countries and the global demand may have differential effects on the countries' external adjustment. To address this issue, we construct a country-specific exposure to global demand, by interacting the country's average ratio of exports of goods and services to GDP with the weighted annual GDP growth rate of G4 countries including the US, Germany, Japan, and China.[2] As shown in Figure A.XI, including the additional control variables does not alter our main results.

12. Control for country-specific linear trends

Figure A.XII presents the impulse responses of key macro variables to the two types of oil shocks, with controls of country-specific linear trends.

13. An alternative measure of oil discovery shocks

We explore whether the main results are sensitive to the alternative measures of two types of oil shocks. To ease concerns regarding the construction of NPV of giant oil discoveries, we use a simple dummy variable for an oil discovery event. The impulse responses of the five key variables to two oil shocks are virtually the same, as shown in Figure A.XIII.

14. Alternative measures of oil revenue shocks

The weights used to construct the country-specific oil revenue shocks may also be a concern. First, using the GDP share of net exports of oil and gas may underestimate the effect of international oil price changes on the income of oil exporters. Thus, we also use the lagged GDP share of total exports or production of oil and gas to construct the oil revenue shocks. Second, the lagged GDP share of net exports of oil and gas is a time-varying weight, which might introduce additional variations in the oil revenue shocks. To ease this concern, we use the country's average GDP share of the net exports of oil and gas during the sample period or in the past three years as the weights to construct the oil revenue shocks. We find that our results are robust to those alternative measures of oil revenue shocks, as shown in Figure A.XIV–Figure A.XVII.

15. Sample of oil exporters

In our baseline estimation, the sample covers all countries in the world, including exporters and importers of oil and gas. Thus, this sample also uses the variations of oil price shocks on oil importers. For instance, a hike in oil prices acts as a negative oil income shock to oil importers. However, one may be concerned that the oil price shock might have different effects on oil importers and oil exporters as the relative price effects might be more important for oil importers. To address this concern, we limit our sample to main oil exporters, which are the country's average exports of oil and gas above the median value. The sample of countries is reduced to 86, but the estimation results are similar to our baseline, as shown in Figure A.XVIII. We also examine the sample of countries with at least one giant oil discovery, which only covers 64 countries, and the baseline results remain to hold, as shown in Figure A.XIX.

16. Various specifications on lag length in the DPDL model

Figure A.XX presents various specifications on lag length in the DPDL model. The specification (a) chooses p=1 and q=4 to show that a small q can capture the dynamic effects of oil discoveries and oil revenue shocks in the short-run (1-5 years), but fail to capture the dynamic effects in the middle-run horizon (5-10 years) due to the insufficient lags of oil shocks. This is particularly important for the oil

[2] All the macroeconomic variables included in the regression are from World Development Indicators provided by the World Bank except the terms of trade from Penn World Table (version 9.1). The US, Germany, Japan, and China are excluded in the regression sample.

discovery shocks as it fails to capture the positive effect on the current account when the oil production starts, which is about 5 years after the oil discoveries on average.

The specifications (b)-(d) choose p=1 and q=11, 12, and 13 to show that the dynamic effects of oil shocks are largely similar to our baseline setting where p=1 and q=10, indicating that including ten years of lags may be sufficient for us to explore the dynamic effects of oil shocks in the subsequent decade.

The specification in (e) includes higher-order lags for dependent variables: p=2 and q=10, and the one in (f) adopts different orders in the lags for two types of oil shocks, i.e., p=1, q=11 for oil discovery shocks, and q=8 for oil revenue shocks. The results are largely similar.

17. Local Projection estimation method

One limitation of the dynamic panel model with distributed lags is that it imposes parametric assumptions on the impulse responses. As an alternative method, we adopt Jordà's (2005) local projection method (LP) to estimate impulse responses directly. The LP method obtains the impulse response for different horizons $h = 1,2,\dots,H$ by directly regressing the h period forwarded dependent variable $y_{i,t+h}$ on the dependent variables $X_{i,t}$ in the current period. Thus, the LP has the advantage as it does not impose dynamic parametric restrictions. More specifically, we use the following specification:

$$y_{i,t+h} = \beta^h Disc_{i,t} + \theta^h Oilrevshk_{i,t} + \gamma^{h\prime} Z_{i,t} + \alpha_i^h + \mu_t^h + \epsilon_{i,t+h}, \qquad (3)$$

Note we also include lagged dependent variables and five years of lagged independent variables as control variables in Z_{it}.[3] As shown in Figure A.XXI below, the results from the LP mostly demonstrate similar patterns to the results obtained through the baseline model for the relevant horizons (1-10 years). Moreover, the LP estimates show large oscillations for the longer horizon (11-20 years), but most of them are insignificant for most of dependent variables.

18. Removing countries with low quality in EWN data

As the EWN compiles the external accounts and country portfolio from multiple data sources, the data quality also varies across countries. The EWN database contains remarks for each country's statistics as well as information about the data's nature and source. We create the country group with low data quality based on a few criteria and the descriptions of the data for each country in the EWN database. First, countries are considered to have low data quality if the notes reveal significant errors and omissions in the data collection and construction (such as Brunei Darussalam, Latvia, and Russia). Second, the constructed variables have issues with consistency (e.g., Korea, Ireland, Taiwan), or if the data fluctuates significantly and consistency cannot be reliably determined (e.g., Syria). Anomalies such as breaks (New Zealand, Afghanistan) and jumps (Malta, Switzerland) will be considered a sign of low quality if they appeared in one or more of the variables. Finally, according to EWN's statement, for some countries, many data sources

[3] The estimated IRFs using the LP method without including lagged variables as controls also show similar patterns but with larger oscillations. However, one additional advantage of this simple static panel setting is that the estimated IRFs are robust to the heterogeneity effects of oil shocks. Note that one potential econometric issue about the baseline dynamic panel model is that the oil shocks might have heterogeneous effects across individual countries. In this case, the fixed effect estimators are inconsistent for the dynamic panel with heterogeneous slopes (Pesaran and Smith, 1995), as well as the computed impulse responses. Our object of interest is to estimate the population-averaged impulse responses rather than the country-specific impulse responses of two types of oil shocks. Wooldridge (2005) show that the fixed effect estimators consistently estimate the population-averaged slope coefficients in the static panel data models with individual-specific slopes under broad conditions. Thus, we can obtain consistent estimates of the population-averaged impulse responses β^h and θ^h for two types of oil shocks by using the LP method without including the lagged dependent variable as controls.

are employed for data processing, and the variables are concatenated from numerous data sources. Those economies will be considered as low data quality as well.

We ultimately left out 37 economies in the EWN data. The whole list of economies excluded is as follows: Afghanistan, Armenia, Australia, Bhutan, Brunei Darussalam, China, China Macao, Costa Rica, Djibouti, Dominica, Ecuador, Euro Area, Indonesia, Ireland, Italy, Korea, Latvia, Lesotho, Luxembourg, Malaysia, Malta, New Zealand, Nicaragua, Norway, Oman, Philippines, Qatar, Russia, Singapore, Swaziland, Switzerland, Syria, Taiwan, Trinidad and Tobago, Uruguay, Venezuela, West Bank, and Gaza.

Figure A.XXII presents the results of impulse responses for the subsample of countries with better data quality, and the results are similar to our baseline.

19. Estimated IRFs for Oil Shocks

Table A.I and A.II present the estimated IRFs of oil discovery shocks and oil revenue shocks, respectively.

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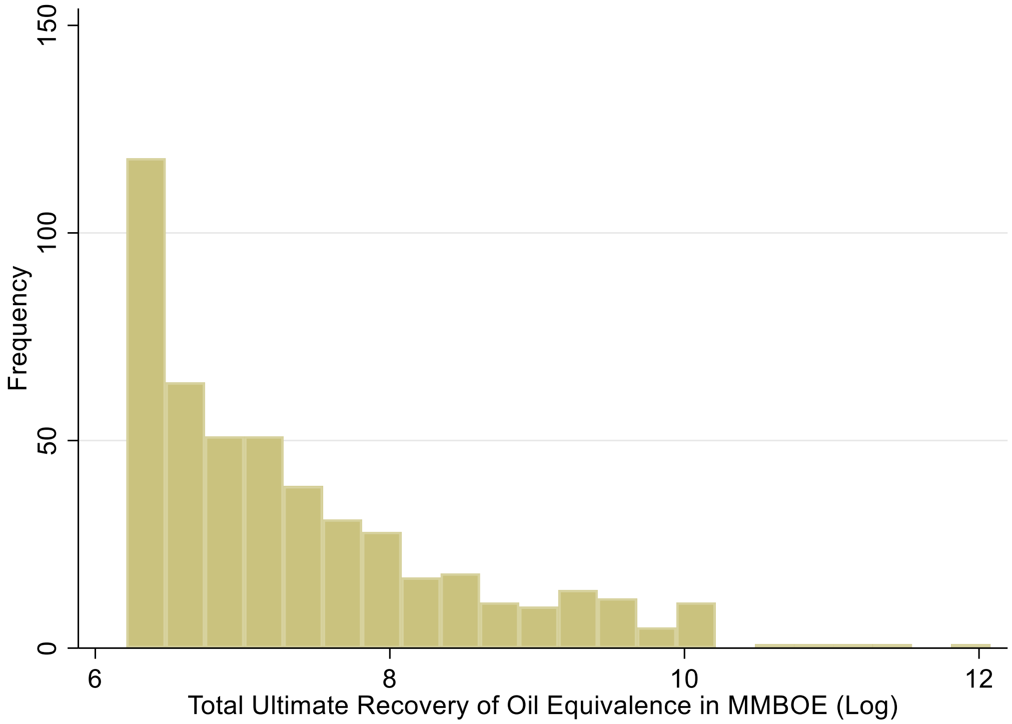
1. The size distribution of giant oil discoveries (1960-2011)

(a)



(b)

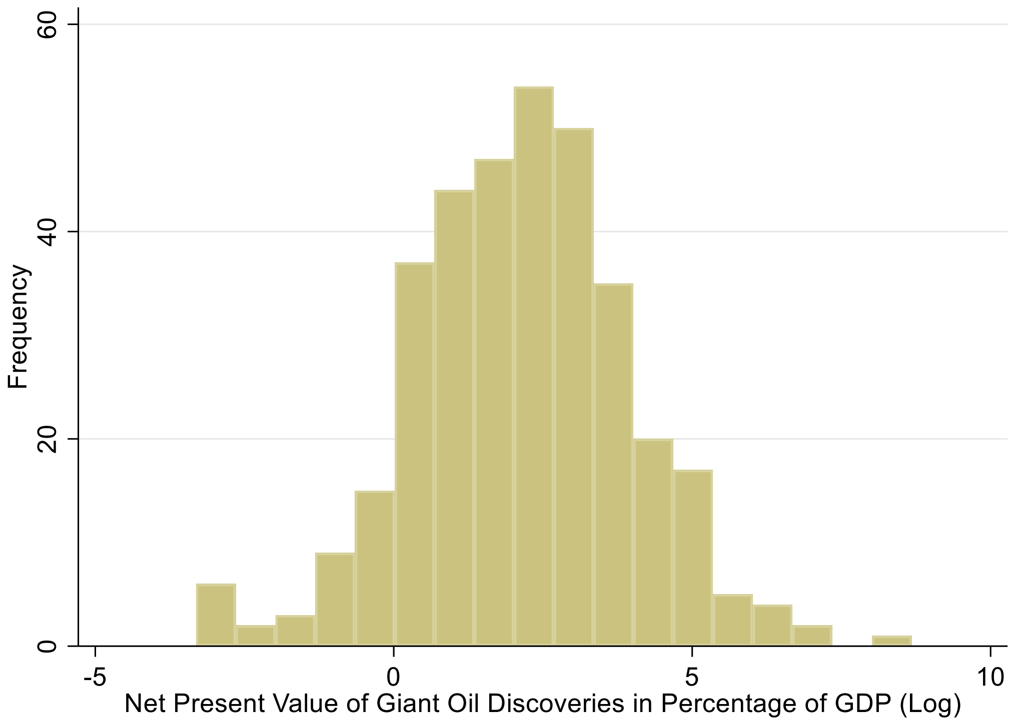


Figure A.I: The Size Distribution of Giant Oil Discoveries: 1960-2011

2. The impact of two oil shocks on GDP

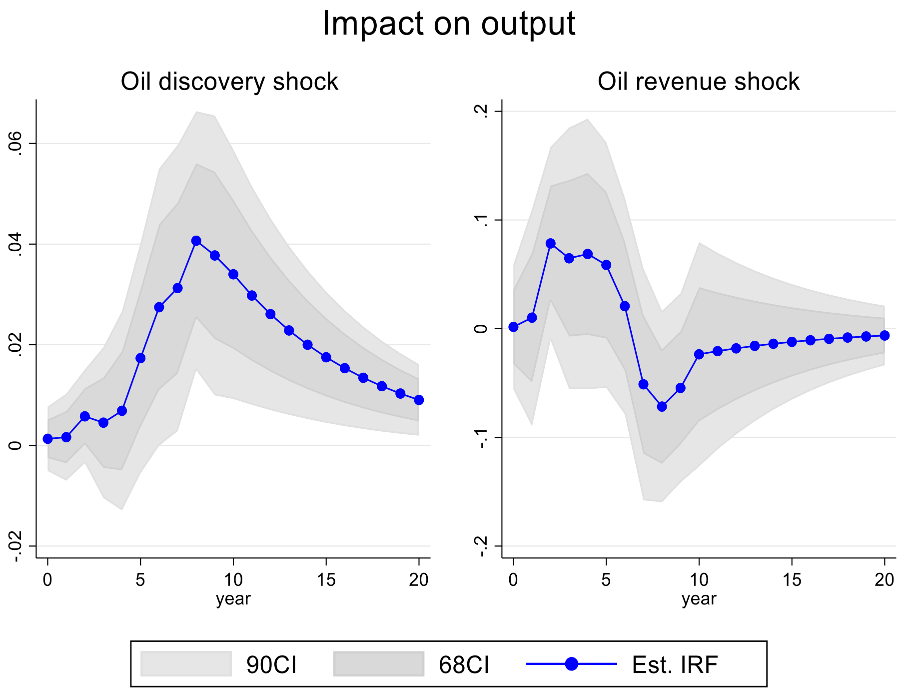


Figure A.II: The Impact of Oil Discovery Shock and Oil Revenue Shock on GDP

Note: The dependent variable is 100*log(real GDP), and the vertical axis shows percentage changes. We use the baseline specification with control of country-specific quadratic trends as ARS (2017). The left column presents the impulse response of an oil discovery with NPV equal to 1% of GDP, and the right column displays the impulse response of an oil revenue shock equal to 1% of GDP. The line with circles indicates point estimates, and gray areas are 90% and 68% confidence intervals.

3. Cumulative IRFs of two oil shocks

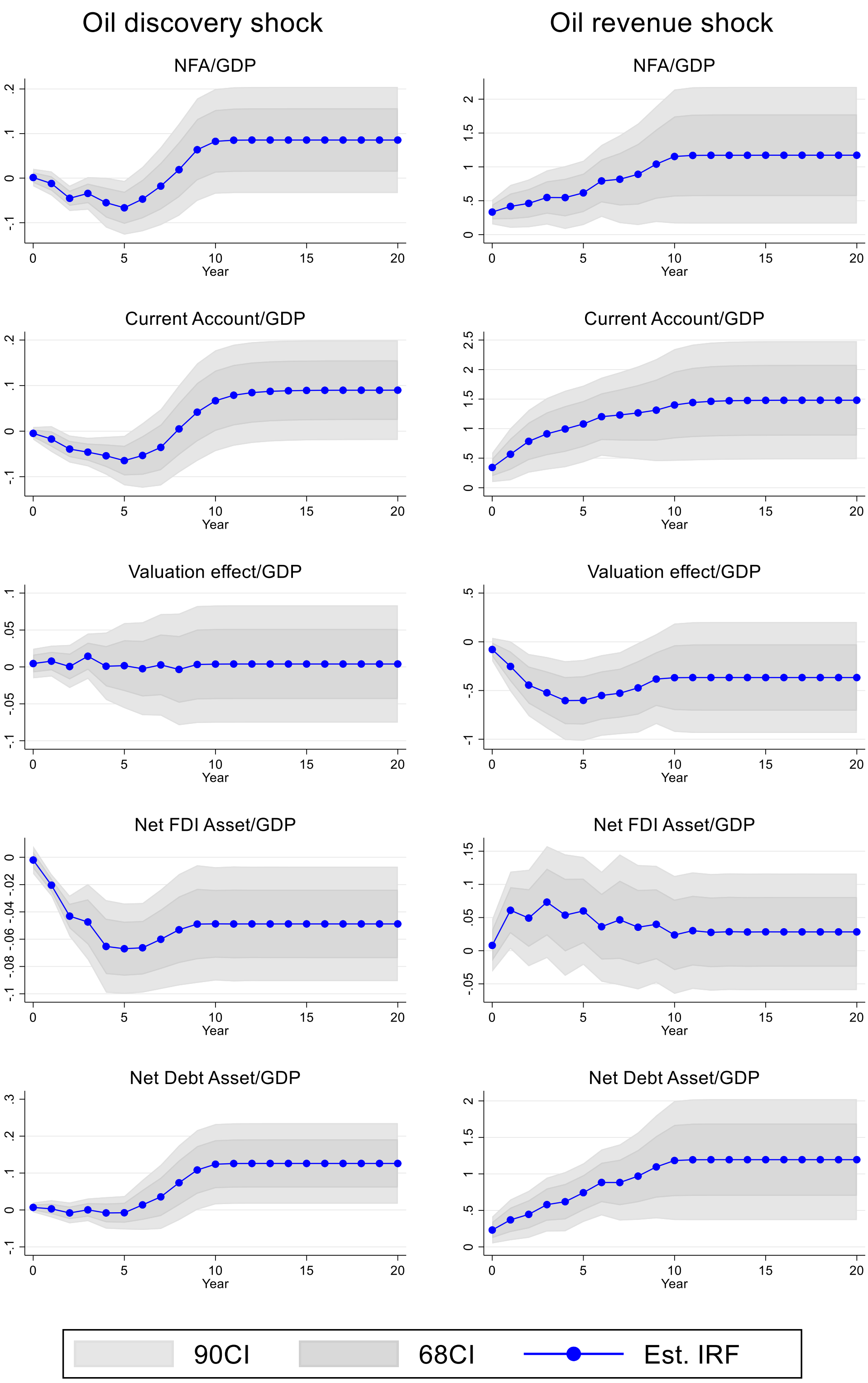


Figure A.III: The Cumulative Effects of Oil Discovery Shocks and Revenue Shocks

Note: The left column presents the **cumulative** impulse responses of an oil discovery with NPV equal to 1% of GDP, and the right column displays the **cumulative** impulse responses of an oil revenue shock equal to 1% of GDP. The line with circles indicates point estimates, and gray areas are 90% and 68% confidence intervals. The vertical axis shows percentage changes.

4. Financial openness

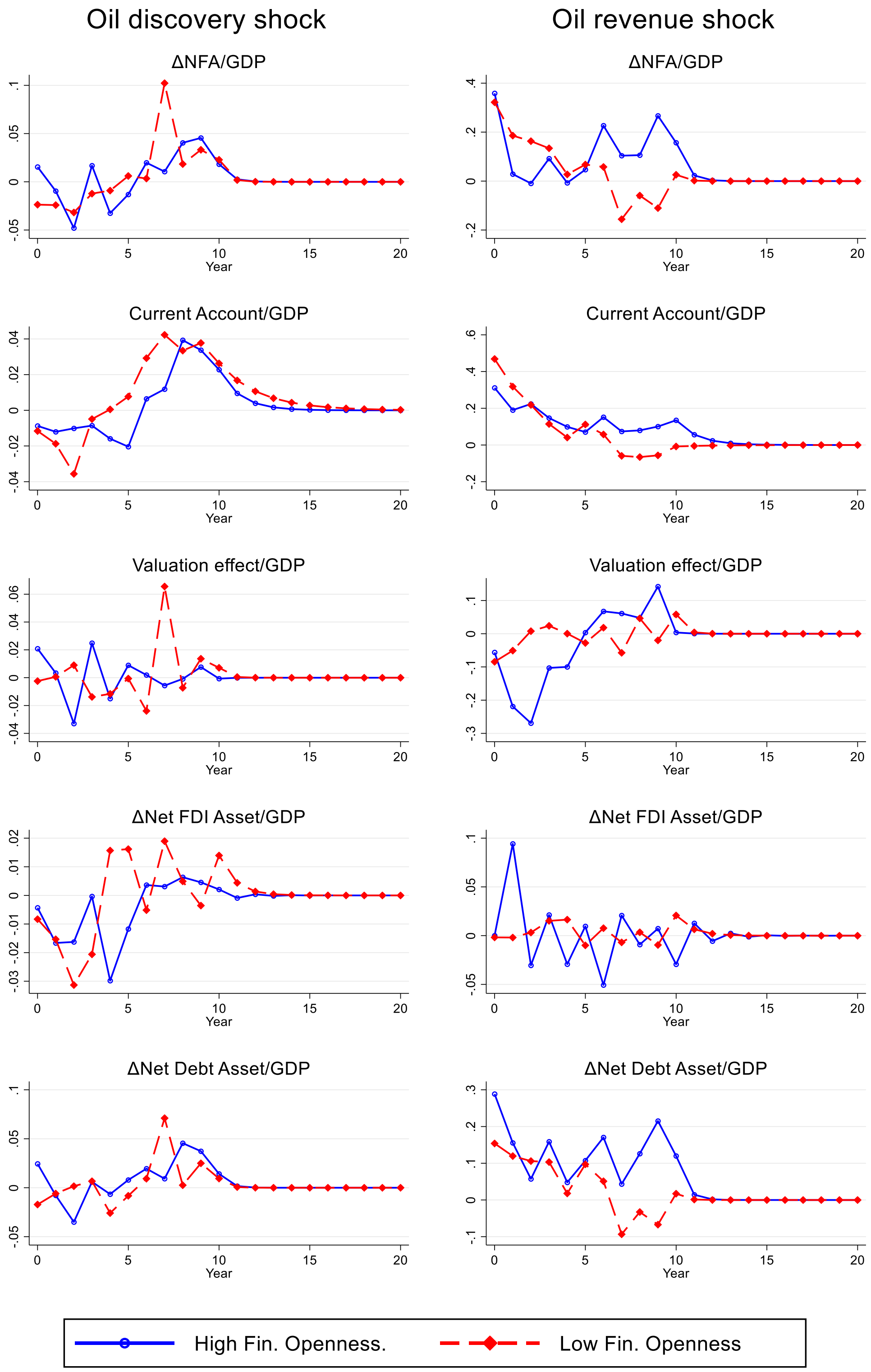


Figure A.IV: Financial Openness

Note: The figure presents the impulse responses of an oil discovery with NPV equal to 1% of GDP in the left column and oil net export revenue shock equal to 1% of GDP in the right column for countries with high and low financial openness, respectively. The vertical axis shows percentage changes.

5. Selected giant oil discovery shocks and unanticipated oil revenue shocks

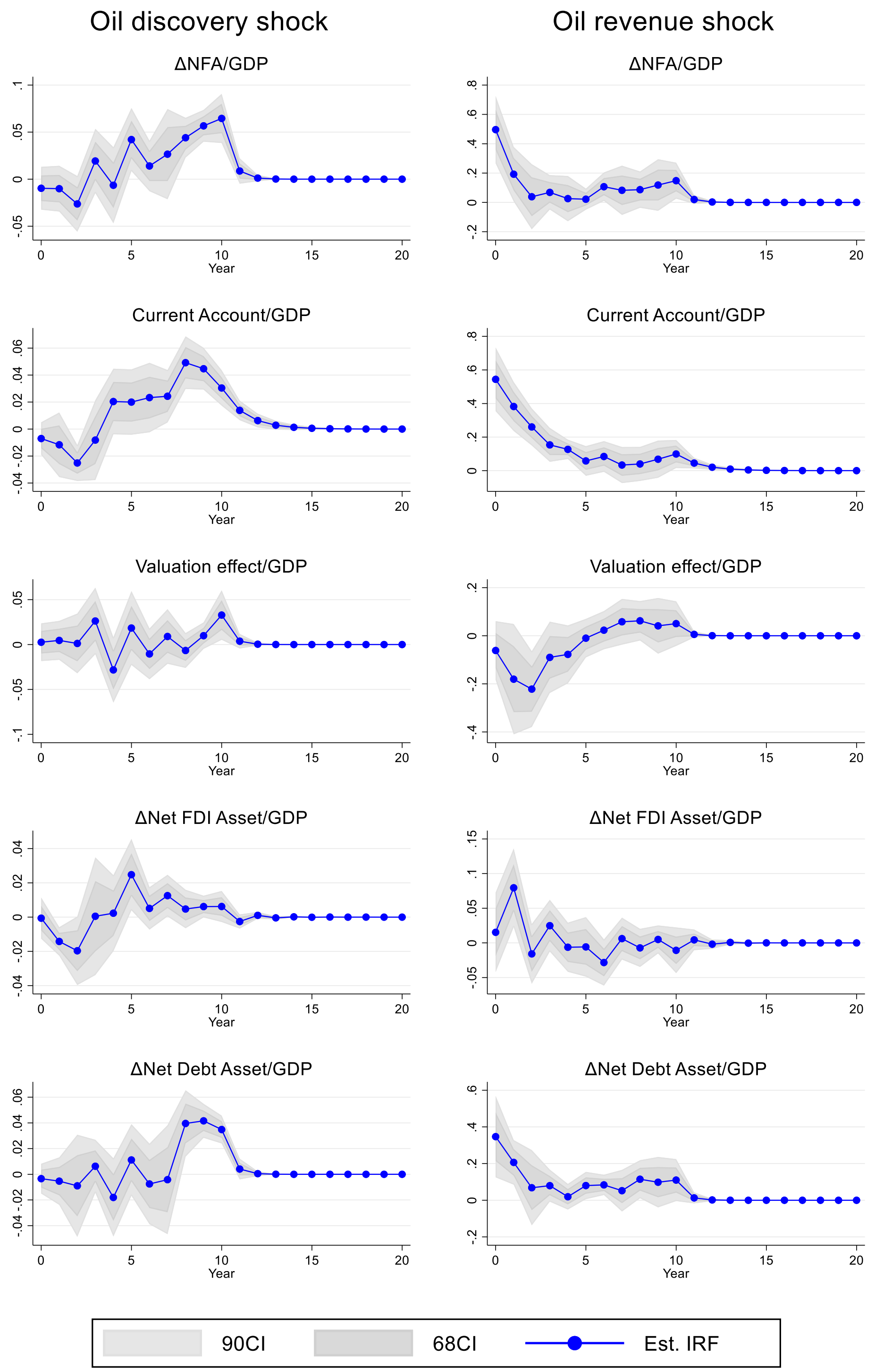


Figure A.V: Selected Giant Oil Discovery Shocks and Unanticipated Oil Revenue Shocks

Note: The left column presents the impulse response of an oil discovery with its NPV equal to 1% of GDP, which does not have discoveries in the past three years, and the right column displays the impulse response of an oil net export revenue shock equal to 1% of GDP, where the oil net export revenue shock is measured as the residual from a panel AR(3) regression including country- and year-fixed effects, and a dummy variable indicating whether a giant oil discovery occurred in the past 10 years. The line with circles indicates point estimates, and the gray areas are 90% and 68% confidence intervals. The vertical axis shows percentage changes.

6. Excluding the top ten oil producers and consumers

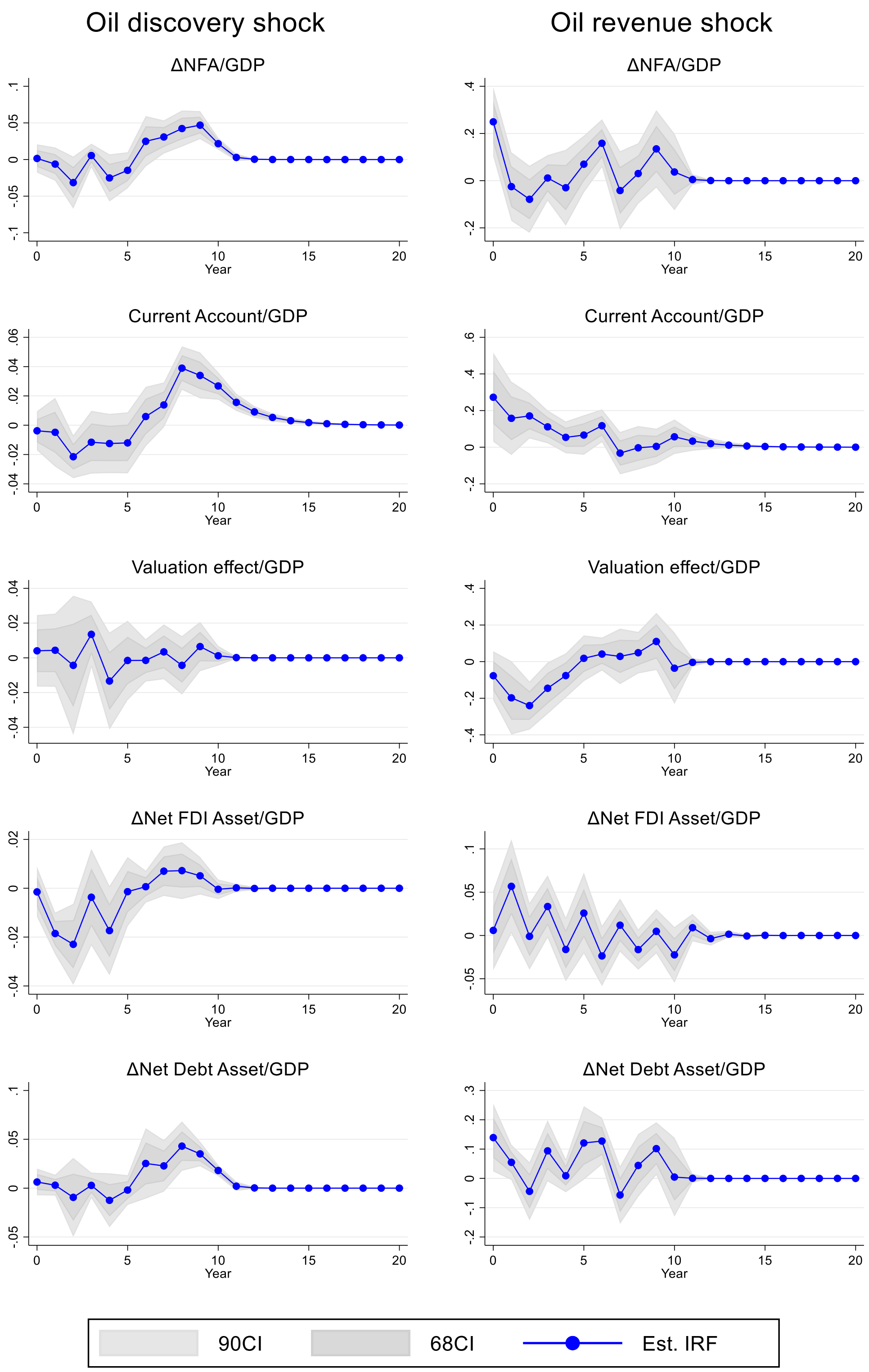


Figure A.VI: Excluding Top Ten Oil Producers and Consumers

Note: The left column presents the impulse response of an oil discovery with NPV equal to 1% of GDP, and the right column displays the impulse response of an oil revenue shock equal to 1% of GDP. The line with circles indicates point estimates, and gray areas are 90% and 68% confidence intervals. The vertical axis shows percentage changes.

7. Excluding member countries in OPEC

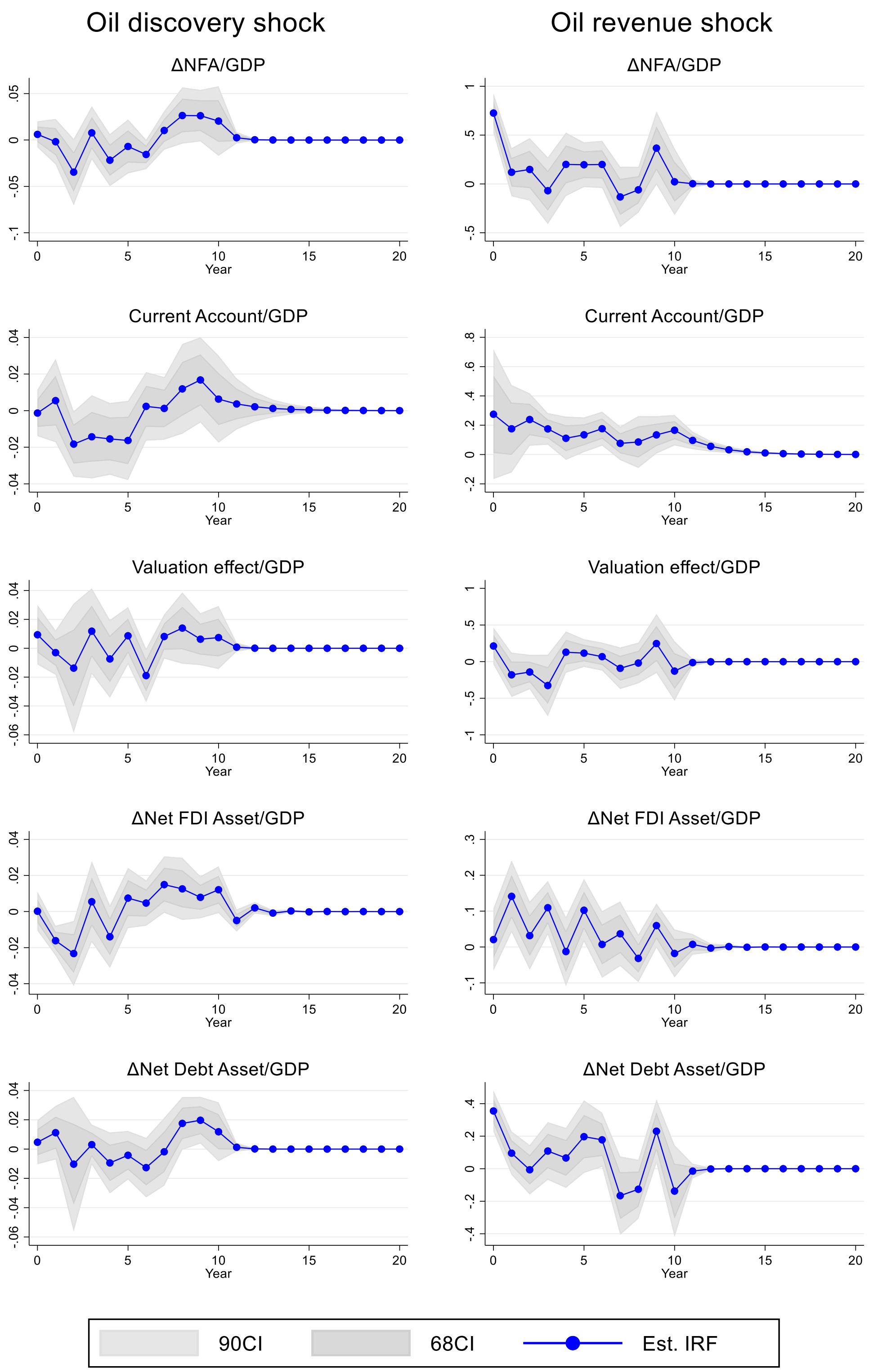


Figure A.VII: Excluding Member Countries in OPEC

Note: The left column presents the impulse response of an oil discovery with NPV equal to 1% of GDP, and the right column displays the impulse response of an oil revenue shock equal to 1% of GDP. The line with circles indicates point estimates, and gray areas are 90% and 68% confidence intervals. The vertical axis shows percentage changes.

8. Excluding countries in the Middle East and North Africa

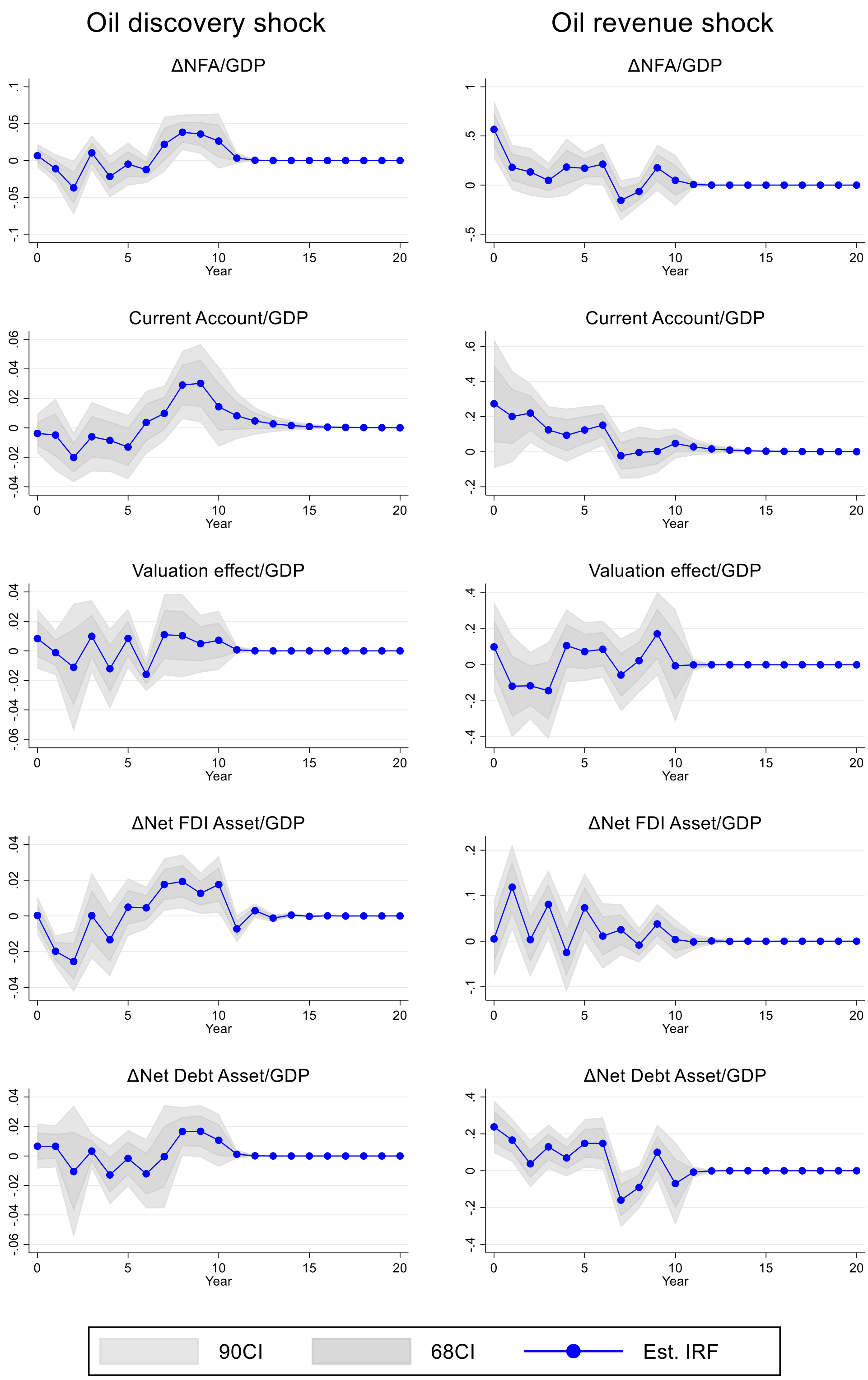


Figure A.VIII: Excluding Countries in the Middle East and North Africa

Note: The left column presents the impulse response of an oil discovery with NPV equal to 1% of GDP, and the right column displays the impulse response of an oil revenue shock equal to 1% of GDP. The line with circles indicates point estimates, and gray areas are 90% and 68% confidence intervals. The vertical axis shows percentage changes.

9. Oil supply shock from OPEC announcements (Känzig, 2021)

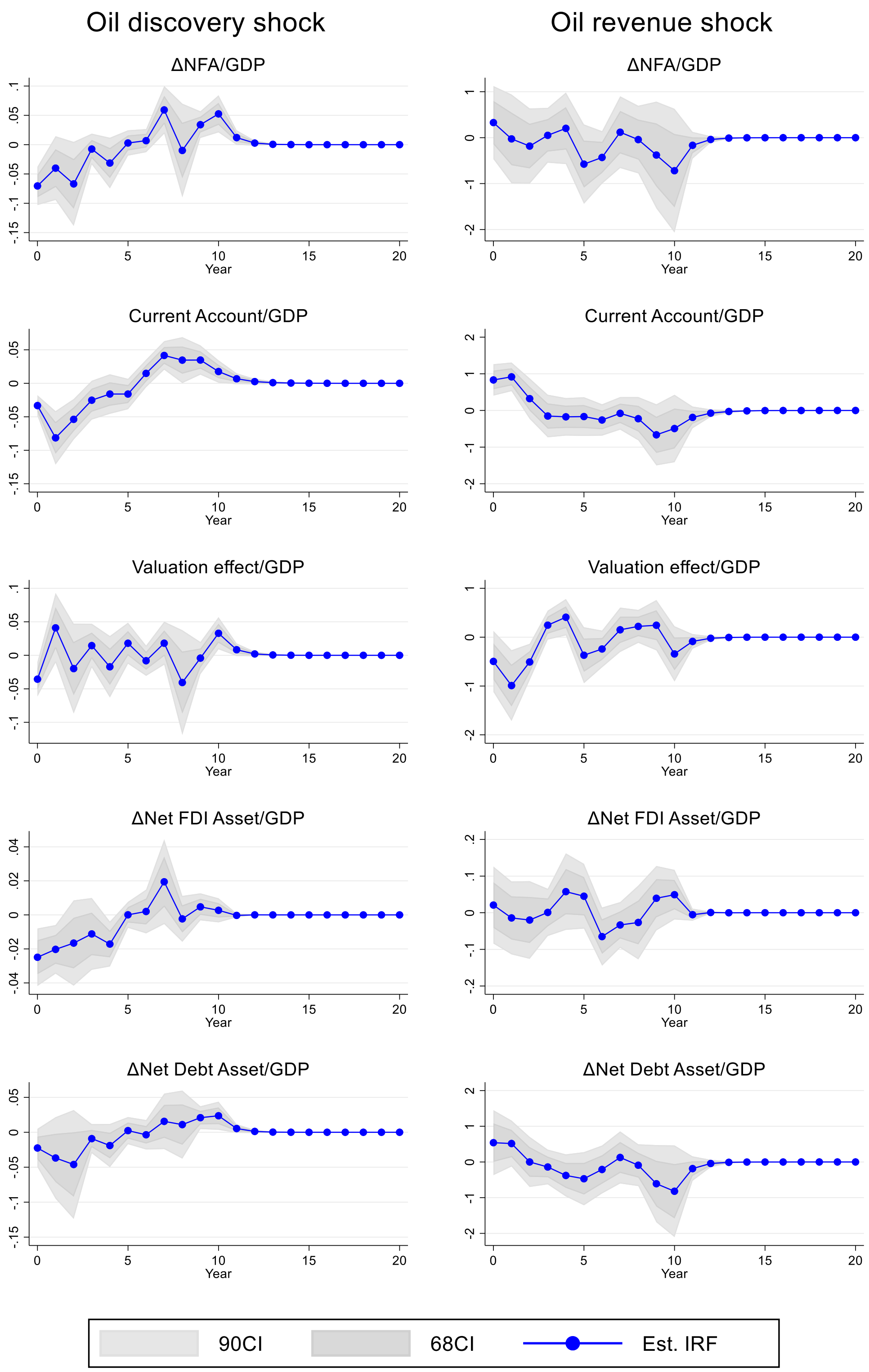


Figure A.IX: Oil Price Surprises from OPEC Announcements

Note: The left column presents the impulse response of an oil discovery with NPV equal to 1% of GDP, and the right column displays the impulse response of an oil revenue shock equal to 1% of GDP. The oil revenue shock is based on the oil price surprises from OPEC announcements, following the method by Känzig (2021). The line with circles indicates point estimates, and gray areas are 90% and 68% confidence intervals. The vertical axis shows percentage changes.

10. Post first oil crisis period (1984-2011)

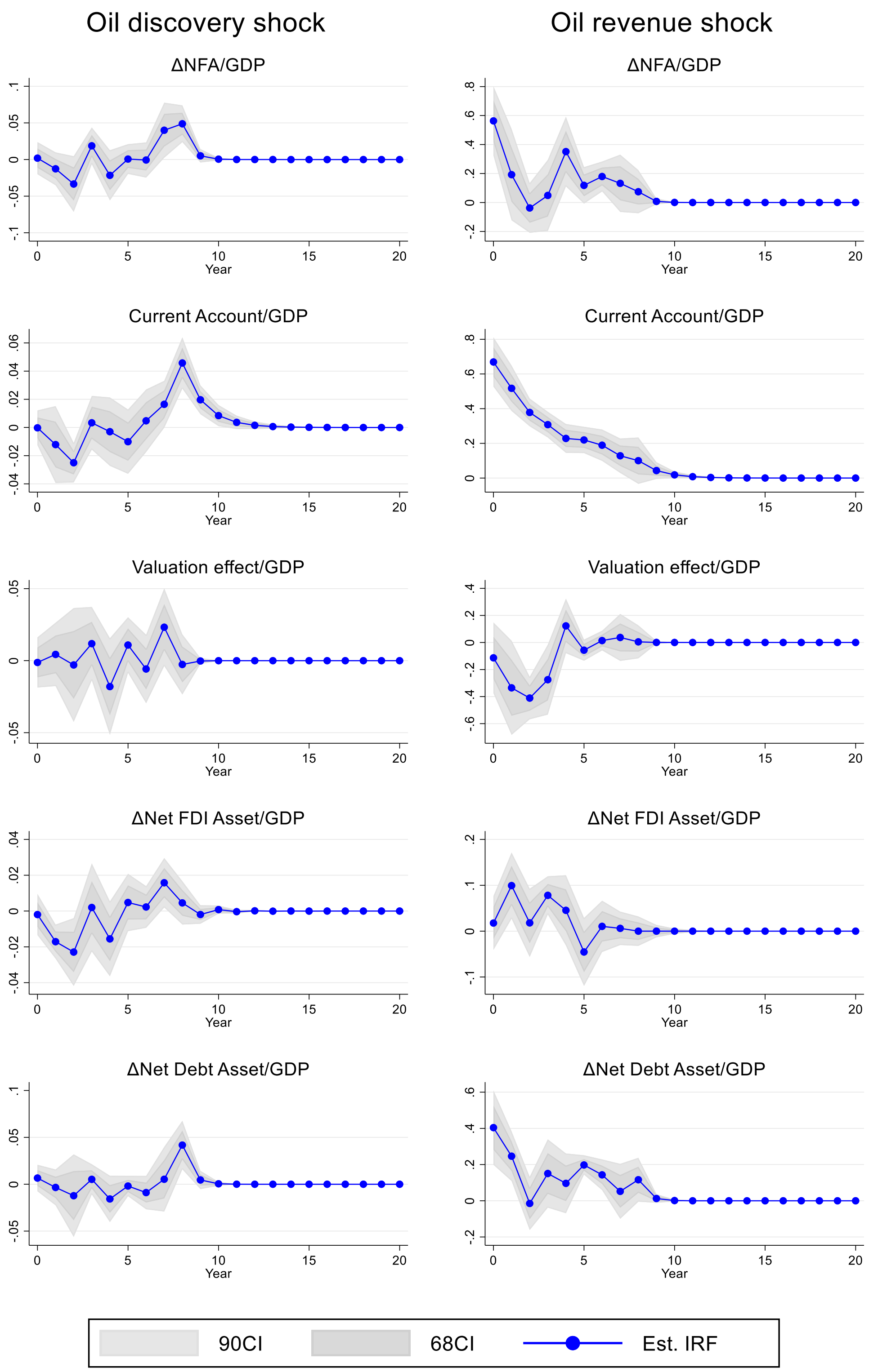


Figure A.X: Post-Oil Crisis

Note: The left column presents the impulse response of an oil discovery with NPV equal to 1% of GDP, and the right column displays the impulse response of an oil revenue shock equal to 1% of GDP. The line with circles indicates point estimates, and gray areas are 90% and 68% confidence intervals. The vertical axis shows percentage changes.

11. Additional control variables

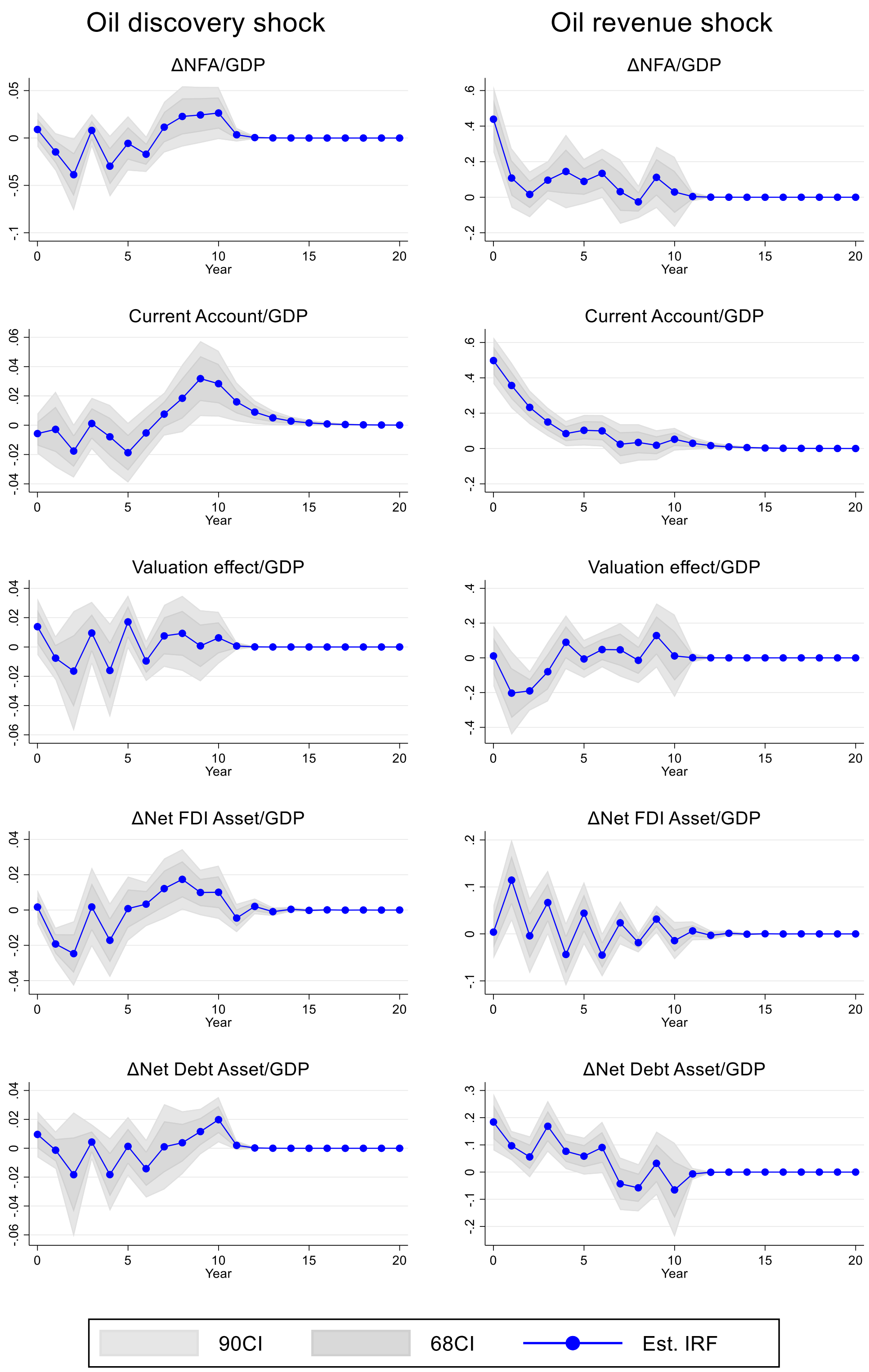


Figure A.XI: Additional Control Variables

Note: The left column presents the impulse response of an oil discovery with NPV equal to 1% of GDP, and the right column displays the impulse response of an oil net export revenue shock equal to 1% of GDP. The regression includes additional control variables such as log GDP per capita, the GDP growth rate, inflation rate, terms of trade, exchange rates, and the global demand factor. The line with circles indicates point estimates, and gray areas are 90% and 68% confidence intervals. The vertical axis shows percentage changes.

12. Control for country-specific linear trends

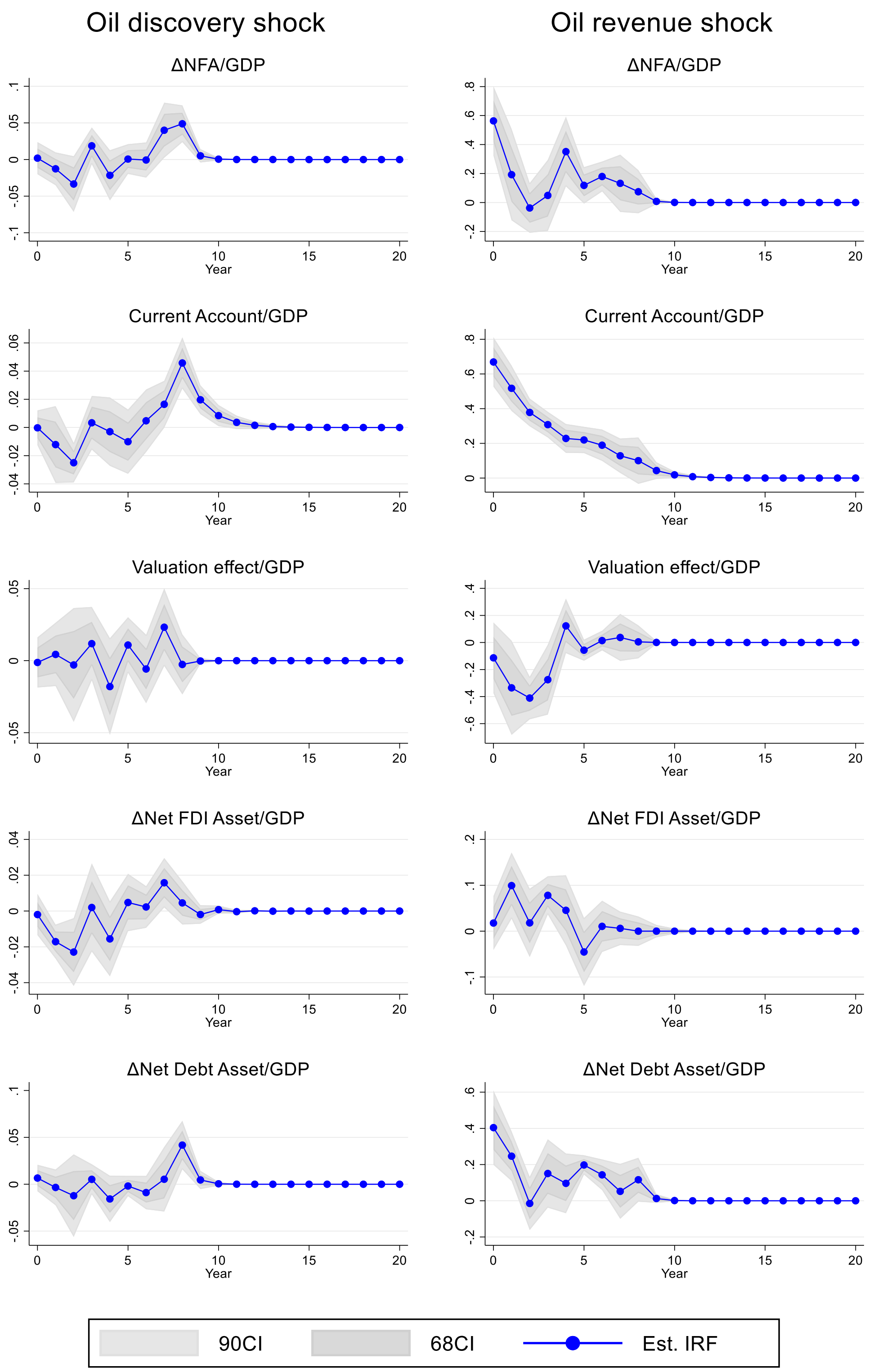


Figure A.XII: Control for Country-specific Linear Trends

Note: The left column presents the impulse response of an oil discovery with NPV equal to 1% of GDP, and the right column displays the impulse response of an oil revenue shock equal to 1% of GDP, with controls for country-specific linear trends of the external balance and international portfolio. The line with circles indicates point estimates, and gray areas are 90% and 68% confidence intervals. The vertical axis shows percentage changes.

13. An alternative measure of oil discovery shocks

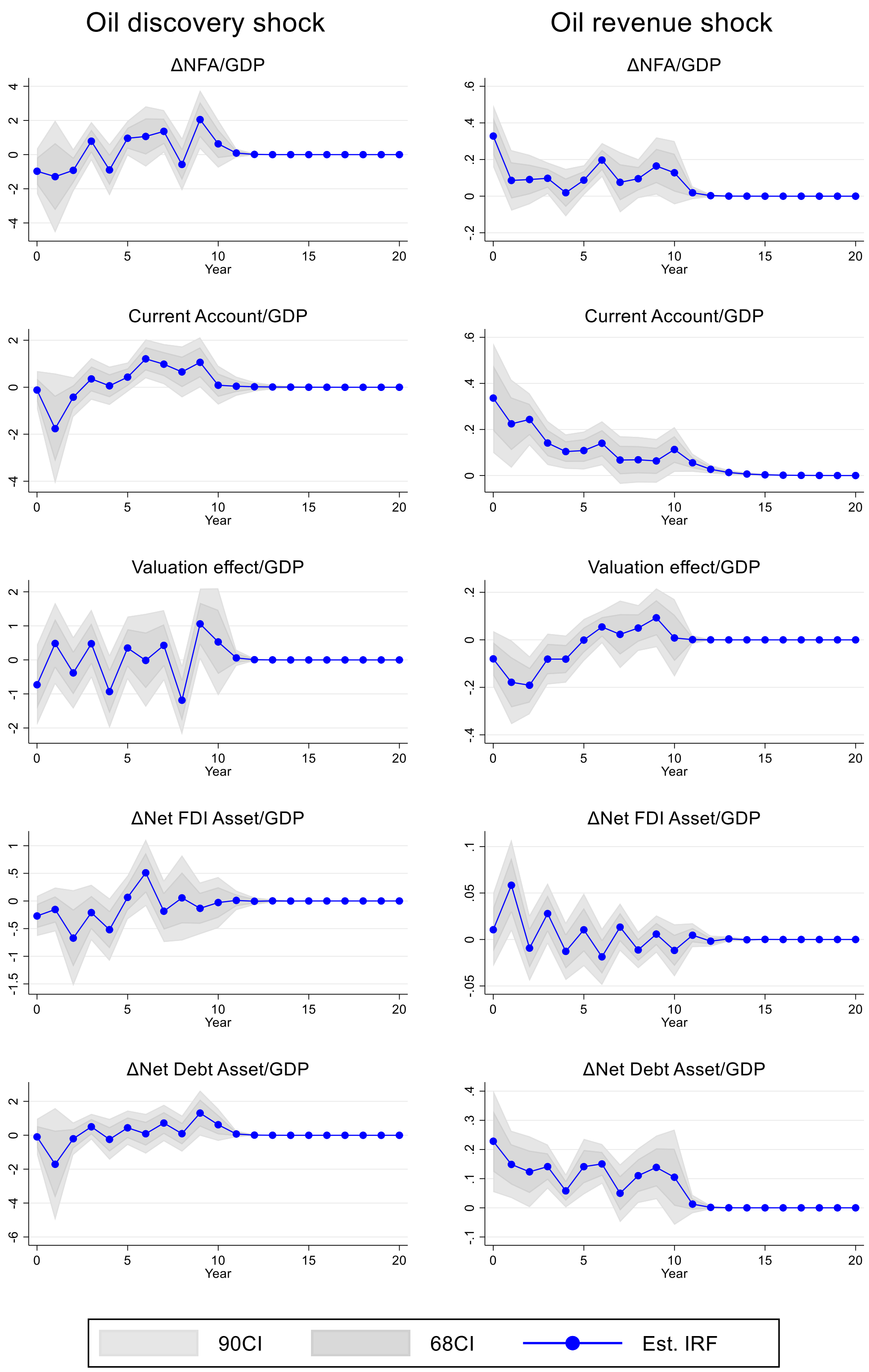


Figure A.XIII: Alternative Measure of Oil Discovery Shocks

Note: The left column presents the impulse response of an oil discovery event dummy, and the right column displays the impulse response of an oil net export revenue shock equal to 1% of GDP. The line with circles indicates point estimates, and gray areas are 90% and 68% confidence intervals. The vertical axis shows percentage changes.

14. Alternative measures of oil revenue shocks

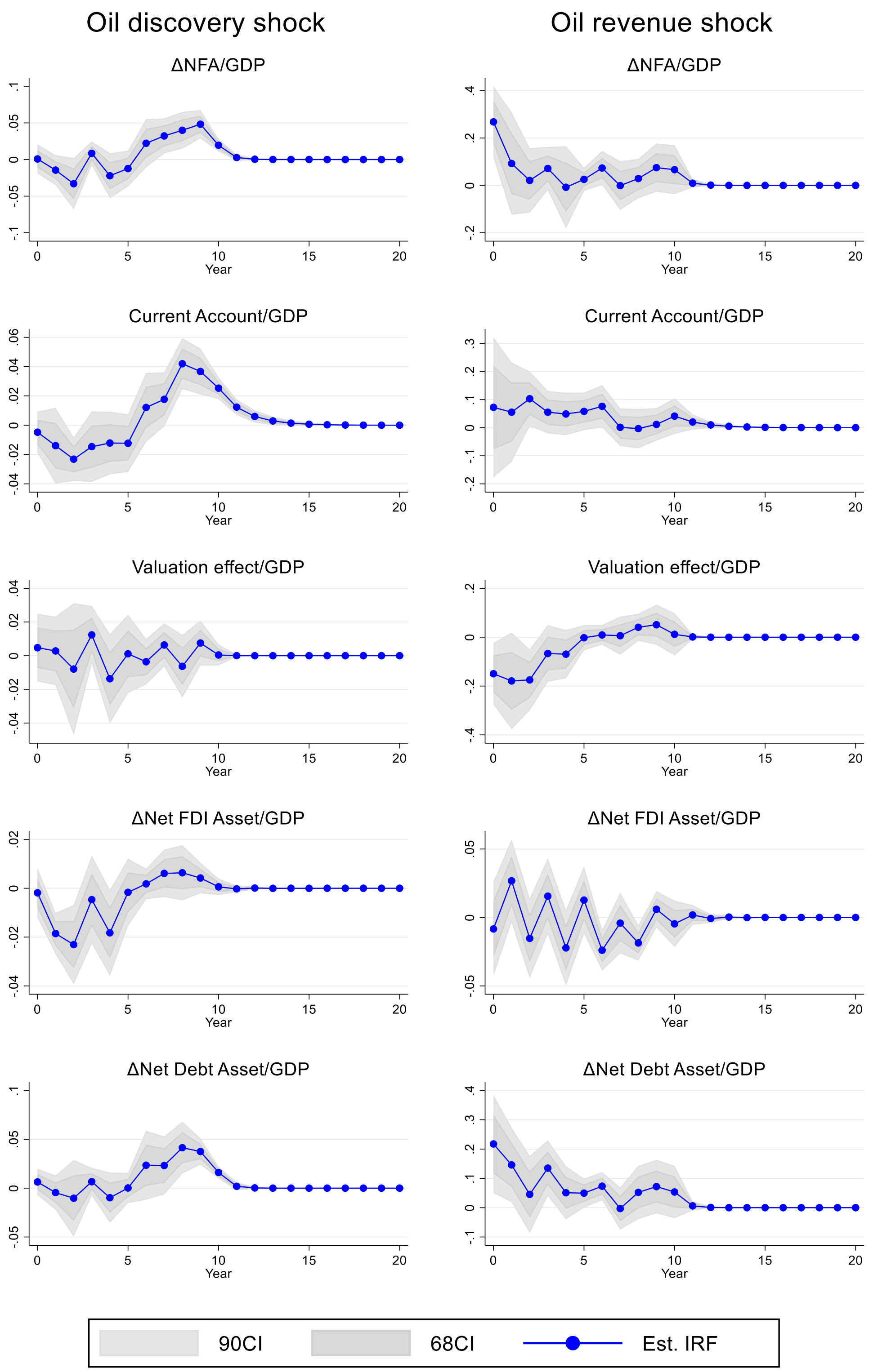


Figure A.XIV: Alternative Measure of Oil Revenue Shocks – Total Exports

Note: The left column presents the impulse response of an oil discovery with NPV equal to 1% of GDP, and the right column displays the impulse response of a total oil export revenue shock equal to 1% of GDP. The line with circles indicates point estimates, and gray areas are 90% and 68% confidence intervals. The vertical axis shows percentage changes.

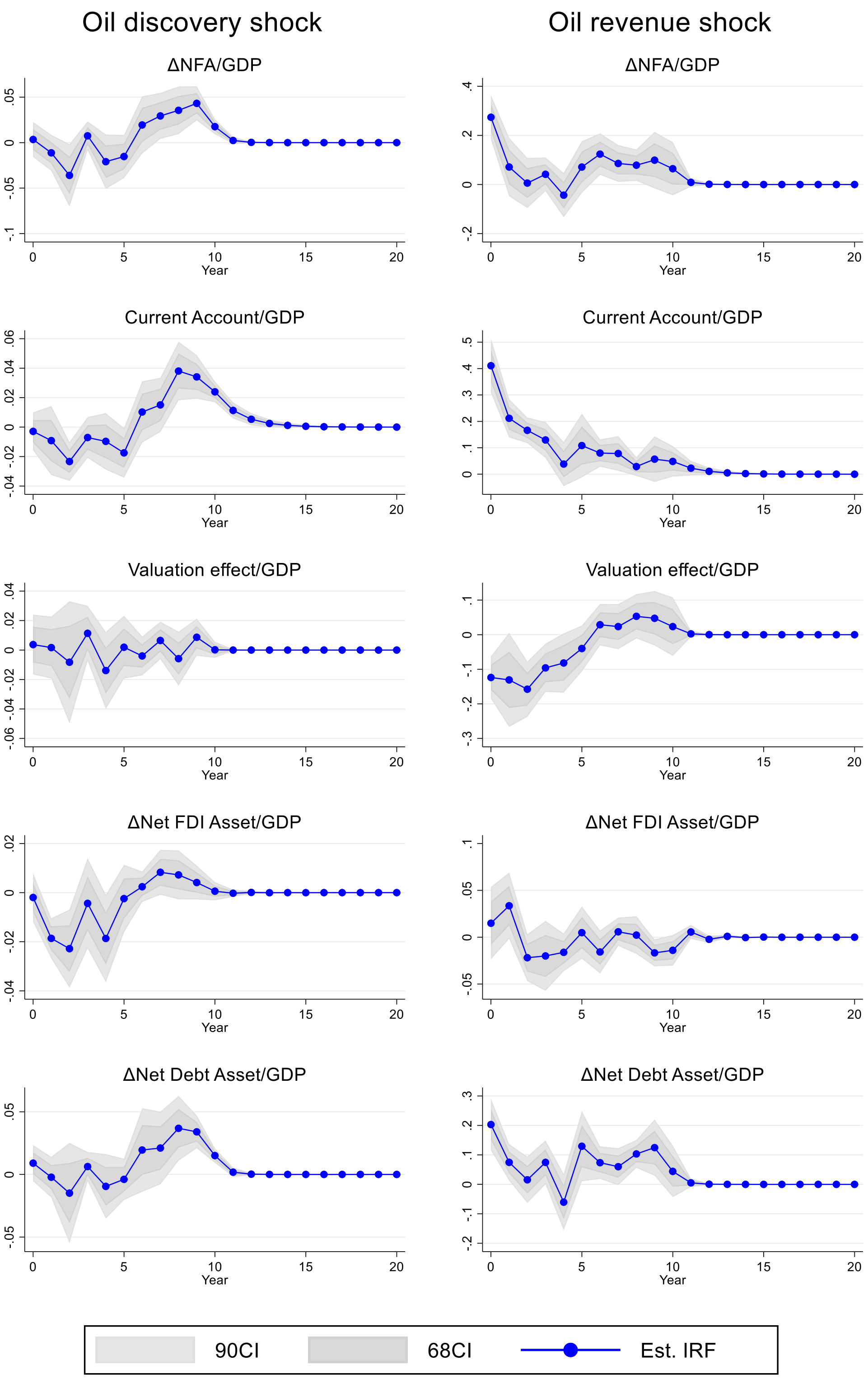


Figure A.XV: Alternative Measure of Oil Revenue Shocks – Total Production

Note: The left column presents the impulse response of an oil discovery with NPV equal to 1% of GDP, and the right column displays the impulse response of a total oil production revenue shock equal to 1% of GDP. The line with circles indicates point estimates, and gray areas are 90% and 68% confidence intervals. The vertical axis shows percentage changes.

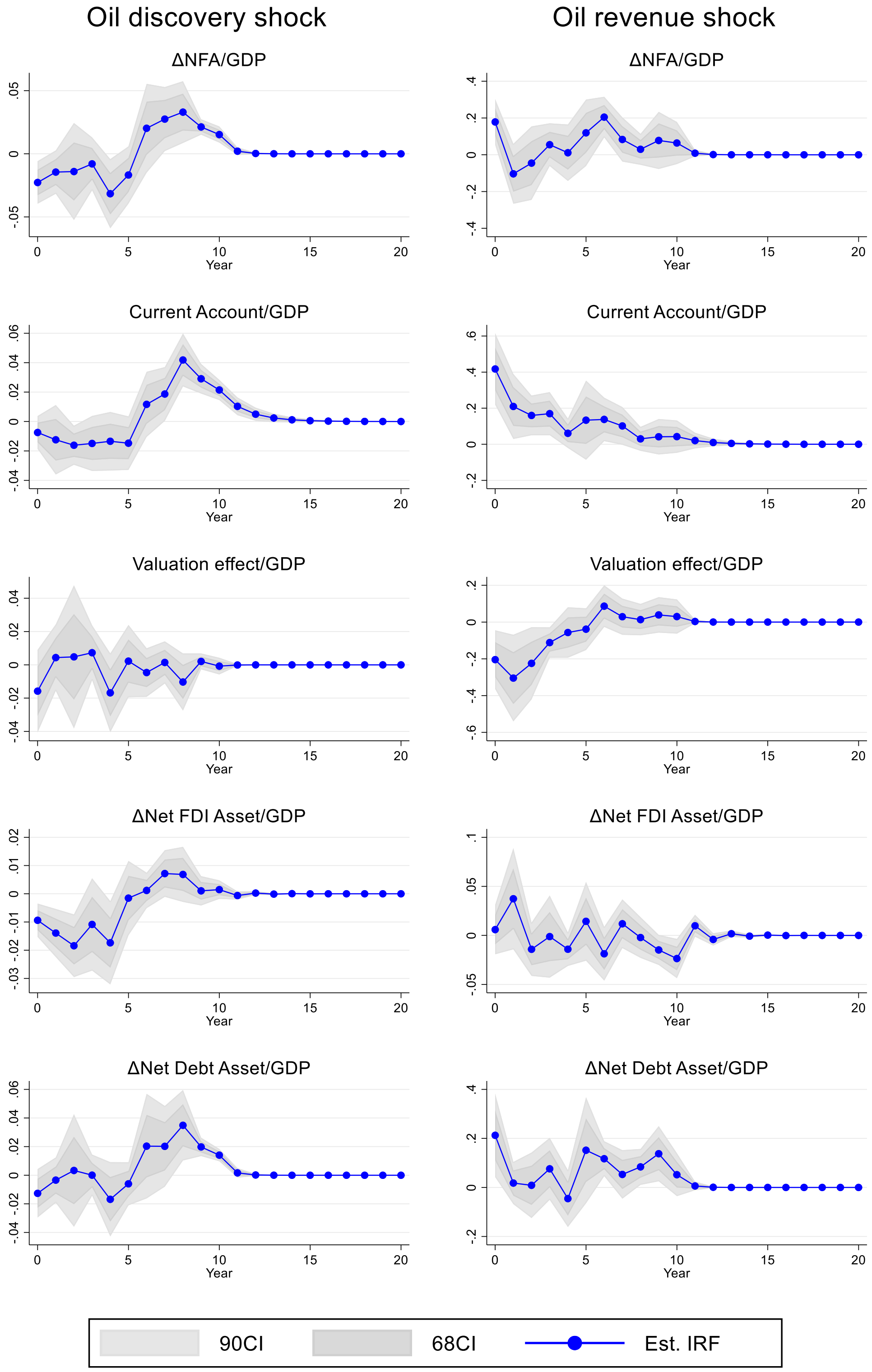


Figure A.XVI: Alternative Measure of Oil Revenue Shocks –

Average GDP Share of Net Exports of Oil and Gas

Note: The oil revenue shocks are based on the average GDP share of the net exports of oil and gas during the sample period. The left column presents the impulse response of an oil discovery with NPV equal to 1% of GDP, and the right column displays the impulse response of an oil net export revenue shock equal to 1% of GDP. The line with circles indicates point estimates, and gray areas are 90% and 68% confidence intervals. The vertical axis shows percentage changes.

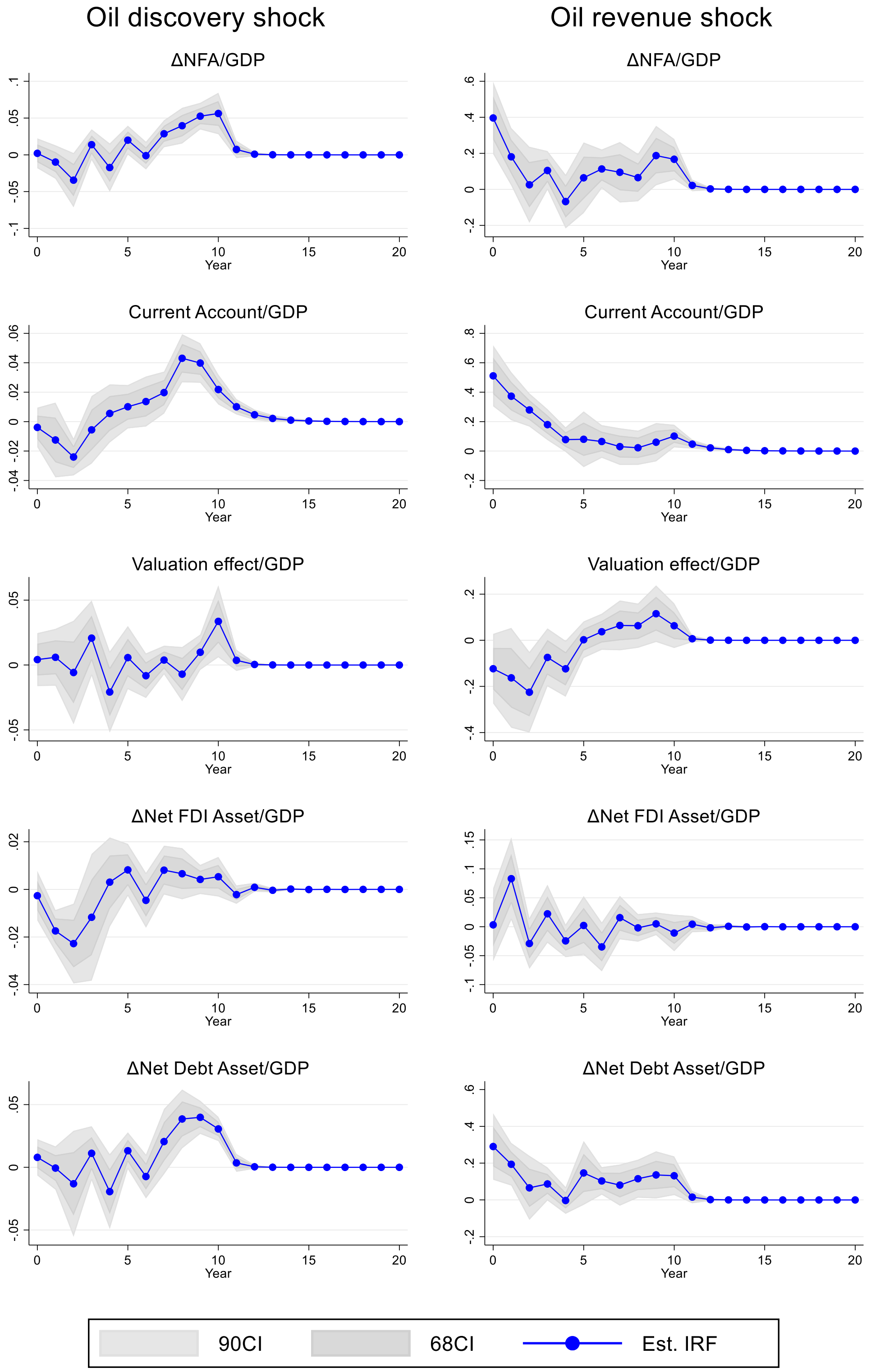


Figure A.XVII: Alternative Measure of Oil Revenue Shocks – Three-Year Lagged Average

Note: The oil revenue shocks are based on the average of the net exports of oil and gas as a percent of GDP in the past three years. The left column presents the impulse response of an oil discovery with NPV equal to 1% of GDP, and the right column displays the impulse response of an oil net export revenue shock equal to 1% of GDP. The line with circles indicates point estimates, and gray areas are 90% and 68% confidence intervals. The vertical axis shows percentage changes.

15. Sample of oil exporters

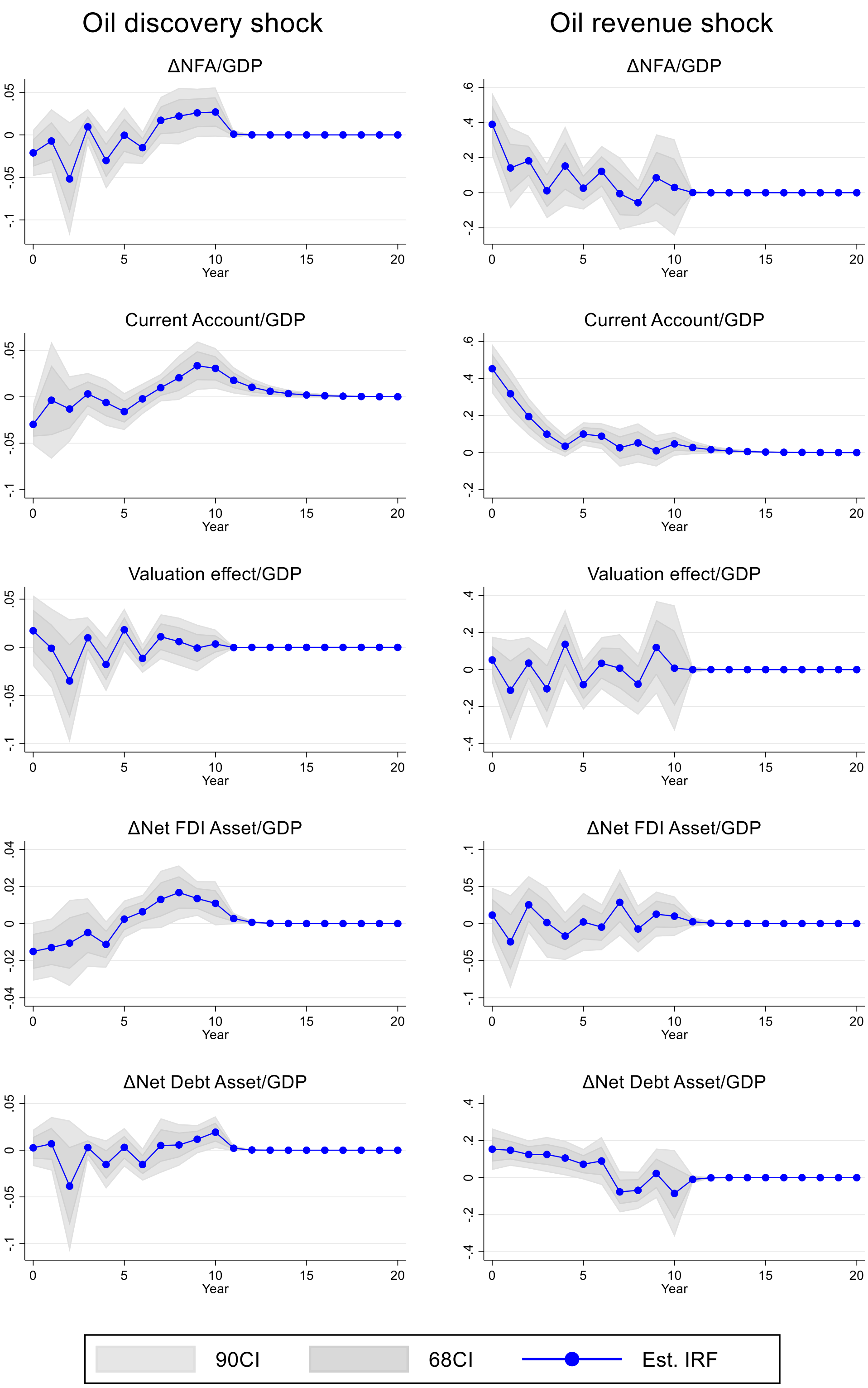


Figure A.XVIII: Sample of Oil Exporters

Note: The sample only covers 86 oil exporters. The left column presents the impulse response of an oil discovery with NPV equal to 1% of GDP, and the right column displays the impulse response of an oil net export revenue shock equal to 1% of GDP. The line with circles indicates point estimates, and gray areas are 90% and 68% confidence intervals. The vertical axis shows percentage changes.

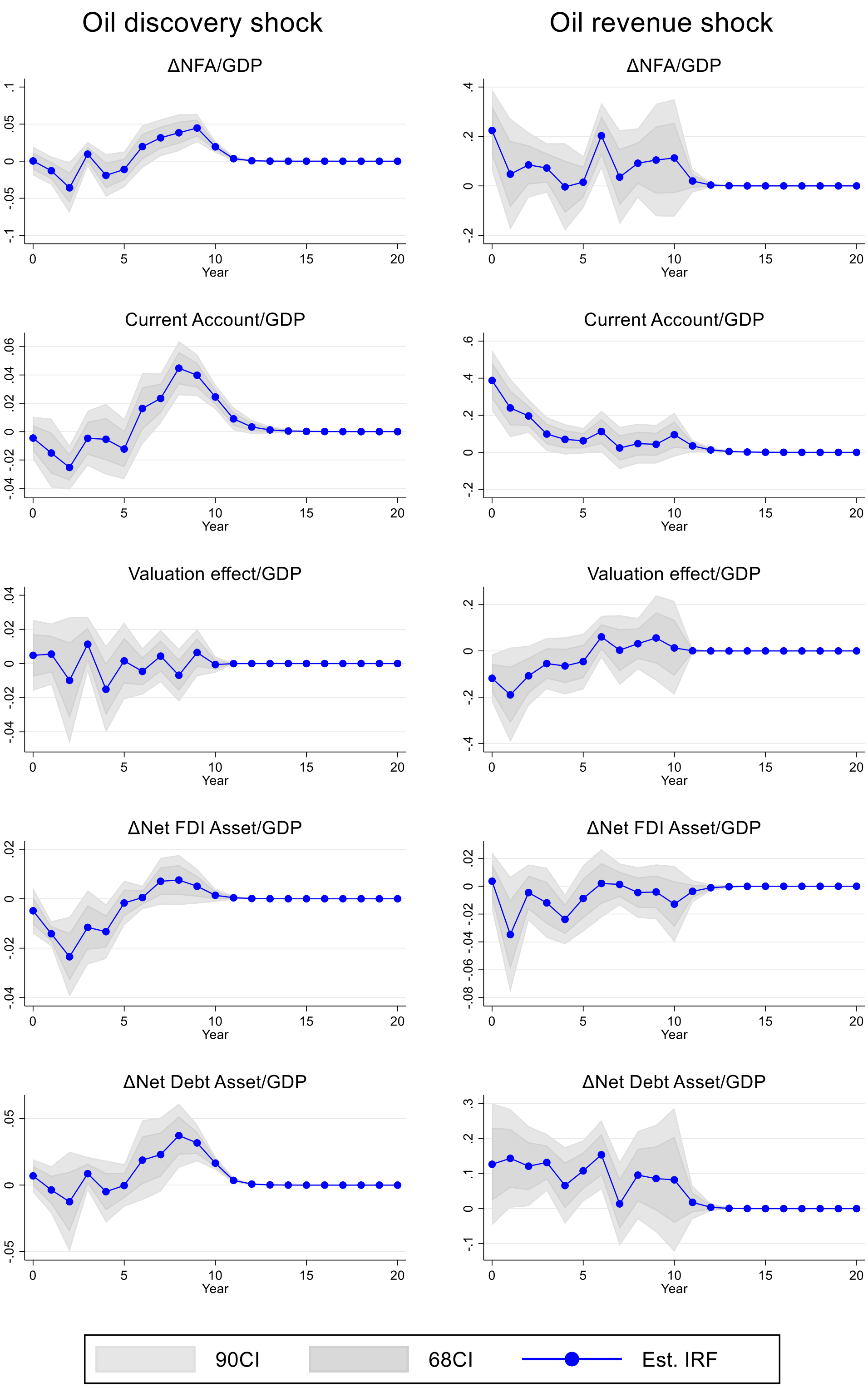
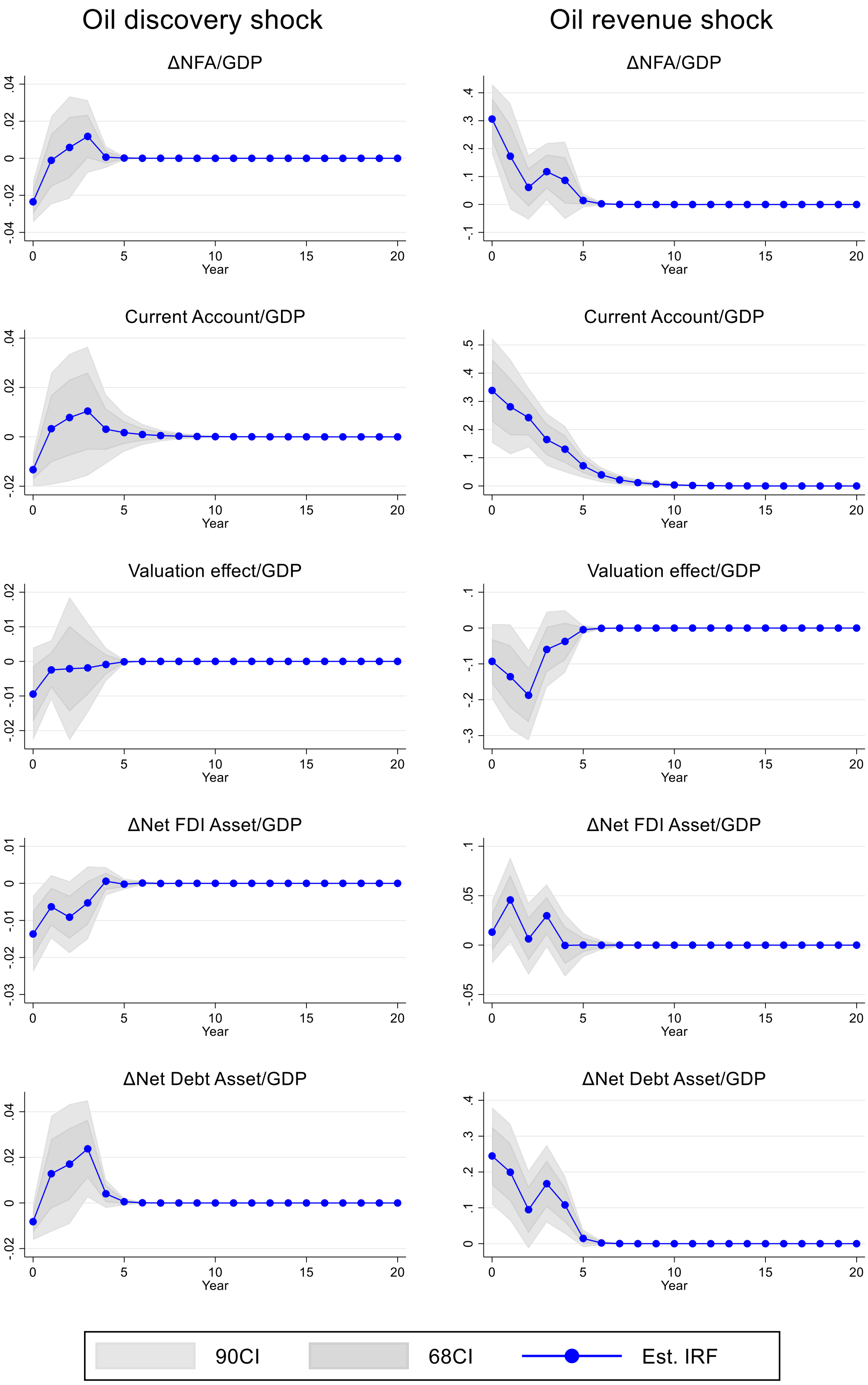


Figure A.XIX: Sample of Countries with Oil Discoveries

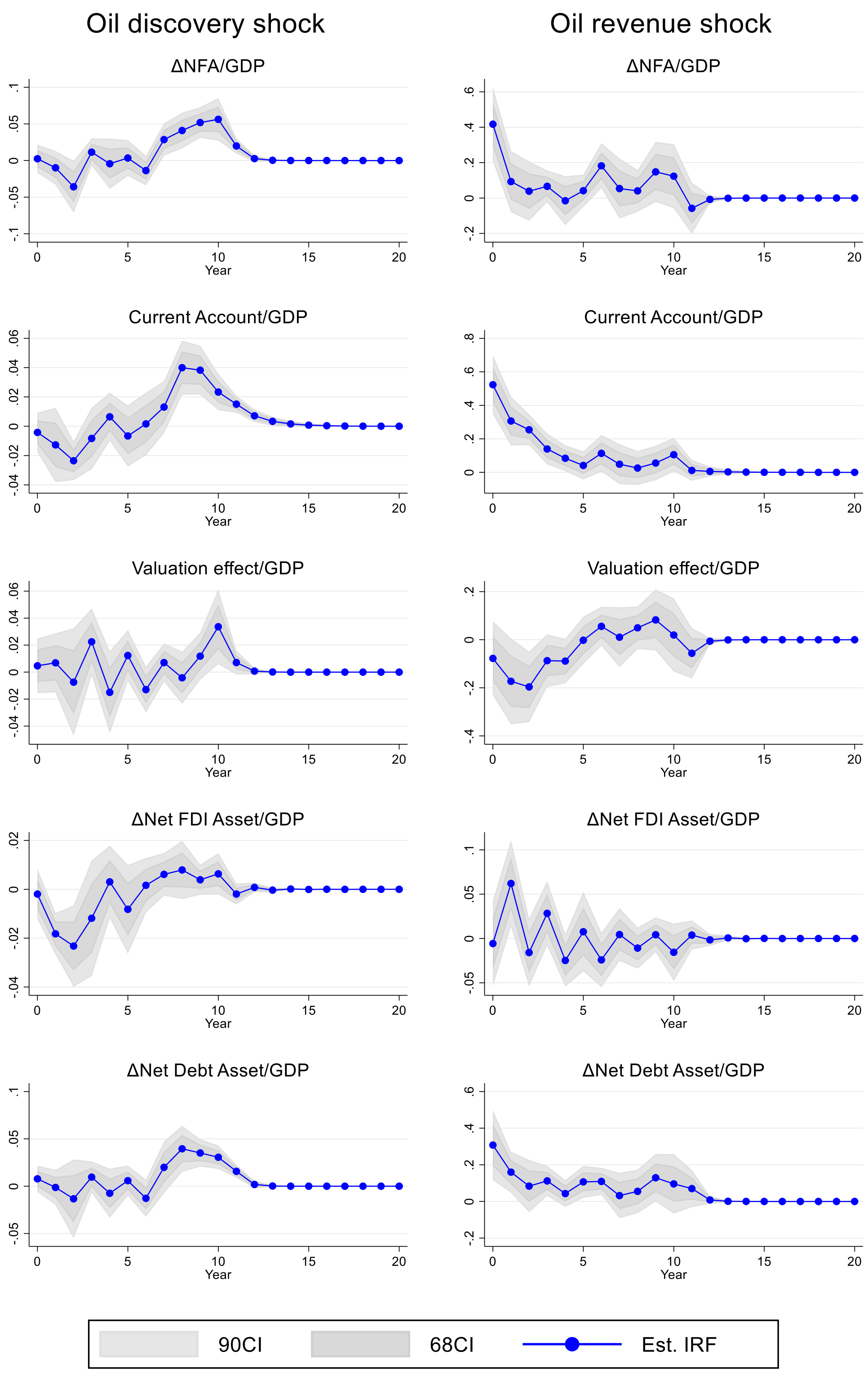
Note: The sample only covers oil exporters and countries with at least one giant oil discovery. The left column presents the impulse response of an oil discovery with NPV equal to 1% of GDP, and the right column displays the impulse response of an oil net export revenue shock equal to 1% of GDP. The line with circles indicates point estimates, and gray areas are 90% and 68% confidence intervals. The vertical axis shows percentage changes.

16. Various specifications on lag length in the DPDL model

(a) p=1, q=4

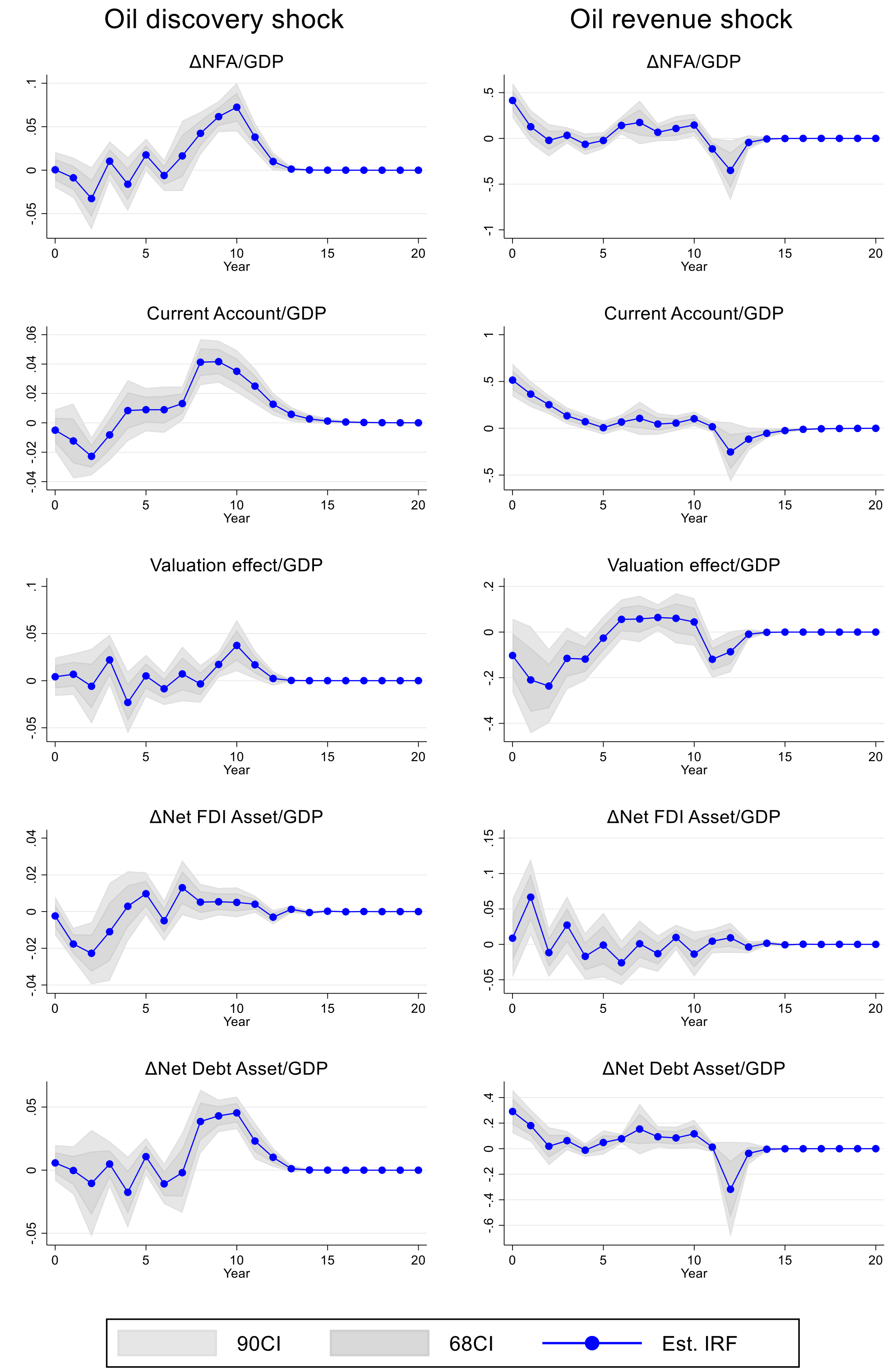


(b) p=1, q=11



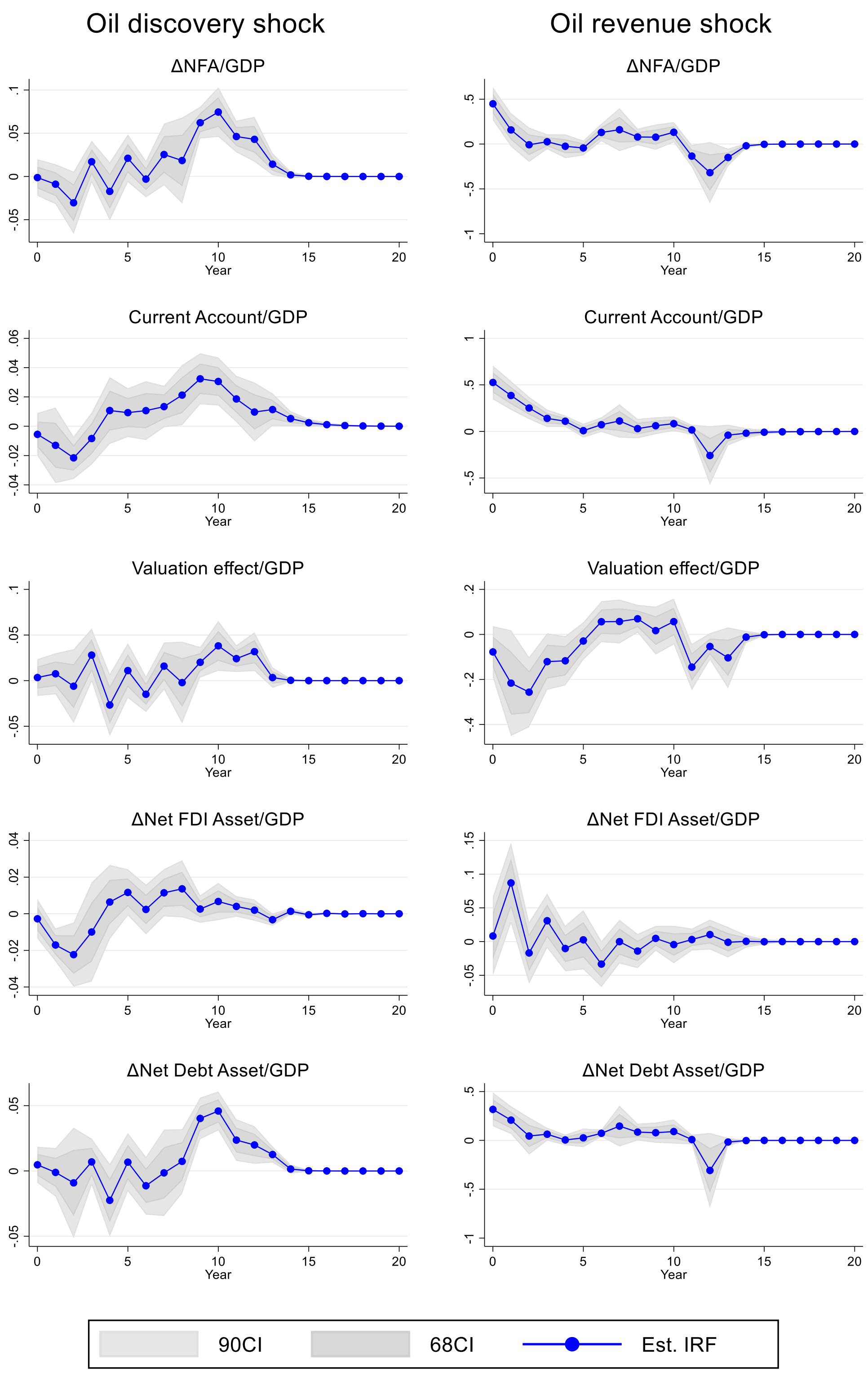
Oil discovery shock
Oil revenue shock
ΔNFA/GDP
Current Account/GDP
Valuation effect/GDP
ΔNet FDI Asset/GDP
ΔNet Debt Asset/GDP
Year
90CI
68CI
Est. IRF

(c) p=1, q=12



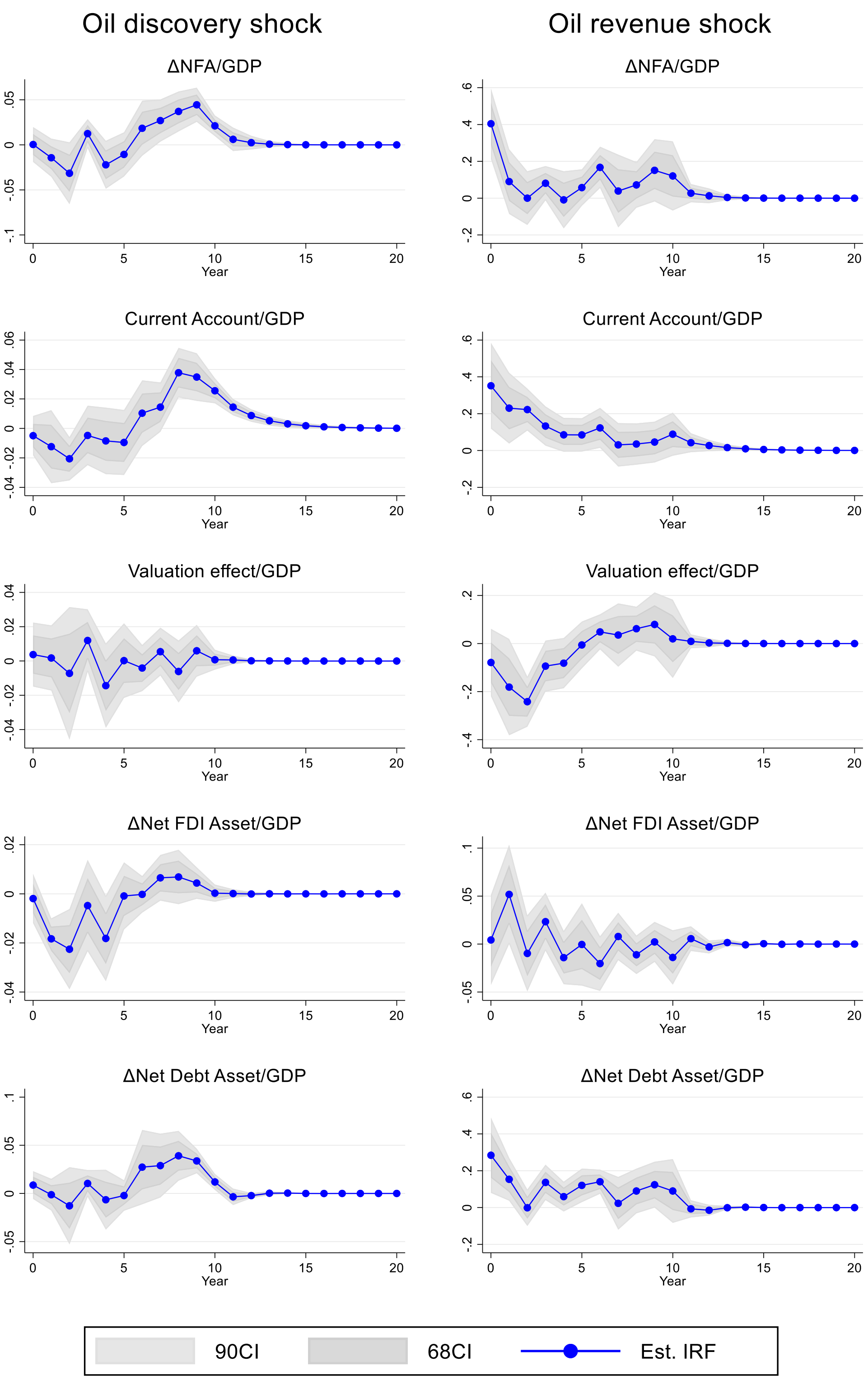
Oil discovery shock
Oil revenue shock
ΔNFA/GDP
ΔNFA/GDP
Current Account/GDP
Current Account/GDP
Valuation effect/GDP
Valuation effect/GDP
ΔNet FDI Asset/GDP
ΔNet FDI Asset/GDP
ΔNet Debt Asset/GDP
ΔNet Debt Asset/GDP
Year
90CI
68CI
Est. IRF

(d) p=1, q=13



Oil discovery shock
Oil revenue shock
ΔNFA/GDP
Current Account/GDP
Valuation effect/GDP
ΔNet FDI Asset/GDP
ΔNet Debt Asset/GDP
Year
90CI
68CI
Est. IRF

(e) p=2, q=10



Oil discovery shock
Oil revenue shock
ΔNFA/GDP
Current Account/GDP
Valuation effect/GDP
ΔNet FDI Asset/GDP
ΔNet Debt Asset/GDP
Year
90CI
68CI
Est. IRF

(f) p=1, q=11 for oil discovery shock, and q=8 for oil revenue shocks

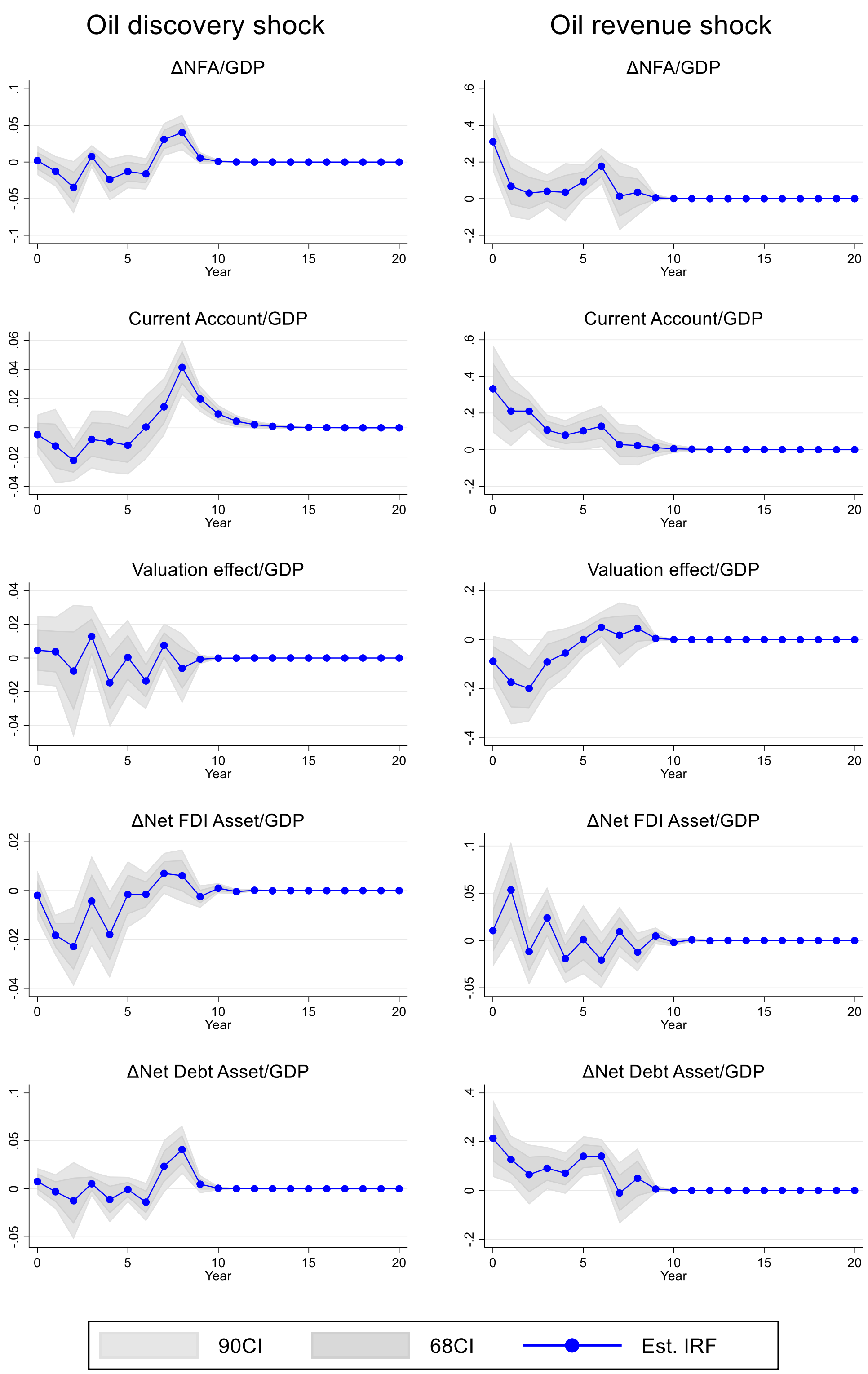


Figure A.XX: Various Specifications on Lag Length in the DPDL Model

Note: The left column presents the impulse response of an oil discovery with NPV equal to 1% of GDP, and the right column displays the impulse response of an oil revenue shock equal to 1% of GDP. The line with circles indicates point estimates, and gray areas are 90% and 68% confidence intervals. The vertical axis shows percentage changes.

17. Local Projection estimation method

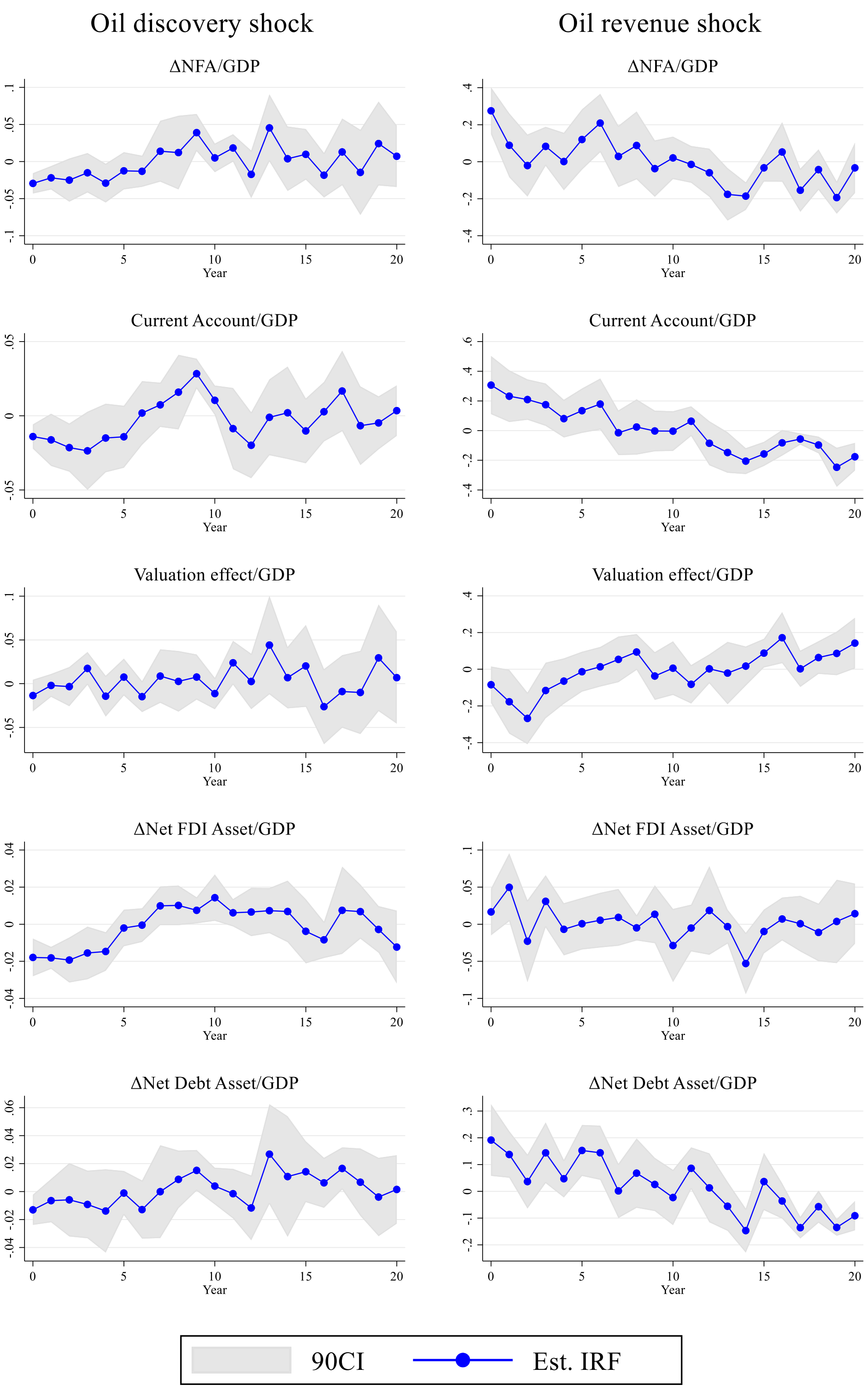


Figure A.XXI: Estimation Results Using Local Projection

Note: The left column presents the impulse response of an oil discovery with NPV equal to 1% of GDP, and the right column displays the impulse response of an oil revenue shock equal to 1% of GDP. The vertical scale is in percentage points. Gray areas are 90 percent confidence intervals.

18. Removing countries with low quality in EWN data

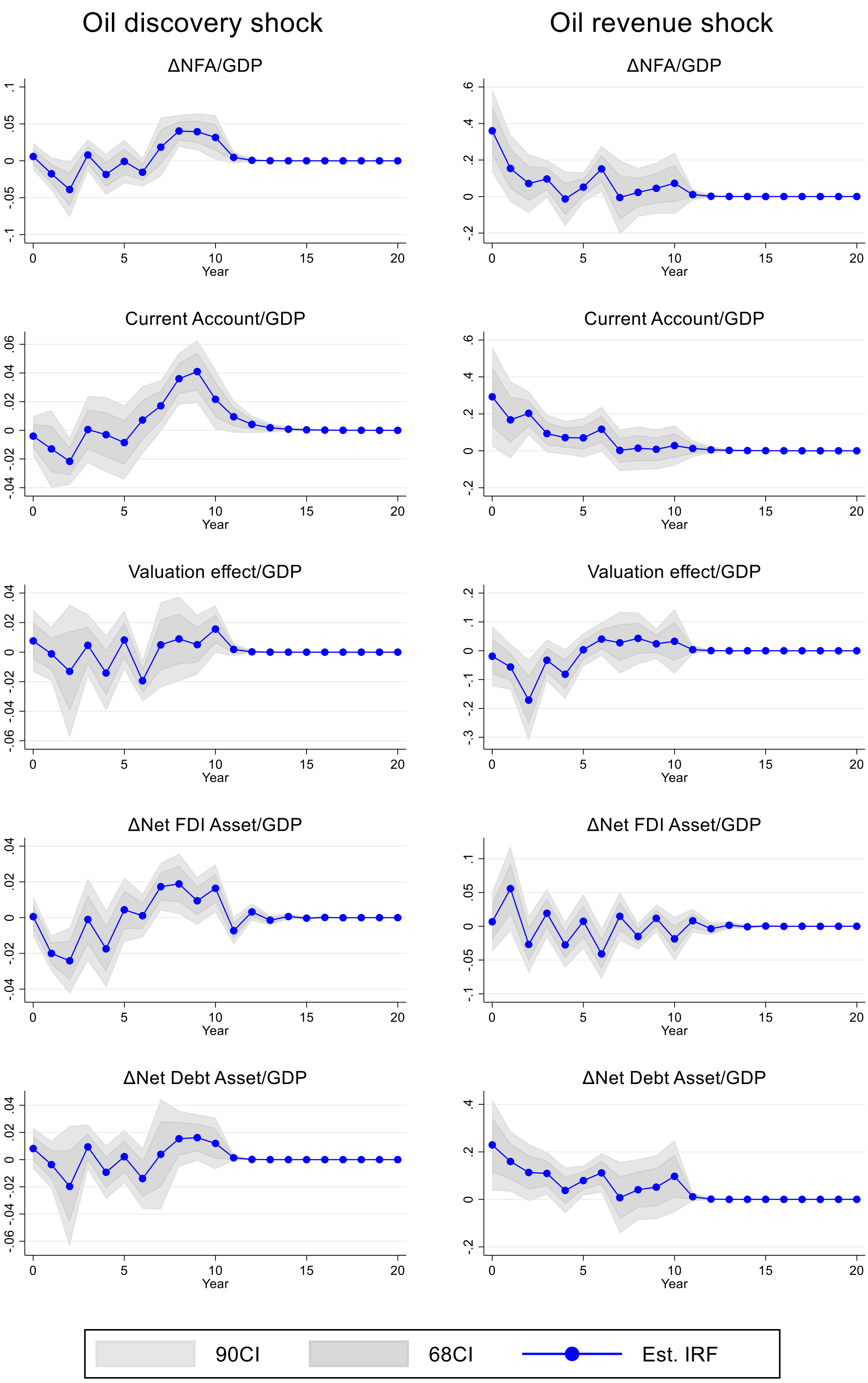


Figure A.XXII: Removing Countries with Low Quality in EWN Data

Note: The left column presents the impulse response of an oil discovery with NPV equal to 1% of GDP, and the right column displays the impulse response of an oil revenue shock equal to 1% of GDP. The vertical scale is in percentage points. Gray areas are 90 percent confidence intervals.

19. Estimated IRFs for Oil Shocks

Table A.I: Estimated IRFs for Oil Discovery Shocks

Year	ΔNFA/GDP	ΔTotal foreign asset/GDP	ΔTotal foreign liability/GDP	CA/GDP	Valuation effect/GDP	ΔNet FDI asset/GDP	ΔFDI asset/GDP	ΔFDI liability/GDP	ΔNet foreign debt asset/GDP	ΔForeign debt asset/GDP	ΔForeign debt liability/GDP
0	0.001	-0.026	-0.027	-0.005	0.005	-0.002	-0.011	-0.01	0.007	-0.008	-0.013
1	-0.013	0.011	0.023	-0.012	0.003	-0.018	0	0.015	-0.004	0.002	0.005
2	-0.033	0.019	0.051	-0.022	-0.007	-0.023	-0.002	0.021	-0.011	0.013	0.022
3	0.011	0.01	0	-0.007	0.014	-0.004	-0.001	0.01	0.008	0.002	-0.006
4	-0.021	-0.003	0.019	-0.008	-0.014	-0.018	0.001	0.015	-0.008	-0.002	0.007
5	-0.011	0.007	0.017	-0.011	0.001	-0.002	0.012	0.015	0	0.002	0
6	0.02	0.018	-0.001	0.011	-0.004	0.001	0.005	0.003	0.021	0.014	-0.001
7	0.029	0.003	-0.024	0.018	0.005	0.006	0.004	-0.003	0.022	0.001	-0.018
8	0.037	0.022	-0.015	0.041	-0.006	0.007	0.003	-0.005	0.038	0.024	-0.013
9	0.045	0.04	-0.006	0.037	0.007	0.004	0.004	-0.002	0.035	0.025	-0.009
10	0.019	0.015	-0.005	0.025	0.001	0	0	-0.003	0.016	0.014	-0.005
11	0.003	0.003	-0.001	0.012	0	0	0	0	0.002	0.004	-0.002
12	0	0.001	0	0.006	0	0	0	0	0	0.001	-0.001
13	0	0	0	0.003	0	0	0	0	0	0	0
14	0	0	0	0.001	0	0	0	0	0	0	0
15	0	0	0	0.001	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0

Table A.II: Estimated IRFs for Oil Revenue Shocks											
Year	ΔNFA/GDP	ΔTotal foreign asset/GDP	ΔTotal foreign liability/GDP	CA/GDP	Valuation effect/GDP	ΔNet FDI asset/GDP	ΔFDI asset/GDP	ΔFDI liability/GDP	ΔNet foreign debt asset/GDP	ΔForeign debt asset/GDP	ΔForeign debt liability/GDP
0	0.334	0.575	0.249	0.343	-0.079	0.008	0.148	0.122	0.231	0.286	0.058
1	0.083	-0.044	-0.125	0.224	-0.174	0.053	-0.035	-0.092	0.139	0.1	-0.044
2	0.045	0.067	0.024	0.219	-0.191	-0.012	0.016	0.034	0.076	0.086	0.012
3	0.087	-0.009	-0.093	0.127	-0.079	0.024	-0.065	-0.084	0.133	0.099	-0.017
4	-0.001	-0.066	-0.061	0.082	-0.081	-0.02	-0.055	-0.042	0.04	0.013	-0.03
5	0.069	-0.047	-0.115	0.085	0.002	0.006	-0.077	-0.067	0.123	0.074	-0.053
6	0.177	0.115	-0.059	0.123	0.05	-0.024	-0.037	-0.015	0.14	0.083	-0.055
7	0.025	-0.017	-0.041	0.029	0.023	0.01	-0.025	-0.029	-0.001	-0.013	-0.02
8	0.073	0.135	0.063	0.036	0.055	-0.011	0.03	0.044	0.087	0.061	-0.03
9	0.15	0.22	0.068	0.047	0.09	0.004	0.005	0.007	0.127	0.173	0.046
10	0.113	0.138	0.026	0.087	0.014	-0.016	0.002	0.015	0.087	0.102	0.015
11	0.016	0.026	0.005	0.042	0.002	0.006	0.001	0.002	0.01	0.031	0.005
12	0.002	0.005	0.001	0.02	0	-0.003	0	0	0.001	0.009	0.002
13	0	0.001	0	0.01	0	0.001	0	0	0	0.003	0.001
14	0	0	0	0.005	0	0	0	0	0	0.001	0
15	0	0	0	0.002	0	0	0	0	0	0	0
16	0	0	0	0.001	0	0	0	0	0	0	0
17	0	0	0	0.001	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0