

For Online Publication

## **Supplementary Appendix**

# **News Shocks in Open Economies: Evidence from Giant Oil Discoveries**

March 3, 2016

## Supplementary Appendix C: Model Graphs

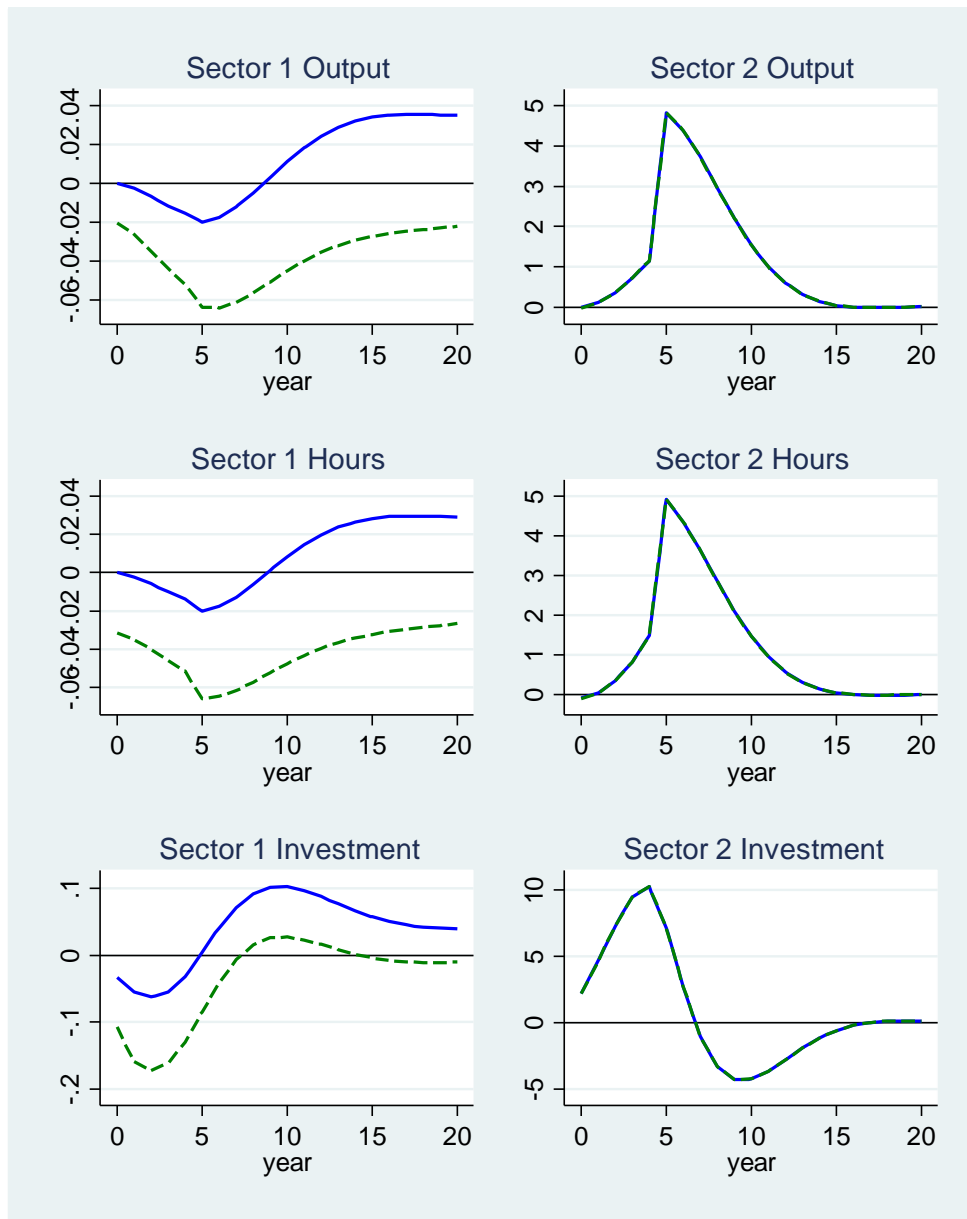


Figure C.I: Effect of Oil Discovery News by Sector

Baseline Model, 5 year lag of news

*Note:* The **solid blue line** is the baseline model with GHH preferences. The **green dashed line** is the model with KPR preferences. The shock is normalized so that the present value of the rise in oil revenue is equal to 1% of initial GDP in the baseline model.

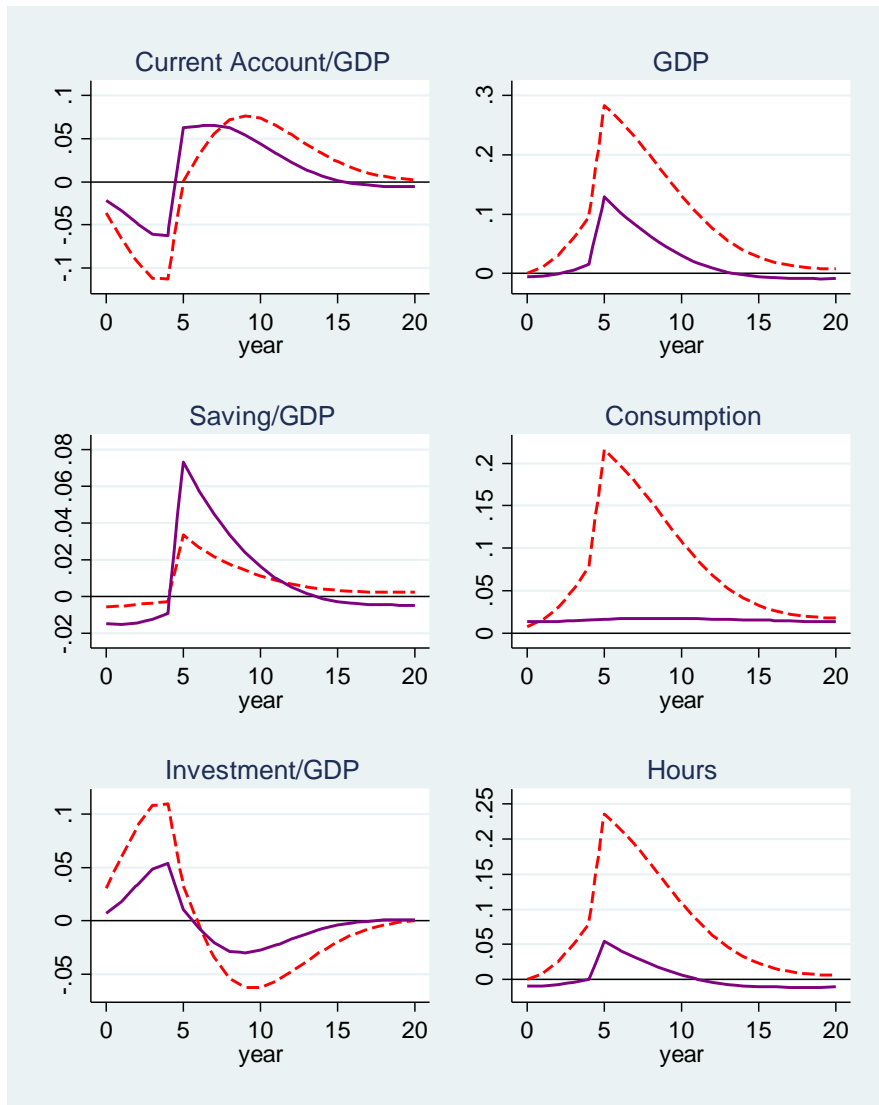


Figure C.II: Effect of Aggregate TFP News

One-Sector Model, 5 year lag of news

*Note:* The vertical axis shows percentage changes. The dashed red line is the model with GHH preferences. The solid purple line is the model with KPR preferences. The shock is normalized so that the present value of the rise in oil revenue is equal to 1% of initial GDP in the GHH model.

## **Supplementary Appendix D: Empirical Graphs and Tables**

### **1. Alternative measures of Net Present Value**

Figure D.I presents the impulse responses of key macro variables to a giant oil discovery shock by using two alternative measures of net present value of giant oil discoveries.

### **2. Sensitivity to groups of countries**

Figure D.II presents the impulse responses of key macro variables to a giant oil discovery shock for the sample exclude Middle East and North African countries or countries without giant oil discoveries. It also presents the results by splitting the sample into high income country group and low income country group according to the classification by the World Bank. High income countries include the groups of “high” and “high middle” income, the low income countries include the groups of “low middle” and “low” income.

### **3. Oil or natural gas discoveries**

Figure D.III presents the impulse responses of key macro variables to a giant oil discovery shock for oil or natural gas discoveries separately.

### **4. Selected giant oil discoveries**

Figure D.IV presents the impulse responses of key macro variables to a giant oil discovery shock for non-sequential discoveries or discoveries without ones in previous three years.

### **5. Control for exploration effects**

Figure D.V presents the impulse responses of key macro variables to a giant oil discovery shock with controls for exploration effects. The exploration effects are measured as the log number of wildcats.

### **6. Sub-Saharan Africa countries and removal of top ten oil exporters**

Figure D.VI presents the impulse responses of key macro variables to a giant oil discovery shock for the sample of Sub-Saharan Africa countries only and the one without top ten oil exporters.

### **7. Alternative econometric specifications**

Figure D.VII presents the results for different specifications of the empirical model.

### **8. Results using Chang and Sakata (2007)’s estimation method**

Figure D.VIII presents the results of Chang and Sakata (2007)’s estimation method.

## **9. The Behavior of the Real Exchange Rate**

Figure D.IX presents the impulse responses of the real exchange rates to a giant oil discovery shock, with controls of country-specific quadratic trends.

## **10. The Behavior of stock market**

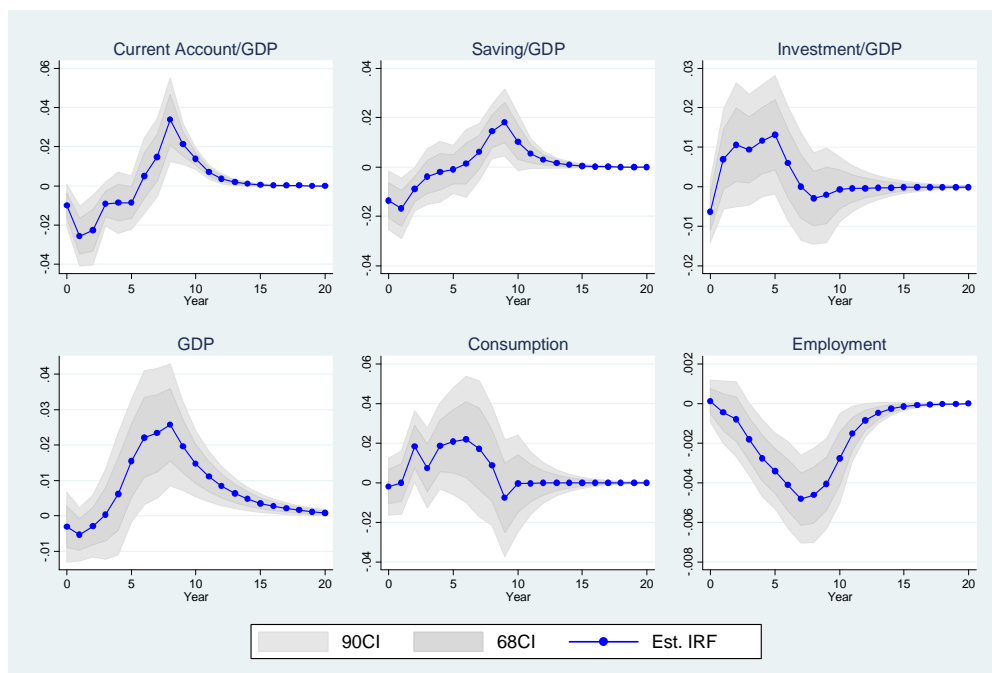
Figure D.X presents the impulse responses of the stock market capitalization to a giant oil discovery shock, with controls of country-specific quadratic trends.

## **11. Baseline coefficient estimates**

Table D.I. presents the baseline coefficient estimation results.

# 1. Alternative measures of Net Present Value

(a) NPV with risk adjusted discount rate and uniform production profile



(b) NPV with common discount rate and uniform production profile

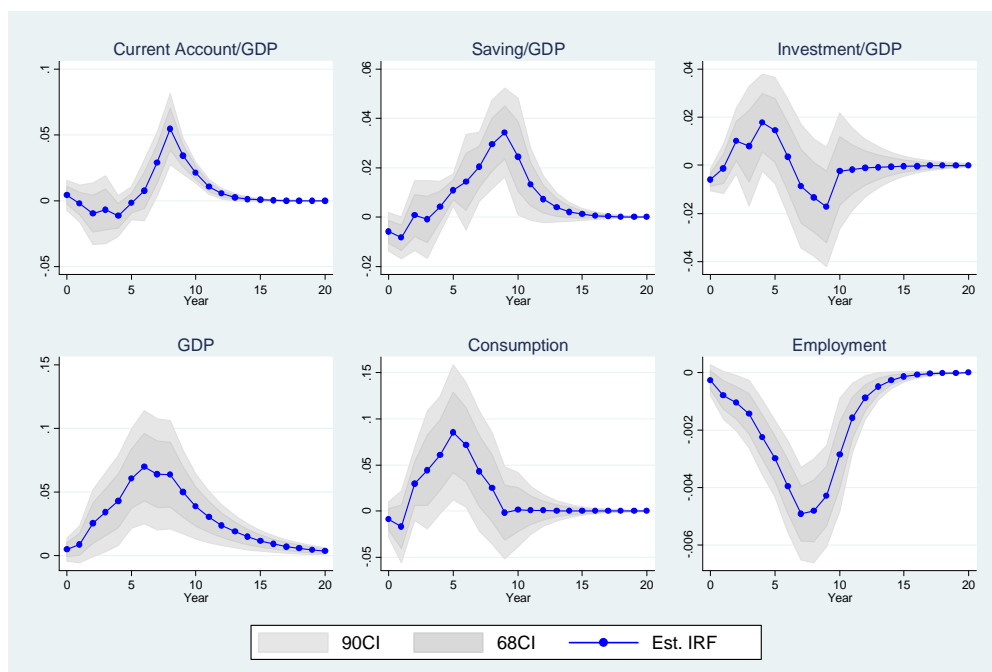
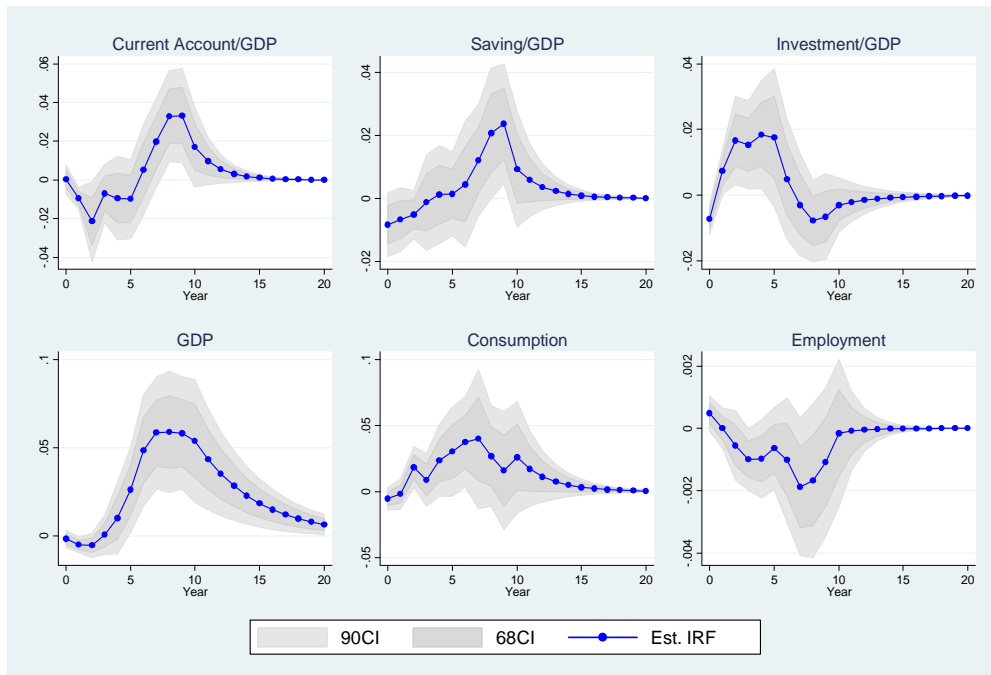


Figure D.I: Alternative measures of Giant Oil Discoveries

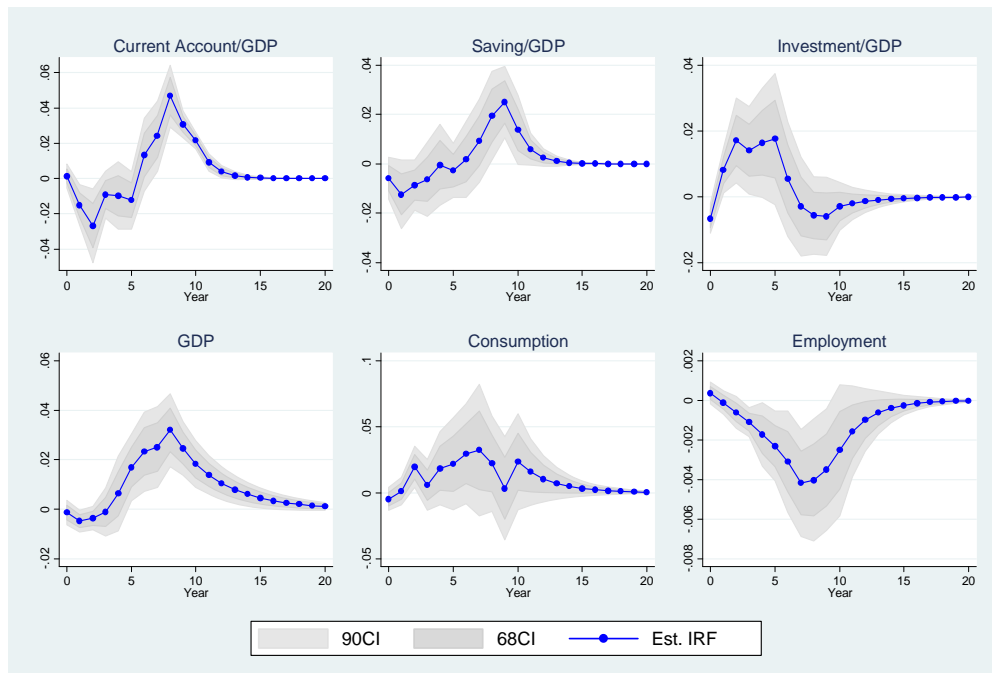
*Note:* The figure presents the impulse responses of key macro variables to a giant oil discovery shock by using alternative measures of net present value of giant oil discoveries. The line with circles indicates point estimates, and grey areas are 90 percent and 68 percent (darker color) confidence intervals. The vertical scale is in percentage points.

## 2. Sensitivity to groups of countries

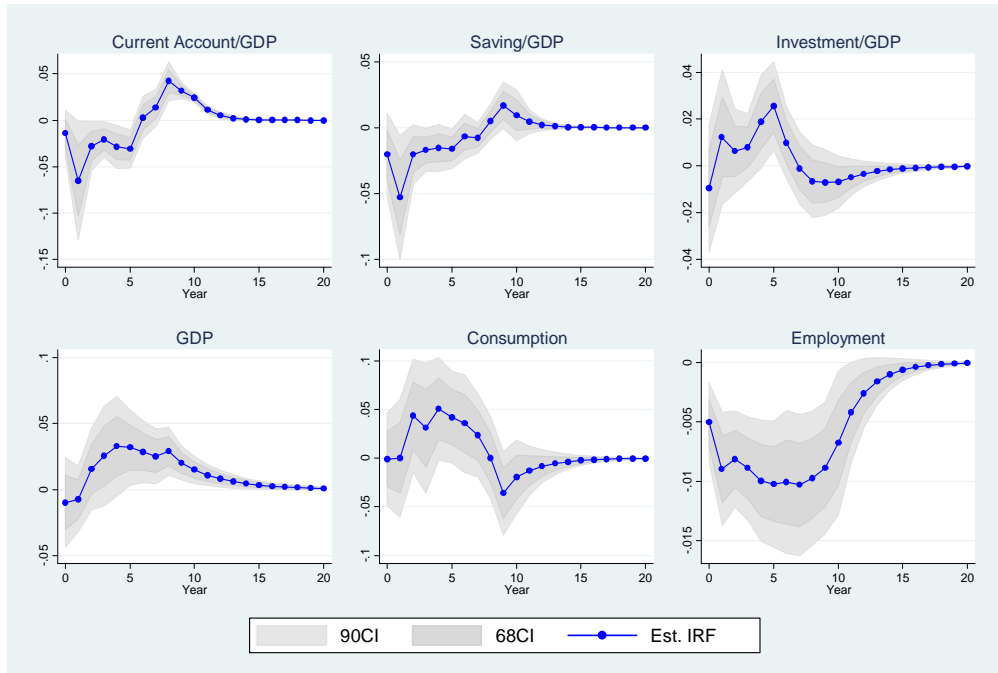
(a) Excluding Middle East and North African countries



(b) Excluding countries without discoveries



(c) High income countries only



(d) Low income countries only

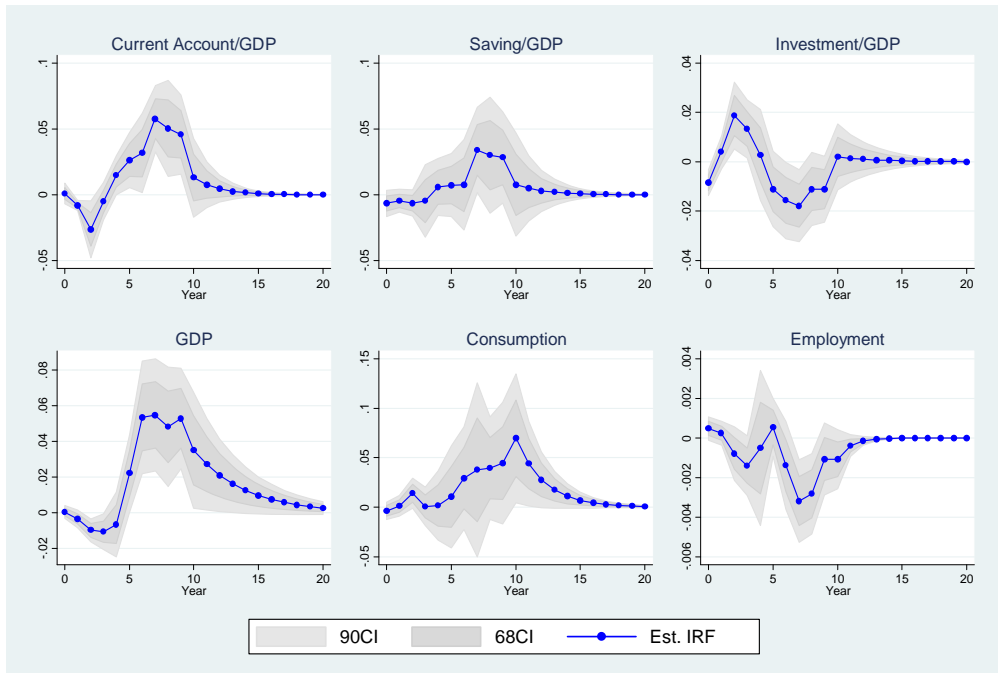


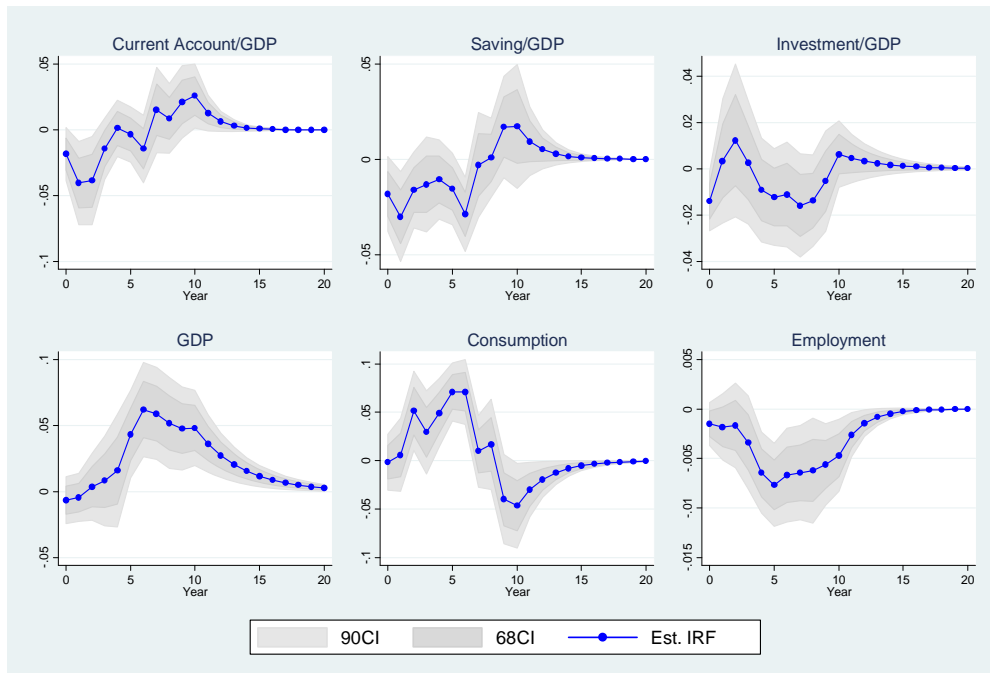
Figure D.II: Sensitivity to Groups of Countries

*Note:* The figure presents the impulse responses of key macro variables to a giant oil discovery shock for selected country groups. The line with circles indicates point estimates, and grey areas are 90 percent and 68 percent (darker color) confidence intervals. The vertical scale is in percentage points. The country groups follow in (c) and (d) follow the World Bank's classification. High income countries include the groups of "high" and "high middle" income, the low income countries include the groups of "low middle" and "low" income.



### 3. Oil or natural gas discoveries

(a) Oil and Condensate discoveries



(b) Natural Gas Discoveries

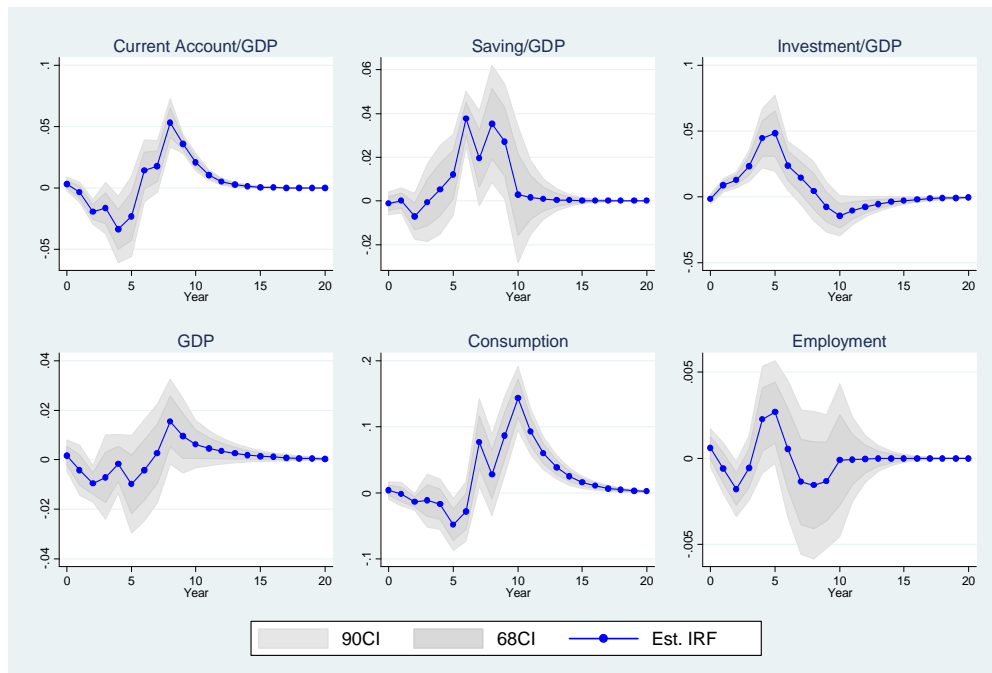
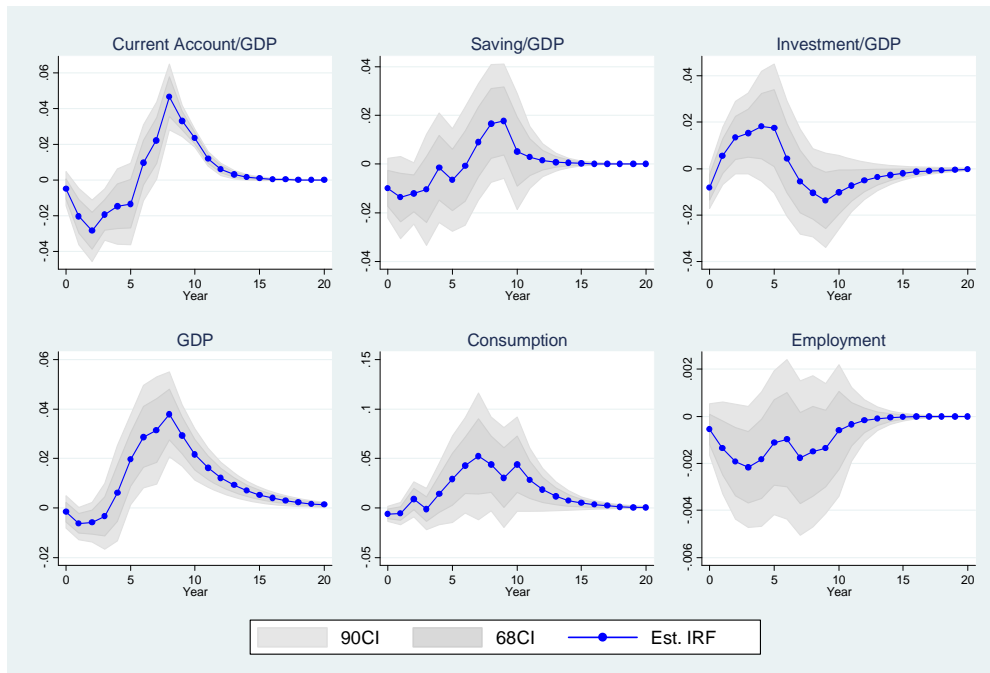


Figure D.III: Oil Or Natural Gas Discoveries

*Note:* The figure presents the impulse responses of key macro variables to a giant oil discovery shock for oil or natural gas discoveries. The line with circles indicates point estimates, and grey areas are 90 percent and 68 percent (darker color) confidence intervals. The vertical scale is in percentage points.

## 4. Selected giant oil discoveries

(a) Non-sequential discoveries



(b) Discoveries without ones in the past three years

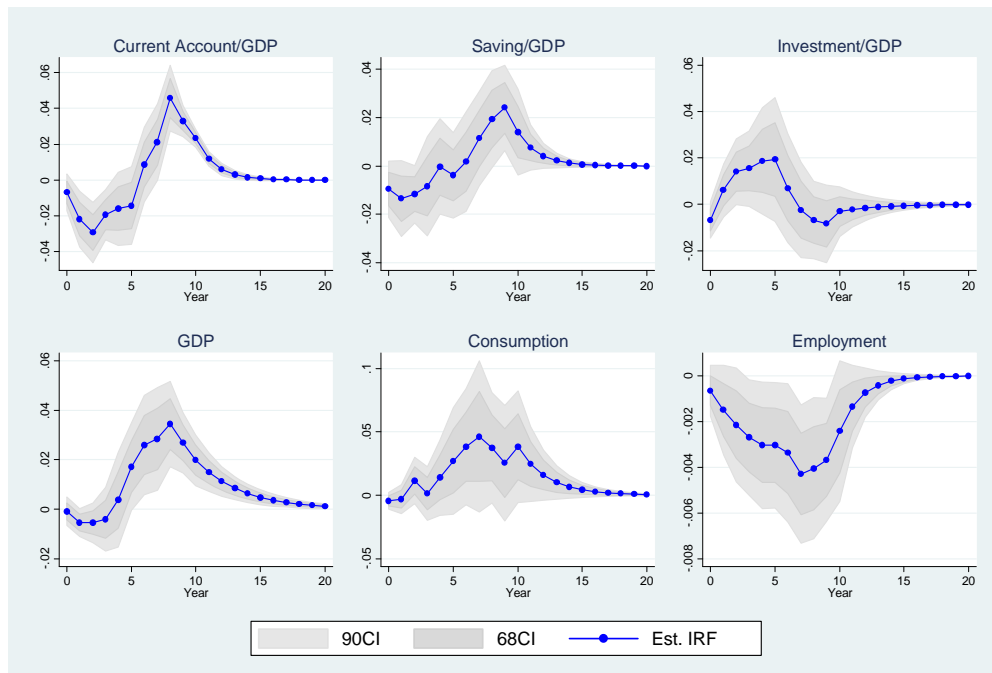
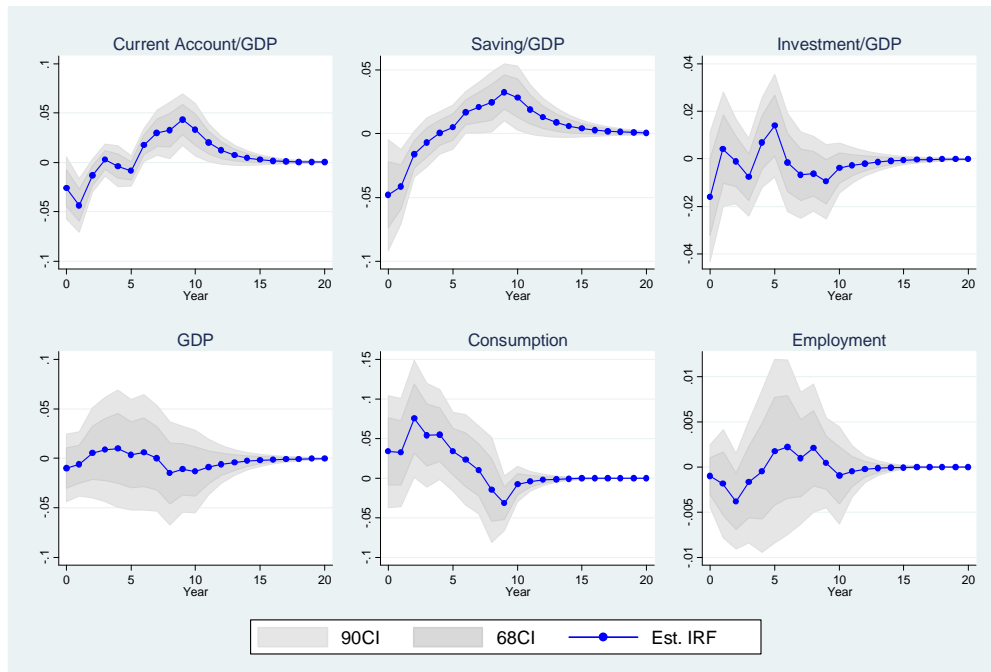


Figure D.IV: Selected Discoveries

*Note:* The figure presents the impulse responses of key macro variables to a giant oil discovery shock for selected giant oil discoveries. The line with circles indicates point estimates, and grey areas are 90 percent and 68 percent (darker color) confidence intervals. The vertical scale is in percentage points.

## 5. Control for exploration effects

(a) Control for (log) wildcats and its 11 lags



(b) Based on the same sample as in (a) but no control for exploration effects

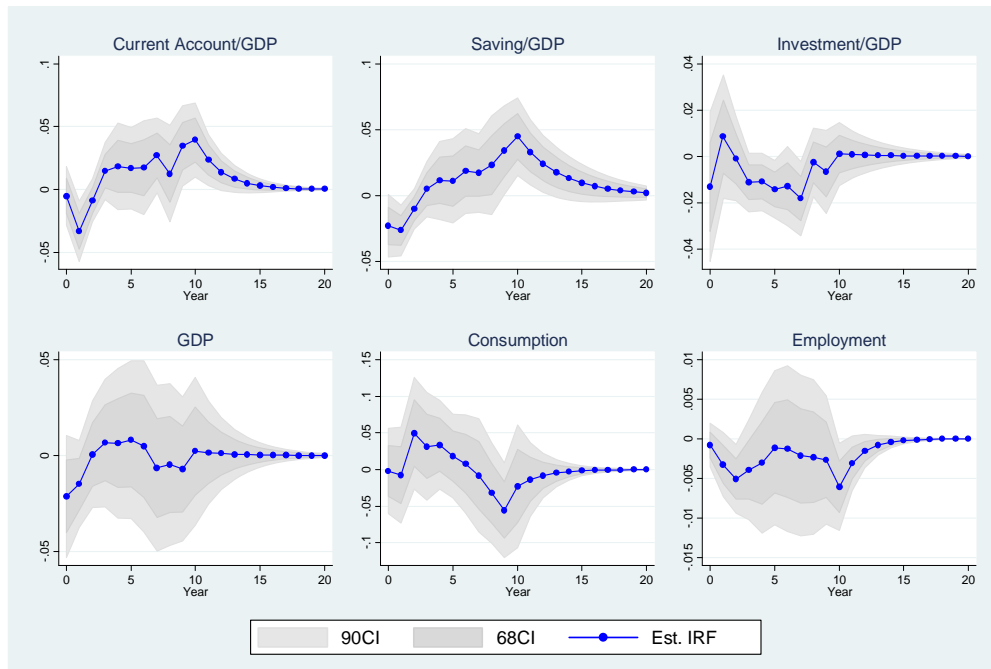
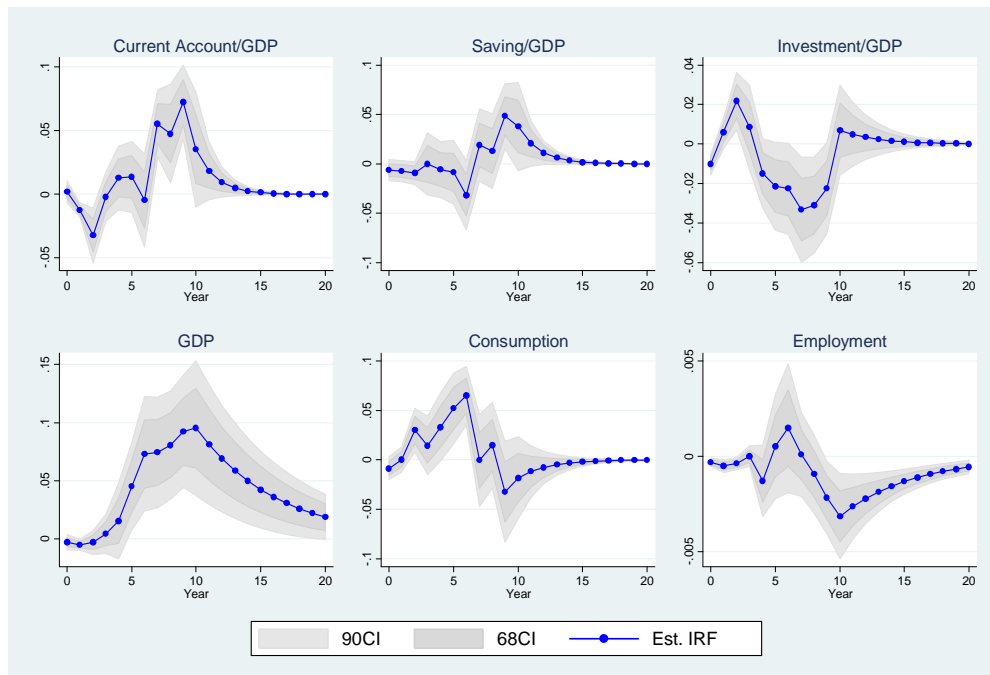


Figure D.V: Control for exploration effects

*Note:* The figure (a) presents the impulse responses of key macro variables to a giant oil discovery shock with control for exploration effects. The figure (b) presents the impulse responses for the subsample where (log) wildcats and its 11 lag values are non-missing without controlling for exploration efforts. The comparison between (a) and (b) shows that the anticipation effect of oil discoveries on the current account and saving is not sensitive to the control of exploration efforts. Moreover, the responses of output, investment and employment are insignificant when we include exploration efforts. It is mainly due to the fact that the measure of exploration expenditures limits our sample to about one-fifth of the original sample. The line with circles indicates point estimates, and grey areas are 90 percent and 68 percent (darker color) confidence intervals. The vertical scale is in percentage points.

## 6. Sub-Saharan Africa countries and removal of top ten oil exporters

(a) Sub-Saharan Africa countries only



(b) Remove top ten oil/gas exporters

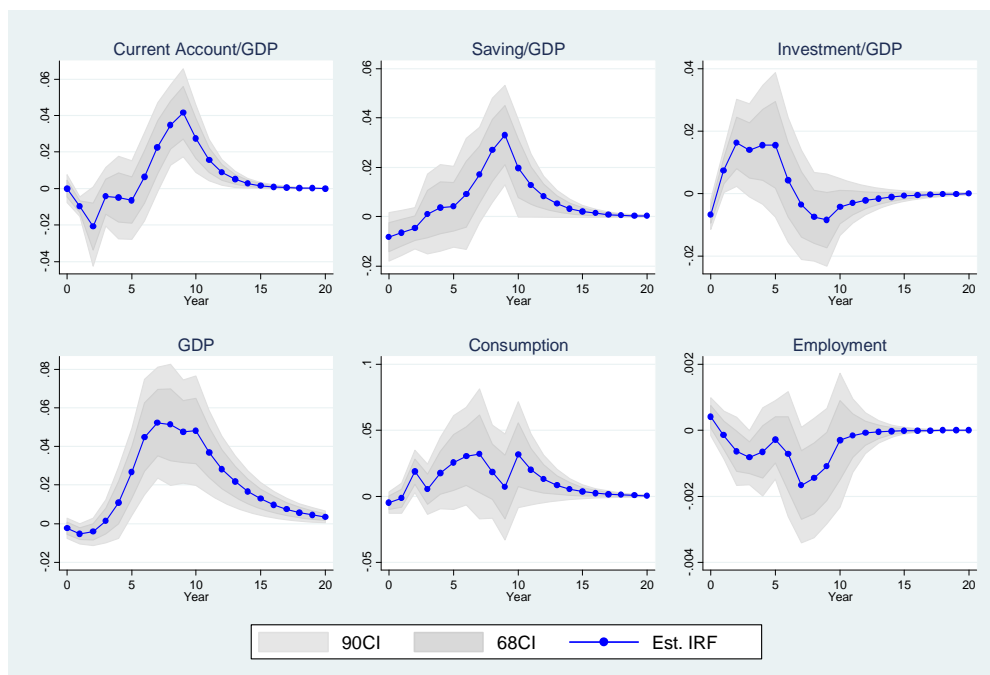
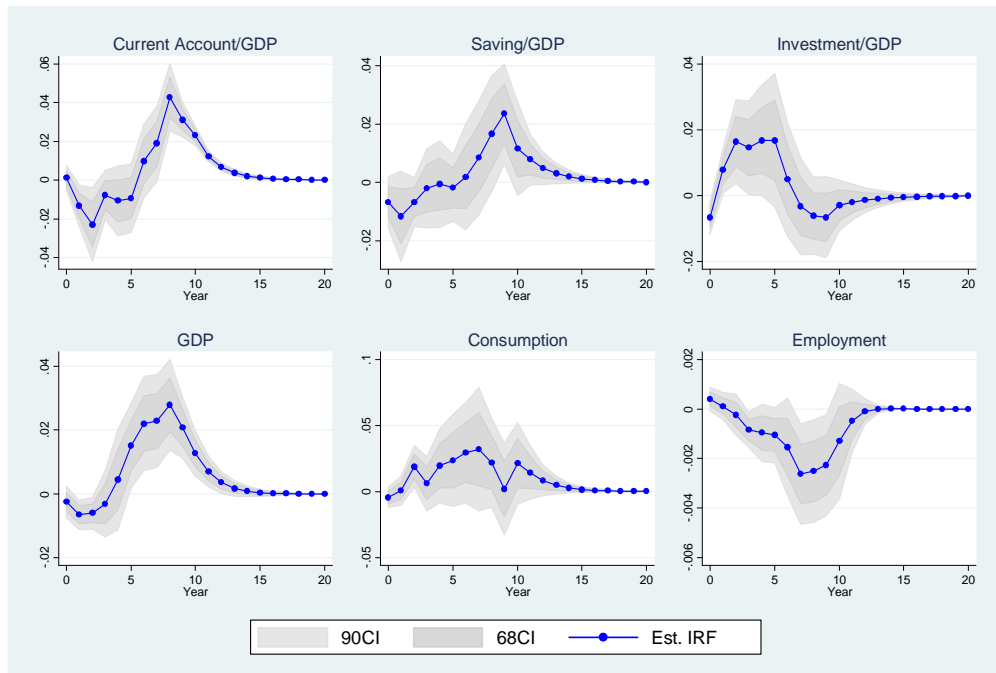


Figure D.VI: Sub-Saharan Africa countries and removal of top ten oil exporters

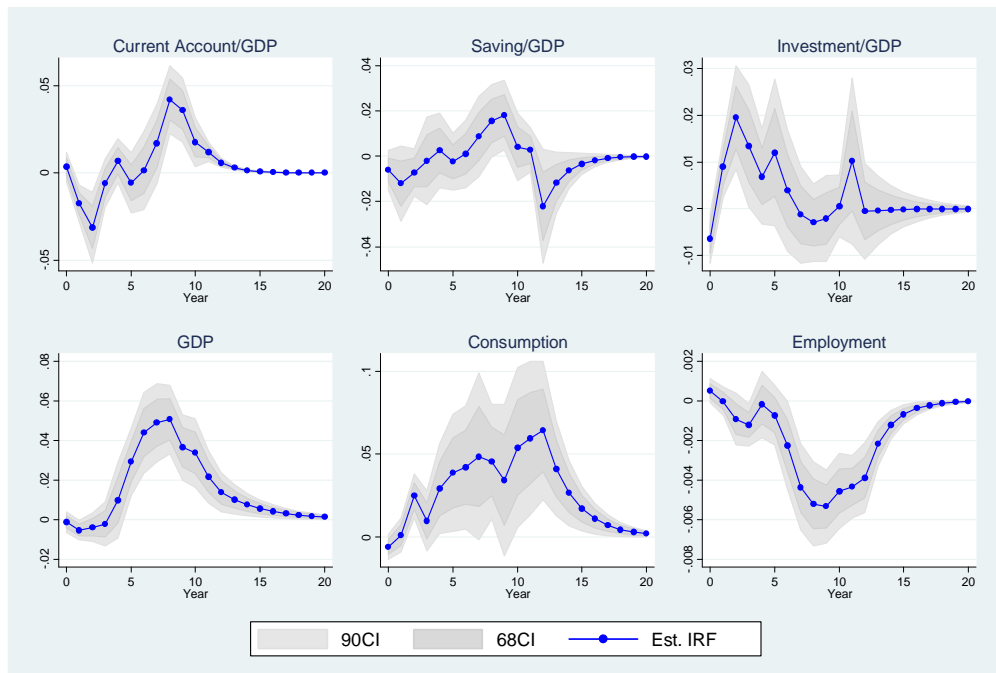
*Note:* The figure presents the impulse responses of key macro variables to a giant oil discovery shocks for selected countries. The line with circles indicates point estimates, and grey areas are 90 percent and 68 percent (darker color) confidence intervals. The vertical scale is in percentage points.

## 7. Alternative econometric specifications

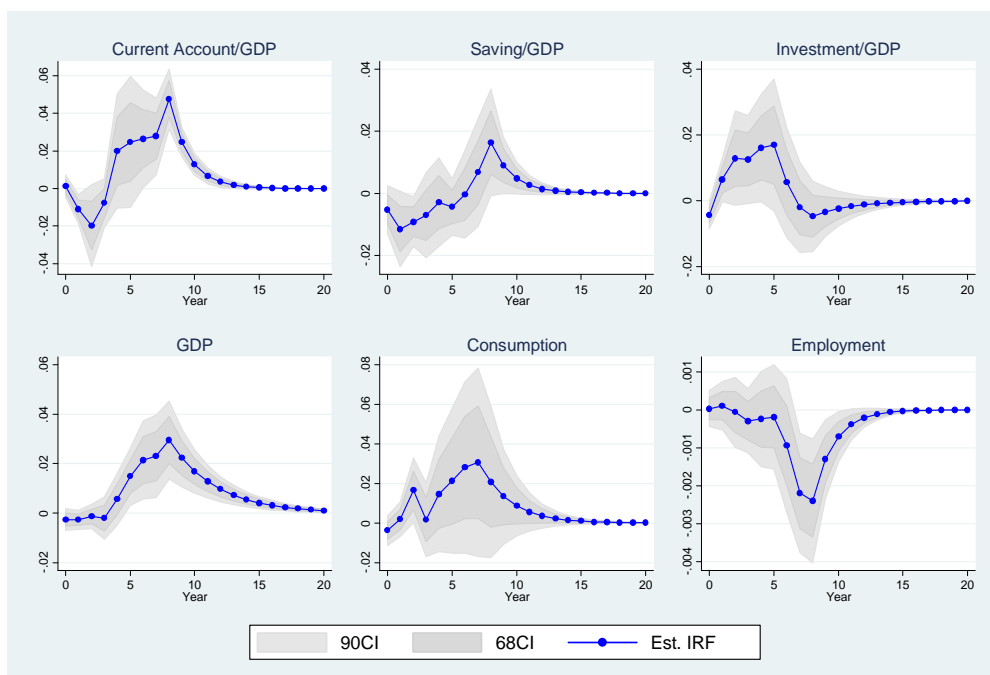
(a)  $p=2, q=10$



(b)  $p=1, q=12$



(c)  $p=1, q=8$



(d) No control for country-specific quadratic trend for GDP, Consumption and Employment

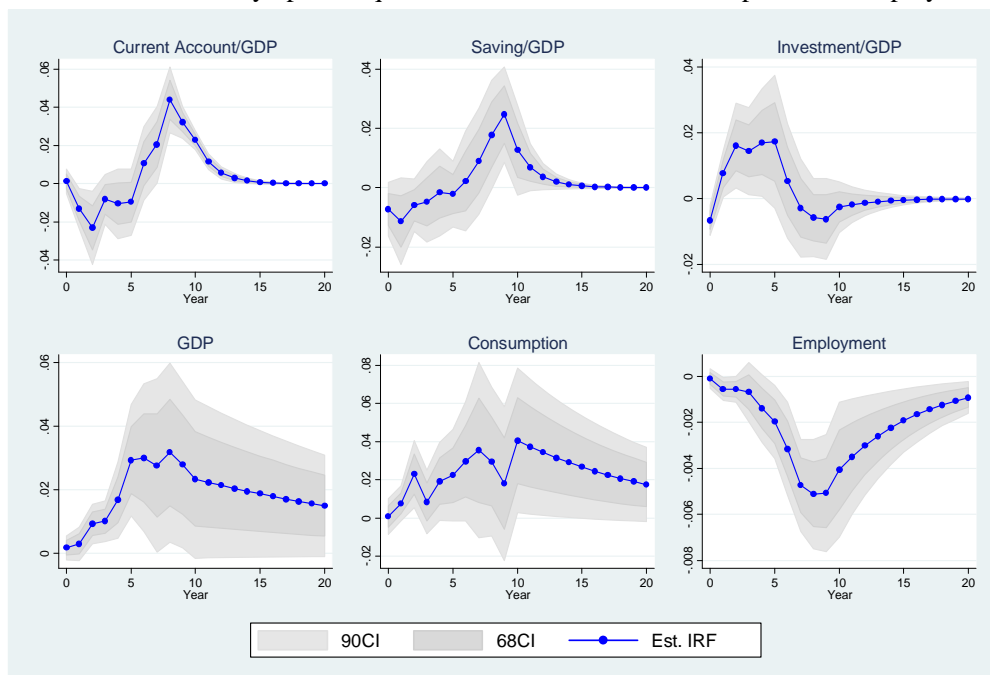


Figure D.VII: Alternative Econometric Specifications

*Note:* The figures present the impulse responses of key macro variables to a giant oil discovery shock for alternative specifications. The line with circles indicates point estimates, and grey areas are 90 percent and 68 percent (darker color) confidence intervals.

## 8. Estimation results using the Chang and Sakata (2007)/ Jordà (2005) method

As an additional robustness test, we estimated alternative impulse responses using the Chang and Sakata (2007) “long autoregression” method. This method, which is equivalent to the Jordà (2005) local projections method, directly estimates the impulse response of a variable  $z$  at horizon  $h$  by regressing  $z_t$  on the shock at time  $t-h$ , and any controls dated  $t-h-1$  or earlier. Because the oil discovery variables are available from 1970 through 2012 but the macro variables are only available from 1980 through 2012, excluding the  $t-h-1$  lag of the dependent variable preserves more of the sample. For the variables that are more likely to be stationary, such as the current account ratio to GDP, the saving rate, the investment-GDP ratio and the employment rate, we include only time and country fixed effects as controls, and hence lose 0 to 10 years of the sample, depending on the horizon. However, because the log of real GDP and consumption are likely to be nonstationary variables, we must also include the  $t-h-1$  lag of the dependent variable (in addition to country-specific quadratic trends) in order to have a time series reasonable specification. Unfortunately, this means that we lose 10 to 20 years of data, depending on the horizon. The estimated impulse responses are more erratic and often less precise, but for the most part give the same patterns as the baseline dynamic model for the relevant horizons.

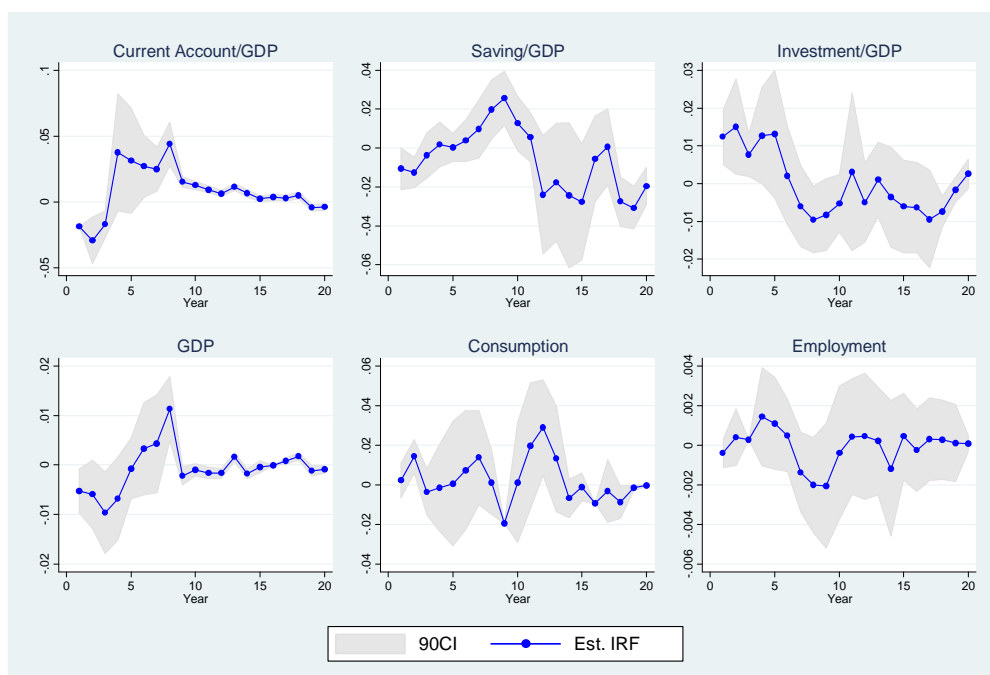


Figure D.VIII: Estimation results using Chang-Sakata (2007)'s method

Note: The vertical scale is in percentage points. Grey areas are 90 percent confidence intervals.

## 9. The Behavior of the Real Exchange Rate

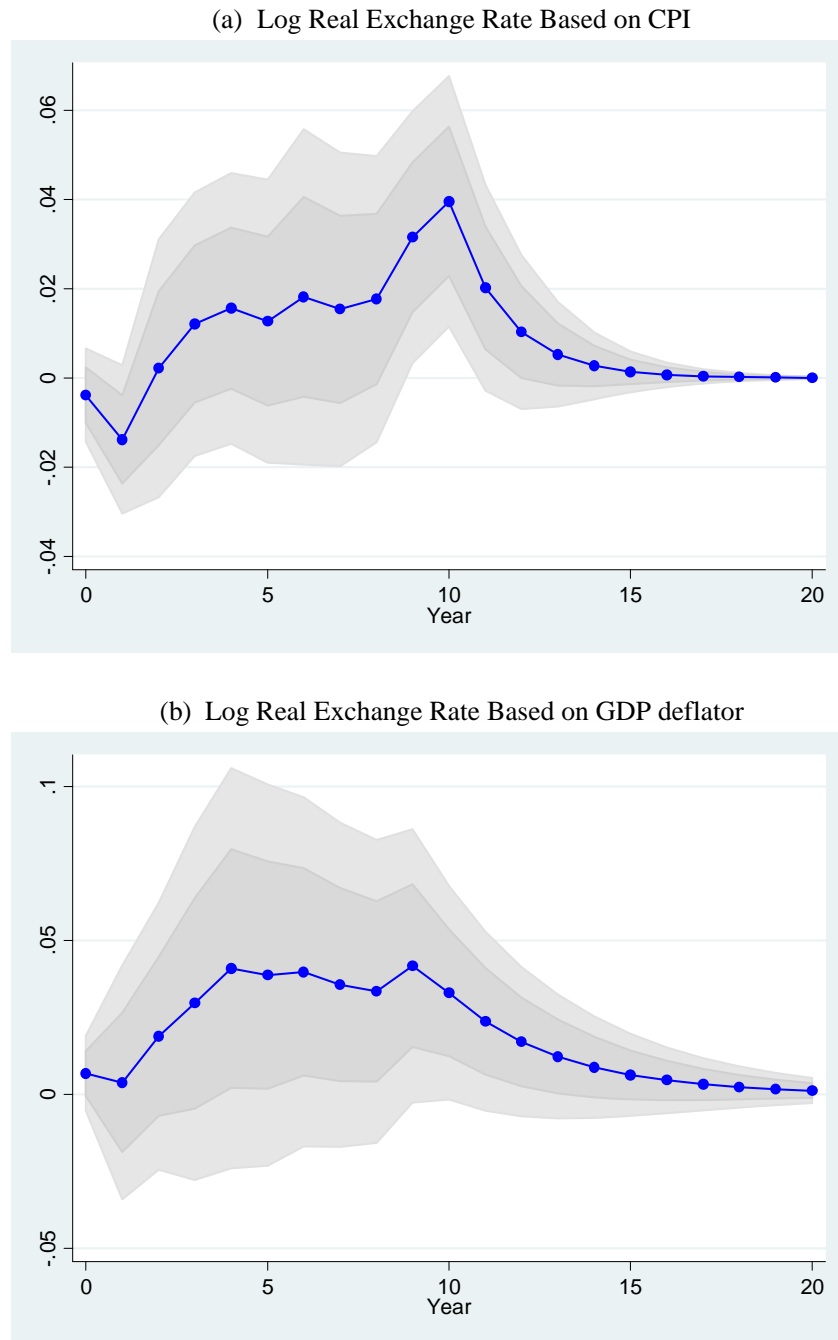


Figure D.IX: Response of the Real Exchange Rate to an Oil Discovery Shock

*Note:* The figure presents the impulse responses of the real exchange rates to a giant oil discovery shock, with controls of country-specific quadratic trends. The line with circles indicates point estimates, and grey areas are 90 percent and 68 percent (darker color) confidence intervals. The vertical scale is in percentage points.



## 10. Stock market capitalization

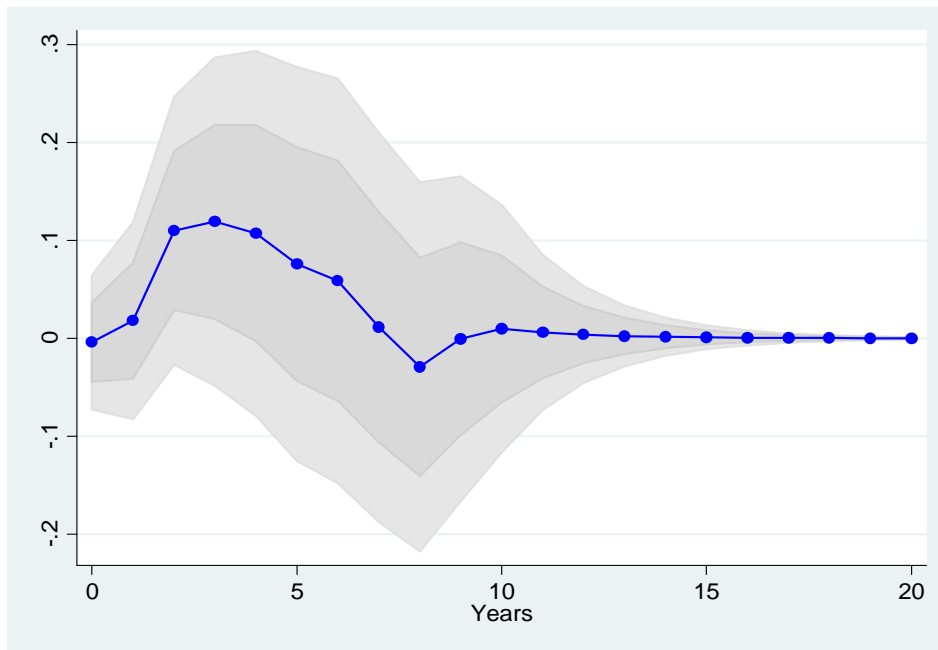


Figure D.X: Response of the Stock Market Capitalization in percent of GDP to an Oil Discovery Shock

*Note:* The figure presents the impulse response of stock market capitalization in percent of GDP to a giant oil discovery shock, with controls of country-specific quadratic trends. The line with circles indicates point estimates, and grey areas are 90 percent and 68 percent (darker color) confidence intervals. The vertical scale is in percentage points.

## 11. Baseline coefficient estimates

Table D.I. : Estimation Results

Dependent variables	CA/GDP	Saving/GDP	Investment/GDP	GDP	Consumption	Employment
	(1)	(2)	(3)	(4)	(5)	(6)
Lagged dependent variable	0.503*** (6.842)	0.544*** (5.762)	0.717*** (23.677)	0.754*** (25.066)	0.646*** (23.496)	0.553*** (11.410)
Disc	0.001 (0.339)	-0.007 (-1.378)	-0.007** (-2.421)	-0.002 (-0.649)	-0.005 (-0.977)	0.000 (1.173)
Disc1	-0.014** (-2.441)	-0.007 (-0.963)	0.012*** (3.547)	-0.004* (-1.862)	0.004 (0.624)	-0.000 (-0.649)
Disc2	-0.017 (-1.288)	0.000 (0.031)	0.011 (1.467)	-0.000 (-0.127)	0.018* (1.990)	-0.001 (-1.238)
Disc3	0.003 (0.558)	-0.002 (-0.221)	0.003 (0.691)	0.002 (0.364)	-0.007 (-0.671)	-0.001 (-1.678)
Disc4	-0.006 (-0.724)	0.001 (0.177)	0.007 (0.946)	0.006 (0.985)	0.015 (1.341)	-0.001 (-0.798)
Disc5	-0.004 (-0.644)	-0.001 (-0.392)	0.005 (0.812)	0.013* (1.940)	0.010 (0.781)	-0.001 (-1.109)
Disc6	0.015* (1.837)	0.003 (0.443)	-0.007* (-1.920)	0.011** (2.237)	0.015 (1.327)	-0.001 (-1.618)
Disc7	0.015* (1.927)	0.008 (0.897)	-0.007* (-1.838)	0.008* (1.940)	0.013 (0.533)	-0.002*** (-3.843)
Disc8	0.034*** (4.396)	0.013 (1.537)	-0.004 (-1.019)	0.013** (2.452)	0.001 (0.045)	-0.001** (-2.400)
Disc9	0.010*** (4.549)	0.015* (1.933)	-0.002 (-0.625)	0.001 (0.889)	-0.012 (-0.714)	-0.001** (-2.167)
Disc10	0.007*** (3.493)	-0.001 (-0.133)	0.002 (0.685)	-0.000 (-0.143)	0.020* (1.878)	-0.000 (-0.403)
N	4,994	4,322	4,342	5,059	4,228	2,901
Number of groups	178	168	169	180	162	155
Within R-squared	0.325	0.321	0.549	0.985	0.967	0.850

Note: Constant, year and country fixed effects are included. Country-specific quadratic trends are also included for log level variables and employment rate. Robust standard errors for panel regressions with cross-sectional dependence are in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .