The effects of international sanctions on military spending of Iran: A synthetic control analysis

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This Talk

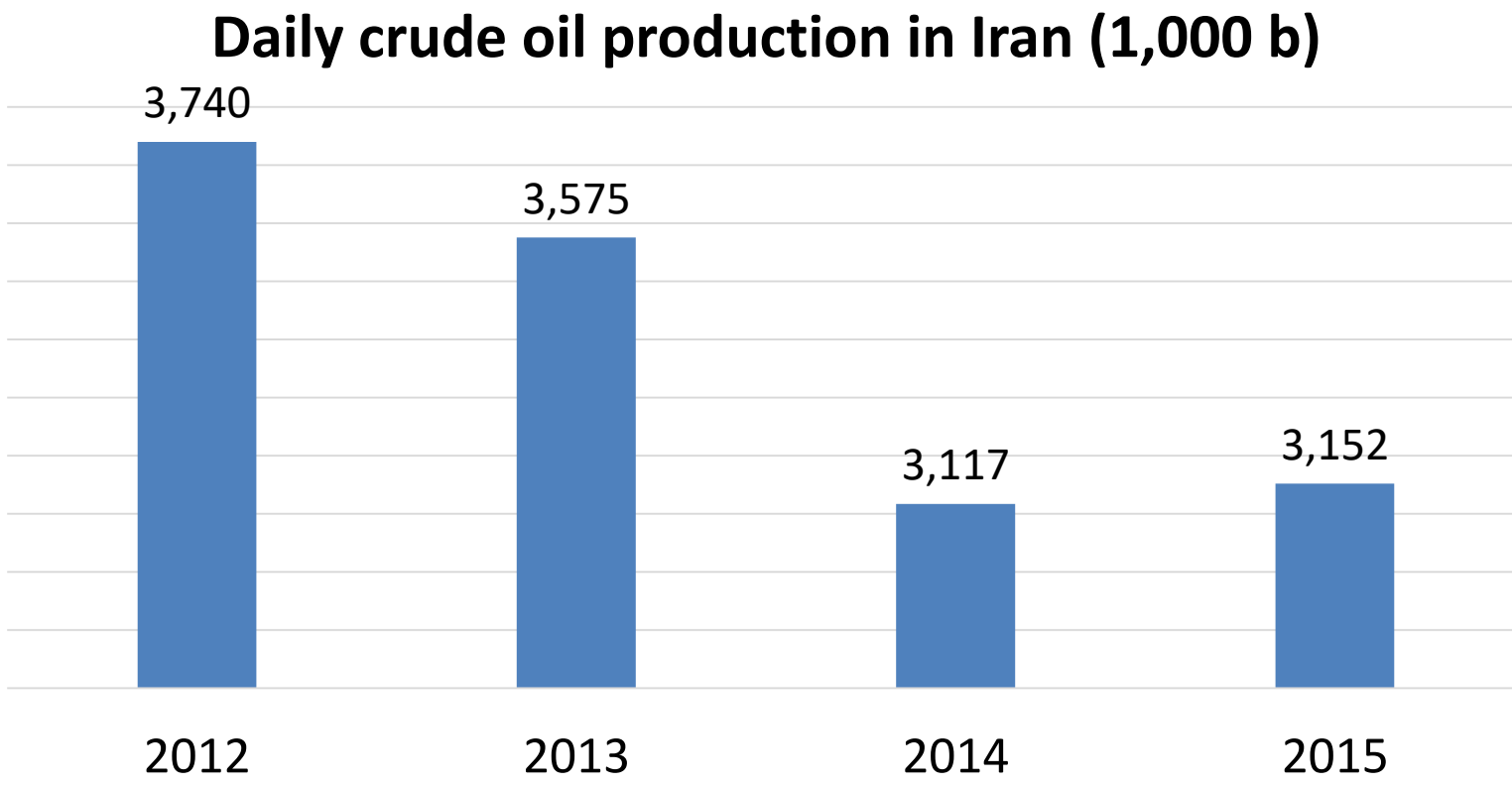
- A background on 2012-2015 International Sanctions
- Sanctions & Military Spending in Iran: a brief review
- Data and Method
- Results
- Conclusion

A background on 2012-2015 International Sanctions

- **Ahmadinejad government (2005-2013)**
- the **United Nations Security Council (UNSC) Resolution 1929**
- it states that "*chemical process equipment and materials required for the Iranian petrochemical industry have much in common with those required for certain sensitive nuclear fuel cycle activities*".
- It provided the legal basis for the first oil embargo against Iran in 2012.
- The EU reacted to the UNSC resolution 1929 and asked its member states to **prohibit the sale and supply of equipment and technologies with relevance for the Iranian petrochemical industry**

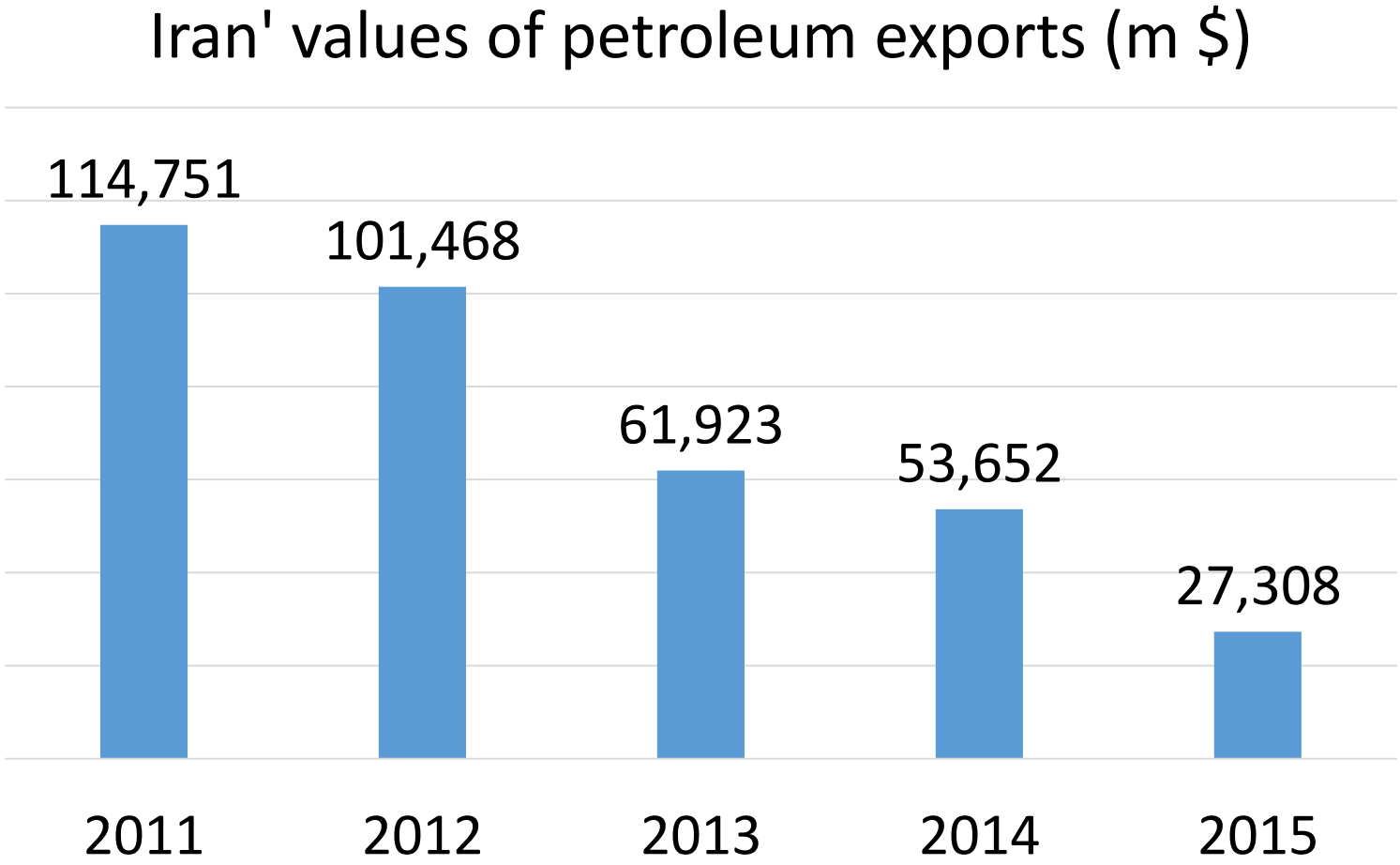
A background on 2012-2015 International Sanctions

- In July 2012, the EU joined the US in imposing sanction on imports, purchase and transport of Iranian crude oil.
- In addition to oil embargo, a series of banking and financial sanctions reduced the financial capacity of the Iranian state significantly.



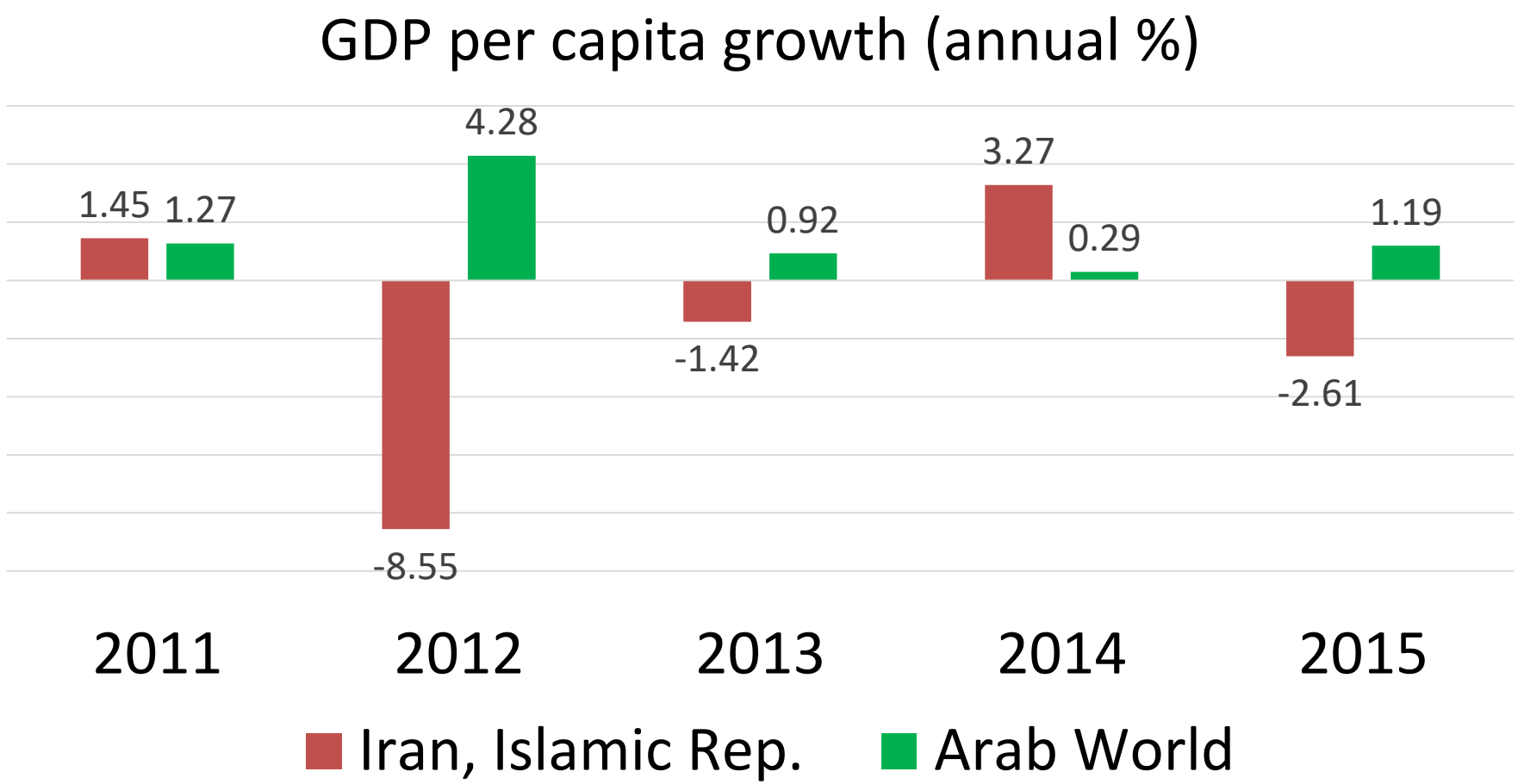
A background on 2012-2015 International Sanctions

- values of petroleum exports of Iran declined from approximately **115 billion US$** in 2011 to **27 billion US$** in 2015.



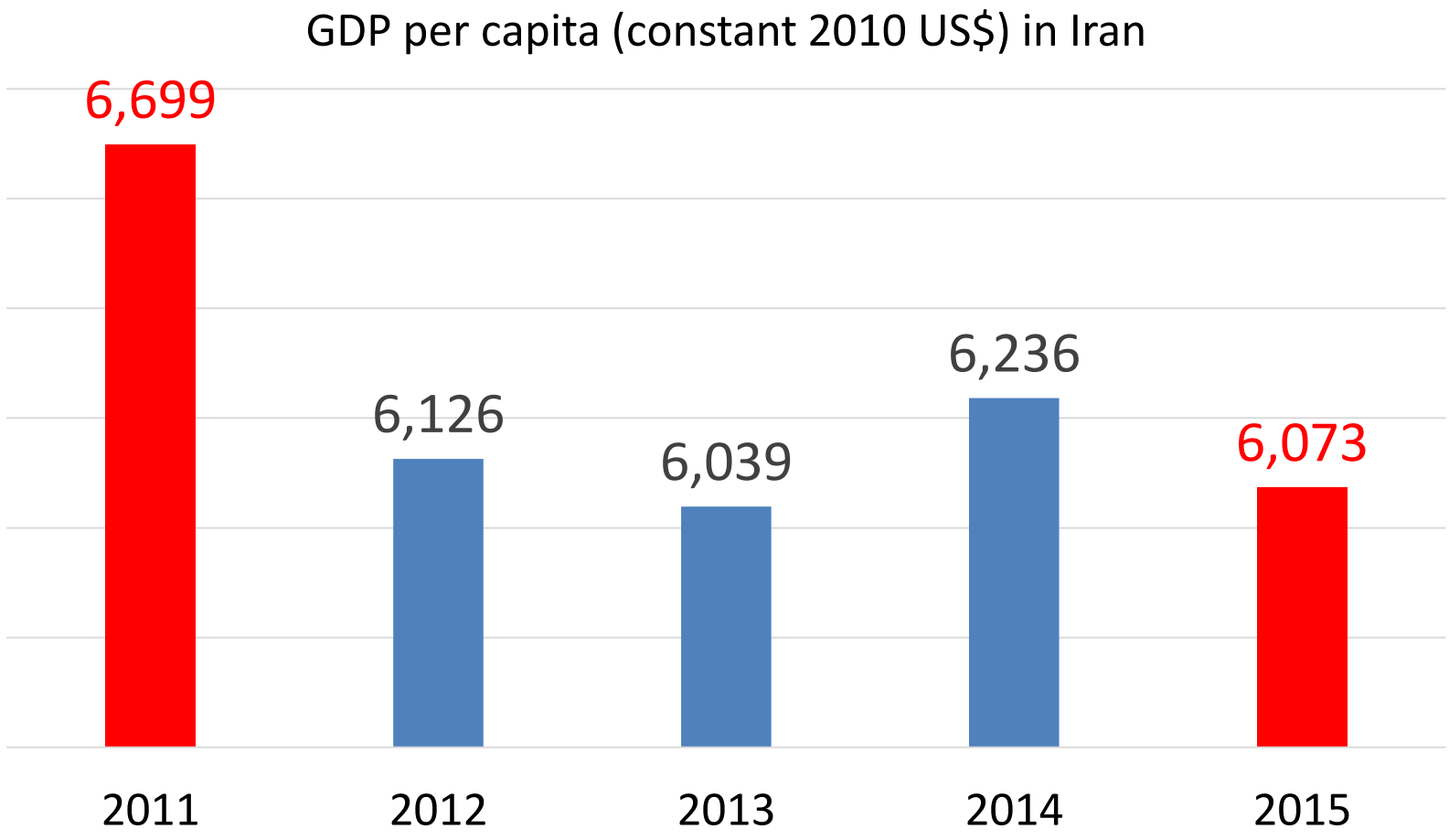
A background on 2012-2015 International Sanctions

The GDP per capita annual growth rates recorded one of the worst performance after the Iran-Iraq war in 2012 with **-8.6%**, dropping further in 2013 by **-1.4%** (World Bank, 2019).



A background on 2012-2015 International Sanctions

the fall of per capita GDP (in 2010 US$) from **6700** US$ in 2011 to **6000** US$ in 2015.



A background on 2012-2015 International Sanctions

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Sanctions and the shadow economy: empirical evidence from Iranian provinces

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ABSTRACT

Using Iranian province level data from 2001 to 2013, this study finds that the international sanctions of 2012/2013 had a significantly stronger negative impact on the growth rate of the shadow economy than they did on the official GDP growth rate. Thus, the international sanctions on Iran have damaged the informal economy even more than the formal economy.

KEYWORDS

Shadow economy; sanctions; Iran

JEL CLASSIFICATION

E26; O11; O19; O47; O53

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Sanctions & Military Spending in Iran: a brief review

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ELSEVIER

Oil revenue shocks and government spending behavior in Iran

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Question:

to what extent a shock in the Iranian oil export revenues affects different categories of Iranian government spending, and whether such shocks affect the military ambitions of the Iranian government or whether it only affects the government's social, health, and education efforts.

Data/Method:

an unrestricted VAR model and estimated the impulse response functions (IRF) and variance decomposition analysis, using annual data from 1959 to 2007.

Results:

- The main results show that the government's military and security spending responds positively and statistically significantly to shocks in oil revenues (or oil prices).
- Other social spending of the Iranian government does not show a significant response to oil shocks.

Using an asymmetric definition of oil and gas rents per capita, a one standard deviation absolute increase in **"negative changes" of energy rents** causes a **significant and negative response on the side of military and domestic security spending**, also indicating a high sensitivity of Iran's military efforts to unexpected negative shocks.

Sanctions & Military Spending in Iran: a brief review

Defence and Peace Economics

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ISSN: 1024-2694 (Print) 1476-8267 (Online) Journal homepage: https://www.tandfonline.com/loi/gdpe20

Military Spending and Economic Growth: The Case of Iran

Mohammad Reza Farzanegan

Question:
This study examines the dynamic interactions between the economic growth and the military spending of the Iranian Government.

Farzanegan (2011): negative oil shocks➔ response of military spending is negative

Farzanegan (214): negative shock in military spending➔ response of economic growth?

Results:

- main results show that the response of economic growth to positive shocks in the growth rate of military expenditures is positive and statistically significant.
- This finding has an important policy message for debates on energy sanctions on Iran.

Data/Method:

- the Granger causality, IRFs, and variance decomposition tools to trace the
- effects of shocks.
- The study period is 1959–2007.

Sanctions & Military Spending in Iran: a brief review

https://doi.org/10.1007/s10797-015-9378-8

Question:

- This study examines how the quality of political institutions affects the distribution of the government budget in Iran.

Hypotheses:

H1 Shocks to positive changes in the quality of political institutions lead to a *negative* and statistically significant response of military vs. non-military spending in Iran.

H2 Shocks to negative changes in the quality of political institutions lead to *positive* and statistically significant response of military vs. non-military spending in Iran.

Data/Method:

- present a theoretical mechanism through which democracy can shift government expenditure from national defense (military) to productivity-enhancing public spending (e.g., education).
- Impulse response functions and a variance decomposition analysis on the basis of a vector autoregressive (VAR) model.
- 1960 to 2006

Sanctions & Military Spending in Iran: a brief review

International Tax and Public Finance
June 2016, Volume 23, Issue 3, pp 522–549 | Cite as

Political institutions and government spending behavior: theory and evidence from Iran

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Results

we show that the **response of military** spending to **positive changes** in the quality of **democratic** institutions in Iran is **negative** and statistically significant.

education spending responds positively to a **positive shock toward democratization**.

- These results show that **positive development in democratic institutions leads to lower military spending** and a higher provision of social services that directly target a larger portion of the population.

- We view the latter as expenditure biased toward productivity enhancement in the more skill-intensive industry sector.

Sanctions & Military Spending in Iran: a brief review

Theory

- **Sanctions have two effects** of security and income on the target countries.
- **If security effect > income effect** then the target country invests in its military capabilities to resist the possible attacks by sender(s) of sanctions.
- **if the income effects > the security threat** then we expect a deterioration of financial capacity of the target country, reducing the allocation of budget to military projects.

- **Question:**
- to investigate the **impact of the intensity of sanctions on military spending** by controlling other economic, strategic and political determinants of military expenditures in Iran.
- Moreover, we examine the different impacts of **unilateral and multilateral sanctions** on Iran's military expenditure both in **short and long time** horizons

Sanctions & Military Spending in Iran: a brief review

- **Data and method**
- **ARDL approach** to the evolution of military spending in Iran over the period of **1960–2017** using strategic and socio-economic determinants while focusing on the effect of sanctions.

- **intensity of sanctions** is coded as an ordinal variable (0–3), which includes the categories of no sanctions (0), limited sanctions (1), moderate sanctions (2), and extensive sanctions (3).

unilateral U.S. sanctions takes the value of 1 if sanctions are unilaterally imposed, such as in the periods of **1979–2005** and **2016–2017**, and zero otherwise.

multilateral sanctions takes the value of 1 if sanctions are multilaterally imposed, such as in the period of **2006–2015**, and zero otherwise.

Sanctions & Military Spending in Iran: a brief review

- **Results:**
- multilateral sanctions have statistically significant effects on military expenditure.

- The impact of unilateral sanctions on military expenditure is also negative. However, the impact is not statistically different from zero.

- Multilateral sanctions reduce Iran's military spending about 77% in the long run, ceteris paribus.

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An often-asked question

What would Iran's military spending have looked like at the absence of international economic sanctions?

All mentioned analyses miss an optimally estimated counterfactual Iran to the actual Iran that experienced the sanction.

The counterfactual Iran which is also called the "synthetic Iran" is important because it serves to show what would have happened to the military spending of Iran had the international sanctions of 2012-2015 never occurred

Data and Methodology

- We use **SCM** to construct a synthetic control unit for Iran representing **expected military spending** figures **under a scenario** in which there had been **no sanctions after 2012**. We refer to this control unit as ‘‘**Synthetic Iran**’’.

- An **outcome** variable (in our case **military expenditure (current US$) per capita**) should be **comparable** between the **treated country** (Iran) and **its synthetic** before the event (sanctions) conditional on successful generation of such a synthetic Iran.

- In the latter case, **we can suggest a causal effect** of 2012 revolution on the outcome **when the trends of outcome show a significant diversion** between Iran and synthetic Iran **after the shock**.

- We will then able to **quantify this diversion**.

Data and Methodology

- We use annual country-level panel data for the **period 2003–2015.**
- Our donor pool, after dropping missing observations, includes a sample of ***13*** member countries of Organization of the Petroleum Exporting Countries (OPEC) and Middle East & North Africa (MENA)
- **For the pre-2012 sanction characteristics, we use a standard set of control variables**:
- total population, imports of goods and services (constant US$), GDP per capita (constant US$) and real GDP per capita growth rate.

The impact of the sanctions on military spending per capita is equal to the difference, over the period 2013-2015, between the **factual Iranian military spending per capita and the estimated counterfactual military** spending per capita had the international sanctions not happened.

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Results

- **Synthetic Iran** is best generated by a **weighted average of 4 countries** with Angola (53%), Nigeria (30.2%), Algeria (12.3%), and Saudi Arabia (4.5%) having the highest weights
- We can observe that Synthetic Iran reflects the pre-2012 performance of the military spending per capita covariates for Iran closely

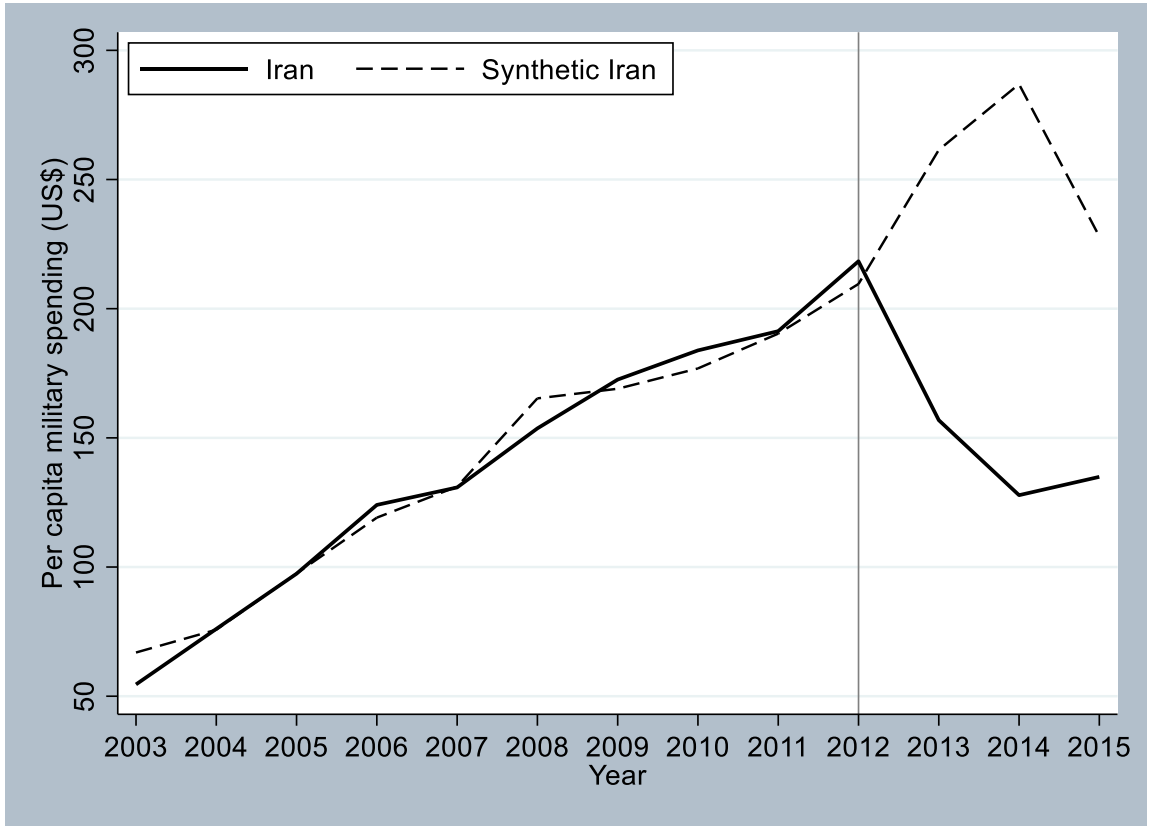
The means of predictors during the pre-treatment period

Predictors	Iran	Synthetic Iran
military spending per capita (2010)	183.85	176.87
military spending per capita (2008)	153.66	165.29
military spending per capita (2006)	124.04	119.12
military spending per capita (2004)	76.05	75.75
logarithm of population	18.08	17.51
logarithm of imports (constant US$)	25.18	24.54
logarithm of GDP per capita (constant US$)	8.72	8.04
GDP per capita growth rate (%)	3.16	4.05

Results

- Figure shows the per capita military spending trajectory of Iran and its synthetic counterpart for the 2003–2015 period

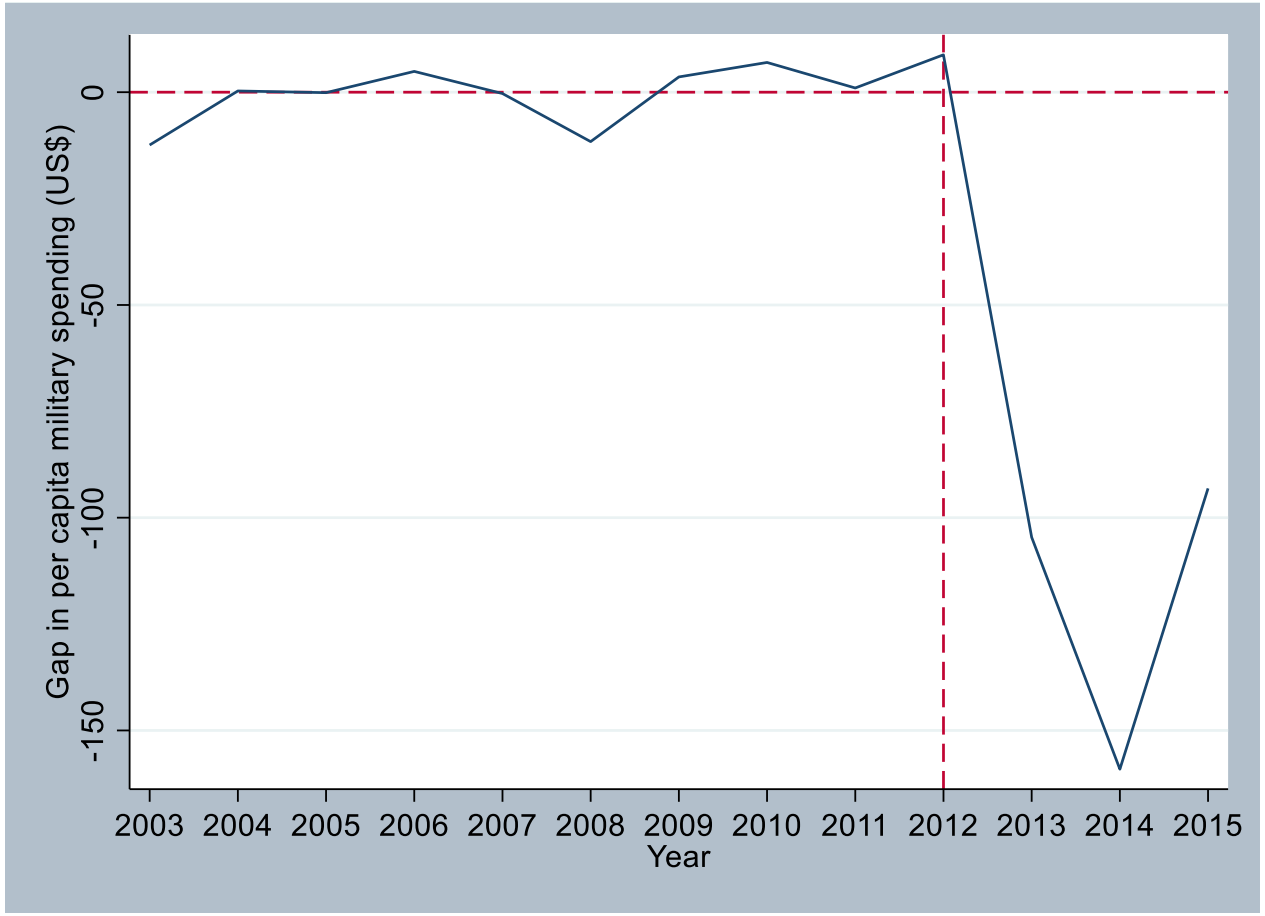
Factual and counterfactual Iran



Results

- Our estimate of the effect of the international sanctions on per capita military spending of Iran is given by the difference between the actual Iran and its synthetic version

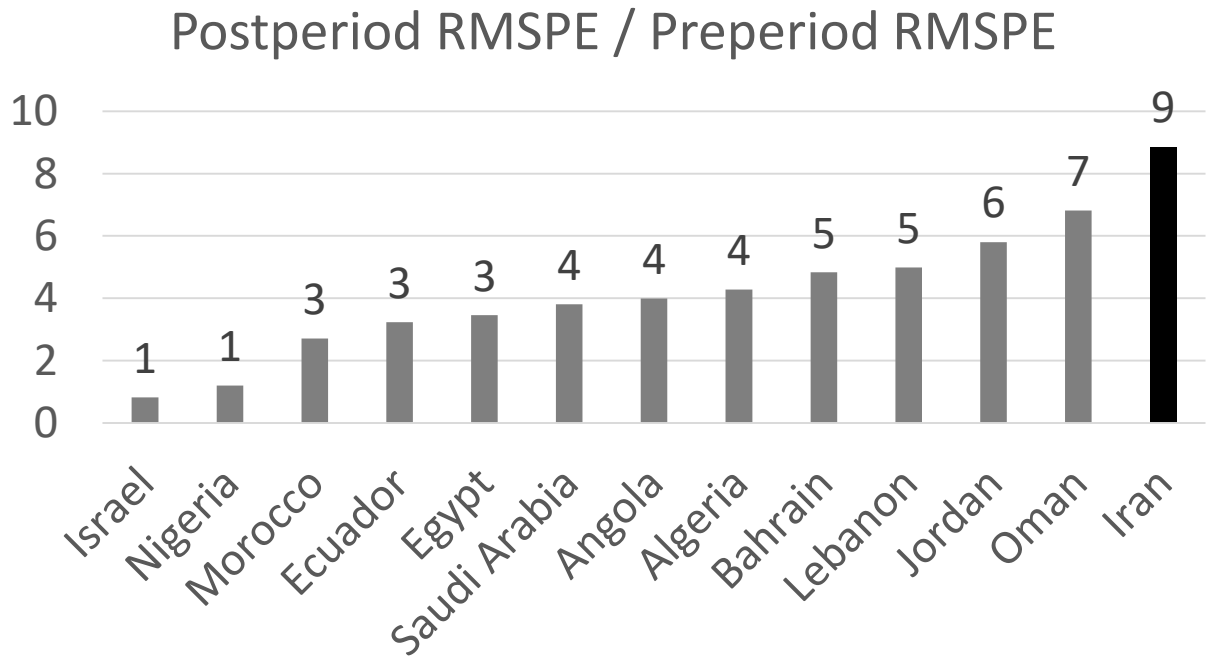
Per capita military spending gap between Iran and synthetic Iran



Results

- If one were to randomly select a country from the sample, the probability of obtaining a ratio as high as Iran would be 1/13 (0.07).

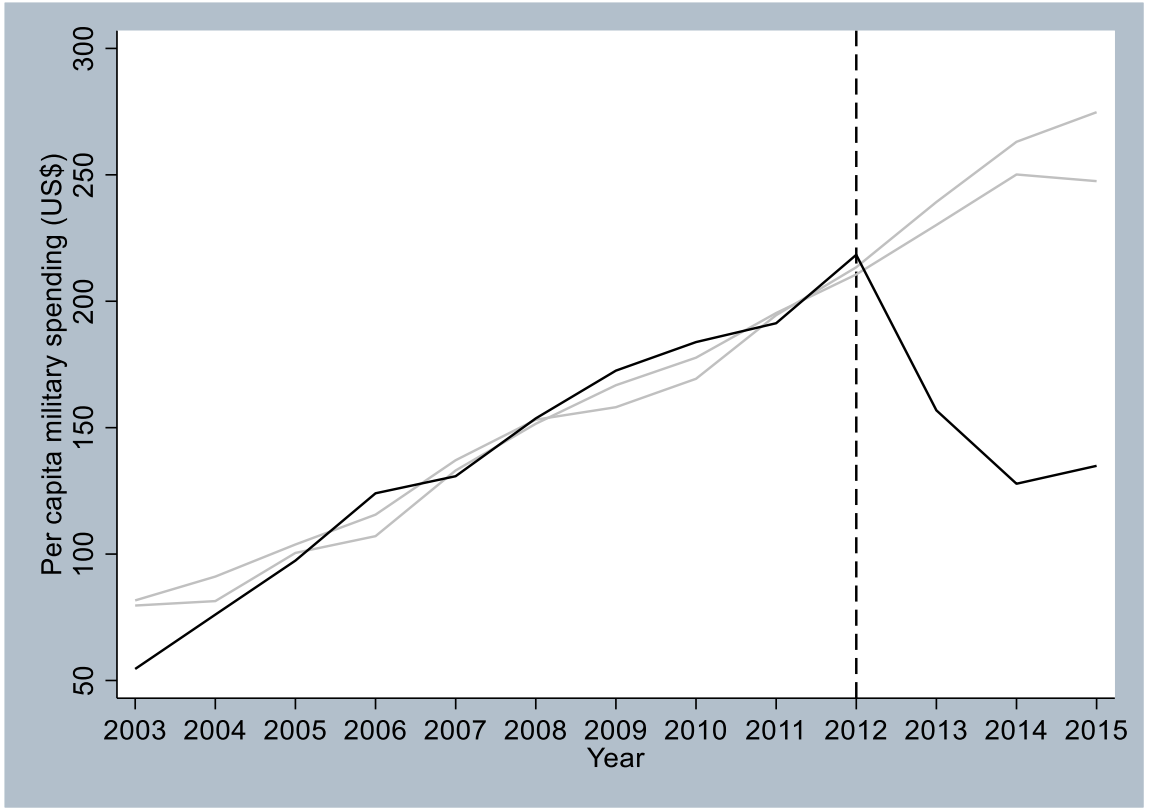
Ratio of post-2012 sanctions RMSPE to pre-2012 sanctions RMSPE: Iran and control countries



Results

- This figure shows that the results of the earlier estimations are robust to the exclusion of any important country from our sample of donor countries.

Leave-one-out distribution of the synthetic control for Iran



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Conclusion

- We employed the **synthetic control method** to study the effects of the international sanctions from 2012-2015 on military spending of Iran.

- Over the **entire 2013–2015** period, **per capita military spending** was reduced by about **119 US$ per year** on average, which amounts to approximately **54%** of the 2012 baseline level.

- In 2015, per capita military spending in the synthetic Iran is estimated to be about 69% higher than in the actual Iran.

Thank you for your attention!