JURNAL
EKONOMI KUANTITATIF TERAPAN

Analysis Of Pollution Haven Hypothesis In World Trade Organization Member Countries
Gita Ayu Kusuma, Ni Putu Wiwin Setyari, Ni Putu Wiwin Setyari

The Economic Sanctions Channel For The Curse Of The Petro-State Of Iran: Evidence From The Synthetic Control Method
Malik Cahyadin, Basem Ertimi Ertimi, Tamat Tamat Sarmidi

Early Marriage And Human Development Index In Indonesia
Bayu Kharisma

Post Covid-19 Pandemic Economic Growth With Human Capital As A Long Term Drive
Lambok DR Tampubolon

The Role Of Economic Digitalization On Economic Performance In Indonesian
Ratna Arvianti, Muhammad Sri Wahyudi Suliswanto

Actor Analysis In Sustainable Village-Based Enterprises: Examining The Role Of Stakeholders
M. Rudi Irwansyah, Bagus Shandy Narmaditya, Diota Prameswari Vijaya

Effect Of Payment Gateway, Financial Literacy, Financial Inclusion On The Performance Of Smes In Mataram City
Dhiya Auliana

Sustainability Study Of Small And Medium Industries Based On Local Wisdom In Denpasar City
I Gede Yudiantara, I Ketut Sudibia, Ni Nyoman Yuliarmi

Analysis Of Macroeconomic Conditions On The Performance Of Protected Mutual Funds In Indonesia In Moderated Age And Size Of Mutual Funds For The Period January 2018 – August 2023
Tinjung Desy Nursanti, Nugraha, Ika Putera Waspada, Maya Sari, Erric Wijaya, Tinjung Desy Nursanti

The Effect Of Intellectual Capital On Competitive Advantage And Company Performance As A Moderating Variable
Ahmad Badawi, Lucky Nugroho, Nurul Hidayah, Anees Jane Ali

The Role Of Job Satisfaction As A Mediating Influence Of Leadership And Organizational Climate On Employee Performance
Ida Bagus Bagus Udayana Putra, Melissa Percilla Sutrisman, I Made Suniastha Amertha

pISSN : 2301 – 8968

JEKT ♦ 17 [2] : 181-200 eISSN : 2303 – 0186

The Economic Sanctions Channel for The Curse of The Petro-State of Iran: Evidence from the Synthetic Control Method

ABSTRACT

This study estimates the impact of economic sanctions on oil exports and economic growth in the case study of Iran. By creating a synthetic control group method that reproduces the oil exports and economic growth before economic sanctions are imposed in the case of Iran, we compare the oil exports as well as the economic growth of the Synthetic and the actual for each period. Using the synthetic control method, we fill a major gap in the sanctioned literature in the petrostate economies case study. Our study finds that both oil exports and the economic growth of Iran would have been lower had it not been exposed to economic sanctions. This research is embedded in the comparative and international landscape linked to the relations of international influences with the domestic economy. The findings explain that economic sanctions are a leading factor in the variations in oil exports and economic growth, which can be reflected in the oil curse. We claim that our empirical investigation can contribute to policy formulation in the domestic and foreign arena by sanctioned countries. Overall, the findings confirm that the imposition of sanctions on a petrostate economy like (Iran) can be operated as another channel of the resource curse from international and foreign policy perspectives.

Keywords: Sanctions, Petrostates, Resource Curse, Synthetic Control Method

JEL Classification: E02, E61, F14

INTRODUCTION

Over the years, the economic impact of sanctions imposed has been central to numerous debates both in politics and international affairs. Governments and international organizations usually enforce sanctions on other governments. With the increase of international attention to petrostates and their foreign policy implications and interests in the global energy transition and the resource curse phenomenon, scant research has focused on the impacts of sanctions on some aspects of the economy. Still, the effect of economic sanctions operating in the context of the resource curse hypothesis should not be ignored due to the increasing number of countries being qualified as Petro-state. We believe that the resource curse mechanism in Petro-state economies is influenced in part by imposing sanctions for subsequent reasons. At the outset, economic sanctions will lead to a substantial decline in exports and imports (Gary Clyde Hufbauer, Schott, & Elliott, 2008); also, the fall in foreign investment would negatively impact the economic development of the target countries (Neuenkirch & Neumeier, 2015). Consequently, the adverse influence of sanctions on GDP growth and other macroeconomic leading indicators is strongly supported. Hence, governments will be more exposed to the resource curse. Consequently, the imposition of sanctions will be one of the manifestations of the resource curse phenomenon.

This study explores the impact of economic sanctions on oil exports and the GDP growth rate. The resource-dependent economic base of the petrostates facilitates the distribution of social benefits in boom times. However, high dependence on oil exports produces a volatile economy that can collapse due to sanctions. We, therefore, argue that economic sanctions could contribute to economic deprivation and resource revenue reductions leading to triggering further curse, and also argue that economic sanctions can be viewed as an additional channel of the oil curse. We try to estimate the impact of economic sanctions on the oil exports of Iran, using the synthetic control method.

To investigate this, first, we review the literature on the petrostate economy and its structures and the effectiveness of economic sanctions. Secondly, we present Iran as a case study, its economic characters, and the proclivity of Iran and the Petro-states, in general, to fall into the trap of the oil curse. This paper aims to show that oil export cuts in the case of Iran, which is unorthodox for a petrostate economy; economic sanctions tend to make matters even worse. Thus, it can be considered as another transmission channel of the oil curse.

Countries with oil or other natural resource abundance frequently fail to grow at the same rate as countries without natural resources. A phenomenon is termed the Natural Resource Curse (Frankel, 2012). In countries abundant with mineral

resources, especially fuel resources (oil), this type of natural resource may have played a negative role in the pace of GDP growth over the past four decades. The natural resources curse would be an exclusive phenomenon of petroleum resources, that is, oil and natural gas.

A constant influx of oil rents helps the petrostate economy enjoy considerable sovereignty from its people and separate itself from social and political pressures. Petrostates are focused on intensive government and the oil sector, mainly disassociating the state. With state income flowing and structural vulnerabilities, petrostate economies are more prone to growing authoritarianism. Petrostates, already disconnected from social forces, have very few reliable institutions for peaceful conflict resolution during economic shocks. Petrostates are also more inclined to promote military rule and adopt authoritarian conflict solutions (Henry, 2004).

The recognition of extraordinary rents generated by the use and the economic value of oil resources raises questions about how governments exploit them. Oil rents exhibit characteristics that are claimed as an essential part of explaining the causal mechanisms of oil on economic performance. It is in this sense that Ross (2013) characterizes oil revenues by their scale, a form of appropriation, instability, and lack of transparency. Thus, the governments of exporting countries have appropriated petroleum revenues that are usually large, not collected by taxes, unpredictably volatile, and easy to be hidden from the control of civil society.

According to Ross (2013), these characteristics would be the root of the oil curse. Given the specificity of oil resources, in this context of an intense concentration of exports in a limited number of producing countries, a particular group of countries is formed that differs from other oil producers. This group of so-called Petrostate producers about the work of (Colgan, 2014; Karl, 1997), who analysed, theoretically and historically, part of these countries. Some of the petrostate's best-known characteristics are that they suffer from the resource curse. The resource curse is not some characteristic, but instead a series of adverse economic and political phenomena, each being more susceptible to be found in a petrostate than in other nations (Karl, 1999). Besides, Petro-states are also seen as an obstacle to institutions and democracy (Jensen & Wantchekon, 2004; Karl, 1997).

Petrostates express similarities not only in domestic politics. There are also some traditional petrostate activities of foreign policy, such as increased military spending and international rebellion or terrorism funding. These tendencies stem from the simplicity at which the state's leadership may regulate oil proceeds, and thus expended on foreign policy. Not every petrostate would, of course, exhibit all these behaviours, as their circumstances and other idiosyncratic considerations may override them (Colgan, 2013, 2014).

Oil raises the ability of the state to trigger international conflicts (Colgan, 2014). These countries have belligerent behaviour in the international arena and pursue more aggressive foreign policies along with their direct economic impacts, resource booms have a significant effect on global security. Being dependent on oil wealth revitalizes aggressive behaviour by such states, so there are systematic impacts of oil resource dependence on exporting states' foreign arena. As stated by M. L. Ross and Voeten (2011), oil-exporting countries behave more aggressively than non-exporting countries, but this hostility barely reinforces actual armed conflict. There is now an unambiguous popular perception that Petro-state countries have more aggressive foreign policies and engage in interstate disputes. The increased dispute tendency of petrostate countries is confluency of two aspects: oil rents and revolutionary leadership. As state authorities can effortlessly allocate oil revenues, they offer rulers greater resources to spend on their militaries, plummeting the domestic costs associated with more risky foreign policy behaviour (Colgan, 2010, 2011, 2013).

Oil-generated conflict disincentives are usually in the government of the petrostate. It is not merely rendering the petrostate to participate in armed action, but it is, therefore, more likely to be aimed at economic sanctions by countries or the international community. Economic sanctions are implemented to put pressure on the existing regime to undertake reforms (Bellin, 2004; Colgan, 2010, 2011). This study, therefore, suggests a new channel that has not been addressed as one of the channels of the resource curse.

This study is organized following some parts. The first part is introduction which elaborates the empirical gaps. The second part is method which formulates an empirical model using Synthetic Control Method. The third part is result and discussion. Meanwhile, the fourth part is conclusion.

METHOD

Estimates of the causal impacts of the economic sanctions on oil exports for selected petrostate economies, as well as the robustness analysis, are presented in this section. Most early studies of sanctions effects were based on traditional estimates methods, such as pooled regression of ordinary least squares (OLS) or fixed time effects. Fresh studies have disputed the validity of the OLS findings regarding the sanctions analysis and used different strategies for bias-correcting techniques. Using more advanced models is motivated by which standard estimation methods will generate inconsistent estimates of parameters and incorrect inferences if panel data regression errors are cross-sectionally correlated (Pesaran, 2006).

Synthetic Control Methods (SCM) serves to answer the following question: "What would be the trend of the target variable in time

if one single important event did not occur in the past?". The SCM method is a synthetic counterfactual technique that is then clearly applied to the series observed. The control sample defines the contra factual as a weighted average of units. Using the SCM minimises the selection bias by eliminating systematic differences between the treatment and control series, fulfils the parallel trends assumption, and eliminates researcher bias in the control series selection (Degli Esposti et al., 2020). The most noticeable benefit of synthetic control methods is controlling the unobserved shocks that affect the treated units over regression-based estimates. Different effects as the unit are treated should be influenced theoretically by units in a (well-selected) control set.

There are numerous explanations of a reliable synthetic control structure, some of which are more formal (Abadie, Diamond, & Hainmueller, 2010), while others are less technically oriented. The underlying formalism is the same. Therefore, the study provides a brief formal description of the method based on (Abadie & Gardeazabal, 2003) and (Abadie et al., 2010).

Let j + 1 be the 11 most dependent oil export countries, where unit 1 introduces the policy (economic sanctions) this study is interested in evaluating at the timeT_{0+1}. Suppose unit 1 is affected by economic sanctions. In this case, the remaining j units (non-sanctioned) countries form the control group, the "donor pool" from which synthetic units will be constructed. Let us define T_0 as the number of pre-sanctions periods in countries with 1 <T_0 <T. Y_{it}^{NP} will be defined as the value of oil exports and economic growth from the country i in period t with no economic sanctions, Y_{it}^{p} refers to the value of oil exports and the GDP growth if the country is sanctioned.

The observed outcome variable can be expressed in the following way:

$$Y_{it} = \begin{cases} Y_{it}^{NP} \\ Y_{it}^{P} = Y_{it}^{NP} + D_{it}\tau_{it} \end{cases} \quad (1)$$

Where (Y_{it}^{NP} is the absence of sanctions), ($Y_{it}^{NP} + D_{it}\tau_{it}$ is the presence of sanctions), $\tau_{it} = Y_{it}^{P} - Y_{it}^{NP}$ is the effect of the policy (sanctions) for country i at time t, and $D_{it} = 1$ if $t > T_0$ and $i = 1$ and $D_{it} = 0$ otherwise. Then (3.13) can be rewritten as:

$$Y_{it}^{NP} = \propto_t + \theta_t Z_{i.} + \lambda_t \mu_i + \varepsilon_{it} \quad (2)$$

where $\propto_t$ is an unknown common factor in which factor loadings are constant across units, with coefficients θ_t, Z_i is a vector of observed covariates, μ_i denotes $(F \times 1)$ vector with unknown parameters, λ_t denotes $(F \times 1)$ vector of unobserved common factors, and ε_{it} are idiosyncratic error terms with a mean of zero.

Synthetic control compares the evolution of each sanctioned country's post-sanction export and GDP growth with that of a weighted combination of non-sanctioned countries. Their characteristics are similar to those of sanctioned countries in the pre-sanctioned period.

The weights are generated based on the pre-treatment similarity of the oil exports and GDP growth and

predictors such as oil production, oil consumption, oil reserve, government expenditure, foreign direct investment (FDI), and trade openness. Weight is then accomplished by a data-driven approach, which requires no moral opinion other than the determination of the donor pool, making it objective and clear to choose the appropriate unit of comparison from the donor pool. The weights that create the best synthetic sanctioned countries from the set of countries given in the donor pool are presented in Table 1. In generating the synthetic unit, the weights in Table 1 are chosen to fit the oil exports before the treatment and the set of predictor variables for oil exports for the synthetic unit and the treatment unit.

To get the weights entirely, the sanctions country's synthetic is generated. Its economic characteristics are oil production, oil consumption, Energy use, GDP growth rate, foreign direct investment (FDI), and Government expenditure. Hence, the objective is to evaluate the effect of economic sanctions on oil exports and GDP growth by applying the synthetic control group. The study uses this method individually for the treatment case of Iran.

Using SCM, this study builds a synthetic for Iran that approximates the values of a set of control variables that serve as predictors for oil exports. In applying the synthetic control method, it is imperative to choose the donor pool from economies that are not also being treated and that share some basic similarities with the treatment group. Therefore, the study restricts the control group to non-sanctioned economies that are heavily dependent on oil rents, leaving us with a donor pool of 10 countries.

The empirical analysis is based on the annual country-level panel data from 1980 to 2018. As economic sanctions were imposed at different times for each country in the study, this yields a pre-intervention period that is not the same among cases. The donor pool includes ten rich -oil countries: Algeria, Ecuador, Colombia, Kuwait, Nigeria, Qatar, Bahrain, Saudi Arabia, Oman, Norway, and the United Arab Emirates. The study defines the sanctioned country (Iran) in the data set as the treated country. The country of interest in my study is a major oil-exporting country, making it at least economically comparable to the donor pool. Choosing the set of controls is the stage with the most significant potential influence on the outcomes (Gharehgozli, 2017; Smith, 2015).

Selecting a set of controls that enters the estimations is the step with potentially the most significant impact on results. Because the control group is meant to replicate the counterfactual better, the control group can simulate the evolution of the treatment group well before receiving the treatment. The monitoring and treatment group cannot precisely be the same; the aim is to be sufficiently similar. Choosing a donor pool from non-treated economies that share certain simple similarities with the treatment group is essential. Therefore, the study limits the control group to unsanctioned economies with 10 countries 'donor

pools. Table 1 provides the shortlist of the countries in the sample.

Table 1. List of Control and Treated Countries

Control group Countries	Treated Countries
Algeria	Iran
Angola	
Kuwait	
Qatar	
Saudi Arabia	
Nigeria	
Oman	
Norway	
Colombia	
Ecuador	

The non-sanctioned countries are consequently a suitable control group for the study. In the study, oil exports and GDP growth are the outcome variables. The predictors of oil exports and GDP growth are a series of macroeconomic variables known to influence oil exports and GDP growth. An annual panel dataset covering the years 1980-2018 is the sample used for the study.

The weights are produced based on the pre-treatment resemblance of the oil exports and predictors such as oil production, oil consumption, oil reserve, government expenditure, FDI, and GDP. Weight is then accomplished by a data-driven approach, which requires no moral opinion other than the donor pool's determination, making it objective and clear to choose the appropriate comparison unit from the donor pool[1]. The weights that generate the best synthetic sanctioned country from the set of states given in the donor pool are presented in Table 2. In creating the synthetic unit, the weights in Table 2 are chosen to fit the oil exports before the treatment and the set of predictor variables for oil exports for the synthetic unit and the treatment unit. In this respect, the synthetic country imitates the real economy, not just for oil exports but also for other variables that are potential oil export predictors.

Synthetic Iran is best generated by Algeria, Saudi Arabia, and Kuwait. Moreover, Table 3 compares Synthetic's pre-sanction match for each case and a population-weighted average of donor countries.

[1] Our donor pool includes 10 rich -oil countries: Algeria, Ecuador, Colombia, Kuwait, Nigeria, Qatar, Bahrain, Saudi Arabia, Oman, Norway, and the United Arab Emirates.

Table 2. Country Weight in Synthetic Iran

Iran	
Country	**Weight**
Algeria	.367
Angola	0
Colombia	0
Ecuador	0
Kuwait	.269
Nigeria	.092
Norway	0
Oman	0
Qatar	0
Saudi Arabia	.271
United Arab Emirates	0

Source: Authors' calculations

Table Error! No text of specified style in document.**.** Oil Exports Predictor Means before Economic Sanctions

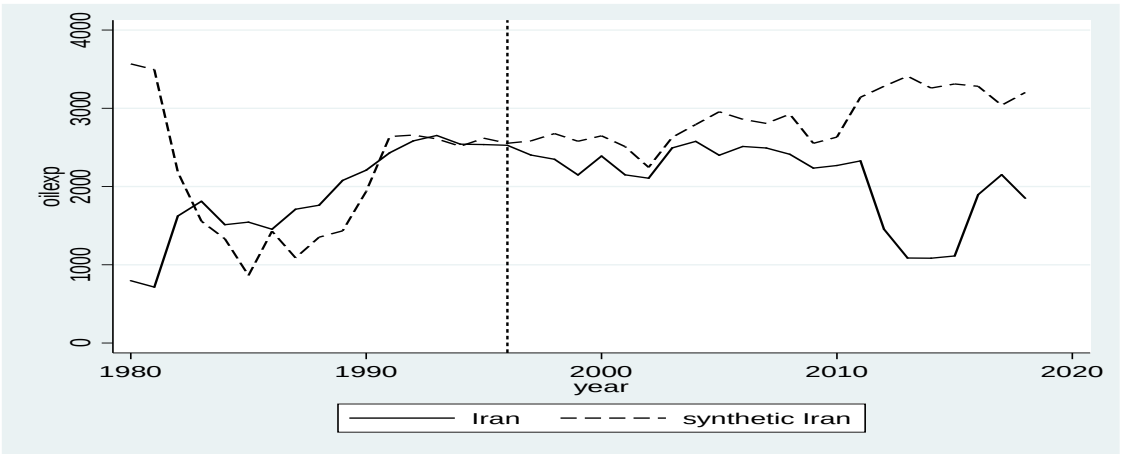
	Iran	
Variables	**Treated country**	**Synthetic country**
Oil production	3210.608	3301.322
Oil consumption	1236.323	693.92
Energy use	1707.718	2271.205
GDP	-2.28	-.1250399
FDI	8.15e+08	2.67e+09
Government expenditure	13.34075	18.1245

Note: over 1980-1990, all variables are averaged. As a predictor, the study has augmented this matching with oil exports.

RESULTS AND DISCUSSION

In 1996, President Clinton imposed sanctions on US trade and investment in Iran. Following an executive order of earlier March 1995, it excluded the US energy investment in Iran (Katzman, 2011).

Figure 1 exhibits the paths of Iran's oil exports and synthetic Iran from 1980 to 1996. Synthetic Iran closely approximates Iran's oil exports before the economic sanctions were imposed. The impact of economic sanctions imposed in 1996 is the discrepancy between the oil exports of actual Iran and synthetic Iran. The difference between the two after 1996 implies a large negative impact of economic sanctions. The gap plot provides the gap value between the two paths displayed in Figure 1. Both figures display that while the oil exports of synthetic Iran grow, the oil exports of actual Iran drop remarkably after 1996, with the gap between them increasing in magnitude. The oil exports of Iran after 1996 were 6% less than the value they would have been if there were no economic sanctions placed. Relative to the synthetic Iran benchmark, Iran's oil exports were reduced by 7% in the first year after the sanctions. Hence, the results imply negative economic sanctions on Iran's oil exports.

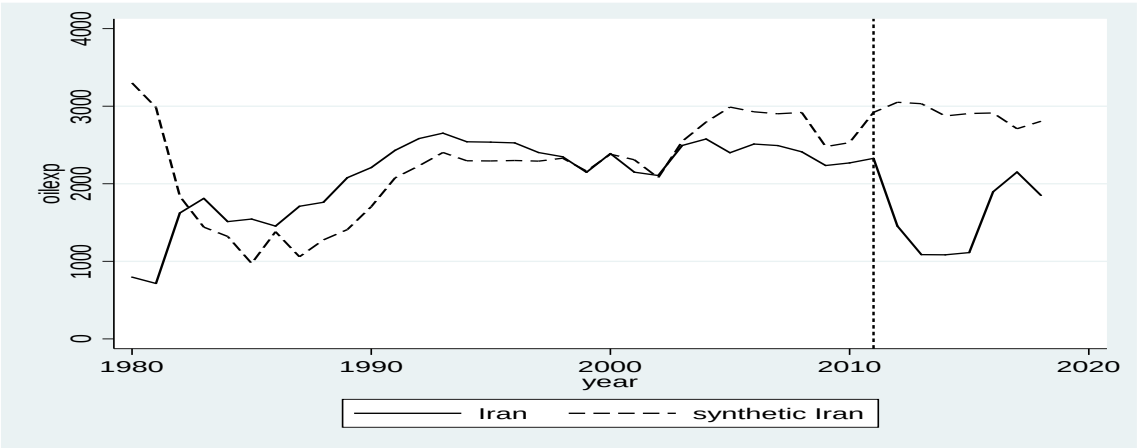


Note: The vertical dashed line is the year of imposing sanctions.

Figure1. Synthetic Iran and The Effect on Oil Exports (sanctions of 1996)

Comprehensive US and EU economic sanctions were further imposed in 2011 (Borszik, 2016). Figure 2 shows that while oil exports of synthetic Iran grow, the oil exports of actual Iran drop remarkably after 2011, with the gap between the two increasing in magnitude. Iran's oil exports in 2011 were 2328 million barrels, which this study estimates to be 873 million barrels less than the value it would have been if there were

no economic sanctions. After imposing economic sanctions, this equals a 38 % drop in oil exports. According to the synthetic control analysis, the study estimates that, in 2011, oil exports would have been 1813 million barrels higher if there were no economic sanctions. The gap between the two after 2011 indicates that the sanctions negatively impacted the country's oil exports.



Note: The vertical dashed line is the year of imposing sanctions

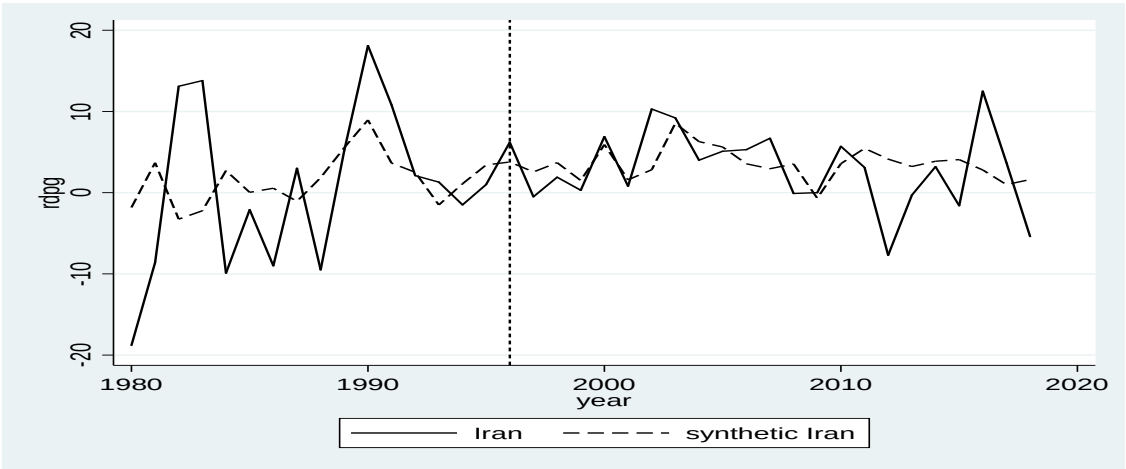
Figure 2. Synthetic Iran and The Effect on Oil Exports (sanctions of 2011).

Figure 3. Placebo Effect of Oil Exports Iran vs Synthetic Iran

Figure 3 presents the oil export gap between actual Iran and its synthetic counterparts. As it may seem, there is a small gap before imposing economic sanctions, but following 2011, needless to say, the gap expands until 2015. The gap between the two after 2011 indicates that the economic sanctions negatively impacted the country's oil exports. Besides, the figure

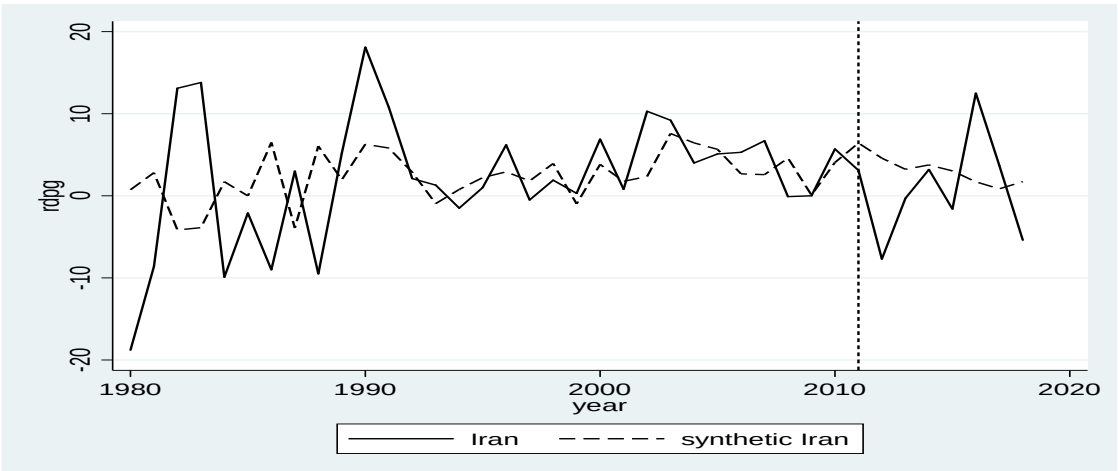
displays both differences concurrently. Since implementing economic sanctions, Iran has had the biggest average gap, so the test has not falsified our prediction.

Figure 4 displays the paths of Iran's Iran GDP growth rate and its synthetic from 1980 to 2018. Synthetic Iran closely resembles Iran's GDP growth rate over the pre-sanction period. The impact of economic sanctions imposed in 1996 is the difference between the GDP growth rate of actual Iran and synthetic Iran. The discrepancy between the two after 1996 suggests a large negative effect of the economic sanctions on the country's GDP growth rate.



Note: The vertical dashed line is the year of imposing sanctions.

Figure Error! No text of specified style in document.**.** Synthetic Iran and the Effect on GDP growth (sanctions of 1996)



Note: The vertical dashed line is the year of imposing sanctions

Figure 5. Synthetic Iran and the Effect on GDP (sanctions of 2011).

Figure 5 shows that while the GDP growth rate of synthetic Iran closely reproduces Iran's value of GDP growth rate, the GDP growth rate of actual Iran drops notably after 2011, with the gap between the two growing in magnitude. In other words, the real GDP growth rate suffers a drop of the GDP growth rate because of economic sanctions.

According to Gharehgozli (2017), these sanctions, which targeted Iran's access to the international banking system and its energy sector, had a considerable detrimental effect on Iran's economic growth, especially from 2011 to 2014. Gharehgozli calculated that the sanctions decreased Iran's real GDP by nearly 17%, with the sharpest decline occurring in 2012, using the synthetic control approach. comparing to the 1996 economic sanctions in this investigation which allow us for a comparison of the two sets of economic sanctions and an analysis of any potential discrepancies in their impact. Therefore, it can be noted that the economic sanctions imposed on Iran in 1996 and 2011 had significant impacts on the country's economy. However, the sanctions of 2011 had a more severe impact than those of 1996.

In 1996, the United States imposed sanctions on Iran due to its support for terrorism and its nuclear program. The sanctions targeted specific industries such as oil and gas, arms sales, and financial transactions. The impact of these sanctions was limited as they were not supported by other countries, and Iran was still able to export oil to some countries.

In contrast, the sanctions imposed in 2011 were much more comprehensive and had a more significant impact on Iran's economy. These sanctions were imposed by the United States and the European Union due to concerns about Iran's nuclear program. They targeted all sectors of the Iranian economy, including oil exports, banking, shipping, and trade. The impact of these sanctions was severe as they significantly reduced Iran's ability to export oil and access international financial markets. This led to a sharp decline in Iran's GDP growth rate, high inflation rates, currency devaluation, and increased unemployment rates. As a result, while both sets of economic sanctions had an impact on Iran's economy, the ones imposed in 2011 had a more severe effect due to their comprehensive nature and international support.

Given that one segment of these economies is highly dependent on the oil sector and controlled by the state, targeted country sanctions will have comparable consequences as far as economic sanctions are concerned. Due to the petrostate economies' nature, the negative spillover impacted not only the oil sector but other related sectors. Hence, the economic sanctions, in this sense, fuel what appears to be an oil curse in petrostate countries

Several cross-country studies deal with aspects of negative sanctions on the economy and society. Broadly speaking, most sanctions studies are typically qualitative. Gary C Hufbauer, Schott, and Elliott (1990) analysed 115 case studies of sanctions initiated during World War I, and Lam (1990) utilized the Probit estimation methodology to study. Gary C Hufbauer et al. (1990) indicated that sanctions are more efficient when

placed on relatively small, affected countries; with relatively sound foreign-policy goals, poor economies, and fragile target country policy.

Unlike these factors, much research centred on the impact of international sanctions on trade relations. Using the Gravity Model method, Caruso (2003) addressed the effect of economic sanctions on international trade. Figures accept the theory of significant negative impacts on trade flows through the implementation of multilateral economic sanctions. A subsequent study (Caruso, 2005) measures the effect of sanctions on international trade using the same method. Using the US and 49 target countries indicates that extensive sanctions negatively affect bilateral trade, though modest sanctions do not. Yang, Askari, Forrer, and Zhu (2009) compare the effect of US trade with the EU and the target countries and obtain contrasting trade diversion performances with those impacted by U.S. trade sanctions.

Another branch of the literature concentrates on other impacts of sanctions. Ebrahimi, Jalalian, and Esfandyari (2015) perform comparative and informative studies on the human rights impact of international sanctions in Iraq and Iran. They observed that sanctions hinder human rights from different angles, including education, health, and development. Wen, Zhao, Wang, and Chang (2020) investigate the impact of sanctions on energy security by using panel data from target countries covering the span of 1996 to 2014 and utilising the fixed effects model. The research suggests that in certain instances, international sanctions have a substantial detrimental impact on the energy stability of target countries. That means that international sanctions could decrease energy efficiency and then deteriorate the environment's quality. In another vein, Peksen and Drury (2010) used a cross-national data decomposition vector model from 1972 to 2000. Comprehensive sanctions adversely affect freedom and democracy. Kamali, Mashayekh, and Jandaghi (2016) found a link between economic sanctions and government corruption in target countries with a 1995–2012 study of 73 sanctioned and 60 non-sanctioned countries. The findings show that the Results found that sanctioned countries' corruption is more severe than in non-sanctioned countries.

In a specific country case, several sanctions have been imposed on Iran. Aghazadeh (2013) discusses Western multilateral sanctions' effects on Iran's economy. The key finding indicated substantial effects of sanctions on Iran's macroeconomic indicators that were found in his study. Haidar (2014) demonstrates that Iranian sanctions have impacted small Iranian exporters most badly. In the following study, Haidar (2017) examined the relationship between sanctions and export deflation of non-oil Iranian exports using an autoregressive model and is finding substantial proof of export decline. Also, his figures showed that two-thirds of Iran's export value had plummeted to non-sanction countries.

Shirazi et al. (2016) used the fixed-effect gravity model to analyse the impact of sanctions in the three years 2012, 2013, and 2014. Their main result is that the effects on Iran have important and negative impacts on exports, with an estimated annual

decrease in Iran's export flows of 33%. Ianchovichina, Devarajan, and Lakatos (2016) implemented a global simulation model to assess the consequences of lifting sanctions on Iran either with or without strategic responses. Their results showed that Iran gains more with average per-capita welfare increases of nearly 3% and, moreover, Iran's petroleum exports to the EU increase to half its pre-embargo rate.

Haidar (2017) examined Iran's 2006-2011 relationship between sanctions and export collapse. His estimated findings found that two-thirds of Iran's export value fell to non-sanction countries. To assess the effects on the Iranian economy of international trade, Gharehgozli (2017) employed the synthetic control method. Findings have revealed that the economy of Iran, in particular its GDP and trade, was hit by over 17%. Frank (2017) observed that comprehensive trade sanctions negatively impact bilateral trade.

However, Ghahroudi and Chong (2020) examine the effect of sanctions on foreign direct investment inflows and macroeconomic determinants. Empirical findings show that Sanctions have no major moderating effect on the relationship between macroeconomic factors. Interestingly, sanctions have a favourable association with Iran's FDI inflows. In recent years, sanctions have had a considerable effect on Iran's economic development owing to higher sanctions intensity. Findings also indicate that trade openness and GDP growth have no major effects on FDI. Felbermayr, Syropoulos, Yalcin, and Yotov (2019) explored the effect of sanctions on international trade, emphasizing Iran. They showed that bilateral sanctions could decrease two-way trade by approximately 86%. Their investigation of the sanctions on Iran has shown various impacts on bilateral trade between partner countries in Iran.

Except for the above studies, to conduct data-driven comparative case studies, we use a panel dataset and create counterfactuals utilizing SCM for the case study. Three sanction studies have previously employed the SCM. Mirkina (2018) analyses data from 1970 to 2010 to evaluate the impact of sanctions on FDI in several countries sanctioned during that time. Gharehgozli (2017) investigates the impact of intensified sanctions on Iran's GDP from 2011 to 2014. Rodríguez (2019) considers the impact of sanctions on Venezuela's production. And Barseghyan (2019) analysed the macroeconomic implications of the Western sanctions imposed on Russia in 2014.

Considering the nature of sanctions placed on each case study in our sample, we focus on the spectrum of impacts of sanctions on oil exports in the petrostate of Iran. These counties are heavily dependent on their oil, which would greatly influence and affect the entire economy. Overall, there was no substantial investigation of the resource curse under economic sanctions as one of the transmission channels. In doing so, a synthetic control method will be employed. This study differs from those suggesting evidence from a case study country and the impact of economic sanctions to suggest another mechanism through which resource curse is affected.

Although recent literature across countries has strengthened our

perception of the resource flow by concentrating on economic and political channels, it has done so without distinguishing between different characteristics of states. Then a particular channel may well be attached to a resource with those characteristics. Therefore, we study a new transmission channel of a given country.

CONCLUSION

This paper has provided evidence that the economic sanctions adversely affected oil exports in the case of Iran. We applied the synthetic control method to produce an adequate control group, estimating a large negative post-sanctions effect. We use country-level panel data on oil exports and GDP growth rate followed by the period of sanctions to detach the economic impacts of economic sanctions. In this respect, we put forward the synthetic control method to assign how the oil exports and GDP growth rate would have behaved in the absence of economic sanctions. We find that Iran could have suffered from economic sanctions, and lower exports had not been exposed to economic sanctions. Through the placebo studies and the 'leaving-one-out' tests, we have demonstrated that our estimated effect is caused by economic sanctions; hence our estimate is robust. We provide evidence that economic sanctions can operate as another channel in the resource curse context for the petrostate economies by taking case studies for four countries.

The case study of Iran confirms many of the conclusions on economic sanctions. First, sanctions have been imposed largely isolated from other strategies, such as constructive engagement and diplomacy. This has hampered their options to succeed, as sanctions have strongly undermined them. Second, although it is difficult to point to a direct causal mechanism, the imposition of economic sanctions has coincided with the deepening of authoritarianism, as the literature predicts. However, this case provides new insights of value to the literature on the impact of economic sanctions. Since Iran is heavily dependent on one sector and it is mostly state-controlled, targeted sanctions directed towards the state may have more profound effects.

This paper complements current work on the economic effects of sanctions, including Neuenkirch and Neumeier (2015), Shin, Choi, and Luo (2016), and Pond (2017) estimators. The previous results of a major adverse effect on target economies could be motivated by dynamics in the context of the resource curse and foreign policy as well as economic development. For example, a study of other macroeconomic indicators on the effect of economic sanctions may be a promising path for future studies focusing on particular petrostate economies.

In summary, the study has significant policy contributions, and we put forward policy implications by means of the following. First, considering the harmful effects of sanctions, the government can consider taking different measures. Henceforth, the sanctioned countries can deteriorate the effectiveness of sanctions by developing mutually win-win cooperation with other countries such as constructive engagement, facilitating technology, foreign

investment, and economic integration. It can be concluded that sanctions might have decreased oil exports, and then damaging the economy may lead these governments to approach the design of foreign policy initiatives in the form of constructive engagement to mitigate the negative effect of economic sanctions.

This study has some guiding importance for future studies in the fields of international economic relations and political economy in the context of the resource curse. This study suggests for future empirical investigations to provide industry-level estimates of the impact. This would help to determine if the sanctions had an impact beyond the oil sector and affected other sectors of the Iranian economy. It would also be helpful to provide more detailed information on the specific industries included in the analysis, including their size and characteristics. Hence, there is ample room for further studies. In addition, this paper can provide suggestions for future empirical investigations to evaluate if different types of sanctions behave differently over time.

REFERENCES

Abadie, A., Diamond, A., & Hainmueller, J. 2010. Synthetic control methods for comparative case studies: Estimating the effect of California's tobacco control program. *Journal of the American statistical Association, 105*(490), 493-505.

Abadie, A., & Gardeazabal, J. 2003. The economic costs of conflict: A case study of the Basque Country. *American economic review, 93*(1), 113-132.

Aghazadeh, M. 2013. *International Sanctions and Their Impacts on Iran's Economy*: Lap Lambert Academic Publishing.

Barseghyan, G. 2019. *Sanctions and counter-sanctions: What did they do?* (9523233068). Retrieved from

Bellin, E. 2004. The robustness of authoritarianism in the Middle East: Exceptionalism in comparative perspective. *Comparative politics*, 139-157.

Borszik, O. 2016. International sanctions against Iran and Tehran's responses: political effects on the targeted regime. *Contemporary politics, 22*(1), 20-39.

Caruso, R. 2003. The impact of international economic sanctions on trade: An empirical analysis. *Peace Economics, Peace Science and Public Policy, 9*(2).

Caruso, R. 2005. The impact of international economic sanctions on trade empirical evidence over the period 1960-2000. *Rivista Internazionale di Scienze Sociali*, 41-66.

Colgan. 2010. Oil and revolutionary governments: Fuel for international conflict. *International Organization, 64*(4), 661-694.

Colgan. 2011. Oil and resource-backed aggression. *Energy Policy, 39*(3), 1669-1676.

Colgan. 2013. *Petro-aggression: When oil causes war*: Cambridge University Press.

Colgan. 2014. The emperor has no clothes: The limits of OPEC in the global oil market. *International Organization, 68*(3), 599-632.

Degli Esposti, M., Spreckelsen, T., Gasparrini, A., Wiebe, D. J., Bonander, C., Yakubovich, A. R., & Humphreys, D. K. 2020. Can synthetic controls improve causal inference in interrupted time series evaluations of public health interventions? *International Journal of Epidemiology, 49*(6), 2010-2020.

Ebrahimi, M., Jalalian, A., & Esfandyari, L. 2015. The impacts of economic sanctions on human rights in countries of Iran and Iraq. *World Scientific News, 16*, 12-27.

Felbermayr, G. J., Syropoulos, C., Yalcin, E., & Yotov, Y. 2019. On the effects of sanctions on trade and welfare: New evidence based on structural gravity and a new database.

Frank, J. 2017. *The empirical consequences of trade sanctions for directly and indirectly affected countries*. Retrieved from

Frankel, J. A. 2012. The natural resource curse: A survey of diagnoses and some prescriptions. *HKS Faculty Research Working Paper Series*.

Ghahroudi, M. R., & choy Chong, L. 2020. Role of Sanctions and Macroeconomic Determinants on FDI Inflow: A Case Study.

Gharehgozli, O. 2017. An estimation of the economic cost of recent sanctions on Iran using the synthetic control method. *Economics Letters, 157*, 141-144.

Haidar, J. I. 2014. Sanctions Backfire: Did Exports Deflection Help Iranian Exporters. *Mimeograph, Paris School of Economics*.

Haidar, J. I. 2017. Sanctions and export deflection: evidence from Iran. *Economic Policy, 32*(90), 319-355.

Henry, C. M. 2004. Algeria's Agonies: Oil rent effects in a bunker state. *The Journal of North African Studies, 9*(2), 68-81.

Hufbauer, G. C., Schott, J. J., & Elliott, K. 1990. Economic sanctions reconsidered, institute for International Economics. *Washington (1990, 1998)*.

Hufbauer, G. C., Schott, J. J., & Elliott, K. A. 2008. Economic Sanctions Reconsidered 3rd edition (hardcover+ CD). *Peterson Institute Press: All Books*.

Ianchovichina, E., Devarajan, S., & Lakatos, C. 2016. *Lifting economic sanctions on Iran: global effects and strategic responses*: The World Bank.

Jensen, N., & Wantchekon, L. 2004. Resource wealth and political regimes in Africa. *Comparative political studies, 37*(7), 816-841.

Kamali, T., Mashayekh, M., & Jandaghi, G. 2016. The impact of economic sanctions on corruption in target countries: a cross country study. *World Scientific News, 45*(2), 276-291.

Karl, T. L. 1997. *The paradox of plenty: Oil booms and petro-states* (Vol. 26): Univ of California Press.

Karl, T. L. 1999. The perils of the petro-state: reflections on the paradox of plenty. *Journal of International Affairs*, 31-48.

Katzman, K. (2011. *Iran sanctions*.

Lam, S. L. 1990. Economic sanctions and the success of foreign policy goals: a critical evaluation. *Japan*

and the World Economy, 2(3), 239-248.

Mirkina, I. 2018. FDI and sanctions: An empirical analysis of short-and long-run effects. *European Journal of Political Economy, 54*, 198-225.

Neuenkirch, M., & Neumeier, F. 2015. The impact of UN and US economic sanctions on GDP growth. *European Journal of Political Economy, 40*, 110-125.

Peksen, D., & Drury, A. C. 2010. Coercive or corrosive: The negative impact of economic sanctions on democracy. *International Interactions, 36*(3), 240-264.

Pesaran, M. H. 2006. Estimation and inference in large heterogeneous panels with a multifactor error structure. *Econometrica, 74*(4), 967-1012.

Pond, A. 2017. Economic sanctions and demand for protection. *Journal of Conflict Resolution, 61*(5), 1073-1094.

Rodríguez, F. 2019. Sanctions and the Venezuelan economy: What the data say. *Latam Economics Viewpoints*.

Ross. 2013. *The oil curse: How petroleum wealth shapes the development of nations*: Princeton University Press.

Ross, M. L., & Voeten, E. 2011. *Unbalanced Globalization in the Oil Exporting States.* Paper presented at the annual meetings of the American Political Science Association, Seattle, September.

Shin, G., Choi, S.-W., & Luo, S. 2016. Do economic sanctions impair target economies? *International Political Science Review, 37*(4), 485-499.

Shirazi, H., Azarbaiejani, K., & Sameti, M. 2016. The Effect of Economic Sanctions on Iran's Exports. *Iranian Economic Review, 20*(1).

Smith, B. 2015. The resource curse exorcised: Evidence from a panel of countries. *Journal of Development Economics, 116*, 57-73.

Wen, J., Zhao, X., Wang, Q.-J., & Chang, C.-P. 2020. The impact of international sanctions on energy security. *Energy & Environment*, 0958305X20937686.

Yang, J., Askari, H., Forrer, J., & Zhu, L. 2009. How Do US Economic Sanctions Affect EU's Trade with Target Countries? *World Economy, 32*(8), 1223-1244.