Unintended Transnational Effects of Sanctions: A Global Vector Autoregression Simulation

Hatipoglu, Emre; Considine, Jennifer; AlDayel, Abdullah

DOI:
10.1080/10242694.2022.2073429

Publication date:
2023

Routledge
Taylor & Francis Group

Defence and Peace Economics

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/gdpe20

Unintended Transnational Effects of Sanctions: A Global Vector Autoregression Simulation

Emre Hatipoglu, Jennifer Considine & Abdullah AlDayel

To cite this article: Emre Hatipoglu, Jennifer Considine & Abdullah AlDayel (2023) Unintended Transnational Effects of Sanctions: A Global Vector Autoregression Simulation, Defence and Peace Economics, 34:7, 863-879, DOI: 10.1080/10242694.2022.2073429

To link to this article: https://doi.org/10.1080/10242694.2022.2073429

Published online: 11 May 2022.

DEFENCE AND PEACE ECONOMICS
2023, VOL. 34, NO. 7, 863–879
https://doi.org/10.1080/10242694.2022.2073429

Routledge
Taylor & Francis Group

Unintended Transnational Effects of Sanctions: A Global Vector Autoregression Simulation

Emre Hatipoglu, Jennifer Considine and Abdullah AlDayel

King Abdullah Petroleum Studies and Research Center, Riyadh, Saudi Arabia

ABSTRACT

The debate on unintended consequences of sanctions, such as their adverse effects on human rights, public health, or the economy beyond intended sectors in the target state, has become increasingly popular over the last couple of decades. Interestingly, however, this debate has mostly overlooked the transnational aspects of these unintended consequences. This study examines one such aspect, namely the economic spillover of sanctions to neighboring countries. Our global vector autoregression oil and inventory model (GOVAR) simulations on Indonesia, a medium-level oil producer, indicate sanctions may spill over to its neighbors' domestic economy. The risk and nature of spillover varies with respect to the type of sanctions employed, timing of sanctions, and the macroeconomic indicator in the neighboring state in question. Equity markets appear especially susceptible to a contagion effect. Understanding how a sanction spills over to neighboring states can help sender states design sanctions that minimize regional disruptions.

ARTICLE HISTORY
Received 03 November 2021
Accepted 29 April 2022

KEYWORDS
Economic sanctions; spillover effects; economic interdependence; international trade

Introduction

Sanctions remain a popular foreign policy tool in global politics. The Threat and Imposition of Sanctions (TIES) dataset identifies 1412 instances of sanction threats that were directed against a target state by another state, a group of states, and/or international organizations between 1945 and 2005, of which 845 escalated into actual sanction impositions (Morgan, Bapat, and Kobayashi 2014). Having a more recent coverage, the EUSANCT dataset notes 326 such episodes threatened and/or imposed by the UN, the U.S., or the EU between 1989 and 2015 (Weber and Schneider 2022).

Falling somewhere between a diplomatic protest and a full-scale militarized coercion (Hufbauer 1998, 1), sanctions have been widely used around the globe to induce change on a variety of policy areas (Early and Cilizoglu 2020). These contested policies range from 'soft-issues' such as international trade practices or intellectual property enforcement to 'hard-issues' such as reciprocating the use of military force or preventing nuclear proliferation. Economic sanction episodes have continued to mark global politics, such as U.S. sanctions on Russia, Iran, Sri Lanka, Eritrea, and Uzbekistan, EU sanctions on Russia, Fiji, Madagascar, and Honduras, and UN sanctions on North Korea, among others.

Like all forms of coercive policy, sanctions hurt bystanders (Solomon and McGann 2005). These unintended consequences have become an increasingly salient concern also for a sender due to a potential backfiring of the public perception and attitude on humanitarian grounds (Gordon 2015, 867; McLean and Roblyer 2017) or a sanction's negative economic consequences for special interest

CONTACT Emre Hatipoglu emre.hatipoglu@kapsarc.org King Abdullah Petroleum Studies and Research Center, Riyadh, Saudi Arabia

groups in the sender country (McLean and Whang 2014). In parallel, sanctions research has increasingly focused on sanctions' unintended consequences. The initial focus has been on the adverse humanitarian consequences (Cortright et al. 1997), with a specific emphasis on health of individuals in the targeted state (Daponte and Garfield 2000; Peksen 2011; Parker, Foltz, and Elsea 2016; Habibzadeh 2018). Further studies examined the political consequences of sanctions. Some, for instance, focused on how sanctions could deteriorate the stability of a regime (Marinov 2005; Escribà-Folch and Wright 2010). Findings suggested that the targeted regime's response, in turn, can hurt various rights of its citizens (Peksen 2009; Drury and Peksen 2014; but also see, Gutmann, Neuenkirch, and Neumeier 2020), as the targeted government increases the level of internal repression (Wood 2008) and/or rallies its citizens around the flag (Grauvogel and von Soest 2014). Sanctions may also cause unintended economic consequences beyond the sectors they are designed to hurt. Economic sanctions disrupt the targeted state's international trade flows (Caruso 2003), FDI inflows (Mirkina 2018), increase the probability of financial crises (Peksen and Son 2015; Hatipoglu and Peksen 2018), and level of poverty (Neuenkirch and Neumeier 2016).

Research on unintended consequences of sanctions has so far been mostly confined to such adverse effects within the targeted state. Interestingly, scholars have shown little interest in the transnational aspects of unintended consequences of sanctions policy. Understanding whether and how sanctions economically spillover to neighboring countries should concern policymakers and scholars for a variety of reasons. A state's economy does not operate in a vacuum; an external shock to its economy will be felt by its economic partners. For instance, the economic slowdown in a target state will reduce imports from and exports to that state. Such a reduction in cross-border trade may disrupt various real economy indicators in neighboring states of the target, such as export revenues or firm profitability. Sanctions also have the capacity to disrupt complex global supply chains, creating new and unanticipated disruptions in various quarters of the globe. When the EU responded to Russia's annexation of Crimea with sanction threats, the European Central Bank warned that imposition of these sanctions could spill over to the Euro area via 'trade and financial linkages with Russia' 2014.

Global investments tend to respond quickly to such slowdowns, leading to a decrease in investor confidence. At a larger scale, financial crises triggered by sanctions in the targeted state can easily spread easily in its region (Allen and Gale 2000, but also see Dimitriou, Kenourgios, and Simos 2013). These concerns were voiced by the U.S. Treasury in 2018, when it warned U.S. Congress that 'expanding sanctions on Russia to include new sovereign debt would have "negative spillover effects" on global financial markets and businesses' 2018. Such disruptions in the flow of trade, capital, and services can also result in unexpected human movements across borders and geopolitical tensions in the region. Furthermore, sanctions intended against a single country may create a regional backlash against sanctioning entities.[1]

This paper constitutes one of the first systematic investigations of how international economic sanctions spill over to the domestic economies of neighboring states. Scholars have presented notable work on how economic sanctions divert international trade to or from neighboring countries (e.g. Slavov et al. 2007, Bove et al. 2021). Our study differs from this line of research. We demonstrate the contagion effect of trade and financial sanctions imposed to a target on the domestic economic indicators of neighboring countries. In doing so, we also highlight potential interdependencies between real and financial markets among countries within a region, through which adverse consequences of economic sanctions may permeate.

We demonstrated these potential spillover effects by conducting counterfactual analysis, utilizing a global (panel) vector autoregression (GVAR) framework, to assess how different types of sanctions can affect various macroeconomic indicators of neighboring countries. The past decade has witnessed a growing interest in applying GVAR analysis to the spillover effects of growth and trade shocks on neighboring countries. For example, Cashin, Mohaddes, and Raissi (2012) examine how economic shocks in a MENA country can cascade within the region as well as to global markets, Olayungbo (2019) assesses potential fallout effects of a U.S.-China trade war on oil exporting

countries in Africa, and Khan (2020) examines how economic shocks can reverberate across the Baltic, Central, and Eastern Europe. Our modified GVAR models simulate the imposition of trade and financial sanctions on Indonesia, a regional powerhouse with significant trade and financial ties to its neighbors in Southeast Asia. Our models simulate sanctions under varying business cycles and trace potential spillover effects in the GDP and equity prices in neighboring countries. The results indicate that economic spillover to innocent bystander countries in the region should be considered as a distinct risk for sanctions policy.

Simulation of Sanctions to Assess Potential Spillover Effects

This study utilizes a novel analytical framework to analyze how sanctions affect various sectors of a target economy. Our global vector autoregression oil and inventory model (GOVAR), a specific GVAR model, was initially developed to conduct counterfactual analyses to assess the effects of hypothetical economic and political shocks to the global oil market. Its extended coverage of international financial and commodity markets makes it a versatile tool for the analysis of a wide range of policy. Our model builds upon the GVAR model developed by Kamiar and Hashem Pesaran (2016), which covers 33 countries quarterly from 1979Q4 to 2015Q4.[2] Our additions to Kamiar and Hashem Pesaran (2016) include the modification of the price equation and country-specific models to include a new variable, OECD oil inventories, the extension of the dataset to 2018Q3, and the addition of three major oil-producing countries, Iran, Russia, and Venezuela. Appendices A and B list the countries and the variables (including their data sources) used in our model, respectively.[3] A complete technical description of the model can be found in Considine, Aldayel, and Hatipoglu (2020).

The 36 individual countries included in our GOVAR analysis were chosen to represent the global oil market. These countries collectively represent well over 87% of global GDP and include eight of the world's top 15 oil-exporting nations. This wide coverage allows us to assess the regional effects of a trade or financial sanction on an oil-producing country (Indonesia in our case), both through linkages in the regional market, as well as through that sanction's effect on global oil, commodity, and financial markets. In this respect, our model differs from analyses that employ conventional VAR analyses to gauge the effect of sanctions on targets in a domestic setting (e.g. for Iran, see Dizaji and van Bergeijk (2013); for Russia, see Dreger et al. (2016)). On the demand side, all of the world's top 10 crude oil-importing countries are represented in the model, namely China, the U.S., India, Japan, Korea, Netherlands, Germany, Spain, Italy, and France. These ten countries accounted for over 68% of the global crude oil imports in 2019.

Our simulation of trade sanctions is based on a hypothetical cut in Indonesian oil production. Following Kamiar and Hashem Pesaran (2016), world oil prices are included as a global variable and weakly exogenous in all the individual country models except Russia and Iran. This is a departure from traditional GVAR models, which tend to view oil prices as endogenous variables, thereby restricting the ability of countries (other than the U.S.) to affect oil prices. For the purposes of this study, it is important to allow oil production from each individual oil-producing country to affect global oil prices, which, in turn, will feedback to the system affecting all the macroeconomic variables in the GOVAR setup (Considine, Aldayel, and Hatipoglu 2020; Considine, Hatipoglu, and Aldayel 2021; Kamiar and Hashem Pesaran 2016).

The dynamic properties of the model are illustrated by the persistence profiles (PP) and impulse response functions. The PPs describe the effects of system-wide, or variable-specific shocks on the cointegrating relationships in the GOVAR model.[4] PPs are normalized to a starting value of 1 on the impact of a system-wide shock. The rate at which they tend to zero illustrates the speed at which the system returns to equilibrium following the shock. For most of the countries included in our analysis, the speed of convergence was relatively fast, taking approximately 3 years. The responses of specific variables to shocks are illustrated by generalized impulse response functions of (GIRFs), which allow researchers to trace specific paths through which a perturbation in one-dimension (e.g. a change in short-term interest rates) cascades through the entire global system (Stephane et al. 2007). We run

100 replications for each shock-outcome pair to bootstrap our results and form our 90% confidence intervals in our GIRFs. While our model allows us to generate GIRFs up to 40 quarters, we confined our analyses to 3 years (12 quarters).

The GOVAR framework offers various advantages to further our understanding of sanctions as a policy tool, and, more generally, our ability to theorize foreign policy processes. Three such major advantages stand out in this study. First, as with the traditional GVAR framework, the GOVAR simulations allow a wide range of relevant players to interact with each other over time. This stands out as an important advantage as foreign policy actions rarely occur in isolation. For example, players (targets and other interested parties) often enact policies to counteract (or amplify) the adverse consequences of economic sanctions. Some oil-producing nations, for instance, may increase their production when one of their peers unexpectedly cuts oil exports and production to capture market share. The GOVAR model reveals a comprehensive picture of the pressures a specific economic sanction will put on various commodity and financial markets in the target state *as well as* spillover effects on other countries and selected global commodity markets (e.g. global prices for oil, metal and agriculture) included in our model.

The long time coverage of our GOVAR model (1979Q4 to 2018Q3) allows us to hypothetically 'sanction' a country under various conditions of the global economy. The ability to simulate shocks at various points in the business cycle gives the analyst considerable analytical leverage, especially when examining the potential direct and spill-over effects of sanctions on an oil-producing country. The price and availability of oil in global markets at any given time will determine the potential impact of economic sanctions on the economy of the target and its trading partners. Accordingly, we use counterfactual analyses to 'shock' the system under tight and loose oil market conditions.[5]

The introduction of sanctions in tight oil markets can exacerbate the scarcity of crude oil supplies leading to a higher oil price and increased volatility on world oil markets. Since oil is a basic input for many forms of production, increased volatility may have adverse consequences to real and financial sectors within the targeted state and across the various economic regions that this state is connected to. Alternatively, sanctions in loose oil markets have the capacity to hurt an oil-exporting country more as existing low oil prices may have already led to reduced revenue from oil exports and higher domestic budget deficits. The additional burden on the targeted state's economy could lead to a disruption in complex industrial supply chains, and a reduction in exports for the targeted state's neighbors and trading partners. The exact nature of such conditional effects, if any, will depend on many factors that are endogenous to each other across space and time. The GOVAR framework allows us to 'repeat' various counterfactual scenarios under different settings while taking such dependencies into account.

The final advantage of the GOVAR model that will be highlighted in this study is the fact that it allows the simulation of both trade and financial sanctions. These shocks may be transmitted to neighboring countries at different rates depending on the exact types of sanctions. Financial sanctions can increase the risk premium for the target country and its neighbors. Global capital constantly evaluates regional and global alternatives for its investments. Neighboring countries with close economic ties to a targeted country may suffer from an immediate increase in risk premiums in a sanction episode. In addition, global investment funds are subject to periodic performance criteria and may be forced to balance their losses in one country (i.e. the target of sanctions) by selling off otherwise well-performing assets in the same region (i.e. neighboring countries).

One final word of caution here. The GOVAR model will reflect any historical trends that are present in the data at the specific starting point in time from which projections are made. In other words, GOVAR reflects the specific 'memory' of the global economy at that specific point in time. For instance, our 'tight' market scenario for Indonesia reflects the economic conditions inherent in the time series in 2013Q3. At that time Indonesia was experiencing a strong upward trend in inflation and a widening budget deficit that had started at the beginning of 2013. Both the government and

the Central Bank of Indonesia had taken measures to curb inflation in 2013Q2. Therefore, the shock we introduce to the system in 2013Q4 will be superimposed on a market that was already experiencing these historical influences.

A Smart Perturbation? A Simulation of Sanctions on A Middle-Level Oil Producer

This study simulates the imposition of sanctions on Indonesia under two different time periods – reflecting different states of the market – to assess any potential spillover effects on its neighbors.[6] We have chosen Indonesia as a targeted oil producer for several reasons. Indonesia is a medium-sized oil producer, producing about 785,000 barrels per day in 2018 and slightly shy of 720,000 barrels per day in 2019 (International Energy Agency 2020). The nation is the third largest oil producer in Asia, behind China and India. It was an OPEC member until 2009, when it left only to reactivate its membership for a brief period between January and December 2016. Indonesia possesses a population of 267 million people, making it the fourth most populous country in the world (CIA), and is a leading power within the Association of Southeast Asian Nations (ASEAN).

The 16th largest economy in the world with a GDP that exceeds $1 trillion, Indonesia is a significant player in the Indo-Pacific region, both as a consumer and producer country. In 2018, the island nation's bilateral trade exceeded $67 billion with China, $30 billion with Singapore, Korea, and Japan each, $18 billion with Malaysia and Thailand each, and reached levels as high as $7.4 billion with the Philippines (World Bank 2020). Oil is an important part of the Indonesian economy and plays a critical role in sustaining these economic relations, both as a critical source of exports, and through the secondary benefits it creates for the Indonesian economy.

Indonesia's internal structure and external relations make it a good candidate to assess the potential spillover effects that sanctions can have on an oil-producing country. Oil is a basic strategic good for which a liquid global market exits. Its availability and affordability are critical to the economic health of both exporters and importers. Investments in and revenue from oil production affect the health of a producer state's political stability (Smith 2004; Fjelde 2009) and national economy (Davis, Ossowski, and Fedelino 2003; Berument, Basak Ceylan, and Dogan 2010; Difiglio 2014). Inflows of capital are also closely related to the capacity to extract (and export) oil (Matsumoto et al. 2012, 823). More importantly, capital can be obtained at affordable levels permitting developing countries to maintain a functional budget, a competitive economy, and a healthy balance of payments. For an oil-producing economy that is fully integrated in the global system, one could also expect that the nature of oil and financial flows could also relate to the economic health of the country's trading partners. On the one hand, increased levels of income and appreciation of currency can translate into increased levels of imports from neighboring countries. Meanwhile, under certain fiscal policy choices, such oil income may make the country a more attractive destination for global portfolio and direct investments at the expense of other countries in the region. On the other, a fall in oil revenues, hence the country's income, may significantly hurt Indonesian imports (Hausmann and Rigobon 2003).

Despite (or because of) being a major oil producer, Indonesia is no stranger to economic sanctions. The TIES dataset features 19 episodes between 1945 and 2005 where Indonesia was threatened with sanctions, nine of which escalated into sanction impositions. Similarly, the EUSANCT dataset identifies three impositions out of four sanction threats against Indonesia by the EU and the U.S. between 1989 and 2015, including EU restrictions to Indonesian oil imports in 1999.

The effects of an oil or financial sanction against an oil-producing country can vary in relation to global availability and price of oil at the time this perturbation occurs. Accordingly, we run our simulations of trade and financial sanctions each under two settings, namely when the global market for oil is tight or loose. The tight market scenario sets the clock for world markets virtually at 2013Q4, a time when Brent was trading above $100 US per barrel, and OECD inventories were trading below their 5-year average (OPEC Secretariat 2014). The loose market scenario sets the clock for world markets virtually at 2018Q3, a time when Brent was trading below $75.00 US per barrel, and OECD

inventories were well above their 5-year average (OPEC Secretariat 2019). In both cases, we introduce a one standard deviation shock to Indonesia's oil production and short-term interest rates to simulate trade and financial sanctions, respectively. In the tight oil markets scenario, these shocks indicate a 2.7% drop in oil production or a 0.6% increase in short-term interest rates. The corresponding figures for the loose oil markets scenario are 2.4% for oil production, or, again, 0.6% for short-term interest rates. To reiterate, the analyses below are sanction simulations and create various counterfactuals to assess whether such disruptions in a target state's economy have the potential to spill over to other countries in the region.

Figures 1 and 2 present how each simulated sanction affects main macroeconomic indicators in Indonesia. The dashed line indicates the median simulation within a 90% confidence interval indicated by the shaded area in gray for each indicator, namely real GDP, inflation, nominal short-term interest rates and oil production.[7] The y-axis indicates deviations from baseline levels of the performance indicator in each quarter. The results suggest that macroeconomic indicators in Indonesia react to both types of sanctions. These reactions legitimize the question of whether the domestic effects of these sanctions in the Indonesian economy, in turn, could spill over to the macroeconomic indicators in neighboring states. Also, the effects of oil sanctions on the Indonesian economy seem to be conditional on the nature of global oil markets, hence justifying our decision to run our simulations under both tight and loose conditions.

Under tight oil market conditions, oil sanctions suggest a permanent negative displacement of half a percent of Indonesian GDP from its baseline for this study's horizon of twelve quarters. The effect of oil sanctions on inflation and short-term interest rates in this scenario appear negligible. The decline in GDP because of oil sanctions under loose oil market conditions is much less and mostly concentrated during the first year of the sanctions. The confidence intervals also caution the

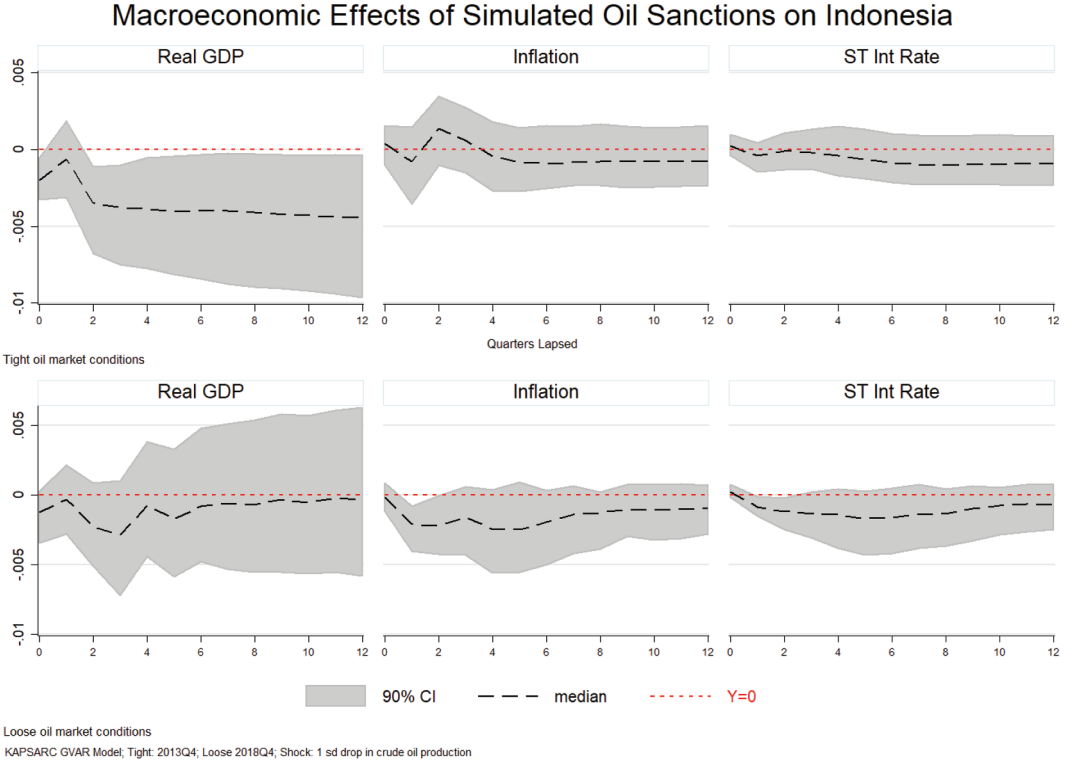

Figure 1. Simulated effects of oil export sanctions on Indonesia.

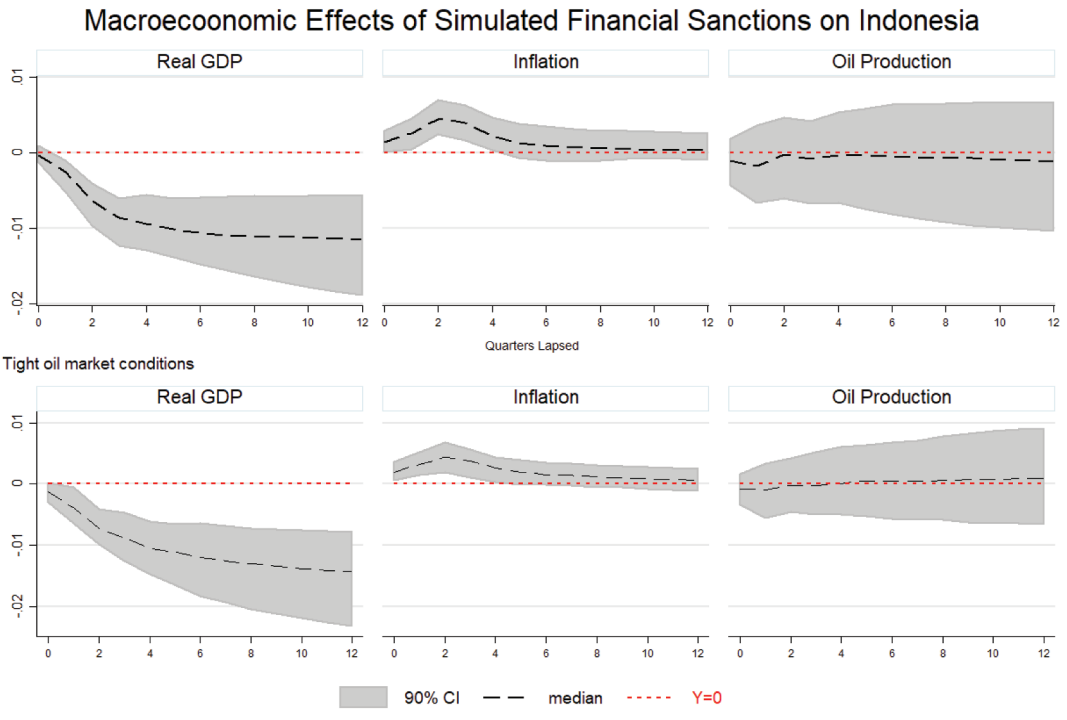

Figure 2. Simulated effects of financial sanctions on Indonesia.

reliability of this minor depressing effect on GDP during the first four quarters following the sanction. The simulated effects of a sanctioned oil industry on Indonesia's inflation and short-term interest rates are also quite minor (about −0.1%) and temporary, though exhibiting (near) statistical significance. Financial sanctions, on the other hand, seem to have a considerable bearing on the Indonesian domestic economy regardless of the condition of global oil markets. In both tight and loose oil market scenarios, financial sanctions cause an immediate drop in GDP, accompanied by a small but significant increase in inflation. The deviation from baseline GDP worsens over time and settles around a permanent 1% decrease in about a year. The economy responds to inflation quickly after the peak in the second quarter of about 0.4%; the shock to inflation dissipates thereafter.[8]

Testing for Spillover Effects

Simulation #1 – Trade Sanctions: Restriction of Oil Production and Exports

While sanctions can take on various forms, trade and financial sanctions are the most common, and economically consequential for the region and possibly global markets. Our first set of simulations run a round of trade sanctions on Indonesian oil production. These sanctions can take place in the form of export sanctions (i.e. preventing the sale of Indonesian oil in global markets, hence a drop in Indonesian oil production), or import sanctions (i.e. prohibition of oil-extraction equipment sale to Indonesia, which, in turn, hurts Indonesia's capacity for oil production). The simulated shock amounts to a one standard deviation drop in Indonesian oil production, amounting to 2.7% and 23,841 barrels/day for the tight market and 2.4% and 20,328 barrels/day for the loose market scenarios. These assumptions are realistic; sanctions are often busted via 'black-knights,' especially for goods that have relatively inelastic demand and not are easily substitutable (Early 2015; Kavaklı, Tyson Chatagnier, and Hatipoğlu 2020).

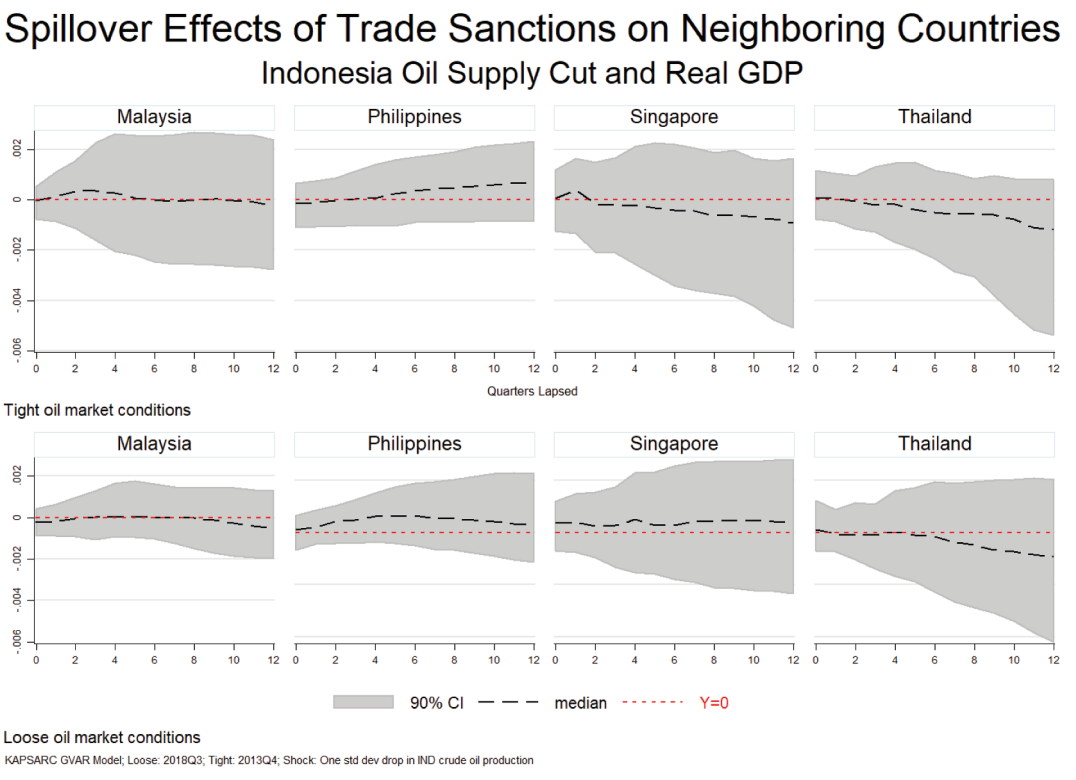

Figure 3. Oil sanctions on Indonesia and GDP in neighboring countries.

Our first set of results, illustrated in Figure 3, investigate how oil sanctions to Indonesia affect the real GDP of neighboring countries under loose and tight oil market conditions. Out of the four sets of sanction-economic result pairs we examine in this study, the simulation of oil sanctions on GDP of neighboring countries turns out to be the least consequential, under both loose and tight oil market conditions.[9] While exhibiting no statistical significance, comparing the tight and loose oil market scenario suggests two trends. First, the consequences of trade sanctions on real GDP seem to be minimally worse under the tight oil market scenario for all four neighboring countries. Malaysia's minute uptick between quarters two and four could be a result of its ability, as an oil producer itself, to replace Indonesian oil in the region. Second, the effects of sanctions seem to kick in after a lag of four to six quarters in five of the eight simulations presented. Oil inventories could be one of the reasons explaining this delay.

Figure 4 suggest that the effect of Indonesian oil sanctions on equity prices in its region is slightly more pronounced. The confidence intervals, however, continue to caution us on interpreting the substantive effects of these simulations. Under tight market conditions, our simulation suggests Malaysian stock markets (BM) will rise very slightly while the relatively riskier Philippines (PSE) and Thai (SET) stock markets will lose value over the next 3 years following oil sanctions. These slight movements may suggest that while BM may be receiving a part of the portfolio investments exiting Indonesia, investors may be also exiting the SET and PSE either due to increased regional risk and/or to balance their portfolios by selling assets in the other non-sanctioned markets in the region. The Singaporean Exchange (SGX) remains the least affected among the four neighbors. This is not surprising since the SGX is a much deeper equities market.

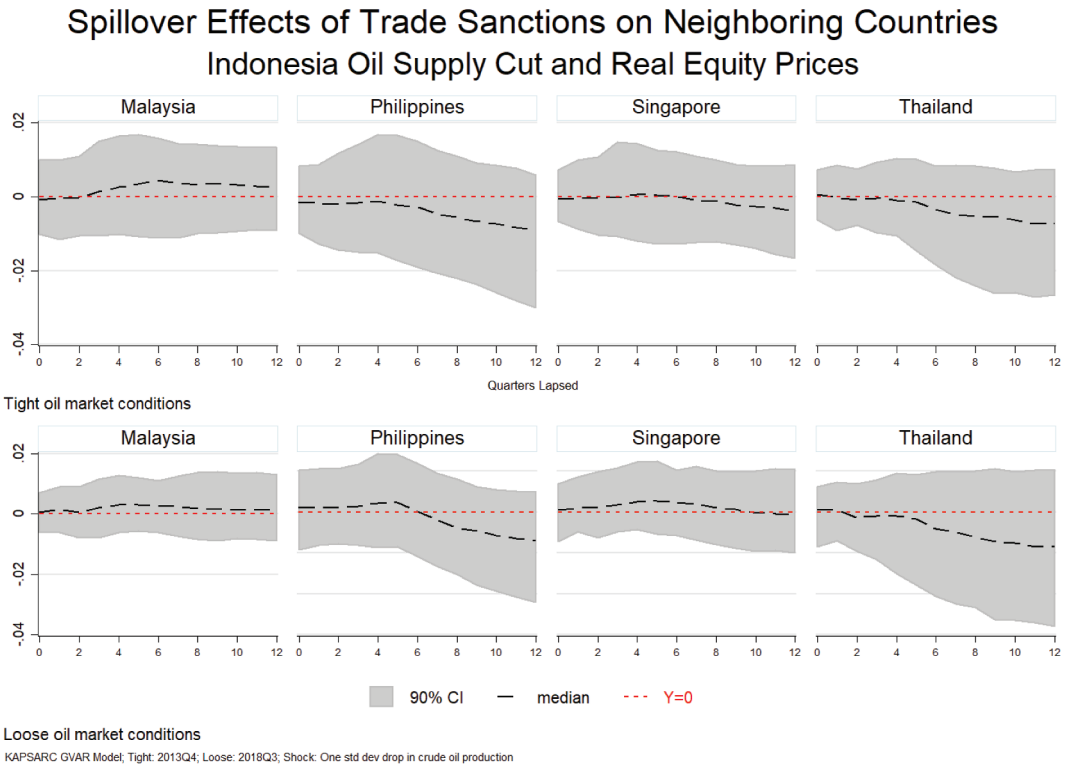

Figure 4. Oil sanctions on Indonesia and Equity Prices in neighboring countries.

Results from Indonesian oil sanctions under loose market conditions reveal a very similar picture to that of tight market conditions. The few small differences are all in accordance with our expectations. Our median simulations indicate PSE and SGX join BM in a small upward rally. These slight increases may be because the adverse effects of oil sanctions against an oil producer in an oversupplied oil market may be less contagious in the region. Interestingly, PSE equities diverge from BM and SGX after six quarters and join SET in losing value for the remaining half of our time horizon.

Simulation #2 – Financial Sanctions: Shock to Indonesian Short-Term Interest Rates

Our second set of simulations mimics financial sanctions by shocking Indonesian short-term interest rates. While the magnitude of our financial shock to Indonesian short-term interest rates may initially seem small (an increase about of 0.5%), its effects on the macroeconomic indicators of the neighboring states are notable, especially on equity prices.

Figure 5 suggests that all four neighboring counties in our analysis experience small losses in their GDP, for which the maximum effects hover around −0.2%. These deviations may appear small; however, it is worth noting that such a deviation indicates a 10% decrease in base-line growth in an economy that is expected to experience a 2% GDP growth, otherwise. In contrast with corresponding results under trade sanctions, these deviations achieve exhibit statistical significance under tight, and near statistical significance under loose oil market conditions. The status of the global oil market seems to condition this adverse effect financial sanctions have on the GDP of neighboring countries. Our simulations predict loose oil market conditions to slightly decrease the GDP of Philippines and Thailand, while tight oil market conditions do so for the GDP of Malaysia and Singapore.

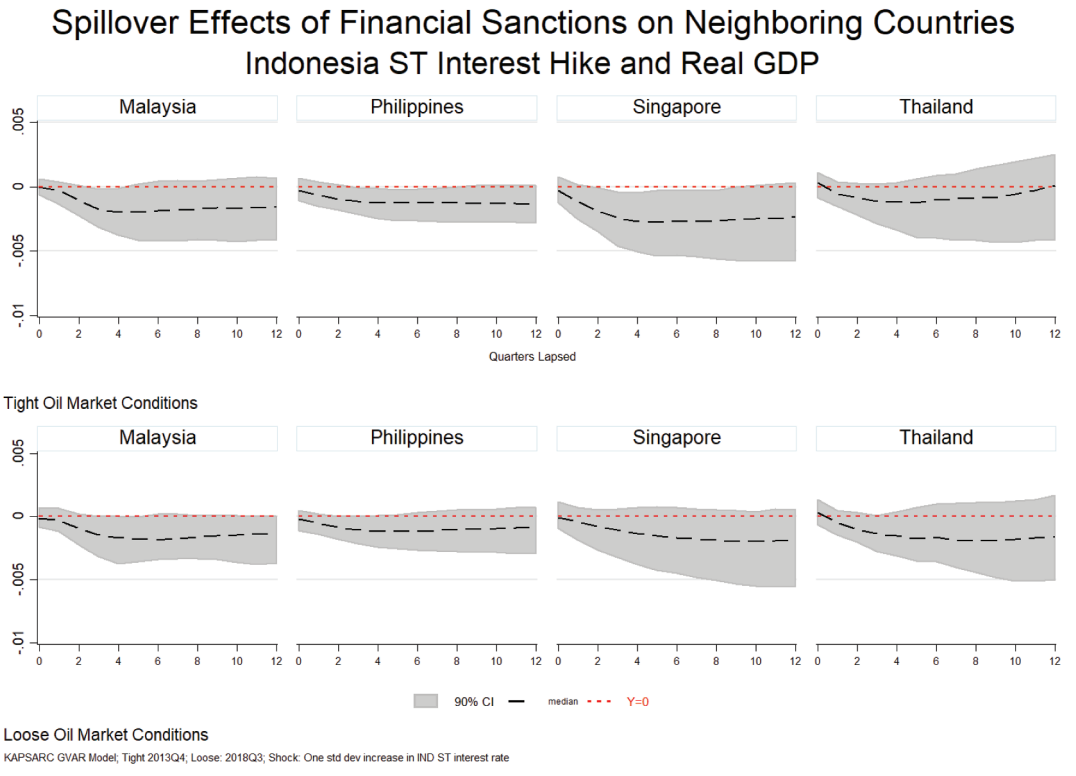

Figure 5. Financial sanctions on Indonesia and real GDP in neighboring countries.

Among various sets of simulations conducted in this study, spillover effects seem to be most evident for financial sanctions on Indonesia to equity markets in its neighbors. In Figure 6, the equity markets in all four neighbors lose value due to financial sanctions, both under tight and loose oil market scenarios. In most cases, neighboring states witness depreciation in their equity prices immediately, where the prices reach their minimum after about a year. Philippines emerges as the most adversely affected country where losses in equity prices after a year amounted to 3.1% under tight and 2.2% under loose oil market conditions.[10]

The losses in other countries' equity markets occur around 2% and 1.7% under tight and loose oil market conditions, respectively, after a year. These findings suggest sanctions may be scaring investors more when the targeted state, which is a major consumer in the region, is already suffering economically from low prices in one of its main exports, i.e. oil. That the same effect is not observed under trade (oil) sanctions point out to two possible explanations. First, our simulations of Indonesia suggest that oil sanctions will be less consequential than financial sanctions for Indonesia, hence raising less concern in the region. Furthermore, oil sanctions under loose oil market conditions may cause deflationary pressures driving interest rates down, hence making neighboring countries in the region more attractive destinations for global capital. The second relates to the speed of reactions to sanctions for both Indonesia and its neighbors. Investors may be quicker to realize profits in the financial market whereas the relatively slow pace of the real sector may give economic players sufficient time to adjust to trade sanctions to minimize spillover effects. As a matter of fact, unlike the other three sets of simulations for potential spill-over effects, Indonesia's neighbors start with an immediate loss in the case of equity prices following financial sanctions.

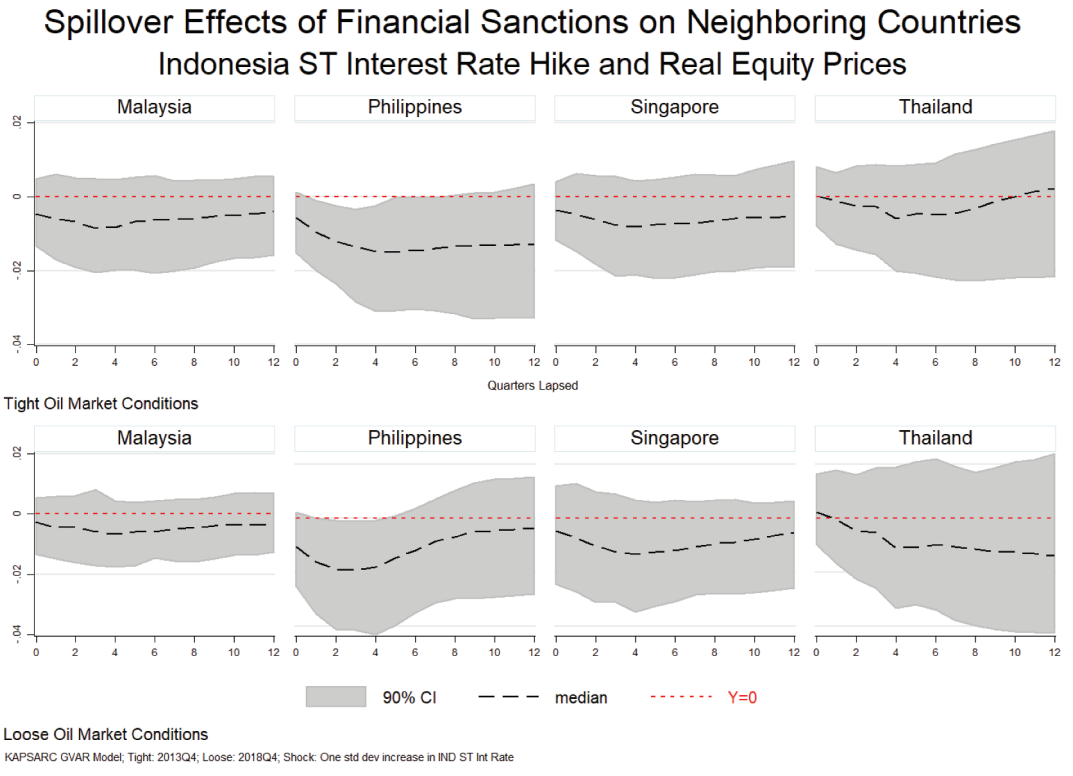

Figure 6. Financial sanctions on Indonesia and equity prices in neighboring countries.

Conclusion

This study is one of the first attempts to systematically assess spillover effects of an economic sanction in the domestic economies of neighboring states. Our simulations of 'mild' trade and financial sanctions on Indonesia suggest economic spill-over in the region emerges as an adverse consequence of sanctions. However, the substantive effect of this spill over is conditional on various factors. First, the spill-over effects of financial sanctions seem to be more consequential. The adverse spill-over effects of financial sanctions are slightly more pronounced when oil prices are high. We posit two reasons for this. The budgetary pressures on non-oil-producing neighboring states are higher under tight oil markets. In addition, foregone revenues hurt Indonesian consumption, and consequently Indonesia's trading partners, more when oil prices are high.

Finally, sanctions do not spill-over to all markets and neighbors the same way. Real-equity markets in the region seem to be most affected by financial sanctions, suggesting markets may respond to sanctions in one market of Southeast Asia by selling off assets in another. This finding underlines the fact that foreign policy between two states does not occur in a vacuum. The nature of the inter-dependency between a superpower and another state, for instance, may extend beyond their dyadic relation, but rather form at the regional level. Our simulations also suggest neighbors with deeper equity markets, such as Singapore and Malaysia, can counter the risk of capital flight from financial sanctions on Indonesia more effectively. The pattern with respect to GDP is somewhat different. The more dependent a neighbor is on trade in goods and services with Indonesia, the more its GDP will be hurt due to a hypothetical contraction of the Indonesian economy due to financial sanctions.

The implications of our findings extend beyond economic consequences in the region. Recent work on trade and interdependence suggests disturbance in the flows of goods, services, and capital among countries may lead to various geopolitical tensions in the region including militarized conflict

(see, inter alia, Peterson 2020; Chatagnier and Can Kavaklı 2017; Kleinberg, Robinson, and French 2012). For example, countries in the region with similar export profiles that can no longer export to the sanctioned country may scramble for new markets, increasing the risk of militarized conflict between them (Chatagnier and Can Kavaklı 2017). Alternatively, a region-wide recession may encourage the governments of the neighboring countries to simultaneously divert attention from economic woes, especially if they are responsive to popular demands (Oneal and Tir 2006). Since neighbors tend to harbor conflicts (dormant or acute) more frequently between each other, these diversions may significantly escalate tensions in the region (Tir 2010).

Our simulations also suggest that the economy of some neighbors will be more adversely affected than others; the resulting changes in relative power of states within a region may constitute another source of interstate conflict (Huth, Scott Bennett, and Gelpi 1992; Lemke 2004). On a different note, regional difficulties sanctions cause can group the target's neighbors against the sanctioning entity (Chen 2021). Such adverse geopolitical implications regional spillovers may create under certain conditions may outweigh the benefits the sender will derive from threatening and/or imposing sanctions.

More generally, our simulations present yet another reason for the importance of devising smarter sanctions that 'hurt' those capable of producing policy change while insulating other parties from sanctions' adverse effects. Sanctions selectively targeting those culpable for the contested policy in the targeted country (e.g. asset freezes, visa bans against political elites), in this respect, may produce more benefits than trade or financial sanctions. At the very least, however, recognition of such adverse consequences of spillovers in their risk registry would be a valuable first step for sanctioning parties in minimizing these consequences.

Various safety measures in sanctions design come to mind in alleviating the adverse spillover effects of sanctions. Automatic 'carrot policies' for neighboring countries institutionalized in sanction legislation may limit the risk of financial contagion by signaling markets that the region, as a whole, remains safe to invest in. Such carrots may include temporary tariff reductions for the neighboring countries' exports or selective procurement of real and financial commodities of these neighbors by the sanctioning government. Incentivizing global funds to keep their portfolios in the region could be another option. The sanctioning state, for example, could use relevant fiscal instruments such as a temporary decrease in the capital gains tax for that region's financial products.

Endnotes

1. Developing a better understanding of transnational effects of economic sanctions would also contribute to the general debate on spillovers in IR literature. The concept of spillovers across borders has been addressed in the context of conflict (Atzili 2007; Salehyan 2008), social movements (Meyer and Whittier 1994; Hadden 2014), and international norms and practices (Finnemore and Sikkink 1998), among others. In economics, a wealth of studies examines spillover effects between various markets. For such effects between oil and other markets (real and financial), see, inter alia, Mensi et al. (2013); Arouri, Lahiani, and Khuong Nguyen (2011); Singh, Kumar, and Nishant (2019); and Guhathakurta, Ranjan Dash, and Maitra (2020).
2. VAR and GVAR analyses have been utilized in various policy areas to conduct forecasting and counterfactual analysis. Oil market VAR analyses, that is analyses that run counterfactuals on variables in a single oil-producing country have evolved from the original work of Kilian (2009). One of the early canonical GVAR models is outlined by Stephane et al. (2007), which explores international linkages in the Euro area. This framework has been extended to several applications in forecasting and counterfactual analysis. The first GVAR forecasting model to be applied to the global economy is Pesaran, Schuermann, and Vanessa Smith (2009), where the authors forecast delayed responses of several real and financial variables, including real output inflation, real equity prices, exchange rates and interest rates, to various specific macroeconomic shocks. Extensions of the GVAR framework to counterfactual analysis and forecasting include examination of global trade imbalances (Bussière et al. 2012), and effects of COVID19 on main global macroeconomic indices (Chudik et al. 2020), among others.
3. Unit root, weak exogeneity, pairwise correlations and structural stability tests are summarized in the online technical appendix and are available on demand.
4. The PPs are not displayed for brevity and since they carry little interpretive value. All PPs have converged for all simulations run in this study.

5. The price of oil per barrel averaged $108 in 2013, with a peak of $117 in September that year. Despite the ongoing tension with Iran at the time, global oil markets were in a relatively loose condition in Q3 of 2018. This is primarily the result of a build in inventories and is seen by the reduction in WTI prices from $76 at the start of the quarter to $46 by the end of Q3 2018.
6. To be precise, our GOVAR model allows us to assess whether and to what extent sanctions on Indonesia affect any country included in our model. We choose to focus on neighboring countries as neighbors tend to trade among each other more, be grouped together in global financial markets, and develop deeper levels of interdependence beyond economic ties.
7. Unfortunately, equity prices for Indonesia are not available in our GOVAR model.
8. The results of the analysis presenting the cumulative medium changes and statistical significance of the variables real GDP, inflation, crude oil production, equity prices and short-term interest rates for a two-year period are summarized in Tables C1 and C2 under Appendix C. The significance levels are most notable for the financial sanctions, which are statistically significant for at least seven quarters under tight and loose market conditions. In loose markets, the oil market sanctions are significant for only the first two quarters following the initial shock to the system.
9. These four pairs are oil sanctions – GDP, oil sanctions – equity markets, financial sanctions – GDP, and financial sanctions – equity markets.
10. The results of a spillover effect on equity prices in the Philippines are statistically significant for financial sanctions in both tight and loose oil markets (see Appendix C).

Disclosure Statement

No potential conflict of interest was reported by the authors.

ORCID

Emre Hatipoglu http://orcid.org/0000-0002-5927-4423
Jennifer Considine http://orcid.org/0000-0003-3060-9629
Abdullah AlDayel http://orcid.org/0000-0001-7229-881X

References

Allen, F., and D. Gale. 2000. ""Financial Contagion"." *Journal Of Political Economy* 108 (1): 1–33. doi:10.1086/262109.
Arouri, M. E. H., A. Lahiani, and D. Khuong Nguyen. 2011. ""Return and Volatility Transmission between World Oil Prices and Stock Markets of the GCC Countries"." *Economic Modelling* 28 (4): 1815–1825. doi:10.1016/j.econmod.2011.03.012.
Atzili, B. 2007. ""When Good Fences Make Bad Neighbors: Fixed Borders, State Weakness, And International Conflict"." *International Security* 31 (3): 139–173. doi:10.1162/isec.2007.31.3.139.
Berument, M. H., N. Basak Ceylan, and N. Dogan. 2010. ""The Impact of Oil Price Shocks on the Economic Growth of Selected MENA1 Countries"." *The Energy Journal* 31 (1). doi:10.5547/0195-6574-ej-vol31-no1-7.
Bove, Vincenzo, Di Salvatore, Jessica, Nisticò, Roberto. 2021. Economic sanctions and trade flows in the neighbourhood wp-2021-184 (World Institute for Development Economic Research (UNU-WIDER)).
Bussière, M., A. Chudik, and G. Sestieri. 2012. Modelling global trade flows: results from a GVAR model. Federal Reserve Bank of Dallas. Globalization and Monetary Policy Institute Working paper 119, Dallas.
Caruso, R. 2003. ""The Impact of International Economic Sanctions on Trade: An Empirical Analysis"." *Peace Economics, Peace Science and Public Policy* 9 (2). doi:10.2202/1554-8597.1061.
Cashin, P., K. Mohaddes, and M. Raissi. 2012. *The Global Impact of the Systemic Economies and MENA Business Cycles*. Washington, D.C: International Monetary Fund.
Chatagnier, J. T., and K. Can Kavaklı. 2017. ""From Economic Competition to Military Combat"." *Journal Of Conflict Resolution* 61 (7): 1510–1536. doi:10.1177/0022002715613565.
Chen, F. R. 2021. ""Extended Dependence: Trade, Alliances, And Peace"." *The Journal of Politics* 83 (1): 246–259. doi:10.1086/709149.
Chudik, Alexander, Kamiar Mohaddes, Pesaran, M. Hashem, Mehdi Raissi, A. Rebucci . 2020. ""A Counterfactual Economic Analysis of Covid-19 Using A Threshold Augmented Multi-Country Model"." *Journal of International Money and Finance* 119: 102477. doi:10.1016/j.jimonfin.2021.102477.
CIA. "The World Factbook: Indonesia." 2020. *Cia.Gov*. Accessed July 22. https://www.cia.gov/the-world-factbook/countries/indonesia/
Considine, J., A. Aldayel, and E. Hatipoglu. 2020. ""World Oil and Inventory Study: A Global VAR Analysis"." *KAPSARC*. doi:10.30573/ks.

Considine, J., E. Hatipoglu, and A. Aldayel. 2021. ""The Sensitivity of Oil Price Shocks to Preexisting Market Conditions: A GVAR Analysis"." *Journal Of Commodity Markets* 100225. doi:10.1016/j.jcomm.2021.100225.
Cortright, D., G. A. Lopez, T. George Weiss, L. Minear, L. Brahimi, N. C. Crawford, J. Devin, J. Gibson, E. Hoskins, and S. Zaidi. 1997. *Political Gain and Civilian Pain: Humanitarian Impacts of Economic Sanctions*. Lanham, MD: Rowman & Littlefield.
Daponte, B. O., and R. Garfield. 2000. ""The Effect of Economic Sanctions on the Mortality of Iraqi Children Prior to the 1991 Persian Gulf War"." *American Journal of Public Health* 90 (4): 546–552. doi:10.2105/ajph.90.4.546.
Davis, J. M., R. Ossowski, and A. Fedelino. 2003. *Fiscal Policy Formulation and Implementation in Oil-Producing Countries*. Washington, D.C: International Monetary Fund.
Difiglio, C. 2014. ""Oil, Economic Growth and Strategic Petroleum Stocks"." *Energy Strategy Reviews* 5: 48–58. doi:10.1016/j.esr.2014.10.004.
Dimitriou, D., D. Kenourgios, and T. Simos. 2013. ""Global Financial Crisis and Emerging Stock Market Contagion: A Multivariate FIAPARCH–DCC Approach"." *International Review of Financial Analysis* 30: 46–56. doi:10.1016/j.irfa.2013.05.008.
Dizaji, S. F., and P. A. G. van Bergeijk. 2013. ""Potential Early Phase Success and Ultimate Failure of Economic Sanctions"." *Journal Of Peace Research* 50 (6): 721–736. doi:10.1177/0022343313485487.
Dreger, C., K. A. Kholodilin, D. Ulbricht, and J. Fidrmuc. 2016. ""Between the Hammer and the Anvil: The Impact of Economic Sanctions and Oil Prices on Russia'S Ruble"." *Journal of Comparative Economics* 44 (2): 295–308. doi:10.1016/j.jce.2015.12.010.
Drury, A. C., and D. Peksen. 2014. ""Women and Economic Statecraft: The Negative Impact International Economic Sanctions Visit on Women"." *European Journal of International Relations* 20 (2): 463–490. doi:10.1177/1354066112448200.
Early, B. R. 2015. *"Busted Sanctions: Explaining Why Economic Sanctions Fail"*. Redwood, CA: Stanford University Press. doi:10.1515/9780804794329.
Early, B. R., and M. Cilizoglu. 2020. ""Economic Sanctions in Flux: Enduring Challenges, New Policies, and Defining the Future Research Agenda"." *International Studies Perspectives* 21 (4): 438–477. doi:10.1093/isp/ekaa002.
Escribà-Folch, A., and J. Wright. 2010. ""Dealing with Tyranny: International Sanctions and the Survival of Authoritarian Rulers1"." *International Studies Quarterly* 54 (2): 335–359. doi:10.1111/j.1468-2478.2010.00590.x.
Finnemore, M., and K. Sikkink. 1998. ""International Norm Dynamics and Political Change"." *International Organization* 52 (4): 887–917. doi:10.1162/002081898550789.
Fjelde, H. 2009. ""Buying Peace? Oil Wealth, Corruption and Civil War, 1985—99"." *Journal Of Peace Research* 46 (2): 199–218. doi:10.1177/0022343308100715.
Gordon, J. 2015. "The Invisibility of Human Harm: How Smart Sanctions Consumed All the Oxygen in the Room." *Social Research* 82 (4): 863–874. doi:10.1353/sor.2015.0060.
Grauvogel, J., and C. von Soest. 2014. ""Claims to Legitimacy Count: Why Sanctions Fail to Instigate Democratisation in Authoritarian Regimes"." *European Journal of Political Research* 53 (4): 635–653. doi:10.1111/1475-6765.12065.
Guhathakurta, K., S. Ranjan Dash, and D. Maitra. 2020. ""Period Specific Volatility Spillover Based Connectedness between Oil and Other Commodity Prices and Their Portfolio Implications"." *Energy Economics* 85: 104566. doi:10.1016/j.eneco.2019.104566.
Gutmann, J., M. Neuenkirch, and F. Neumeier. 2020. ""Precision-Guided or Blunt? the Effects of US Economic Sanctions on Human Rights"." *Public Choice* 185 (1–2): 161–182. doi:10.1007/s11127-019-00746-9.
Habibzadeh, F. 2018. ""Economic Sanction: A Weapon of Mass Destruction"." *The Lancet* 392 (10150): 816–817. doi:10.1016/s0140-6736(18)31944-5.
Hadden, J. 2014. ""Explaining Variation In Transnational Climate Change Activism: The Role Of Inter-Movement Spillover"." *Global Environmental Politics* 14 (2): 7–25. doi:10.1162/glep_a_00225.
Hatipoglu, E., and D. Peksen. 2018. ""Economic Sanctions and Banking Crises in Target Economies"." *Defence And Peace Economics* 29 (2): 171–189. doi:10.1080/10242694.2016.1245811.
Hausmann, R., and R. Rigobon. 2003. *"An Alternative Interpretation of the 'Resource Curse': Theory and Policy Implications"*. Cambridge, MA: National Bureau of Economic Research. doi:10.3386/w9424.
Hufbauer, G. 1998. "*Sanctions-Happy USA*, 98-4, Washington, DC: Institute for International Economics.
Huth, P., D. Scott Bennett, and C. Gelpi. 1992. ""System Uncertainty, Risk Propensity, and International Conflict among the Great Powers"." *Journal Of Conflict Resolution* 36 (3): 478–517. doi:10.1177/0022002792036003004.
International Energy Agency. 2020. *2019 World Energy Outlook*. Paris: International Energy Agency.
Kamiar, M., and M. Hashem Pesaran. 2016. ""Country-Specific Oil Supply Shocks and the Global Economy: A Counterfactual Analysis"." *Energy Economics* 59: 382–399. doi:10.1016/j.eneco.2016.08.007.
Kavaklı, K. C., J. Tyson Chatagnier, and E. Hatipoğlu. 2020. ""The Power to Hurt and the Effectiveness of International Sanctions"." *The Journal of Politics* 82 (3): 879–894. doi:10.1086/707398.
Khan, N. S. 2020. ""Spillover Effects of Trade Shocks in the Central and Eastern European and Baltic Countries"." *Journal Of Economic Integration* 35 (1): 39–68. doi:10.11130/jei.2020.35.1.39.
Kilian, L. 2009. ""Exogenous Oil Supply Shocks: How Big are They and How Much Do They Matter for the U.S. Economy?"." *Review of Economics and Statistics* 90 (2): 216–240. doi:10.1162/rest.90.2.216.
Kleinberg, K. B., G. Robinson, and S. L. French. 2012. ""Trade Concentration and Interstate Conflict"." *The Journal of Politics* 74 (2): 529–540. doi:10.1017/s0022381611001745.

Lemke, D. 2004. *Regions of War and Peace*. Cambridge: Cambridge University Press.
Marinov, N. 2005. ""Do Economic Sanctions Destabilize Country Leaders?"." *American Journal Of Political Science* 49 (3): 564–576. doi:10.1111/j.1540-5907.2005.00142.x.
Matsumoto, K., V. Voudouris, D. Stasinopoulos, R. Rigby, and C. Di Maio. 2012. ""Exploring Crude Oil Production and Export Capacity of the OPEC Middle East Countries"." *Energy Policy* 48: 820–828. doi:10.1016/j.enpol.2012.06.027.
McLean, E. V., and D. A. Roblyer. 2017. ""Public Support For Economic Sanctions: An Experimental Analysis"." *Foreign Policy Analysis* orw014. doi:10.1093/fpa/orw014.
McLean, E. V., and T. Whang. 2014. ""Designing Foreign Policy"." *Journal Of Peace Research* 51 (5): 589–602. doi:10.1177/0022343314533811.
Mensi, W., M. Beljid, A. Boubaker, and S. Managi. 2013. ""Correlations and Volatility Spillovers across Commodity and Stock Markets: Linking Energies, Food, and Gold"." *Economic Modelling* 32: 15–22. doi:10.1016/j.econmod.2013.01.023.
Meyer, D. S., and N. Whittier. 1994. ""Social Movement Spillover"." *Social Problems* 41 (2): 277–298. doi:10.2307/3096934.
Mirkina, I. 2018. ""FDI and Sanctions: An Empirical Analysis of Short- and Long-Run Effects"." *European Journal Of Political Economy* 54: 198–225. doi:10.1016/j.ejpoleco.2018.05.008.
Morgan, T. C., N. Bapat, and Y. Kobayashi. 2014. ""Threat and Imposition of Economic Sanctions 1945–2005: Updating the TIES Dataset"." *Conflict Management and Peace Science* 31 (5): 541–558. doi:10.1177/0738894213520379.
Neuenkirch, M., and F. Neumeier. 2016. ""The Impact of US Sanctions on Poverty"." *Journal Of Development Economics* 121: 110–119. doi:10.1016/j.jdeveco.2016.03.005.
Olayungbo, D. O. 2019. ""The US–China Trade Dispute: Spill-Over Effects For Selected Oil-Exporting Countries In Africa Using GVAR Analysis"." *Transnational Corporations Review* 11 (4): 310–322. doi:10.1080/19186444.2019.1682407.
Oneal, J. R., and J. Tir. 2006. ""Does The Diversionary Use Of Force Threaten The Democratic Peace? Assessing The Effect Of Economic Growth On Interstate Conflict, 1921?2001"." *International Studies Quarterly* 50 (4): 755–779. doi:10.1111/j.1468-2478.2006.00424.x.
OPEC. 2014. World Oil Outlook. Vienna, Austria: OPEC Secreteriat.
OPEC. 2019. World Oil Outlook. Vienna, Austria: OPEC Secreteriat.
Parker, D. P., J. D. Foltz, and D. Elsea. 2016. ""Unintended Consequences Of Sanctions For Human Rights: Conflict Minerals And Infant Mortality"." *The Journal Of Law And Economics* 59 (4): 731–774. doi:10.1086/691793.
Peksen, D. 2009. ""Better Or Worse? The Effect Of Economic Sanctions On Human Rights"." *Journal Of Peace Research* 46 (1): 59–77. doi:10.1177/0022343308098404.
Peksen, D. 2011. ""Economic Sanctions And Human Security: The Public Health Effect Of Economic Sanctions"." *Foreign Policy Analysis* 7 (3): 237–251. doi:10.1111/j.1743-8594.2011.00136.x.
Peksen, D., and B. Son. 2015. ""Economic Coercion And Currency Crises In Target Countries"." *Journal Of Peace Research* 52 (4): 448–462. doi:10.1177/0022343314563636.
Pesaran, M. H., T. Schuermann, and L. Vanessa Smith. 2009. ""Forecasting Economic And Financial Variables With Global Vars"." *International Journal Of Forecasting* 25 (4): 642–675. doi:10.1016/j.ijforecast.2009.08.007.
Peterson, T. M. 2020. ""Reconsidering Economic Leverage And Vulnerability: Trade Ties, Sanction Threats, And The Success Of Economic Coercion"." *Conflict Management And Peace Science* 37 (4): 409–429. doi:10.1177/0738894218797024.
Reuters. 2014. "Concerns About Possible Escalation Of Ukraine Crisis Have Risen -ECB". https://www.reuters.com/article/idUSL6N0OM59820140605.
Reuters. 2018. "Treasury warns of wide impact if U.S. sanctions Russian debt". https://www.reuters.com/article/idUSKBN1FM24Q
Salehyan, I. 2008. ""The Externalities Of Civil Strife: Refugees As A Source Of International Conflict"." *American Journal Of Political Science* 52 (4): 787–801. doi:10.1111/j.1540-5907.2008.00343.x.
Singh, V. K., P. Kumar, and S. Nishant. 2019. ""Feedback Spillover Dynamics Of Crude Oil And Global Assets Indicators: A System-Wide Network Perspective"." *Energy Economics* 80: 321–335. doi:10.1016/j.eneco.2019.01.005.
Slavov, S. T. 2007. "Innocent or Not-so-innocent Bystanders: Evidence from the Gravity Model of International Trade About the Effects of UN Sanctions on Neighbour Countries." *World Economy* 30 (11): 1701–1725.
Smith, B. 2004. ""Oil Wealth And Regime Survival In The Developing World, 1960–1999"." *American Journal Of Political Science* 48 (2): 232–246. doi:10.1111/j.0092-5853.2004.00067.x.
Solomon, M., and A. J. McGann. 2005. ""Caught in the Crossfire: "Innocent Bystanders" as Optimal Targets of Economic Sanctions"." *Journal Of Conflict Resolution* 49 (3): 337–359. doi:10.1177/0022002705276568.
Stephane, D., M. H. P. Filippo Di Mauro, L. Vanessa Smith, and L. V. Smith. 2007. ""Exploring the International Linkages of the Euro Area: A Global VAR Analysis"." *Journal Of Applied Econometrics* 22 (1): 1–38. doi:10.1002/jae.932.
Tir, J. 2010. ""Territorial Diversion: Diversionary Theory Of War And Territorial Conflict"." *The Journal Of Politics* 72 (2): 413–425. doi:10.1017/s0022381609990879.
Weber, P. M., and G. Schneider. 2022. ""Post-Cold War Sanctioning by the EU, the UN, and the US: Introducing the EUSANCT Dataset"." *Conflict Management and Peace Science* 39 (1): 97–114. doi:10.1177/0738894220948729.
Wood, R. M. 2008. ""A Hand upon the Throat of the Nation": Economic Sanctions and State Repression, 1976-2001"." *International Studies Quarterly* 52 (3): 489–513. doi:10.1111/j.1468-2478.2008.00512.x.
World Bank. 2020. *World Integrated Trade Solution Statistics*. https://wits.worldbank.org/

Appendix A – List of Countries Included in GOVAR Model

Argentina, Australia, Austria, Belgium, Brazil, Canada, China, Chile, Finland, France, Germany, India, Indonesia, Italy, Japan, Korea, Malaysia, Mexico, Netherlands Norway, New Zealand, Peru, Philippines, South Africa, Saudi Arabia, Singapore, Spain, Sweden, Switzerland, Thailand, Turkey, United Kingdom, United States

Appendix B – Variables and Data Sources

Commodity	Financial
Oil Production	ST Nominal Int Rate
(EIA)	(IMF, NSA)
Oil Inventories	LR Nominal Int Rate
(EIA)	(IMF, NSA)
Oil Price (Global)	Real Exchange Rates
(Bloomberg)	(Bloomberg, NSA)
Agricultural (Global)	Inflation
(IMF)	(MF, FRED, NSA)
Metal (Global)	Equity Prices (Real)
(IMF)	(Bloomberg)
	Real GDP
	(World Bank, FRED, NSA)

NSA: National Statistical Accounts; FRED: St. Louis FED; IMF: International Monetary Fund. A more detailed discussion of data sources can be found in Considine, Aldayel, and Hatipoglu (2020).

Appendix C – Statistical Significance Levels

Table C1. Selected results by country and region: Loose market scenario.

	Real GDP		Inflation		Crude oil production		Equity markets		Short-term interest rates	
Oil industry sanctions:										
Oil supply cut										
Indonesia	−1.27%	B	−1.25%	A	−17.4%	*			−0.85%	A
Malaysia	−0.10%		−0.05%				−0.08%		−0.03%	*
Philippines	−0.12%		−0.06%				0.43%		−0.05%	
Singapore	−0.01%		−0.05%				−0.35%		−0.04%	
Thailand	−0.20%		−0.12%				−1.41%		−0.06%	
Financial sanctions:										
Short-term interest rate hike										
Indonesia	−7.96%	*	3.05%		−1.64%				3.69%	*
Malaysia	−1.05%		−0.06%	C			−5.14%		−0.01%	
Philippines	−0.63%		0.26%				−6.88%	A	0.27%	E
Singapore	−1.38%		−0.01%	A			−4.83%		0.07%	*
Thailand	−0.93%		0.15%				−0.53%		0.19%	*

Notes: Median cumulative changes after two years in %, * refers to statistically significant at 90% confidence intervals. A: statistically significant in one quarter. B: statistically significant in two quarters. C: statistically significant in three quarters. D: statistically significant four quarters. E: statistically significant in five quarters. F: statistically significant in six quarter. G: statistically significant in seven quarters.

Table C2. Selected results by country and region: Tight market scenario.

	Real GDP		Inflation		Crude oil production		Equity markets		Short-term interest rates	
Oil industry sanctions:										
Oil supply cut										
Indonesia	−2.58%	G	−0.15%		−14.38%	*			−0.34%	
Malaysia	0.11%		−0.03%				1.43%		0.01%	
Philippines	0.09%		0.02%				−1.74%		0.00%	
Singapore	−0.13%		−0.03%				−0.11%		−0.01%	
Thailand	−0.18%		0.06%				−1.14%		0.04%	
Financial sanctions:										
Short-term interest rate hike										
Indonesia	−5.87%	G	1.80%	E	0.00%				2.36%	F
Malaysia	−1.07%	C	0.01%				−5.33%		0.00%	
Philippines	−0.79%	E	0.29%				−9.91%	G	0.27%	D
Singapore	−1.66%	F	−0.05%				−5.22%		0.05%	
Thailand	−0.65%		0.00%				−2.57%		0.05%	B

Notes: Median cumulative changes after two years in %, * refers to statistically significant at 90% confidence intervals. A: statistically significant in one quarter. B: statistically significant in two quarters. C: statistically significant in three quarters. D: statistically significant four quarters. E: statistically significant in five quarters. F: statistically significant in six quarter. G: statistically significant in seven quarters.