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Abstract

English:

This research project intended to find possible reasons why US policymakers were reluctant to immediately impose their secondary sanctions on Iranian oil products following the US withdrawal from the Joint Comprehensive Plan of Action in May 2018. An econometric analysis was conducted to determine the impact of changes to global oil supplies resulting from US sanctions on Iranian oil exports. Results provided evidence that fluctuations in oil supplies worldwide did not significantly affect global oil prices. It is theorised that either reductions in Iranian oil exports simply did not have an impact on global oil prices, or US authorities managed to take necessary measures to stabilise the market while their waivers were in effect. Further, due to the insignificant results in the econometric tests it was theorised that there may have been political reasons beyond oil prices that hindered the US from fully applying its secondary sanctions for a whole year. In summary, this research found that there may be important factors restraining the ability of states to impose sanctions, which may have a negative impact on the actual effectiveness of this economic instrument.

German:

Diese Masterarbeit war geeignet um mögliche Gründe dafür zu finden, warum die US-Regierung, nach Ihrem Rücktritt aus dem Joint Comprehensive Plan of Action im Mai 2018, Ihre Sanktionen auf iranische Ölexporte nicht sofort vollständig implementierten. Ein ökonometrisches Model wurde entwickelt um den Einfluss von veränderten globalen Ölvorräten auf weltweite Ölpreise festzustellen. Die Ergebnisse gaben Beweis um zu behaupten, dass es nach dem US-Austritt bis zum Ende der von der US-Regierung ausgegebenen Sonderfreigaben für das importieren von iranischen Öl in May 2019, keine Korrelation zwischen globalen Ölvorräten und Ölpreisen gab. Es wurde theoretisiert, dass entweder die gesunkenen iranischen Ölexporte soweit keinen Einfluss auf Ölpreise hatten, oder die US-Regierung sich mit den Sonderfreigaben Zeit gekauft hatte um den Ölmarkt vor den weiter sinkenden iranischen Ölexport zu stabilisieren. Des Weiteren, es wurde theoretisiert, dass es möglicherweise weitere politische Gründe für die Sonderfreigaben für Ölimporte gab. Dieses Forschungsprojekt hat herausgefunden, dass es globale Faktoren gibt die die Fähigkeit von Staaten um Sanktionen zu implementieren erschwert. Diese könnten die Effektivität von Sanktionen bedeutungsvoll limitieren.

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List of Abbreviations

- EU – European Union
- GDP – Gross Domestic Product
- GNP – Gross National Product
- IAEA – International Atomic Energy Agency
- INSTEX – Instrument in Support of Trade Exchanges
- JCPOA – Joint Comprehensive Plan of Action
- OECD – Organisation for Economic Cooperation and Development
- OPEC – Organisation of the Petroleum Exporting Countries
- P5 – Permanent Members of the United Nations Security Council
- UN – United Nations
- UNSC – United Nations Security Council
- US – United States
- WTI – West Texas Intermediate
- WTO – World Trade Organisation

Chapter 1: Introduction

When the US unilaterally withdrew from the JCPOA in May 2018, also known as the Iran nuclear deal, US President Donald Trump proclaimed that he will impose “the toughest sanctions regime ever imposed” on Iran (BBC 2018b). Mass hysteria within the capitals of the world followed and the withdrawal announcement was seen akin to signing a death warrant for the international agreement which had taken over a decade of frustrating negotiations to find consensus on.

Under the JCPOA, the permanent members of the UNSC, Germany and the EU pledged to gradually lift sanctions as detailed in UNSC Resolution 2231. These sanctions had been placed on Iran for its nuclear weapons programme that it had been reportedly developing since at least the beginning of the current century (Yergin 2006, 78). The termination of multilateral nuclear-related sanctions imposed by the UNSC is a core part of the deal (European Parliament 2015). Additionally, the role of the US and EU as the two main entities lifting sanctions is clearly demonstrated because they are to lift certain sanctions, as defined in Annex II and Annex V of the JCPOA, that they have unilaterally enacted (European Parliament 2015). The IAEA was tasked with safeguards verification activities on Iran and has been reporting on the issue to the Member States of the IAEA at every Board of Governors meeting. The IAEA reports state that Iran has been fully abiding by its obligations under the JCPOA ever since its inception (IAEA 2019).

At the time of the US withdrawal, experts argued that by breaking its commitments under the agreement and by introducing secondary sanctions, US authorities are leaving Iran no more economic incentives to remain in the arrangement. Many experts forecasted that Iran would itself leave the agreement latest in November 2018 when US secondary sanctions on Iranian oil exports were to come into force (Anonymous, interview with diplomat, September 3 2018). The Iranian economy is highly dependent on oil exports, with up to 43% of its exports consisting of oil products (World Bank 2019). While the wind down periods for re-imposing US unilateral sanctions, partly in August and partly in November, drew closer the prospects for the JCPOA became ever darker.

However, against all predictions, Iran did not end its implementation of the JCPOA after November 4th when the wind down periods for US sanctions ended. Briefly before the US secondary sanctions on Iranian oil exports were to come into effect, the US government

announced its intention to give waivers to eight countries or entities for at least half a year to import Iranian oil (Pamuk & Gardner 2018). After half a year, these waivers were not renewed and the US secondary sanctions of Iranian oil products have since been fully implemented (Pompeo 2019). Since the US withdrawal in May last year, Iran's position towards the JCPOA has changed dramatically. Iran's status as a full party to the JCPOA and its comprehensive implementation of its commitments has been on the line since Iran announced that it would partially withhold its obligations under the agreement if the remaining parties to the JCPOA did not keep to UNSC Resolution 2231 and oppose US unilateral sanctions (BBC 2019g). This announcement was made exactly one year after US withdrew from the agreement and it set a 60-day ultimatum for the remaining parties to act (BBC 2019g).

This research project will focus specifically on oil sanctions imposed by the US following its withdrawal from the JCPOA. Using the JCPOA as a case study and focusing only on one type of industry targeted by economic sanctions allows for a detailed understanding of a complex economic instrument which is influenced by many factors. Simply creating large quantitative studies that aggregate an enormous number of sanctions episodes will inevitably be unable to explain the fine details of each case. This research will demonstrate the complexity of only one industry targeted by sanctions, and the potential economic and global limitations that impede the efficacy of this economic instrument. The true effectiveness of economic sanctions has been questioned by multiple researchers and academia has to date not been able to reduce this ambiguity (e.g. Hufbauer et al 2007, 158-59; Pape 1997, 106). As such, research in the field is highly topical because it allows for a more nuanced understanding of a highly complicated instrument.

To understand economic sanctions, it is vital to first define the concept. Sanctions have been defined as "restrictions on commercial relations between citizens and firms of at least two countries" (Kozhanov 2011, 144). More accurately, they are a form of coercive foreign policy where by a sender state disrupts economic ties with a target state due to political developments in the latter (Cortright & Lopez 1995, 3; Drezner 2003, 643). Sanctions typically take one of the following three forms; export restrictions, import restrictions or impeding financial flows (Hufbauer et al 2007, 44-45). All three forms have different features which can potentially produce very different outcomes.

Sanctions have often been described as the only viable option that falls between direct military force and diplomacy, and therefore their widespread application by states is rather unsurprising (Neuenkirch & Neumeier 2015, 111). The study of economic sanctions is especially pertinent in the contemporary environment, because their use has increased exponentially in the last few decades (Cortright & Lopez 1995, 3). While many states still use sanctions unilaterally, their multilateral imposition through UNSC resolutions has become more popular (Cortright & Lopez 1995, 5). This research will focus solely on unilateral sanctions.

Chapter 2: Literature Review

Extensive research has been dedicated to studying the effectiveness of economic sanctions, but there is still no consensus on the matter. Some studies have estimated sanctions to be successful in a third (34%) of cases (Hufbauer et al 2007, 158-59). Pape (1997, 106), on the other hand, argues that Hufbauer et al (2007) have made systematic errors in their analysis which resulted in inflating the actual success rate of sanctions. Using the same data set but a different methodology, he found that sanctions are effective in less than 5% of all cases (Pape 1997, 93).

According to Cortright and Lopez (1995, 9), five features need to be satisfied for sanctions to damage the target's economy; the cost of sanctions to the target economy need to exceed 2% of its GNP, the GNP differential between the sender and target needs to be at least 10:1 in favour of the sender, the sender's trade needs to make up more than 25% of the target's total trade, sanctions need to be quickly imposed with full cooperation of key trading partners, and ongoing costs of sanctions to the sender must be minimal (Lopez & Cortright 1995, 9). If these criteria are not satisfied, then sanctions will not have a meaningful economic impact on the target (Lopez & Cortright 1995, 9). This research into the actual economic costs is significant because financial harm is the main means through which sanctions aim to create change. However, Elliott (1995, 52) states that clearly targeted sanctions, which aim at the specific weaknesses of a state's political system or economy, are more likely to succeed than simply causing the greatest overall economic damage. Thus, focusing only on key macroeconomic indicators may not be enough to understand why certain sanctions episodes fail and others succeed. Furthermore, the significance of time has also been studied and it has been demonstrated that sanctions are time variant. Neuenkirch and Neumeier (2015, 111-12) found that the impact of UN sanctions on annual real GDP growth becomes insignificant ten years after imposition while it takes seven years for the same to happen to US equivalents.

Further research has been dedicated to examine the difference in effectiveness between unilateral and multilateral sanctions. According to Neuenkirch and Neumeier (2015, 111), multilateral UN sanctions reduce the real GDP/capita growth rate of the target country by around 2% per annum while unilateral episodes by the US cause approximately a 0,75-1% reduction in real GDP/capita per annum growth rate. US was used as the case for unilateral

imposition, because it is the most active user of economic sanctions and the US has an important role in the world economy (Neuenkirch & Neumeier 2015, 111). Multiple studies (Bapat & Clifton 2009, 1085; Lopez & Cortright 1995, 5-6; Elliott 1995, 56) beyond Neuenkirch & Neumeier (2015) have also testified that multilateral episodes are more effective than unilateral sanction. However, according to Bapat & Morgan (2009, 1075), there is still a considerable amount of studies that believe the unilateral usage works better than multilateral sanctions initiatives.

The main purpose of imposing sanctions has been defined as changing the unwanted political behaviour of the target state, which is an ambitious goal (Cortright & Lopez 1995, 7). As the successfulness of sanctions is logically evaluated against the main goal of imposing them, Cortright and Lopez (1995, 7) argue that sanctions therefore have limited effectiveness. Researchers have also defined other purposes for placing sanctions, including sending messages of condemnation or simply lacking alternatives to respond (Cortright & Lopez 1995, 7). Regardless, academic research on sanctions has tended to focus solely on whether the sender manages to change the political conduct of the target.

Research has also focused on the difference between threatened and imposed sanctions, which have been found to exhibit quantitative and qualitative differences (Afesorgbor 2018, 3). Threatening with sanctions before imposing them tends to undermine the economic costs and reduce the trade-deteriorating effect of imposition because the target has time to react (Afesorgbor 2018, 7). However, successful coercion is more likely to end in the threat stage, because rational actors will balance the costs and benefits of compliance or non-compliance and make potential policy changes before having to endure the actual damage of sanctions (Drezner 2003, 646). However, in reality sanctions do not end in the threat stage as commonly as researchers would expect (Drezner 2003, 646).

Sanctions can also produce the exact opposite of what the sender originally intended through the rally-around-the-flag effect (Eland 1995, 32). This occurs if a large enough proportion of the target's population unites behind their government to oppose the foreign economic intervention (Eland 1995, 32). Further, sanctions are less likely to lead to desired outcomes if there is no strong internal opposition within the target country that can challenge the perceived malicious behaviour of the incumbent political leadership (Eland 1995, 34). The latter concept has been further expanded by academics who argue that the

impact of sanctions on relevant interest groups is more important for sanctions to have a positive outcome than the aggregate severity of the sanctions (Kaempfer & Lowenberg 1988, 786). Letzkian and Patterson (2015, 47) argue that focus needs to be paid on factor endowments to determine the impact of sanctions on power relations. In line with the Stopler-Samuelsson Theorem, focusing on restricting the abundant factor or promoting the scarce factor in a trade-open economy is most likely to produce effective sanctions regimes than simply causing vast economic damage (Letzkian & Patterson 2015, 48).

Some studies have also been dedicated to understanding the effect of sanctions on different types of regimes. According to Escriba-Folch and Wright (2010 348), the effectiveness of economic restrictions depends on the type of regime targeted and generally they are only effective in destabilising personalist dictatorships. Therefore, it is paradoxical that a large proportion of sanctions are targeted at autocratic governments even though they have been found to be less likely than democratic leaders to be unseated following sanctions (Oechslin 2014, 24; Marinov 2005, 271). Autocrats can also further compound the effects of sanctions by increasing the costs of public services and thereby prevent the general population from revolting (Oechslin 2014, 25-28).

Additionally, the relationships in sanctions episodes beyond a simple sender-target connection have been examined by Joshi and Mahmud (2018). They noted that there are different network structures, and senders and targets of sanctions can have different impacts depending on their position in the structure. For unilateral sanctions to be effective, the sender-target link needs to form a bridge that, once destroyed, disconnects the target sufficiently (Joshi & Mahmud 2018, 60). If this is not the case, then the sender needs to cooperate with other potential sanctioning states in order to create multi-link cuts that would comprehensively detach the target from the world economy (Joshi & Mahmud 2018, 60). In short, this demonstrates how actors in sanctions episodes are interwoven in political, economic and social fabrics. Regrettably, Joshi and Mahmud's (2018) study is focused purely on theoretical economic modelling and the researchers did not apply their findings to a real world case.

As the current research proposal takes Iran as a key area of focus, it is also necessary to examine academia around economic sanctions in this country. While Afesorgbor (2018, 3) used a global sample and found that imposing sanctions resulted in decreased trade flow

between the target and sender, Haidar (2017, 332-23) found that in the Iranian context the target's exports actually increased as a result of the 2008 multilateral sanctions. However, whilst trade deflection was able to quantitatively compensate for the trade destruction caused by sanctions, it was argued that the resultant increase in prices caused welfare costs (Haidar 2017, 326). It is therefore preliminarily conclusive that, at least in the Iranian context, some damage caused by economic sanctions can be compensated for by new trading routes that open when sanctions are placed. Haidar's (2017, 323) findings were, however, only focused on Iranian non-oil exports.

In terms of external factors affecting US sanctions effectiveness on Iran, Kozhanov (2011, 145) stated that the attitude of Iran's main trading partners towards US sanctions and the extent to which smaller Iranian trade partners can fill the trade vacuum left by leaving key Iranian importers are vitally important for US sanctions to have an economic impact. It was noted that various US sanctions episodes have not been as effective as intended because various states, especially China, have not supported these measures (Kozhanov 2011, 150). Strategic US allies, like the EU, have previously not shown great support for earlier US sanctions against Iran (Kozhanov 2011, 154; Early 2015, 14-16). Further, it is not only foreign interests that have opposed US sanctions on Iran, but also many US firms have declined to comply due to the large potential profits in the Iranian oil industry (Shin et al. 2016, 489).

In summary, the vast amount of research has so far not been able to provide a holistic view on the effectiveness of economic sanctions. The above literature review attests to the complexity of the phenomenon, because it can be analysed from a wide variety of perspectives. Previous studies have either used large data sets with hundreds of data points from a wide variety of countries (e.g. the Threat and Imposition of Sanctions data developed by Morgan et al 2009) or derived conclusions from purely theoretical economic models without applying them to real cases (e.g. Joshi & Mahmud 2018). Furthermore, how economic costs related to sanctions translate to political outcomes is a very difficult question that has not been conclusively explained by researchers. Multiple studies have also examined effectiveness without explaining the reasons for their failure or success. Therefore, the proposed thesis aims to provide additional, more case specific understanding of sanctions using a single case study as the framework.

Chapter 3: Methodology

Sample

The JCPOA will be used as the single case in this research. The JCPOA is a multilateral agreement between Iran on one side, and the P5 of the UNSC, Germany and the European Union on the other. The aim of the agreement is to conclusively end the nuclear weapons aspirations of Iran and make all nuclear-related activities in Iran purely peaceful in nature. As a countermeasure, UN, EU and the US are to lift all nuclear-related economic sanctions that had been placed on the state over the previous decades as they agreed to under the JCPOA. Section 4 of Annex II and Section 17 of Annex V define the sanctions that the US promised to lift (European Parliament 2015). Section 4.3. deals specifically with the energy and petrochemical sanctions that this research will partly focus on. Further, certain natural and legal persons who had been placed on the US Designated Nationals and Blocked Persons List (SDN List), the Foreign Sanctions Evaders List and the Non-SDN Iran Sanctions Act List were intended to be removed from these prohibitive registers (European Parliament 2015, Section 4.8.). In short, the removal of the sanctions as part of the Iran nuclear deal gave Iran the opportunity to engage more freely in the global oil markets than it had for a long time. Following the US withdrawal from the Iran nuclear deal, this situation was reversed once again.

Under the agreement, Iran promised to enter the safeguards regime of the IAEA by ratifying a Comprehensive Safeguards Agreement and provisionally applying its Additional Protocol. These actions place all civil nuclear facilities in Iran under IAEA inspection and give the IAEA rights to inspect any Iranian civil nuclear facilities at any time. The IAEA Secretariat reports periodically to the IAEA Board of Governors, the only policy-making body of the IAEA, on Iran's compliance under its legally binding international safeguards agreements.

The multilateral deal has been praised as a "new chapter of hope" by the current Iranian Minister of Foreign Affairs Mohammad Javad Zarif and "one more chapter in our pursuit of a safer, more helpful and more hopeful world" by then-US President Barack Obama (Hafezi et al 2015). The agreement was settled in 2015 and subsequently endorsed by UNSC Resolution 2231.

On 8th May 2018, the JCPOA gained renewed media attention when US President Trump decided to withdraw from the agreement and gradually reapply all sanctions that US authorities had lifted under the terms of the agreement. The decision was enacted through Executive Order 13846 which authorised the US Department of the Treasury to re-impose the lifted sanctions. Oil sanctions were also put back in place as part of the wider re-imposition of sanctions, as defined in Sections 1(a)(ii), 2(a)(iii), 2(a)(iv), 2(a)(v), 3(a)(ii), 3(a)(iii), 3(a)(iv), 3(a)(v), 3(a)(vi)) of the Executive Order (Exec. Order No. 13846). The exemptions that were given to eight countries or entities to importing Iranian oil were not granted in May 2018 in conjunction with Executive Order 13846 but right before the cool down period of 180 days was about to expire. None of the waivers were renewed beyond their initial duration of six months and were thus allowed to expire on 2nd May 2019.

The sanctions imposed as part of Executive Order 13846 and relevant following actions are striking in the sense that they also include secondary sanctions. Secondary sanctions intend that any entity trading with Iran on goods and services that the US has banned from being imported into its own country will face legal action in the US if it thereafter engages in business in a territory under US jurisdiction. The sanctions that were lifted as part of the JCPOA already included secondary sanctions, for example Section 1 of Executive Order 13622 that was terminated under Article 21 of the JCPOA and subsequently reapplied following US withdrawal from the agreement (European Parliament 2015).

The US withdrawal announcement was a shock to Iran and all other parties to the agreement, because all IAEA reports to date have concluded that Iran is complying with its commitments under the agreement. No other parties besides the US have shown any interest in withdrawing from the agreement and they have continued to hold on to their side of the agreement to lift sanctions. Since the US withdrawal, some remaining signatories have taken measures to limit the impact of US secondary sanctions. The EU is a key example, because they have updated their blocking statute which makes US secondary sanctions on EU companies illegal. Additionally, the EU recently established the INSTEX to facilitate legal trade between EU Member States and Iran (European External Action Service 2018). Regardless, the Iranian political leadership has noted that so far these actions have been insufficient to combat the consequences of US sanctions (BBC 2019g).

Iran has been under various US, UN and EU sanctions since 1979 (Early 2015, 1). The country has been sanctioned for many reasons, including human rights violations, state-sponsored terrorism and most recently their nuclear weapons programme. Additionally, the severity of sanctions has fluctuated over the years, but the Iran and Libya Sanctions Act (ILSA) of 1996 enacted by US was the first time that secondary sanctions were placed (Kozhanov 2011, 146). At the time US trading partners were not thrilled and showed great dissatisfaction with this new form of economic sanctions. The EU was a strong opponent of this measure, and the EU blocking statute, which was reapplied following the recent US withdrawal from the JCPOA, dates back from this tumultuous period (Kozhanov 2011, 147). Additionally, the EU brought a complaint to the WTO on this matter because they argued that it violates international trade agreements that US had signed up to (Elliott & Hufbauer 1999, 406). Only in the last ten years, following reports that Iran had been enriching uranium and developing technology to create a nuclear weapon, have multilateral sanctions on Iran become a viable multilateral option (Early 2015, 1).

The extensive history of sanctions placed on Iran and their reversal under the JCPOA make the Iranian case very relevant to the study of economic sanctions. Furthermore, the US withdrawal from the agreement and its re-imposition of lifted sanctions as well as placing of new (secondary) sanctions against a global opinion that the JCPOA should be fully implemented makes the study even more pertinent. Previous research has been unable to identify whether sanctions are effective or not and it is therefore relevant to focus on specific cases and types of sanctions to examine the details of sanctions. Large-n studies have, at least to some extent, served their purpose in understanding the efficacy of economic sanctions and it is now relevant to focus on detailed analysis of specific cases. This study acts as a balance to quantitative studies with large numbers of cases that have tended to dominate contemporary research into economic sanctions. Additionally, the unilateral nature of US sanctions makes it possible to analyse the significance of opposing global political and economic forces.

Research question

This study will be conducted to answer the following research question; ***following its withdrawal from the JCPOA, why was the US not willing or able to immediately apply its secondary sanctions on Iranian oil exports to full extent?***

When US secondary sanctions on Iranian oil exports make into effect on 4th November 2018, US authorities granted exemptions to eight states or entities, namely India, China, Taiwan, Japan, South Korea, Turkey, Greece and Italy (Pamuk & Gardner 2018). China, India and South Korea are the three top importers of Iranian oil (BBC 2018a). On 22nd April 2019, the US government announced that none of the waivers would be renewed and the secondary sanctions on Iranian oil exports would come into full effect as of 3rd May (Pompeo 2019).

A specific focus on Iranian oil exports is warranted for two reasons; first, research into economic sanctions applied on Iran have consciously excluded oil exports from their research partly because oil sanctions on Iran have only existed since 2012 (Haidar 2017, 323). Second, if all states adhered to US secondary sanctions on these products, then it would potentially have a dramatic impact on the Iranian economy. In 2016, Iran gained around 20% of its GDP from exports of which roughly 43% came from oil trade (The Observatory of Economic Complexity 2018; World Bank 2019). Therefore, shutting off all Iranian oil exports would reduce their annual GDP rate by a staggering 8,6%. This is an oversimplified calculation and doesn't consider the intricacies of the global oil market, for example how the global oil price would react if the third biggest OPEC oil producer and a founding member of OPEC was suddenly eliminated from the market. However, it demonstrates that sanctions on Iranian oil exports need to be researched to understand the intricacies of their application. Further, even despite its potential large scale impact on the Iranian economy it is worth studying why the US was for so long reluctant to make full use of its secondary oil sanctions.

In order to operationalise the research question, three variables were used. First, global oil prices were measured using the WTI oil price. There is no one single global oil price but the WTI oil price, alongside the Brent oil price, is universally used as benchmarks for global oil prices (Chen et al 2016; 42). The WTI price was chosen to that oil price changes can be measured. Second, the S&P 500 Index was included as a proxy for quantifying global economic growth. The same approach has also been taken in previous research (Mohaddes & Pesaran 2017, 323). Finally, global oil supplies were included to probe for the influence of

the supply side on the price of oil on international markets as an independent variable. The justification for specifically examining the supply side of the oil market is explained in a following chapter.

Reliable data on oil supplies was found in the International Energy Agency's monthly Global Oil Market Reports (IEA 2019). Additionally, daily closing prices of WTI oil and S&P 500 Index rates are publicly available in multiple online sources.

Importance of oil prices

The price of oil is of crucial relevance globally because it is an essential component of the energy mix of many states and therefore it is tightly connected to energy security concerns. Energy security has been traditionally defined as the “availability of sufficient supplies at reasonable prices” (Kruse 2014, 17). While a completely stable oil market would be preferable for the wider economy, in reality this does not happen. As in all markets, fluctuations of prices are controlled by demand and supply forces. For both, suppliers and consumers, oil prices are important for economic survival and this therefore critically connects it to the wider security of states (Kruse 2014, 16). European, US and rich Asian states, depend on inexpensive Middle Eastern oil as part of their security (Sorenson 2014, 213). This section will explain why the price of oil is a critical part of the political economy of many states in the world and why states need to consider the consequences of their actions on global oil prices.

According to British Petroleum (2018, 9), oil was the single most consumed form of energy globally in 2017 and it has had an unwavering leading role for decades. This in itself already demonstrates the magnitude and importance of oil as a form of energy. One key factor for this persistent demand for oil has been due to the growth of Asian economies (Yergin 2006, 73). Recent Asian economic growth has been reliant on a continuous supply of cheap energy, including oil (Sorenson 2014, 213).

In 2014, China and India accounted for 16% and 10% of globally traded oil imports, respectively (Zhang et al 2017, 253). This means that these two countries made up roughly one quarter of global oil demand. With regard to their suppliers, the Middle East is the biggest source for Chinese oil imports and it is expected to only increase (Daojiong 2016, 183). It is estimated that by 2020, 80% of total Chinese oil imports will come from the Gulf region (Yetiv 2004, 121). Asian reliance on Middle Eastern oil is not unique, because the Persian Gulf in itself contains around 60-75% of current global oil reserves (Yergin 2011, 4-5, Sorenson 2014, 211). However, the extent of Asian reliance on supplies from the Middle East is staggering, because actors, like China and India, are so heavily dependent on importing oil solely from this one region. This makes supply disruptions in the turbulent Middle Eastern region even more damaging. According to Yergin (2013, 69), future issues in oil markets will be connected to geopolitics rather than the possibility of running out of oil reserves.

Additionally, Western countries perceive that the biggest oil reserves are found in exactly the wrong corners of the world (Kruse 2014, 5). Middle Eastern member states of OPEC are major oil producers, but also face permanent political risks (Chen et al 2016, 42). We will turn to political risk and its implications on oil prices later.

With regard to the global economic market, oil can be considered a complementary commodity and it is therefore linked to various other goods and services produced and consumed in economies. However, more importantly, oil is a widely used source of energy throughout the world which is needed as a basic unit to drive economies. This means that oil prices affect the rates in many other sectors beyond the oil industry itself. Due to its nature as a common energy source, it may not come as a surprise that demand for crude oil exhibits weak price elasticity. This notion is supported by Hamilton (2009, 191), who found that there is a negative correlation between demand for and price of crude oil, but the correlation is weak. The finding that oil demand hardly changes with oil price fluctuations further strengthens the notion that oil is of critical importance for maintaining the energy needs of societies worldwide, because consumers are unwilling to give up their oil consumption even if prices change.

The impact of oil rates on other industries and the macroeconomy has been studied and has concluded that there are multiple connections. For instance, there is a positive correlation between oil prices and inflation (Mohaddes & Pesaran 2017, 316). Lower oil prices result in a diminishing inflation rate whereas higher oil prices have the opposite effect. However, there is a considerably longer time lag for the positive effects of lower oil prices to materialise compared to effects of higher prices (Mohaddes & Pesaran 2017, 316). Further, research has tried to find the connection to share prices, but there is no academic consensus in this regard (Mohaddes & Pesaran 2017, 320). These points demonstrate that the price of oil has comprehensive cross-cutting effects throughout economies.

Furthermore, oil prices also have other macroeconomic consequences and this further strengthens the importance of oil in global economies. In general, it has been concluded that a fall in the oil price is good for the global economy because it drives down prices, interest rates and inflation on aggregate (Mohaddes & Pesaran 2017, 316-20). With relation to economic activity, Mohaddes and Pesaran (2017, 323) further found that there is a negative relationship between economic activity and oil prices on a global scale. These researchers

used the S&P 500 Index as a proxy for economic activity. Additionally, Katircioglu et al (2015, 269) found that, in general, oil prices have a negative and statistically significant impact on real GDP and unemployment rates. However, the impact of oil prices on macroeconomic indicators is influenced by the degree and nature of dependence on external events and oil price movements. From Katircioglu et al (2015), it can be preliminarily expected that oil prices affect the economies of states differently.

The net economic benefit of low oil prices has also been considered, because while importers benefit from it oil exporters are impacted in the opposite manner. It can be argued that the positive economic consequences of lower oil prices are diminished by the negative influence of low oil rates for oil-producing countries, particularly those that heavily export oil products. This argument stems from research into those countries that are especially dependent on revenues from oil exports to fund their economic rewards to citizens at the expense of their political participation. According to Sorenson (2014, 209), Middle Eastern states are the most striking example of such states. In periods of low oil prices, these states fail to collect an adequate amount of revenue to fund their public expenditures, and this limits economic growth and potential has an impact on political processes in these regions (Mohaddes & Pesaran 2017, 324). Countries that are heavily reliant on oil export revenues are often called 'petro-states' (Kruse 2014, 11). The International Monetary Fund has created estimates on the different levels of global oil prices that are necessary for the public budgets of various oil exporting nations to break even (IMF 2018).

Mohaddes and Pesaran (2017, 324) state that oil rates have different impacts on oil importers as well as exporters. Lower prices are better for importers whereas higher prices benefit exporters, both at the expense of the other. However, they also argue that low prices are better for the world economy as a whole, because it can be expected that the increase in marginal expenditure by oil importers exceeds the marginal public expenditure decrease by exporters in such a scenario (Mohaddes & Pesaran 2017, 324). This means that lower oil prices have a net benefit for the world economy.

These findings are important for the current study for two reasons; firstly, oil trade is vital for national economies and for many states to ensure their energy security needs. Due to the global dependence on oil consumption there needs to be sufficient quantities of oil on

the market at reasonable prices. The majority of states are unable to produce oil themselves simply because they have no oil reserves in their territory. This further compounds the dependence of various oil importing nations on states with oil extraction capabilities. As the majority of oil reserves are found in the Persian Gulf and Middle Eastern states have become major oil producers, many importers frequently turn to this area as a source of supply. However, importing from the Middle East comes with significant political risks which may disrupt oil imports and lead to higher prices for consumers. Second, oil prices are important for importers and exporters alike, but both follow different pricing goals. Lower oil prices can be considered akin to a tax cut for oil importers while oil exporters will experience lower profits with decreased prices (Kruse 2014, 2). These conflicting interests can lead to tensions over appropriate prices, but fundamentally stable prices are preferable for both because it leads to a more predictable market environment. Regardless, low rather than high oil prices are more likely to result in net global economic benefits and have a net positive impact on macroeconomic indicators (Mohaddes & Pesaran 2017, 324).

In terms of US decisions to sanction Iranian oil exports following their withdrawal from the JCPOA, US officials need to take into account the impact of their actions on oil prices; whether their actions have an impact of global oil prices or not, and how strong the potential impact may be. The next section will explain how oil prices are set on the global market.

How are global oil prices set?

As the above discussion demonstrates, crude oil and other oil products have become global commodities and are therefore traded on the global market (Kilian 2009, 1054). First of all, it is important to notice that while states and experts commonly speak of the 'global oil price', there is no one single universal price for oil. All oil products technically have their own prices, which reflect for example the quality of the crude oil and various factors associated directly with the country where the oil product is produced. Nevertheless, there are two different oil products that are used throughout the world as benchmarks for oil prices; WTI and Brent Crude. The price of oil is determined on the global market and prices for oil products have been proven to follow same trends as those of WTI and Brent Crude. Henceforth, when this study mentions the 'global oil price' we will be referring to the prices of WTI.

Significant research has been conducted into understanding what determines the price of oil on international markets. Explanations vary from price elasticities of demand and supply to the vulnerability of supplies to disruptions and speculation. While there is a degree of disagreement among academics on the dominant determinants, at the most basic level the oil market operates like a traditional market where the market sets the prices. Market fundamentals are key to the industry where supply and demand interact to form an equilibrium (Espinasa et al 2017, 432). This is very similar to other real industrial commodity prices (Baumeister & Kilian 2016, 140). All else being equal, oil industry models suggest that the oil price depends on the state of the global economy (Baumeister & Kilian 2016, 154). For instance, Espinasa et al (2017, 432) concluded that the 2002 global oil price increase was demand-driven due to economic growth in non-OECD countries (Espinasa et al 2017, 442). Yet, despite the rather simple picture painted, oil prices are extremely difficult to predict into the future and some academics have even described the process as a random walk (Hamilton 2009, 184). Many other factors also influence the increasingly interconnected and complicated oil market.

While demand and supply have been categorised as price inelastic in the oil market, they are not equally important in determining prices (Hamilton 2009, 180). Research has been unanimous in determining that demand fluctuations have a much greater influence on oil prices when compared to supply changes (Hamilton 2009, 180, Baumeister & Kilian 2016, 142; Chen et al 2016, 45). Chen et al (2016, 45) found that demand exhibits a positive impact

on price and explains around 35% of price changes while supply changes can be used to explain only around 6% of price variation. These results are significant because they rather counterintuitively demonstrate that while market fundamentals are critical in determining oil prices, changes in supply alone do not have a major impact on oil prices. Similar findings have been echoed elsewhere where demand rather than supply changes have been attributed to price shocks (Kilian 2009, 1053). Regardless, there is also a nexus between demand and supply that cannot be overlooked. Namely oil demand consists of consumption demand and inventory demand (Baumeister & Kilian 2016, 142). Consumption demand refers to purchases that are made to fulfil current demand requirements, whereas the latter refers to demand made to balance future demand in anticipation of potential supply disruptions (Baumeister & Kilian 2016, 142). This demonstrates the connection between supply and demand, and exemplifies how changes in supply must also take into account potential implications on the demand side which is more influential in changing prices. Simply put, oil prices are expected to rise significantly if states expect vital complications to fulfil their demand requirements due to a future shortfall of supply on the market.

One way in which oil supplies can be disrupted is through geopolitical events and this is particularly important because of the dominance of Middle Eastern oil on the market. The region has been especially volatile in the past decades, with political and security challenges still creating issues. Political risk and speculation have been found to have a significant influence on crude oil prices, alongside oil supply and demand (Kesicki 2010, 1605-1606). With respect to OPEC member states, political risk events have a significant but weak impact on price fluctuations, both in the short and long run (Chen et al 2016, 46). According to West and Alkadiri (2013, 232), the failure of negotiations between Iran and other states willing to curb its nuclear weapons programme around 2011-2012 created a potential for military action against the former and thereby introduced a risk premium on Iranian oil prices. Also, following an EU embargo on Iranian oil in 2012, the global oil price rose by \$9 (Kilian & Lee, 2014, 85). Additionally, the real price of oil rose directly after the Iranian Revolution in 1979 as well as after the outbreak of the Iran-Iraq War in 1980 (Baumeister & Kilian 2016, 146; Kilian & Lee, 2014, 85). In all cases the issue was not simply about a decreased supply on the market, but the major concern was about the stability of supplies for oil importing nations (Kilian & Lee 2014, 84).

Despite the significance of speculation and trust for markets, the cross-cutting impact of speculative demand must be doubted. First, a \$9 price increase in the EU Iranian oil embargo scenario is noteworthy, but it is mild compared to the influence of demand shocks. Second, while speculation may have good explanatory power in the short term, its pervasiveness is constrained by the fact that it lacks sufficient longevity to explain price changes (Espinasa et al 2017, 449-450). For instance, the \$6 oil price increase following the start of the Iran-Iraq War was only a temporary spike (Baumeister & Kilian 2016, 146). This is contradictory to the sustained price premium on Iranian oil that West and Alkadiri (2013, 232) argue to have been established following the failed nuclear weapons negotiations with Iran in 2011-12.

In summary, market fundamentals are the major determinant of oil prices but psychological and speculative elements cannot be ignored from calculations. Within market fundamentals, the demand side carries a lot more explanatory power than supply related alterations. The resilience of the global oil price to supply disruptions has been demonstrated in multiple cases, for example following the Iran-Iraq War, the EU embargo on Iranian oil products and failure of talks in 2011-2012 related to Iran's nuclear weapons activities. Regardless, the human elements of speculative oil markets must be considered, because they may explain rush to the market. This demonstrates the inherent connection between the oil market and wider politics, for instance security considerations.

Conceptual framework

The key concept in this proposed study – economic sanctions – falls within the wider conceptualisation of economic coercion. More specifically, this study focused on secondary sanctions, which are a sub-category in economic sanctions. Secondary sanctions are an economic instrument that attempts to influence overseas investment decisions of companies not registered in the sender state (Meyer 2008, 908). They do this by penalising the foreign entities if they, after conducting business on sanctioned products with a target state, also engage in transactions in the sender state's economy (Meyer 2008, 908). Some state actors and researchers claim secondary sanctions to be extraterritorial (Meyer 2008, 908).

Moreover, economic interdependence is a key concept which will help narrow the focus on this research project. Senders and targets of sanctions are interwoven in a combination of social, political and economic links (Joshi & Mahmud 2018, 52; Keohane & Nye 1989, 7). As such, sender-target relationships and economic sanctions do not exist in a vacuum. Using economic interdependence within this conceptual framework will allow for an investigation of the external factors that influence decisions to place sanctions. For example, the influence of Iranian oil exports on the world market, the influence of the OPEC and the long-term nature of oil contracts can be examined.

In summary, using primary as well as secondary sanctions and economic interdependence as the conceptual framework will help determine the possible effectiveness of the most recent US sanctions on Iran. However, more importantly, it will help investigate external factors that determine the decisions to place sanctions. This latter notion is an aspect of economic sanctions that previous research has failed to address. Previous research has tended to skip examination of external features weighing down on the decision-making process of applying sanctions.

Theoretical framework

The following theoretical model has been devised to answer this study's research question:

Independent variable (IV) → Intervening variable (CV) → Dependent variable (DV)

Global oil supply → Global economic growth → Global oil price

This research assumes that changes in global oil prices will affect the ability of the US to fully impose its sanctions. If US secondary sanctions on Iranian oil exports lead to a supply disruption and result in higher prices, then this may act as a restraining factor on US authorities to fully apply their sanctions. The general notion is that higher oil prices have negative consequences on the US and world economy as a whole. For this reason, global oil prices are seen as the independent variable.

This research is based on various academic papers which argue that certain factors, which are external to the sender state, impact its decision to impose economic sanctions (e.g. Joshi & Mahmud 2018, 60; Early 2015, 2; Hufbauer et al 2007, 57; Kozhanov 2011, 145). These include factors like global oil prices, international cooperation, third parties undercutting the sanctioning efforts of a sender and the existence of 'black knights' that can take the place of important trading partners when they are forced to leave due to sanctions (Early 2015, 2; Hufbauer et al 2007, 57; Kruse 2014, 2; Kozhanov 2011, 145). The basic assumption is that states make decisions about applying sanctions within the context of the global economy. It is clear that US secondary sanctions on Iranian oil exports can have wide ranging negative consequences on Iran's economy, but still they were fully applied by US political authorities only after one year of wind down periods and waivers. Situating the scenario within the global political economy, and more precisely the global oil market, may provide potential answers to why US officials were reluctant to fully apply their oil sanctions on Iran.

With reference to intervening variables, global economic growth is theorised to fit into this category because it is perceived that market fundamentals are the main determinants of global oil prices (Espinasa et al 2017, 432; Kilian & Lee 2014, 86; Baumeister & Kilian 2016, 140; Chen et al 2016; 46; Kilian 2009, 1053). Previous research on has found that demand side variables have a stronger impact than supply factors on global oil prices (Kilian 2009, 1053; Chen et al 2016, 46). Utilising economic activity as an intervening variable will allow for a balanced approach between demand and supply in this research.

Finally, global oil prices are used as the dependent variable because they are theorised to be affected by the independent and intervening variables, namely by demand and supply. This model assumes that fundamentally sanctions will only be applied when costs on the own politico-economic structure, as well as less importantly on key partners, are kept to a minimum and they simultaneously have a strong impact on the target (Elliott 1995, 53).

The above demonstrates that interdependence between states has an impact on their freedom to act within the international system, for instance in global economic markets. Due to interdependence, uni- and multilateral actions may create widespread effects throughout the whole system. In terms of the global oil market and the ability of the US to impose its oil sanctions on Iran to full extent, this research hypothesises the following:

H₁: Following its withdrawal from the JCPOA, the ability of the US to fully apply its sanctions on Iranian oil exports has been constrained by upward pressure on the global oil price as a result of reduced Iranian oil supply on the market.

Yet, not only does this research assume that there are factors within the global oil market that hamper the ability of the US to act completely independently, but interlinkages to wider political and economic issues also act as hindrance. It is predicted that wider relations between states, beyond the Iranian nuclear weapons issue, impede the potential of the US to act freely and mitigate anarchic behaviour of states. Neoliberal institutionalism is the underlying theoretical basis for this research project because it allows understanding of how international regimes, both formal and informal, direct the behaviour of states (Keohane & Nye 1989, 9). States are so tightly connected with one another that global connectivity has a serious impact on their behaviour. States cannot make decisions in an economic and political vacuum because their behaviour is governed by sensitivity and vulnerability interdependence (Keohane & Nye 1989, 12-13). Sensitivity refers to the severity of costs associated with interdependence on a state, whereas vulnerability refers to how available and costly alternatives to current forms of interdependence are to a state (Keohane & Nye 1989, 12-13). The following hypothesis has been devised to capture the notion of global interdependence:

H₂: Following its withdrawal from the JCPOA, the ability of the US to fully apply its sanctions on Iranian oil exports has been constrained by US concerns over the sanctions contributing to deterioration in US-China relations.

Data analysis

This research developed an econometric model using EViews 10 and used previous academic research as a basis for identifying key variables. The S&P 500 Index and global oil supply were grouped as independent variables, because they are both hypothesised to have an impact on the dependent variable. Academics have observed that global oil prices are majorly determined by demand and supply market fundamentals (Espinasa et al 2017, 432; Kilian & Lee 2014, 86; Baumeister & Kilian 2016, 140; Chen et al 2016; 46; Kilian 2009, 1053). Additionally, the impact of supply disruptions has been concluded to be very weak, especially in comparison to the potency of the demand side (Kilian 2009, 1053; Chen et al 2016, 46). Global oil supplies were isolated because this research intended to analyse the influence of US secondary sanctions on Iranian oil exports and the resultant supply reduction in Iranian oil production. While potential supply shocks have also been linked to speculative demand increases, speculation is not quantifiable within the limits of the current research. Therefore, explanations about potential speculative demand will be examined within a theoretical framework in the discussion. Finally, the WTI oil price was chosen as a dependent variable because it is hypothesised to be influenced by the two dependent variables.

Bi- and multivariate regressions were used to determine correlations within the data set. Multivariate regressions were utilised to analyse the impact of a change in global oil supplies on the WTI oil price, when controlling for economic growth. Bivariate analyses were conducted to triangulate the multivariate regression findings and thereby enhance the reliability of the research.

A major flaw of the current research was the nature of publically available data. While daily statistics exist for the closing rates of WTI oil and the S&P 500 Index, similarly frequent data is not available for public use for global oil supplies. Data on supplies of oil are only accessible for each month. For this reason, the current study had a sample size of only 12 months, because all variables had to be made comparable. This was done by adding together all closing rates of WTI oil and S&P 500 Index separately and then dividing it by the number of days that the market was open on each respective month. Further, the sample could also not be subsampled for comparison to for example focus only on the period after all US waivers expired in May 2019, because then the sample size would have been too small. In short, the fact that the US withdrew from the Iran nuclear deal in May 2018, and the fact

that this research was intended to analyse changes only since then, rendered it impossible to enlarge the sample size. Coupled with the limited time since the US withdrawal from the JCPOA, the sample size was considerably reduced.

Furthermore, the impact of economic growth and supply disruptions may impact global oil prices with a time lag. While supply shocks cause an immediate real price increase, demand shocks have been reported to occur with a delay of multiple months (Kilian 2009, 1062). If certain supply or demand changes only occur at a considerable time lag, then their impact may not be reflected in the current study. The research at hand can therefore only be considered as a short term analysis. The secondary sanction waivers given by the US expired on 2nd May 2019 and all data used in the model is from the time period when the wind down periods or exemptions were in force.

Data collection

The operationalisation of the research question and the hypotheses is made more difficult due to the fact that the topic being researched is tightly connected with issues of national security and business interests. Finding reliable data, for example on Iranian national oil production and on oil contracts between Iran and other states, is therefore not realistic. This is demonstrated by the OPEC Monthly Oil Market Report which differentiates between crude oil production figures derived from “secondary sources” and those gained through “direct communication” (OPEC 2018a, 57).

Due to the above mentioned difficulties in acquiring reliable data, this study focused on restraining factors identified by previous researchers and applied them to the case of US oil sanctions on Iran. Findings and theories developed by previous researchers were contextualised within the current econometric model in order to determine to which extent global interdependence influences the ability of the US to impose sanctions on Iranian oil exports following its withdrawal from the JCPOA. The results obtained from the econometric analysis are explained using theoretical explanations of the functioning of the global oil market in the discussion section. This research broadens current understanding of economic sanctions by providing detailed inquiry into one vital industry that can be targeted by sanctions.

Chapter 4: Results

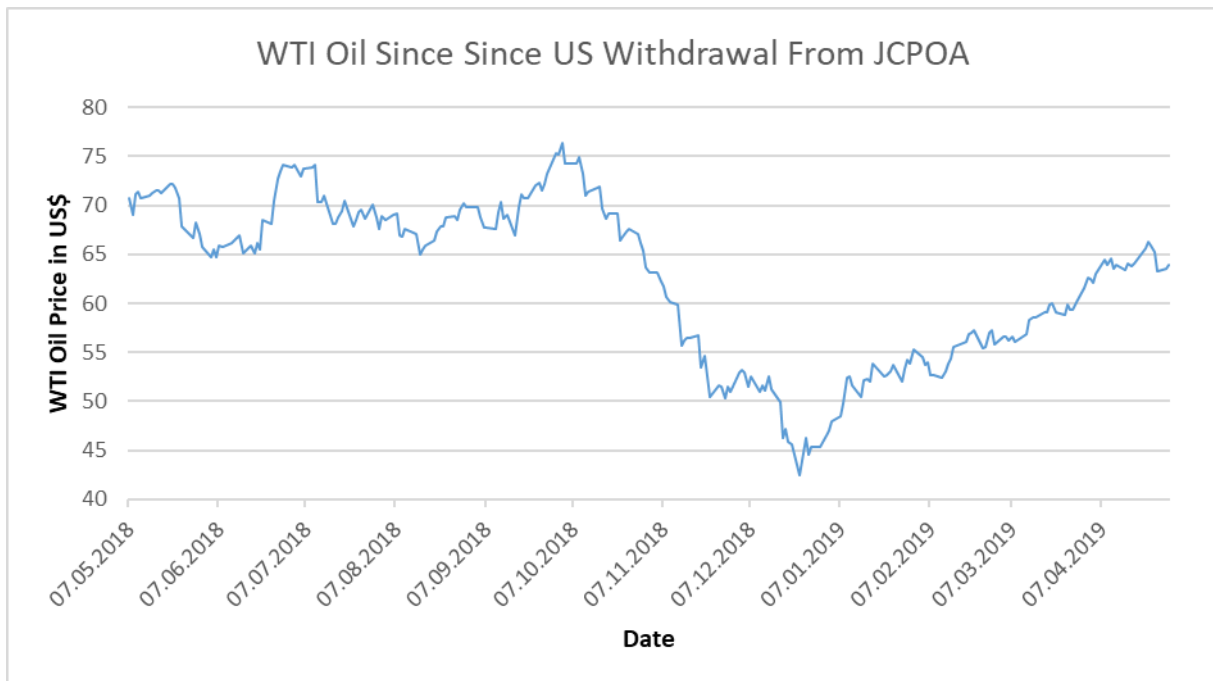


Fig. 1: WTI Oil Price Since US Withdrawal from JCPOA

Fig. 1 shows how the WTI oil price has changed since the US withdrawal from the JCPOA. Despite the theoretical assumption that lower world supply of oil would result in a higher oil prices, this has not occurred since the US withdrawal from the JCPOA. The WTI oil price has fallen from \$69,06 on 8th May 2018 (when the US officially withdrew from the Iran nuclear deal) to \$63,91 on 30th April 2019. The WTI oil price hit its lowest point in the sample period on 24th December 2018 \$42,53. Since then the price has demonstrated a rising trend.

Table 1 shows how oil supply figures, derived from the International Energy Agency's Monthly Oil Report, have fallen from 50,22 mbd in May 2018 to 48,43 mbd in April 2019. However, it is important to note that the figures are incomplete because they do not include all oil producing states. For example, data from US oil production is not included in the data set.

Date	Global oil supply (mbd)
May 2018	50,22
June 2018	50,37
July 2018	50,83
August 2018	51,11
September 2018	51,47
October 2018	51,65
November 2018	51,78
December 2018	51,17
January 2019	49,53
February 2019	49,28
March 2019	48,68
April 2019	48,43

Table 1: Global oil supply from May 2018-March 2019 (source: IEA 2019)

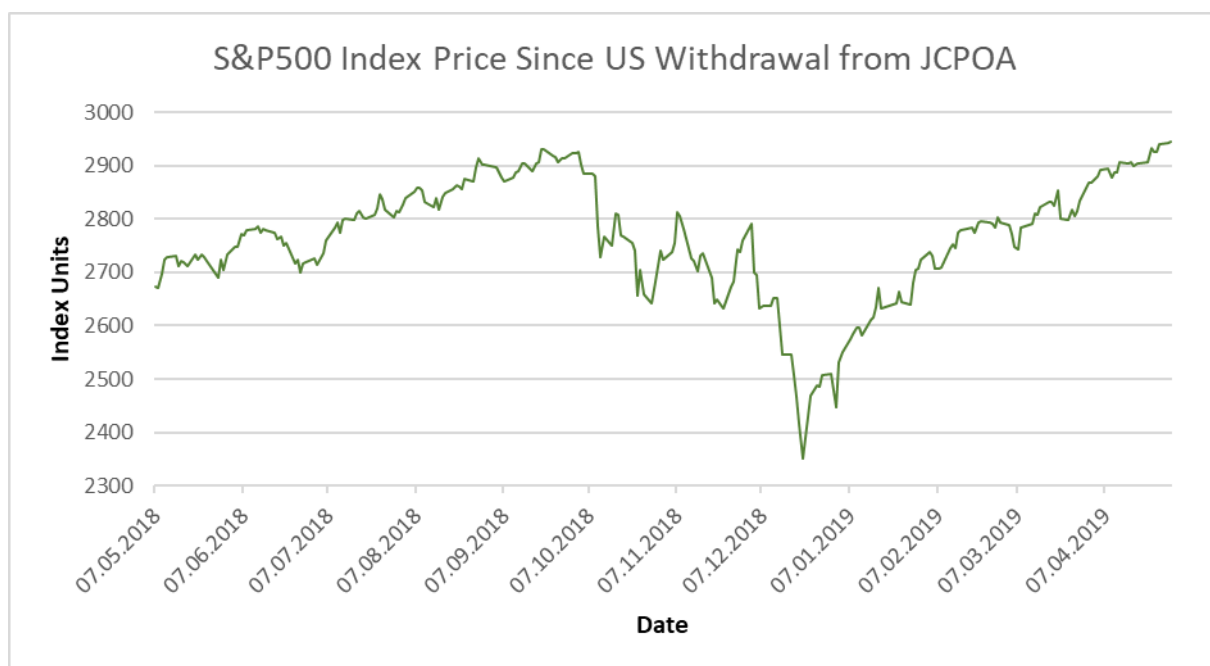


Fig. 2: S&P 500 Index since the US withdrawal from JCPOA

Fig. 2 shows how the S&P 500 Index rate has changed since the US withdrawal from the JCPOA. The index has increased from 2672,63 on 8th May 2018 to 2945,83 on 30th April 2019. The latter figure marked a record high for the S&P 500 Index (Imbert 2019).

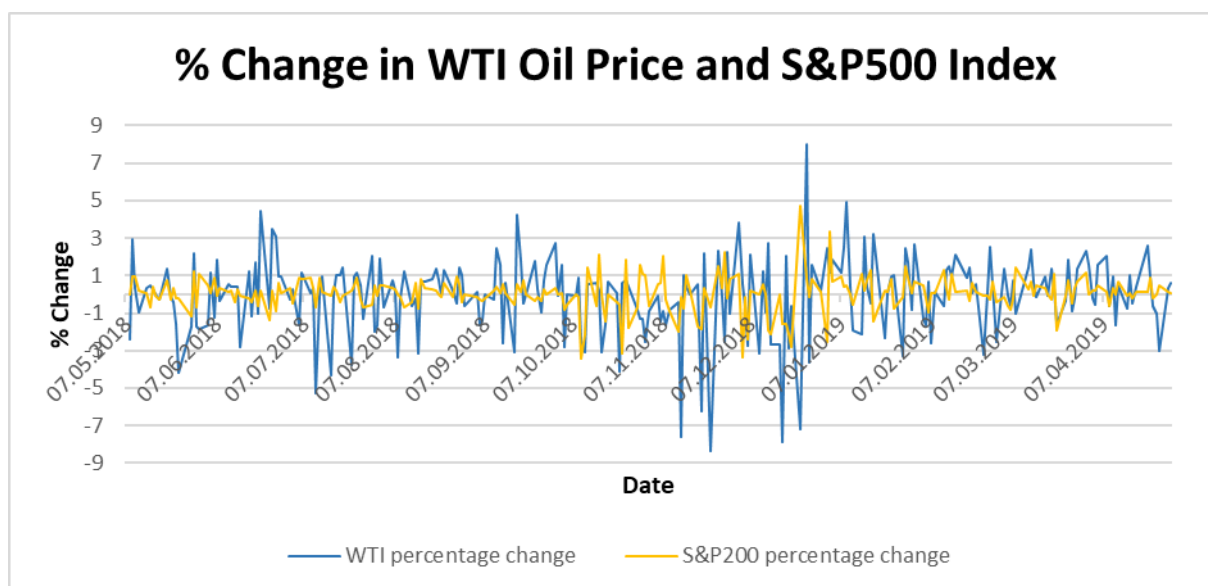


Fig. 3: % change in WTI oil price and S&P 500 Index since US withdrawal from JCPOA

Fig. 3 shows percentage changes in daily WTI oil prices and the S&P 500 Index. It demonstrates that the WTI oil rate was more volatile in daily percentage terms than the S&P 500 Index. This is further proven by Fig. 4, which shows that the standard deviations of the monthly logarithms of the WTI oil price are higher than those of the S&P 500 Index.

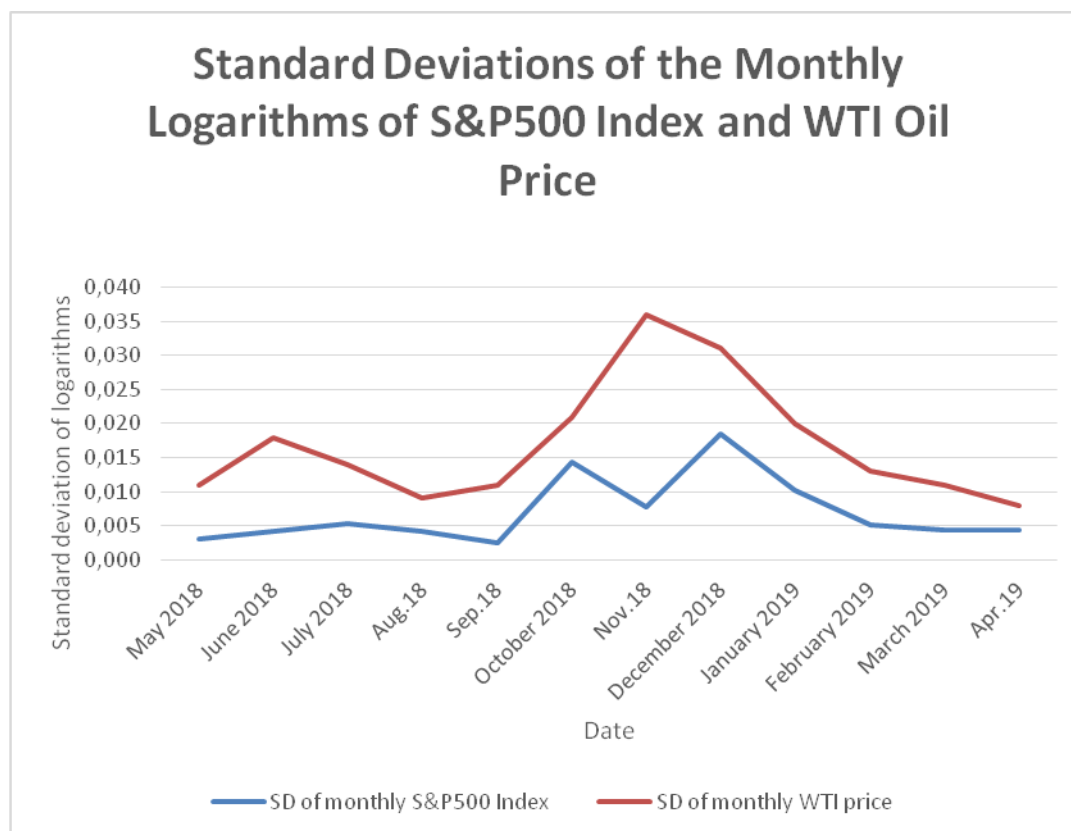


Fig. 4: Graph on standard deviations of monthly logarithms of S&P 500 Index and WTI oil price

These findings demonstrate that either the WTI oil price is highly sensitive to S&P 500 Index fluctuations or other factors also affect oil prices. The results below on bi- and multivariate regressions provide some direction on this matter, but it is important to repeat that the data set used monthly averages created from the daily closing rates of WTI oil price and S&P 500 Index. There are obvious fluctuations within each month for which WTI rates and S&P 500 Index, but it was not possible to consider these fluctuations accurately in the regressions because all series had to be adapted into monthly figures. However, the model in this study is concerned strictly with market fundamentals, namely economic growth and oil market supply. This justifies the application of monthly instead of daily data.

Results from bi- and multivariate regressions

Fig. 5 shows the results from a bivariate regression with WTI monthly average oil prices as the dependent variable and S&P 500 Index monthly average as the independent variable. The null hypothesis of homoscedasticity was not rejected (Breusch-Pagan Test F-statistic: 0.92) and therefore no error variance adaptations were made. Heteroscedasticity means that the error variance changes with alterations in the regression calculations.

The results demonstrate that there is evidence that the S&P 500 Index has a statistically significant impact on the WTI monthly average price (t-Statistic 2,85, p-value 0,02). We can reject the null hypothesis of non-correlation because the absolute value of the t-Statistic is greater than 2 and the p-value is significant at the 5% level. On average, every unit increase in the S&P 500 Index increased the WTI oil price by 0,05\$. Additionally, the S&P 500 Index explains 44,88% of the variation in WTI oil prices within the sample.

Dependent Variable: WTI_MONTHLY				
Method: Least Squares				
Sample: 2018M05 2019M04				
Included observations: 12				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-83.06133	51.07683	-1.626204	0.1350
SP_MONTHLY	0.052683	0.018462	2.853526	0.0171
R-squared	0.448811	Mean dependent var		62.59583
Adjusted R-squared	0.393692	S.D. dependent var		8.067080
S.E. of regression	6.281492	Akaike info criterion		6.664104
Sum squared resid	394.5714	Schwarz criterion		6.744922
Log likelihood	-37.98462	Hannan-Quinn criter.		6.634182
F-statistic	8.142609	Durbin-Watson stat		0.626333
Prob(F-statistic)	0.017146			

Fig. 5: Bivariate analysis (IV: S&P 500 Index monthly average, DV: WTI monthly average)

Fig. 6 shows the results from a bivariate regression with WTI monthly average oil prices as the dependent variable and monthly oil supply as the independent variable. Again, the null hypothesis of homoscedasticity was not rejected (Breusch-Pagan Test F-statistic: 0,36) and therefore no error variance adaptations were made.

The results show that there is evidence that monthly global oil supply changes do not have a statistically significant impact on the WTI monthly average price (t-Statistic 0,90, p-value 0,39). The null hypothesis of non-correlation could not be rejected because the absolute value of the t-Statistic is lower than 2 and the p-value is not significant at any relevant significance level.

Dependent Variable: WTI_MONTHLY				
Method: Least Squares				
Sample: 2018M05 2019M04				
Included observations: 12				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-33.64746	106.6692	-0.315438	0.7589
SUPPLY	1.910474	2.116919	0.902479	0.3880
R-squared	0.075313	Mean dependent var		62.59583
Adjusted R-squared	-0.017156	S.D. dependent var		8.067080
S.E. of regression	8.135984	Akaike info criterion		7.181482
Sum squared resid	661.9424	Schwarz criterion		7.262300
Log likelihood	-41.08889	Hannan-Quinn criter.		7.151561
F-statistic	0.814467	Durbin-Watson stat		0.577031
Prob(F-statistic)	0.388024			

Fig. 6: Bivariate analysis (IV: monthly global oil supply, DV: WTI monthly average)

Fig. 7 shows the results from a multivariate regression with WTI monthly average oil prices as the dependent variable and S&P 500 Index monthly average and global monthly oil supply as the independent variables. Again, the null hypothesis of homoscedasticity could not be rejected (Breusch-Pagan Test F-statistic: 0,68) because the F-statistic did not meet the significance requirements at any relevant significance level. Therefore, no adaptations were made for error variance.

The results show that there is evidence that S&P 500 Index has a statistically significant impact on the WTI monthly average price (t-Statistic 3,27, p-value 0,01), when controlling for the impact of changes in global oil supplies. On average, every unit increase in the S&P 500 Index increased the WTI oil price by 0,06\$, when keeping the impact of global oil supplies constant. On the other hand, the model gives no evidence that global oil supplies have a statistically significant impact on the WTI monthly average price, when controlling for the impact of S&P 500 Index fluctuations (t-Statistic 1,66, p-value 0,13). Finally, the model explains 57,76% of the variation in WTI oil prices within the sample.

Dependent Variable: WTI_MONTHLY				
Method: Least Squares				
Sample: 2018M05 2019M04				
Included observations: 12				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-219.4372	94.87539	-2.312899	0.0460
SP_MONTHLY	0.056150	0.017165	3.271193	0.0097
SUPPLY	2.516800	1.519562	1.656267	0.1320
R-squared	0.577569	Mean dependent var		62.59583
Adjusted R-squared	0.483696	S.D. dependent var		8.067080
S.E. of regression	5.796545	Akaike info criterion		6.564719
Sum squared resid	302.3994	Schwarz criterion		6.685946
Log likelihood	-36.38831	Hannan-Quinn criter.		6.519837
F-statistic	6.152632	Durbin-Watson stat		0.964009
Prob(F-statistic)	0.020697			

Fig. 7: Multivariate analysis (IV: S&P 500 Index monthly average and monthly global oil supply, DV: WTI monthly average)

Chapter 5: Discussion

In line with findings from previous research on the price mechanisms of global oil prices, this study intended to expand knowledge on the consequences of supply disruptions on oil rates within the framework of a sanctions episode. The results of this research were intended to explain whether fluctuations in the international price of oil resulting from a supply disruption limit the ability of states to place economic sanctions on oil products. In the beginning of this study, it was argued that oil prices and their fluctuation has important consequences for the global economy because it can have deep impacts on macroeconomic variables, for instance inflation and unemployment rates (Katircioglu et al 2015; 269). While oil importers want to avoid unnecessarily high oil prices to avoid negative influences on their economies, exporters seek higher prices to maximise profits (Mohaddes & Pesaran 2017, 324). While this is an evident conflict of interest, it has been found that lower oil rates are more beneficial to the global economy as a whole than higher prices (Mohaddes & Pesaran 2017, 324). Within this context, and following traditional economic rationale that a leftward shift in the supply curve will result in increased prices, it was hypothesised (H_1) that US could not fully apply its secondary sanctions on Iranian oil exports after its withdrawal from the JCPOA because its actions would lead to higher oil prices worldwide, and negative consequences for the US economy and the wider world.

However, the current research provides evidence that, since the US renewed imposition of primary and secondary sanctions on Iranian oil products, the global supply of oil has not had a statistically significant impact on the WTI oil price, the benchmark for global oil prices. On the other hand, economic growth, measured using the S&P 500 Index, proved to be statistically relevant for explaining variations in international oil prices. These results can potentially indicate that the hypothesis (H_1) can be disproved. The results demonstrate that, at least so far, there is little evidence to prove that fears over increased oil prices have deterred the US from fully applying its oil sanctions on Iran. Since 3rd May 2019, the US government has not granted any more waivers and the secondary sanctions are in full effect ever since.

These results are, on the whole, similar to those found by previous research. Earlier findings unanimously indicate that the demand side has the strongest impact on global oil prices, but supply still has a small positive influence (Chen et al 2016, 45; Kilian 2009, 1053; Baumeister

& Kilian 2016, 142, Kesicki 2010, 1605). The only contradiction is that while other studies have found a very small correlation between supply disruptions and oil prices, the current research found no correlation whatsoever. Since the start of 2018, Iranian oil supply has declined from 3,83 mbd to 2,37 mbd in May 2019 (OPEC 2018a: OPEC 2019). This can surely be defined as a serious oil supply disruption.

In short, three theoretical explanations for the US waivers will be examined; first, single supply disruption events simply don't have a major impact on global oil prices. Second, global oil supply has not had a significant impact on oil prices because US authorities have been able to create higher oil supply from their own production and through cooperation with other oil producing states to offset the reduced Iranian oil production. Finally, due to the insignificant results on the impact of oil supplies on international oil prices, the role of third party relations in a sanctions network will be probed.

Oil sanctions and precautionary demand

Demand has been further subdivided to compromise the effects of speculation from supply disruptions. Termed either precautionary demand shocks or anticipatory demand, this process explains how importing states may end up demanding more oil to prepare for a potential shortage in the future (Kilian 2009, 1064; Chen et al 2016, 45). The wind down periods and waivers need to be considered as a phase of threatened sanctions (Afesorgbor 2018, 2). In anticipation of the full imposition of sanctions certain countries may engage in stockpiling, especially if the imported goods or services have high sunk costs (Afesorgbor 2018, 2-3). This is where a connection exists to research on the global oil market, because precautionary demand is seen to raise prices if states start preparing for a shortage of vital goods (Kilian 2009, 1062).

The current research did not examine this variable, because it is very difficult to quantify speculation. Nevertheless, the concept provides a clear connection to economic sanctions placed on oil products and how their geopolitical nature can in theory lead to increased prices by affecting demand as well as supply. The following section will provide insight into the official state rhetoric around the US withdrawal from the Iran nuclear deal and wider geopolitical realities that surround the topic.

Speculation is important in all trading markets and therefore there may be demand side impacts from such activity also in the oil sector. Sanctions are seldom instated without statements or other rhetoric explaining this purpose. Statements are often made not only about the reasons for imposing sanctions, but also how states plan to execute them. This also applies in the context of the US withdrawal, with comments and official statements having been made throughout the world. Yet, Afesorgbor (2018, 13) argues that threats need to be credible or otherwise they can even undermine the effectiveness of sanctions.

To understand how credible US threats are, we need to consider the goal of their sanctions policy on Iranian oil exports. The official aim of the current US government is to reduce Iranian oil exports to an absolute zero. Technically, starting on 2nd May 2019 when the sanction waivers to eight countries or territories expired, the US secondary sanctions now apply equally to every state in the world that imports sanctioned Iranian oil products. The US government has repeatedly demonstrated in high profile cases that it intends to fully enforce its sanctions. The high profile extradition claim filed by the US for Huawei Chief Financial Officer Meng Wanzhou acts as a clear example (BBC 2019b). Further, BNP Paribas agreed to a \$8,9bn settlement with US authorities for violating sanctions placed on Iran in 2015 (Raymond 2015). While both cases were not directly involved with oil trade, they demonstrate the seriousness of US to enforce its wider sanctions policy against Iran. While questions have been raised about the legality of secondary sanctions by state actors as well as academic, there have been no cases where courts would have made a ruling on the matter (Davidson 1998, 1425). It is striking that companies are willing to pay extraordinarily high penalties and not seek challenge in legal courts for a legally questionable trade restriction like secondary sanctions.

Lately, however, US statements on the enforcement of their oil sanctions have taken a milder approach. During the 22nd May 2019 press conference where it was announced that no further waivers will be given for states to import Iranian oil products, US Secretary of State Michael Pompeo also stated the following: “We don’t lay out sanctions that we don’t have any intention of encouraging countries to cooperate with” (Pompeo, 2019). One reading of this is that the US considers cooperation rather than coercion as a means to fulfil their sanctions objectives. While it may offer a certain degree of contradiction to the policy of driving Iranian exports to zero, it seems to recognise that relations with other states are

an element that needs to be considered when applying sanctions (Cranmer et al 2014, 5). The importance of relations with third party states will be considered in a later part of the discussion. The ambiguous quote above can also be interpreted as a threat to other states and that the US central government will coerce third countries to cooperate if necessary. Nevertheless, the high profile court cases and statements by US officials have so far not materialised in high oil prices. This is demonstrated by the fact that global oil prices had on average fallen since the US withdrew from the JCPOA until the expiry of the waivers. Yet, due to limited time resources, data collection for this research ended on the last day of April 2019 and therefore fluctuations in oil prices beyond this date could not be included in the model.

While researchers have analysed the impact of supply disruptions and precautionary demand in general on oil prices, economic sanctions may be a different breed because they can be circumvented. It is naïve to presume that all states and entities abide by sanctions, especially when they are set by foreign states and act against their own national interests. Trade deflection is a feature that has been researched in connection to sanctions and has been found to have a softening effect on the consequences of sanctions, even to such an extent that they can compensate for the majority of revenue losses caused by sanctions (Haidar 2017, 347). Additionally, established trading partners with a keen interest to avoid negative economic consequences of sanctions may work together to evade them, for example by facilitating re-export procedures and by forming different companies to complicate the tracing of financial transactions. According to Eland (1995, 39), illegal evasion is especially prevalent in the long term and this makes sanction episodes more porous as time passes. It may be very difficult for the US to obtain information on business details between Iran and third countries because of the complexity of the trade procedures and potential confidentiality of information. In short, enforcing sanctions is not as simple as observing in which ports Iranian oil tankers dock. The fact that the current US sanctions on Iranian oil are unilateral in nature makes it easier for entities to circumvent, because globally there may be lack of support for the sanctions (Bapat & Morgan 2009, 1093). The fact that there are possibilities to circumvent economic sanctions, unlike when a pure physical supply disruption occurs, may provide one explanation why the oil market has not experienced higher oil prices since the re-imposition of US sanctions. The possibility to evade sanctions to some extent may provide price stability.

Beyond events directly related to changes in oil supply, the threats of war between Iran and US also need to be analysed because geopolitical events have been found to have an effect on oil prices (Baumeister & Kilian 2016, 146). Following the expiration of the waivers for Iranian oil exports, tensions on the Strait of Hormuz has increased dramatically. Threats have been wide-ranging, extending from Iran threatening to close the Strait of Hormuz to actual physical attacks conducted in the region (Holland 2019). The Strait of Hormuz is a strategically extremely important corridor for oil exports, because over 23 million barrels are transported through the choke point every day (Kruse 2014, 23). This represents around 20% of global oil transport (Kruse 2014, 23). If supplies through the Strait are majorly disrupted, this is potentially going to have a strong impact on speculative aspects and actual supply volumes in the global oil market, thereby leading to higher world oil prices.

Both, US and Iran, have been actively militarising the Strait of Hormuz in the past few weeks. For instance, the US has sent B-52 bomber airplanes and deployed its USS Abraham Lincoln aircraft carrier to the region (BBC 2019c). Additionally, President Trump recently announced his intention to send further 1,500 US soldiers to its military bases in the vicinity (BBC 2019d). Actual strikes have also happened in the region, for example four oil tankers were recently damaged by unknown objects just south of the Strait. The US government has asserted that Iranian mines planted in the sea caused the damage to the oil tanker, but they have given no hard evidence to back their claims (BBC 2019e). Beyond actual aggression, menacing comments have also been made by both sides. However, both have repeatedly contended that they do not intend to start an armed conflict. Regardless, the increased militarisation of the Strait of Hormuz and the secrecy by which both sides operate can lead to misunderstandings in the future. The situation is definitely tenser than before the newest US sanctions.

Assessing the probability of war between US and Iran is far beyond the scope of this research. However, it can be noted that so far the global oil price has not experienced an upward shock as a result of the heightened tensions. From the 3rd May until 31st May 2019, the WTI oil prices has fallen from \$61,98 to \$53,49. This is the period right after all the exemptions expired and the threats between US and Iran started escalating. However, evidence from previous historical conflicts in the Middle East demonstrates that oil prices have been quite resistant to geopolitical events. For example, the 2003 Iraq War caused oil

prices to spike only briefly and added an extra \$6 per barrel to oil prices (Baumeister & Kilian 2016, 146). In addition, the sanctions and EU embargo on Iranian oil exports in 2012 caused a \$9 increase in oil prices (Kilian & Lee 2014, 85). Thus, there is ample evidence to suggest that geopolitical phenomena have had a much more subdued impact on oil prices than market fundamentals. However, the psychological trauma caused by the 1970s OPEC oil embargo, which led to oil prices being multiplied many times and caused serious lack of supply in oil-importing nations, cannot be discounted.

Additionally, the Tanker War during the Iran-Iraq War of 1980-88 demonstrates that armed conflict has occurred in the Strait of Hormuz before. During the Tanker War, Iranian and Iraqi armed forces attacked each other's unarmed vessels in the Strait of Hormuz and waters close to it, as well as ships from other nations that were sailing in the region (Wise 2007, 7). The vast majority of ships targeted were oil tankers because both sides aimed to deliberately hinder each other's oil trade through these attacks (Wise 2007, 7). US armed forces were also involved during the end of the conflict. They conducted missions under Operation Earnest Will and protected allied ships by forming convoys for safe passage through the Strait of Hormuz (Wise 2007, 12-13).

While the Tanker War lasted from 1981-1988 with varying intensity, this period witnessed no significant oil price escalations, even though a stockpiling effect was observed at the very beginning of the war (Long 2011, 44). Even though hundreds of civilian vessels were attacked, this represents only a very small fraction of all the ships that sailed through the Strait during the conflict (Wise 2007, 7). The Tanker War and its consequences demonstrate that so far the latest tensions and attacks in the Strait of Hormuz are far less serious than previous cases have been. The Strait is a choke point for oil transport, but it may also be strategically very difficult for Iran to disrupt oil transport through it to such an extent that global oil prices would react dramatically. Further, Iranian oil exports are heavily reliant on the water passage, for example through its Kharg Island oil terminal, while many other oil exporting countries in the region have also been developing extensive overland pipelines to destination countries (Speight 2011, 94).

It must still be kept in mind that even though Iran is currently the third biggest oil producer in OPEC, its production makes up less than one-tenth of overall OPEC production (OPEC 2019, 57). Due to the political tensions between Iran and other OPEC member states, for example

the currently unfolding 'Middle East Cold War' between Iran and Saudi Arabia, it is extremely unlikely that other members of the cartel will call for an oil embargo as an act of solidarity for Iranian struggles under the US sanctions. Even with the above mentioned war posturing, direct threats to oil tankers in the Strait of Hormuz, the potential psychological trauma left by the 1970s OPEC oil embargo and all other related tensions, global oil prices has not experienced a significant increase. Rather, it fell during the month of May 2019 when the waivers expired.

Yet, the impact of precautionary demand cannot be ignored even though its impact so far seems to have been limited. Data collection for this study does not reach deep into the period when all waivers had been abolished. Regardless, whatever the exact impact has been, it is clear that the effect on precautionary demand on oil prices has not been dramatic so far. To fully understand economic sanctions on oil products, it is important to acknowledge the sanctions act itself as well as what different parties say and how the sanctions affect wider affairs. Whatever factors may be pushing precautionary demand and thereby oil prices do not seem to have been strong enough so far to outweigh other factors, like the influence of economic growth. However, this does not preclude that they will have an impact in the future. A clear answer on the restrictive capacity of precautionary demand on the ability of the US to impose its sanctions cannot be provided with the current analysis, but at the very least the impact appears to be limited for the time being.

Saudi Arabia and spare production capacity as a shock absorber

The above provides a compelling theoretically informed explanation to why changes in oil supply during the sample period proved to have an insignificant impact on the global oil price. However, there is also an alternative explanation for the lack of correlation; US direct intervention to balance out the decrease in supply that has occurred as a result of reduced Iranian oil output. While global oil supply has decreased from 50,22 mbd in May 2018, when the US withdrew from the JCPOA, to 48,68 mbd in March 2019, the global oil price has only been falling. When the US government announced its termination of all waivers for Iranian oil exports it stated that, through increases to its own production and those of its allies, the "well supplied global oil markets" make it possible to remove all remaining waivers (Pompeo 2019). The US has continuously stated that the waivers for IRN oil importers were given due to lack of excess supply in the market and a possible oil price hike as a result if no waivers

were given. This section considers the official explanations given by the US government and analyses how it can be used to explain the non-significance of changes in oil supply on oil prices.

This section is warranted due to the discussions of spare production capacity and its apparent lack in the oil industry. Spare capacity refers to the extra capacity above its normal output levels that an oil-producing state possesses that it can put into production quickly (Yergin 2013, 76). It has commonly been stated that Saudi Arabia possesses the largest spare capacity in the world, with the ability to produce an extra 1,5-2 mbd (Yergin 2013, 76; Espinasa et al 2017, 448). Saudi Arabia is explicit about its ability to increase oil production and it has previously used it to balance out supply disruptions in the market. For instance, in 2012 it used its spare capacity to compensate for the reduction in global oil supply due to declining Iranian oil exports as a result of a global sanctions regime against Iran (Yergin 2013, 76). However, lately there has been speculation that Saudi Arabia has exploited its full spare capacity. This would point to clear implications for Saudi Arabia's ability to balance out the current oil market (Hamilton 2009, 202).

Keeping this in mind, it is interesting to note that Saudi Arabia's oil production reduced from 9,99 mbd in May 2018 to 9,69 mbd in May 2019 (OPEC 2018a, 59; OPEC 2019, 57). This demonstrates that instead of increasing, Saudi oil production actually contracted between the US withdrawal from the Iran nuclear deal and now. However, it is important to note that oil production figures are dependent on many factors beyond global oil supplies. For instance, the OPEC+ format agreed to roll down production in December 2018 in response to a growing gap in oil supply and demand created by sluggish economic growth prospects (OPEC 2018b). During the same period, US oil production increased from 10,77 mbd to 12,4 mbd (EIA 2019). It is vital to note that while the Saudi changes in oil production are included in the International Energy Agency data used for the statistical model, US figures are not included. The US production increase of 1,63 mbd has therefore fully compensated for the 1,46 mbd decrease in Iranian oil supplies, as derived from figures reported by OPEC (OPEC 2019).

However, Iranian oil production was still at 2,37 mbd according to OPEC statistics for May 2019 (OPEC 2019). Considering that the official goal of the US federal government is to drive Iranian oil exports to zero, the current production increases cannot compensate for the

whole production shutdown in Iran. However, this is most likely not the intention because US and its allies probably would only provide additional supply to the market if Iranian production actually decreased further and a need for compensating it materialised. So far global oil supply has been relatively stable, with all the observed changes in Saudi Arabian, US and Iranian oil production. Regardless, even if we consider that Iran used one-third of its production for domestic consumption a much higher increase in production, in the range of an additional almost 2 mbd, would be needed for US and its allies in order to completely offset all Iranian exports (Gheissari 2009, 6). Whether or not there is enough capacity globally to compensate for the loss of all Iranian oil exports has to be put to doubt based on the above mentioned figures, especially considering that there has been reports of Saudi Arabia's spare production capacity having been almost completely exhausted (Hamilton 2009, 202). Regardless, it can be concluded that US increases in supply have so far been high enough to offset Iranian production decreases and therefore keep the oil market in check. It may not be accurate to argue that the oil market balances out automatically, but deliberate actions by the US have acted as shock absorbers and helped to avoid disturbances to market conditions.

However, simply replacing Iranian oil supplies with US equivalents may not be adequate, especially if a large scale supply shock occurs. This is due to the fact that crude oil around the world differs in quality. US crude oil is considered lighter than the heavier crude oil produced in Iran (McKinsey & Company 2019). Light crude oil has a higher percentage of light hydrocarbons and can easily be converted into conventional petroleum products (Fattouh 2010, 335). Heavy crude oil, on the other hand, has a higher percentage of dense metals that make it more difficult to refine (Fattouh 2010, 335). The problem is that refineries in oil importing nations are commonly set to handle only certain types of crude oil and therefore simply replacing Iranian heavy crude oil with lighter US oil may not be possible for many refineries. However, some crude oil from Saudi Arabia and the United Arab Emirates is similar to the Iranian equivalent (Fattouh 2010, 336-338). The ability of the US to maintain stability in global oil prices therefore depends on its agreements with Saudi Arabia and the United Arab Emirates. Unfortunately, the content of the accords that the US government has struck with Saudi Arabia and the United Arab Emirates has been kept secret from the public. The fact that the US cannot simply replace lost Iranian produce by increasing its own

production may be considered a severe restraint on its ability to balance out the market if a large scale supply shock occurs.

In order to continue acting as a shock absorber, US and its allies have to be able to maintain high enough production to compensate for all lost Iranian production while considering all other relevant variables, like economic growth, which may affect oil prices. Time will tell whether or not unilateral sanctions will actually be able to push Iranian oil exports to zero, but it is clear that there needs to be supplementary supply from other states that would compensate for the lost Iranian production. In this scenario, if we assume that there is no 'invisible hand' that automatically coordinates demand and supply to keep a stable oil price, state intervention itself is a hindrance on the ability of the state to act as it wishes. In order to keep a stable oil price, the sanctioning state needs to coordinate its actions with other players and tinker with its own oil production, both activities which take considerable time.

For these reasons, it is not comprehensive enough to consider spare capacity solely as explicit production figures. Also agreements about potential production boosts between US and its oil-producing allies need to be examined. The US government argues that it has reached agreements with Saudi Arabia and the United Arab Emirates to increase production if circumstances require it (Pompeo 2019). However, the details of these agreements, whatever they entail, have been kept strictly secret. Increasing production is not a simple act of just turning open valves at oil facilities. Many states operate at full capacity or close to it, with so far the only exception being Saudi Arabia (Yetiv 2004, 20). In order to increase production, oil producers first need to engage in exploration, drilling, production and only then can they sell their oil products (Espinasa et al 2017, 438). This is a very time consuming process which requires considerable resource investments and the associated financial risks.

The problem of maintaining agreements to keep a stable global oil price is made even more difficult by the fact that there are multiple impeding supply disruptions globally. Venezuela produced 1,17 mbd in May 2019 and is currently in the midst of serious civil unrest (OPEC 2019). Oil production is severely threatened at the same time, also due to US sanctions placed on the Venezuelan state oil company (Exec. Order No. 13850). Additionally, violence has lately reignited in Libya with Field Marshal Khalifa Haftar attempting to take the capital city from the UN-supported Government of National Accord (BBC 2019f). If we combine all the oil supplies that could be lost due to the situations in Iran, Venezuela and Libya, it

becomes clear that US and its allies may need to seriously raise their oil production. Their ability to do this has to be called to question, especially as spare production capacity has been historically very tight in the global oil industry.

In summary, while the econometric model may give strong impetus to reject H_1 , the statements made by US regarding cooperation agreements with Middle Eastern oil producers proves otherwise. It may be argued that prices have not risen since the US re-imposition of oil sanctions on Iran because US has been able to increase its own supply and make agreements with Saudi Arabia and others to sufficiently increase their supply, in required scenarios. However, in this case the global oil price would have been a strong, yet temporary, limitation on the ability of US to fully applying its sanctions on Iranian oil products. As such, H_1 cannot be completely rejected because coming to agreements with third states and increasing own oil production takes considerable time, not mentioning the risks involved. It is necessary to also understand the dynamics triggered by supply disruptions in order to explain the theoretical findings. Exclusively quantitative or qualitative research cannot provide conclusive results on this issue. Additionally, the fact that oil markets, including its speculative components, have not reacted violently so far does not mean that they will not react in the future. Armed conflict between Iran and its adversaries and cumulative supply disruptions with multiple oil producing nations may have fundamental implications on future market conditions.

Sanctions networks and interlinkages

As explained above, the restraining effect of the global oil price on the ability of the US to impose its secondary sanctions on Iranian oil exports proved to be weaker than initially expected. The economic argument of an escalating global oil prices as a result of fully imposed sanctions was continuously stated by the US government for granting the waivers (Pompeo 2019). H_1 cannot be completely dismissed within the current research framework because the US successfully prepared for the full imposition of its oil sanctions through agreements with third countries for them to be ready to increase their oil production and also by increasing its own production capabilities. Yet, previous research on the limited significance of oil supply disruptions on global oil prices and the current study may provide evidence that supply shocks are only one restraining factor for the imposition of oil sanctions.

Based on theory, it may be possible to presume that there are more reasons beyond economic arguments that hindered the US from putting its oil sanctions against Iran into full effect for a considerable amount of time. There may be hidden motives, but simply because the US government doesn't explicitly state them doesn't mean that they have not been considered. Sanctions do not exist exclusively in a sender-target relationship, and therefore connections to those affected by the sanctions must also be considered (Cranmer et al 2014, 5). In this case, it means that by analysing political interactions that the US has established with countries or entities that were granted waivers may provide political rationale to why the said countries or entities were temporarily exempted from US sanctions. This section will focus solely on US-China relations and thereby try to give political reasoning why China was temporarily exempted from US secondary sanctions on Iranian oil imports.

China currently has the second biggest economy in the world and its military is the world's largest in terms of personnel (The Military Balance 2019, 256). It is clear that in a globalised world, US nor China wants to run the risk of disconnecting themselves from each other and causing large scale domestic economic hardship. US has recently been conducting trade negotiations with China to find a new agreement that would comfort both sides. The talks were preceded by US President Trump's imposition of tariffs on certain Chinese goods and services, and the retaliatory tariffs placed by China (Alper et al 2019). Recently, the talks failed and tariffs that had been lifted for its duration were re-imposed on both sides, but even more comprehensively this time (Burns & Cooney 2019). The start of the trade war can be considered to be 6th July 2018 when US imposed its first tariffs in the episode on Chinese products (Burns & Cooney 2019). Various tariffs have been placed since and many round of talks have taken place. However, on 10th May 2019, the trade war re-escalated when US put raised tariffs from 10 to 25 percent on \$200bn of Chinese products (Burns & Cooney 2019). With regard to the US sanctions on Iranian oil, it is noteworthy that they were announced on 2nd November 2018 and ended on 2nd May 2019, and were thus applicable during a considerable time of the trade war. Once the waivers expired, the trade war resumed. This can be pure coincidence, but as the discussion below demonstrates US may have had incentives to safeguard the negotiations through the import exemptions.

China's energy security is heavily reliant on oil imports from the Middle East region and, by 2020, 80% of its oil imports are predicted to come specifically from the Gulf region where

also Iran sits (Yetiv 2004, 121). In April 2019, China was still importing 0,8 mbd of oil from Iran (Aizhu & Meng 2019). According to Kruse (2004, 16), China's main interest in the region is to assure a stable supply for satisfying its energy needs. With limited power projection in the region and its every attempt to improve its energy security being potentially perceived by Washington as a competing force, China has hardly resisted US policy in the Middle East over the past decades. This may be due to China's aversion to compromise its relationship with US due to its economic dependence on it (Yetiv 2004, 134).

While China seems unable to object US policy in the oil rich region, this doesn't mean that the damage to China through the secondary sanctions is insignificant. A foreign country forcing China to cut off one of its major oil trading partners at short notice is sure to hurt China's energy security. China is not only sensitive to changes in supply conditions in the Middle East, but it is also vulnerable to their consequences. Keohane and Nye (1989, 13) define vulnerability as the "relative availability and costliness of alternatives that actors face". Within the oil sector, there are multiple different types of export contracts but it is common for them to be long-term in nature (Haidar 2017, 323). It may therefore be cumbersome, and possibly cause costly contract infringements, for certain states to abruptly end their oil transactions with a state that is facing sanctions. These difficulties may be severe enough to put strain on the US-China bilateral relationship.

With the currently on-going trade war between the two countries, both nations may perceive this as their dominant common priority and therefore be unwilling to compromise their wider relations over a disagreement on sanctions placed on Iran. The Iran issue can be perceived as a relatively minor issue in US-China affairs in comparison to the trade war. The waiver for China may have been one possible confidence building measure to not further deteriorate the relationship and thereby make the trade agreement negotiations even more difficult. When US announced the waivers, they stated that those receiving them had agreed to reduce the scale of their Iranian oil imports (Pamuk & Gardner 2018). However, now that all exemptions have expired, it doesn't mean that they are being fully enforced by the US authorities. While this is pure speculation, the possibility that US will strategically enforce its sanctions when it is of most benefit to itself cannot be entirely discounted.

While this analysis has only provided an insight into wider US-China affairs, it demonstrates that sanctions episodes do not exist in a vacuum. Economic and political phenomena are

connected on multiple levels. These linkages may then prove to be either restraining or reinforcing. Especially with oil sanctions that may cause large scale economic and political difficulties for the sanctioned state itself and those importing from the sanctioned state, wider relationships between the sender state and other states beyond the target need to be carefully analysed. This will facilitate understanding of the potential constraining potential of these connections. Regardless, however strong the impact of wider affairs was it did not hinder US from withdrawing all waivers in the beginning of May 2019. Whatever the restrictive power was, they no longer hinder full application of US secondary sanctions on Iranian oil imports. Therefore, H₂ cannot be rejected based on theoretical argumentation because the vulnerability of China to serious energy security challenges and the potential escalation of the trade war also into a security dimension may have encouraged the US government to temporarily give China a waiver from its oil sanctions on Iran.

Chapter 6: Conclusion

This research project aimed to understand reasons why the US granted waivers for its secondary oil sanctions to import oil from Iran after the US government decided to withdraw from the Iran nuclear deal. When the idea for this study was derived, the US had only recently announced the exemptions for eight countries or entities. How long they would be in place could not be foreseen. It was hypothesised that there were strong elements limiting the ability of the US government to fully impose its sanctions on Iran. In this vein, two hypotheses were established; first, it was expected that the US could not fully apply its secondary sanction on Iranian oil exports following its withdrawal from the JCPOA because the resultant shortfall in global oil supply would result in higher oil prices that would harm the US as well as the global economy (H_1). Second, it was hypothesised that the US was unable to apply its sanctions to full extent due to fears of further deteriorating the US-China political relationship (H_2).

To test the first hypothesis (H_1), an econometric model was developed to analyse the impact of reduced Iranian oil production due to the sanctions on the global oil price. Traditional microeconomic theory on supply projects that a leftward shift in the supply curve would result in increased oil prices (Mankiw 2003, 80). On the other hand, literature on supply disruptions and their impact on oil prices have proven the opposite by stating that supply shocks have a very limited effect on oil rates (Kilian 2009, 1053; Chen et al 2016, 46). The model was created to determine which one of the two conflicting economic theories is more plausible.

The results from the econometric model provided evidence that, for the duration of the wind down period and waivers, changes in global oil supply had no significant impact on oil prices. These results were explained in two possible ways; either supply shocks simply do not have an impact on global oil price in certain cases, or US authorities expected their secondary sanctions on Iranian crude oil exports to result in increased oil prices and they therefore issued waivers to critical Iranian oil importing nations to buy themselves time to stabilise the market. H_1 was partially rejected, because the changes in global oil supply following the issuance of the US secondary sanctions did not significantly affect global oil prices. Therefore, it was perceived that the global price of oil may have, at best, temporarily hindered US imposition of its oil sanctions. This is demonstrated by the waivers being

allowed to expire half a year after being granted. Additionally, the threatening statements and actions made between US and Iran have so far proven unable to trigger precautionary demand and thereby put upward pressure on oil rates.

However, the official statements by US officials about the necessity to create extra supply on the market to compensate for Iranian oil production decreases may demonstrate that oil prices limit the potential of states to apply sanctions on large oil-producing nations. To fully understand the picture, data would have to be gathered much further into the future to comprehend whether US production increases and US 'agreements' with Saudi Arabia and the United Arab Emirates will actually be able to keep the market stable as Iranian oil production continues to fall. According to Yetiv (2004, 207), the global oil market is characterised by complex stability. The global oil market is not as volatile as may appear at first hand because there are pillars within the industry, for example Saudi Arabia's idle capacity and its proven behaviour to use it to balance out supply shocks, which balance out potential instabilities (Yetiv 2004, 91). Nevertheless, it cannot be assumed that these pillars are controlled by an 'invisible hand' but may rather require deliberate activation by actors. Increasing own oil production and coming to agreements with other oil producing states takes considerable resources, and therefore H_1 cannot be fully rejected.

Due to the fact that the impact of supply changes resulting from US sanctions on Iranian oil on global oil prices proved less significant than expected, it was further hypothesised that there have been other reasons why US handed out the waivers. The official reasons given by state actors have often proven not to encompass certain hidden motives (Elliott 1995, 51). Sanctions do not exist in a sender-target vacuum and it may be argued that third parties are particularly important especially when applying secondary sanctions (Cranmer et al 2014, 5). China is highly dependent on oil imports from the Gulf region to satisfy its energy needs. While the trade war between China and US has ebbed and flowed, it is striking to note that the waivers were announced during a period when the negotiations on a new trade agreement were reported to have been progressive. Potential for an agreement was also reported by the media (Burns & Cooney 2019). Due to the vulnerability of China to energy security challenges if they completely closed oil imports from Iran, US was potentially wary to not negatively affect the trade negotiations by causing excessive damage to China's energy needs. This may have played a role in granting the import exemption to China.

However, when the waivers expired even China was not given an extension. The trade war has continued since then, with increased intensity. This provides evidence that even political relations between third states are, at best, a temporary limitation for the application of secondary sanctions on oil products. Nevertheless, H₂ could not be completely rejected because it may have been one of many reasons for handing out the waivers.

The expiration of all exemptions at the beginning of May 2019 and the insignificant impact of supply changes on oil prices since the US withdrawal from the Iran nuclear deal gives comprehensive indication that all hypothesised restraints were weaker than expected. Additionally, the six-month delay for the US to fully impose its sanctions does not mean that large scale damage to Iran's economy was avoided. The oil sanctions are part of a wider sanctions campaign against Iran which is creating widespread economic damage to the country. The country's GDP is expected to fall by 6% in 2019 and inflation is also rising uncontrollably (BBC 2019a). Additionally, the sanctions are continuously being tightened by US authorities to further strangle the Iranian economy.

On 8th May 2019, a few days after all waivers expired, Iran announced that it would partially break its obligations under the JCPOA if the EU and other signatories do not start to "fulfil their obligations" under the agreement within 60 days (BBC 2019g). From this it is clear that the economic and political damage to Iran has mounted to such levels that the benefits they receive from staying in the agreement are becoming less attractive. The unilateral US sanctions on Iran have not come without consequences.

This research project has demonstrated that sanctions are a very complicated instrument with various industry specific nuances and relations outside the sender-target nexus that need to be considered. It seems questionable to analyse sanctions primarily through quantitative large-n studies because they inevitably ignore the differences that exist between sanctions episodes. Large-n studies may provide answers on the effectiveness of sanctions, but they fail to explain what causes this (in-)effectiveness and problems that arise in even applying them. While evidence emerged that the global oil prices and wider US-China relations may have restricted the ability of the US to impose its secondary sanctions on Iranian oil trade, this can by no means be regarded as the only two possible variables that may have constrained US policymakers.

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Pledge of honesty

On my honour as a student of the Diplomatic Academy of Vienna,

I submit this work in good faith and pledge that I have neither given nor received unauthorized assistance on it.

Olli Korpimäki