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Evidence and Policy Implications of Sanctions in the Long Run: The Case of Iran

Sanctions are an increasingly prevalent tool in international policymaking. Their relevance stems from the need to respect national sovereignty while curbing the potentially destabilizing effects of local government policies. The case of sanctions against Iran is particularly interesting to understand the effects and propagation of economic sanctions. First, Iran has been sanctioned for over forty years, thus allowing for a long-run analysis of the phenomenon; in addition, given its relevance in the Middle East, it makes it possible to assess the impact of sanctions on a small—but economically relevant—open economy, levering on high-quality historical data.

Over the past forty years, Iran has been subject to a host of international measures that has led to the progressive isolation of the country from the rest of the world. In November 1979, the so-called "Tehran hostage crisis" ended a period of positive economic and diplomatic relationships between Iran and Western powers. The hostage crisis occurred in the aftermath of the regime change in February 1979—when the Islamic revolution took place—and affected 52 US citizens. In order to secure the release of the hostages, the US imposed a severe set of economic and financial measures against Iran, such as an oil embargo and asset freeze amounting to USD12 billion. Even though the Algiers Accords signed on January 1981 put an end to the crisis, thereby easing the intensity of sanctions, the relations between Iran and the US remained negatively affected by such event. Since then, Iran has been subject to varying degrees of economic sanctions as a result of the strategic decisions made over the political cycles in both countries and in Europe, and the geopolitical considerations regarding the stability of the Middle East.

In a recent study (Laudati and Pesaran, forthcoming), we assess the long-run implications of economic sanctions by developing a novel newspapers-based sanctions index and expanding the time-series literature on the matter. The study focuses on economic sanctions only, thus excluding political measures such as boycotts. Given our identification strategy, it is possible to establish both the impact in terms of total output losses and the relevant channels that can help to explain such losses. Economic sanctions have lowered output growth rates from the potential 4-5 percent to the realized 3 percent per year over the period 1989-2019. Such losses stem from an initial decrease in oil export revenues, which then lead to a substantial depreciation of the Iranian rial, followed by increases in inflation before being reflected in output growth declines. A single quarter of sanctions shocks can explain only a small portion of the overall forecast error variance for the output variable, while a period of two years of protracted sanctions can explain up to 60 percent of the total decline in output growth, when keeping the other shocks fixed.

The current article describes the research design and the main findings of the aforementioned article and of a companion working paper (Laudati and Pesaran 2021). It concludes by providing some policy implications that may help foster the debate on international sanctions, also in light of additional evidence from the literature.

DATA AND RESEARCH STRATEGY

There are two major challenges when assessing the impact of sanctions on the Iranian economy in the long run. On the one hand, sanctions effects are usually estimated by using a dichotomous variable and taking an arbitrary position on the period in which they started ("sanctions on") and ended ("sanctions off") based on the knowledge of historical events—e.g., Gharehgozli (2017).

However, sanctions against Iran have not been imposed in a uniform way over time. Therefore, it is desirable to construct a continuous index of sanctions inten-

KEY MESSAGES

- Periods of prolonged sanctions can lead to large cumulated economic losses

- Oil revenue falls, exchange rate depreciations, and inflation may be key pass-through mechanisms to explain lower output growth

- Direct and indirect effects of sanctions may become entrenched over time, leading to resource misallocation

- Exclusion from foreign markets pushed Iran to develop in-house innovations and domestic product substitutes

- Sanctions may lead to additional socio-economic effects, such as gender-biased policies and reduction of education resources
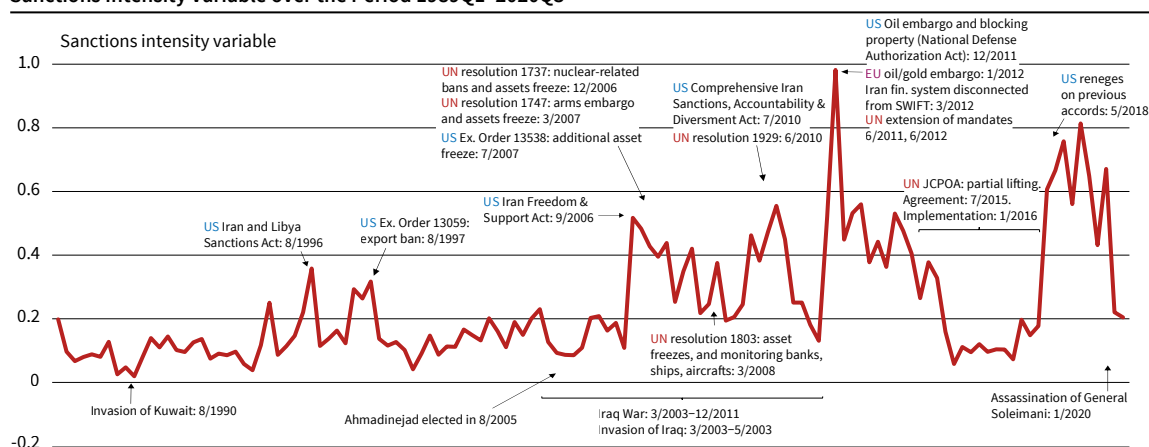
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Figure 1

Sanctions Intensity Variable over the Period 1989Q1–2020Q3

Note: The index is constructed by pooling sanctions-related news on Iran from six leading newspapers: The New York Times, the Wall Street Journal, the Washington Post, the Los Angeles Times, the Financial Times, and the Guardian. See Laudati and Pesaran (forthcoming) for further details on variable construction. © ifo Institute

sity to overcome the limitations of dummy variables. We do so by collecting information on newspaper coverage of sanctions against Iran from six leading outlets spanning both the generalist and economic press. To our knowledge, this represents a contribution to the literature on sanctions' assessment. Figure 1 plots the results and shows that the indicator seems to track remarkably well the actual evolution of major historical and diplomatic events.[1] Sanctions were relatively mild before 2006 and intensified thereafter as a response to Iran's President Ahmadinejad's uranium enrichment program. The highest level of sanctions intensity occurred over 2012-2014, when the US and the UN joined forces to curb such uranium enrichment efforts. This led eventually to the nuclear deal (JCPOA) in 2015—followed by a consequent drop in sanctions—, before the US withdrew from the accord to enact a strategy of "maximum pressure" under US President Trump in 2018.

The second challenge of the study is given by the limitations of comparative approaches used in the policy evaluation literature, such as difference-in-differences, synthetic control methods (Abadie and Gardeazabal 2003), and panel data approach (Hsiao et al. 2012). Such limitations stem from the fact that sanctions began in a phase of structural change for the national institutions due to the Islamic revolution, thus preventing the use of the economic period before 1979. Furthermore, the specific characteristics of Iran make it hard to construct a reliable measure of a "synthetic" Iran variable. Consequently, we build a structural time series model to identify the effects and channels through which sanctions have been affecting the Iranian economy, as proxied by the sanctions intensity indicator.

The paper estimates the total impact of sanctions (direct and indirect losses) for the period 1989-2019 in order to exclude confounding effects from the 1979

[1] The same exercise can be extended in the future to study the effect of sanctions on other economies.

Revolution, the subsequent Iran-Iraq War of 1980-1988, and the Covid-19 shock of 2020. The Statistics Agency of Iran and the Central Bank of Iran provide excellent historical data at quarterly frequency. Additional global variables were retrieved from the usual international institutions such as the World Bank.

THE IMPACT OF SANCTIONS

Main Economic Effects

The time series model focuses on the economic impacts of sanctions on oil export revenues, Iran's rial/USD depreciation, inflation, money supply growth, and real output growth, whilst controlling for several global factors such as oil price changes, world output growth, equity market volatility and more. These estimates proved to be robust to alternative specifications and after allowing for a host of control variables. Our results also show that falls in oil export revenues, strong currency depreciations (with substantial overshooting), and high inflation rates are important channels through which sanctions affect the real economy. On the other hand, the over-expansion of the money supply used to compensate underdeveloped capital and money markets does not seem to affect the path of other domestic variables once we control for inflation and exchange-rate depreciation.

Using impulse response analysis techniques, we also find a significant short-term collapse of oil revenues, an over-reaction of the rial to sanctions, and a subsequent rise in inflation and a fall in output thereafter (Figure 2). The economy adapts reasonably quickly to the new sanction shocks, a property that has already been documented in the literature (Esfahani et al. 2013). The forecast error variance decompositions (FEVDs) with a single quarter shock to sanctions also show that around 80 percent of variations in foreign exchange and 82 percent of variations in output growth remain un-

explained, and most likely relate to many other latent factors that drive the Iranian economy. These results suggest that removal of sanctions on their own is unlikely to ensure a period of sustained growth and low and stable inflation, and many policy reforms are needed to address sanctions-induced price distortions as well as other distortions due to general economic mismanagement, poor governance, and the ambiguities that surround the relative roles of semi-government agencies in the economy.

The outcome of FEVDs is different if we consider the effects of a prolonged period of sanctions. When sanctions are imposed with the same intensity for about two years, keeping all other shocks fixed, they can explain more than 70 percent of the forecast error variance of inflation and around 60 percent of the forecast error variance of output growth. Figure 3 provides a visual representation.

Other Economic and Socio-demographic Effects

In a complementary working paper (Laudati and Pesaran 2021), we expand the scope of the analysis by using the same strategy in order to identify the negative effects of sanctions on the labor market. The employment rate has systematically decreased with respect to other countries in the Middle East and the North Africa region after sanctions were imposed, and women seem to have paid the higher price, with significant declines in female labor force participation.

We also find that sanctions have negatively affected secondary school education, with the number of schools and teachers both negatively affected by sanctions. Again, gender effects seem to be at play here.

The structural transformation pattern of the economy also seems to have been affected by sanctions. The agricultural sector has become more important as a share of the overall economy, while manufacturing has shrunk; the services sector shows no statistically significant change. The latter finding might also be explained as the result of the banking and financial system being hit by sanctions at the same time as the overall knowledge-based economy expanded.

Sanctions have also had a number of interesting unintended consequences for the Iranian economy. At the onset of sanctions, Iran was heavily dependent on oil exports, just as for countries such as Saudi Arabia. Restricting oil exports over a relatively long time has led to important structural transformations of the economy, with significant increases in non-oil exports, most notably petrochemicals, light-manufacturing products and agricultural goods. There have also been significant successes in internet access and the associated rise of high-tech and digital companies in Iran. It is likely that international sanctions have been partly responsible for the rapid rise of high-tech

Figure 2

Impulse Responses of the Effects of One Positive Standard Error Shock to the Sanctions Intensity Variable
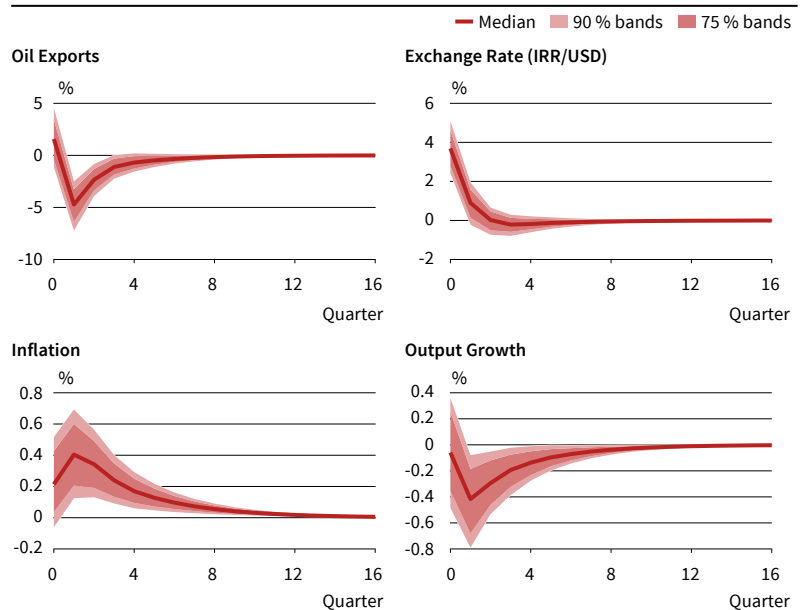
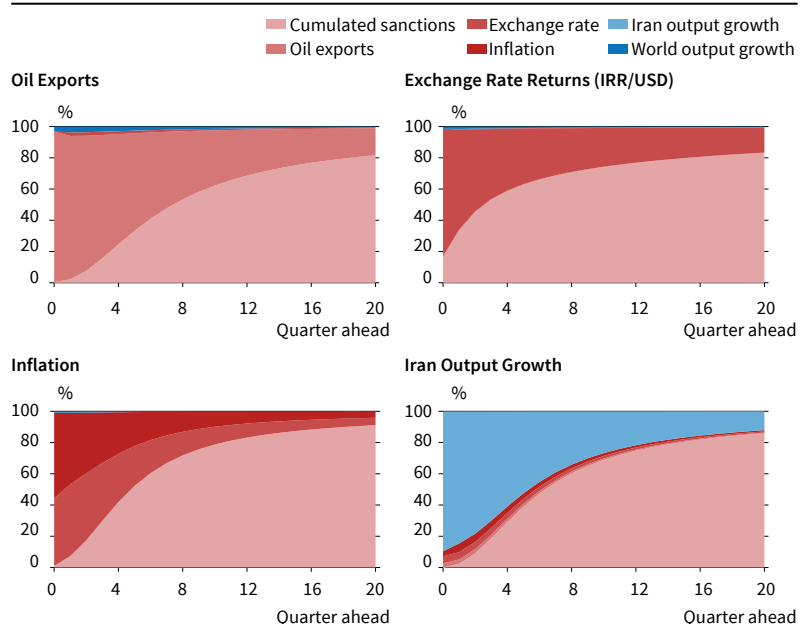Note: See the online appendix in Laudati and Pesaran (forthcoming) for details of variables sources and construction.

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Figure 3

Forecast Error Variance Decomposition for Domestic Variables in the Svar Model with a Cumulative Shock to Sanctions, and Domestic Variables Ordered

Note: See the online appendix in Laudati and Pesaran (forthcoming) for details of variables sources and construction.

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companies in Iran over the past decade although more research is needed on the matter.

POLICY CONCLUSIONS

The recurrent challenge to derive policy conclusions with respect to sanctions lies in understanding what the sanctions' policy aims are in the first place. One fact that emerges from the Iran case is that a nuclear deal was reached as a result of a *multilateral* effort

to engage and negotiate. Between 2012 and 2014, a coalition of countries led to measures that eventually ended with the JCPOA agreement in 2015. This allowed Iran's nuclear enrichment process to be placed under control and ensured international agencies' access to Iran's nuclear facilities, while the country could experience economic and social relief from sanctions lifting. A similar result was not achieved before or thereafter when unilateral strategies were attempted, or when multilateral majorities were fragmented.

When considering the imposition of sanctions, there is no doubt that economic sanctions have harmed the Iranian economy. By considering similar emerging economies, and bearing in mind Iran's economic potential, it seems plausible that Iran could have grown at rates between 4 and 5 percent per year rather than the annual 3 percent rate experienced on average over the past thirty years. In this respect, it is remarkable that, even though sanctions were effective in isolating Iran from the world economy, the country was able to still grow in a semi-autarkic fashion and produce domestically generated innovations and high-tech product substitutes. Furthermore, sanctions have often been used as a rhetorical device by the élite to foster a sense of danger from the outside, thus buttressing the theocracy (e.g., "the resistance economy").

Economically, when sanctions extend over many years, their direct impact on output losses (e.g., from lower oil exports) tends to become increasingly entrenched, with indirect effects such as rent-seeking, resource allocation distortions, and general costs associated with efforts to mitigate and circumvent the sanctions regimes. Furthermore, sanctions may have significant political and socio-demographic reverberations, as we show for the case of gender-biased policies and reallocation away from educational resources. It is generally agreed that, at times of increased sanctions intensity, governments fearful of political consequences are reluctant to curtail distortionary policies, such as large subsidies on food and energy, and they might even accentuate them, or resort to multiple exchange rates to reduce the inflationary effects of sanctions.

The humanitarian aspect of sanctions should also be considered (Kokabisaghi 2018). Regulatory complexity acts as a major barrier to ensure the respect of human rights: trading in products technically allowed by the sanctioning environment (say, to satisfy key drugs' needs) may conflict with financial sanctions (when obtaining payments), thereby inducing excessive uncertainty for international partners to engage in any transactions. In this respect, the effects of the Covid-19 shock should be further studied.

However, Iran's low output growth relative to its potential, high inflation and excess output growth volatility cannot all be traced to sanctions alone: they also have domestic roots stemming from prolonged periods of distorted relative prices, corruption (Farzanegan and Zamani 2022), a weak banking system and under-developed financial institutions (Mazarei 2019). Therefore, when considering lifting the sanctions, global partners may need to keep in mind the adverse effects of years of economic mismanagement. Transparency in government policies is important to induce greater openness to private sector initiatives and foreign investments. Insulating the economy against oil revenue volatility will also become an urgent policy issue if sanctions are removed. Regional development policies should be initiated by giving priority to remote regions that have been left behind.

Finally, it is essential to consider not only the economic and social effects of any agreement, but also the stability of the agreements themselves. Forty years of diplomatic tension have engendered mutual distrust that has to be counteracted with appropriate contractual conditions to prevent an arbitrary and uncalled-for withdrawal from either side.

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