



# The Human Consequences of Economic Sanctions

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May 2023



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## Acknowledgements

*The author thanks Esfandyar Batmanghelidj, Joy Gordon, Dorothy Kronick, George Lopez, Alex Main, and Mark Weisbrot for comments and suggestions and Dan Beeton, Jacques Bentata, Giancarlo Bravo, Luisa García, Jonea Gurwitt, Camille Rodríguez, Gabby Rosazza, and Aileen Wu for editorial and research assistance.*



# Abstract

This paper provides a comprehensive survey and assessment of the literature on the effects of economic sanctions on living standards in target countries. We identify 32 studies that apply quantitative econometric or calibration methods to cross-country and national data to assess the impact of economic sanctions on indicators of human and economic development. Of these, 30 studies find that sanctions have negative effects on outcomes ranging from per capita income to poverty, inequality, mortality, and human rights. We provide in-depth discussions of three sanctions episodes — Iran, Afghanistan, and Venezuela — that illustrate the channels through which sanctions affect living conditions in target countries. In the three cases, sanctions that restricted the access of governments to foreign exchange limited the ability of states to provide essential public goods and services and generated substantial negative spillovers on private sector and nongovernmental actors.



# Executive Summary

This paper provides a comprehensive survey and assessment of the literature on the effects of economic sanctions on living standards in target countries. We identify 32 studies that apply quantitative econometric and calibration methods to cross-country and national data in order to assess the impact of economic sanctions on indicators of human and economic development and human rights. Of these, 30 studies find that sanctions have negative effects on outcomes ranging from per capita income to poverty, inequality, mortality, and human rights. We also provide in-depth discussions of three sanctions episodes — Iran, Afghanistan, and Venezuela — that illustrate the channels through which sanctions damage living conditions in target countries. In the three cases, sanctions that restricted governments' access to foreign exchange affected the ability of states to provide essential public goods and services and generated substantial negative spillovers on private sector and nongovernmental actors.

The use of economic sanctions by some of the world's most important economies has significantly increased in recent decades. Their adoption is almost invariably framed in the context of attempts to deter or dissuade target governments and individuals from actions that purportedly would undermine global security, democracy, or human rights. While a considerable body of research has investigated the effectiveness of sanctions in achieving their intended objectives, much less effort has been devoted to understanding the implications of sanctions for persons living in target countries.

This paper reviews the current state of knowledge regarding the human consequences of economic sanctions. We discuss the effect of sanctions on socioeconomic conditions in target jurisdictions, including on the economy, poverty and distribution, health and nutrition, and human rights. We provide a systematic survey of the empirical literature using both cross-country panel and country-level data sets. We find a remarkable level of consensus across studies that sanctions have strongly negative and often long-lasting effects on the living conditions of most people in target countries.

We supplement this discussion with case studies that illustrate the channels through which sanctions have affected living conditions in three target states: Iran since 1979, Afghanistan since 1999, and Venezuela since 2017. These case studies help us to look more closely at the main channels through which sanctions affect the economy and living standards. They also illuminate why safeguard mechanisms, such as humanitarian exceptions, fail to offset these collateral effects.

### *The use of economic sanctions is on the rise.*

Over the past six decades, there has been significant growth in the use of economic sanctions by Western powers and international organizations. Less than 4 percent of countries were subject to sanctions imposed by the United States, European Union, or United Nations in the early 1960s; today, that share has risen to 27 percent. The magnitudes are similar when we consider their impact on the global economy: the share of world GDP produced in sanctioned countries rose from less than 4 percent to 29 percent in the same period. In other words, more than one fourth of countries and nearly a third of the world economy is now subject to sanctions by the UN or Western nations.

There is also a clear rising trend in individual or entity-specific sanctions. During the first Obama administration, there was an average of 544 new designations to the Office of Foreign Assets Control's (OFAC) list of Specially Designated Nationals (SDNs). That number rose to 975 per year in the Trump administration and has continued rising so far (to 1151 per year) in the Biden administration.

Recent years have seen increasing concern about the continuing humanitarian effects of sanctions. In 2014, the Human Rights Council of the United Nations adopted a resolution stating it was “deeply disturbed by the negative impact of unilateral coercive measures” and “alarmed by the disproportionate and indiscriminate human costs of unilateral sanctions and their negative effects on the civilian population.”

Nevertheless, it appears clear that some of the economic and humanitarian impact of sanctions on target populations is intended. For example, a statement issued by the UK government after freezing Russian central bank assets in February 2022 stated unambiguously that “sanctions will devastate Russia’s economy.” In February 2019, Secretary of State Mike Pompeo stated in response to a question about the effects of sanctions on Iran, “Things are much worse for the Iranian people, and we are convinced that will lead the Iranian people to rise up and change the behavior of the regime.”<sup>1</sup> Pompeo made similar statements about US sanctions in Venezuela the following month.<sup>2</sup>

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<sup>1</sup> Human Rights Watch (2019).

<sup>2</sup> Weisbrot and Sachs (2019).

From another perspective, the chair of the US House Rules Committee, Congressman Jim McGovern, wrote to President Biden in May 2021, asking him to “lift all secondary and sectoral sanctions imposed on Venezuela by the Trump Administration.” In the letter, he noted:

...the impact of sectoral and secondary sanctions is indiscriminate, and purposely so. Although U.S. officials regularly say that the sanctions target the government and not the people, the whole point of the “maximum pressure” campaign is to increase the economic cost to Venezuela... Economic pain is the means by which the sanctions are supposed to work.... it is not Venezuelan officials who suffer the costs. It is the Venezuelan people. Credible sources have consistently found that sanctions have worsened the humanitarian crisis in the country.<sup>3</sup>

***Cross-national studies decisively find severe negative effects of sanctions on people in target countries.***

Our study summarizes the results of 32 research papers and book chapters that use econometric or general equilibrium calibration methods to assess the effects of economic sanctions on living conditions in target countries. This includes 20 studies that use cross-country panel data and 12 studies that use within-country time series or firm-level data. Nineteen of the 20 cross-country papers find consistently statistically significant adverse effects of economic sanctions on the dependent variable of interest. These include per capita income, poverty, inequality, international trade, child mortality, undernourishment, life expectancy, and human rights. One paper finds ambiguous effects of sanctions on human rights, with sanctions leading to deteriorating rights in some specifications and improvement in others. Eleven of the 12 country-level studies find negative effects on similar outcome variables. The only country study that finds the contrary result is a study using Venezuela time series import data, which we discuss in detail below.

Put together, these studies constitute an impressive array of evidence on the negative effects of both broad economic and narrowly aimed sanctions on living conditions in target countries, with most results indicating strong adverse effects and only a handful of nonsignificant results. Nevertheless, there is clearly room for more research to identify the causal mechanisms at work, as the publications surveyed were mostly written during a period in which there have been significant advances in the measurement of sanctions and evaluation of causal effects.

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<sup>3</sup> McGovern (2021).

This paper also provides recent case studies of three economies subject to sanctions barring, or significantly impeding, international economic transactions: Iran, Afghanistan, and Venezuela. The purpose of these case studies is to provide a clearer understanding of the mechanisms through which sanctions affect living conditions in target economies, as well as how these have evolved in the recent past. For this reason, we focus on three cases in which sanctions are still in force and that can help us observe how recent developments that may not be adequately captured by cross-national data — such as the shift to personal sanctions, or the proliferation of humanitarian exceptions — have affected vulnerable groups in target economies.

***Sanctions on Iran significantly reduced oil revenues, leading to import cuts and scarcity of essential goods.***

United States sanctions on Iran were first enacted in response to the November 1979 takeover of the US Embassy in Tehran. To this date, the 1979 Executive Order finding that the situation in Iran constituted an “unusual and extraordinary threat to the national security” of the United States remains the longest-standing US national emergency declaration. Since the United States was, by far, Iran’s largest trading partner before the revolution, the trade embargo caused significant losses. US–Iran trade collapsed immediately after the sanctions and never recovered to its previous levels, even during periods in which sanctions were eased.

The support for multilateral sanctions on Iran was bolstered when evidence surfaced in 2002 of Iran’s construction of two secret research facilities for producing enriched uranium and heavy water. Starting in 2006, the United Nations Security Council approved a series of resolutions freezing the assets of entities and persons involved in Iran’s nuclear program, prohibiting the transfer of nuclear items to Iran, and calling for restraint and vigilance on financing involving Iran and transactions with Iranian banks, including the Central Bank. Predictably, these decisions resulted in stronger compliance obligations for global financial institutions, which then had to guarantee that their operations with Iran were not supporting these banks or proxies for listed Iranian entities. Starting in late 2011, the United States and Europe imposed additional restrictions that led to the banning of the importation of all Iranian crude oil and petroleum products into Europe and the imposition of secondary US sanctions on other countries that did not commit to reducing Iranian oil imports.

The sanctions were lifted as a result of the 2015 Joint Comprehensive Plan of Action (JCPOA), in which Iran agreed to the progressive reduction of its enriched uranium stockpile and enrichment operations. In May 2018, however, the Trump administration withdrew the United States from the JCPOA and reinstated all sanctions on Iran. While the Biden administration has participated

in negotiations attempting to revive some version of the JCPOA, these efforts have been unsuccessful so far.

Iran's GDP, oil production, and export data time series clearly display marked declines following each round of sanctions. They also show some evidence that the economy has progressively become more resistant to the damage from sanctions. Studies using synthetic control methods confirm that sanctions have negatively affected Iran's economy compared to the counterfactual that would have been expected in a no-sanctions scenario. Alternatively, calibration exercises based on partial or computable general equilibrium (CGE) models also find negative effects on living standards.

The data are strongly consistent with the hypothesis that the bulk of changes in Iran's growth performance has been driven by changes in oil exports and production, changes that were strongly affected by sanctions. Imports declined strongly in the aftermath of both the 2011 and the 2018 sanctions, and recovered strongly after the JCPOA accords. Studies using household survey data find that rural households, belonging to low- and middle-income groups, or those headed by old and unemployed persons, had the highest likelihood of moving into poverty in the sanctions period, while households working in the public sector and those headed by highly educated persons were least likely to move into poverty.

Aside from their effects on income and poverty, there is evidence that sanctions significantly affected non-income dimensions of well-being such as health. There were shortages of 73 drugs in Iran during the sanctions period; 32 were also on the World Health Organization's list of essential medicines. Seventy of the 73 scarce drugs fell under an OFAC general license to export drugs to Iran, suggesting that this type of authorization has little practical effect. There is abundant anecdotal evidence that imports of some approved medicines have been blocked. For example, a \$60 million order to an American pharmaceutical company for an antirejection drug for liver transplants failed to reach Iran, despite having all the required OFAC licenses, because no bank would perform the transaction.

We also find that progress in reductions of mortality, stunting, and female anemia stalled considerably during the sanctions period and resumed after sanctions were lifted. Data from the Global Burden of Disease Study show a significant slowing of the rate of decrease of age-standardized disability-adjusted life years after 2011, with the most detrimental effects concentrated on noncommunicable diseases.



***Afghanistan sanctions blocked access to international funds vital for the functioning of the economy.***

In Afghanistan, restrictions on international economic transactions date from the rise of the Taliban to power in 1996, after the prolonged civil war. The decision of almost all countries to withhold recognition of the Taliban government functioned as de facto sanctions by impeding officials from accessing assets or entering into contracts as representatives of the Afghan state. For this reason, neither the UN resolutions nor the US executive orders imposing sanctions refer explicitly to the government of Afghanistan, as there is no formally recognized Afghan government to sanction. Nevertheless, because the Taliban controlled virtually all Afghan state institutions from 1996 to 2001, sanctions on the Taliban effectively blocked access to any foreign assets and limited the ability of the Afghani government to engage in trade. A case in point: the Afghan government was unable to claim control over \$254 million in gold reserves held by Da Afghanistan Bank (DAB), the Afghan central bank, at the US Federal Reserve.

Because nonrecognition acts as a de facto imposition of sanctions on a government, it makes little sense to draw a distinction between the timing of accession of the Taliban to power in Afghanistan in 1996 and the imposition of sanctions three years later. Any meaningful economic interactions between the Taliban government and other states or international organizations were precluded as of 1996. It is of course difficult to construct a counterfactual as to what economic relations with the rest of the world would have been if the Taliban had been recognized as Afghanistan's government and sanctions not been imposed.

Furthermore, there are serious data limitations on any attempt to evaluate the aggregate performance of Afghanistan's economy during the period of Taliban rule or to disentangle the effect of sanctions from that of Taliban rule. Aggregate data collection appears to have effectively ceased long before the Taliban takeover, generating a paucity of statistics on relevant human development outcomes. United Nations estimates indicate a decline of 76 percent in real per capita incomes between 1986 and 2001, which would put it in line with the largest economic growth collapses observed in modern world history.

Education data, despite being quite sparse, show a consistent picture of declining school enrollments, as well as a near-disappearance of female schooling during the 1996–2001 period, as the Taliban applied a nationwide ban on female education and children were increasingly recruited as combatants in the ongoing civil war. Data on infant mortality are more equivocal, partly because of the pervasive use of statistical extrapolation methods by UN agencies. Yet, it is

at least consistent with the hypothesis that child mortality rates rose during the period of Taliban rule, and especially in the last two years, which included the formal imposition of sanctions and the US invasion.

Nongovernmental organizations and UN agencies were highly critical of the effect of sanctions at the time. A 2000 study commissioned by the Office of the UN Coordinator for Afghanistan concluded that UN sanctions had a tangible direct effect on the Afghan economy as well as a substantial indirect impact on the humanitarian situation. On the eve of the adoption of new sanctions by the UN Security Council in December 2000, Doctors Without Borders warned that sanctions would be devastating for a country without a functioning health care system. Even UN Secretary-General Kofi Anan seemed to lament the thrust of the resolution, stating before its adoption that it “is not going to facilitate our humanitarian work.”

The Taliban returned to power in 2021 after a major offensive that followed the withdrawal of US troops. Because both UN and US sanctions aimed at the Taliban had never been lifted, these went into force immediately, restricting any interactions with the new Afghan authorities. Similar to the situation 20 years earlier, lack of formal recognition of the Taliban government mimics the effect of government sanctions, impeding the carrying out of international legal, commercial, or financial transactions involving the Afghan government. The blocking of access to the country’s central bank assets plays an even greater role this time around. The Central Bank now has lost access to significantly larger holdings, valued at \$9.6 billion, or the equivalent of nearly half the country’s GDP, and around 18 months of imports. These were effectively confiscated by the United States (\$7 billion) and Europe in August 2021, after the Taliban took power.

In February 2022, President Biden formally blocked all Afghanistan central bank reserves held in the United States and issued a license enabling the transfer of half (\$3.5 billion) of these to a trust fund, which was said to ensure that the money will be used for the benefit of the Afghan people. The trust fund is managed by a foundation created by Afghan nationals whom the US has accredited as representatives of the Afghan government based on their appointments to central bank management positions prior to the Taliban’s takeover of power.

Major international human rights and humanitarian groups have condemned the confiscation of more than \$7 billion in assets belonging to DAB.<sup>4</sup> John Sifton, the Human Rights Watch Asia advocacy director, said, “restrictions on the banking system of Afghanistan are really intensifying the country’s already serious human rights crisis. And they’re driving populations

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<sup>4</sup> Center for Economic and Policy Research (2022).

into famine.” David Miliband, a former UK foreign secretary and current president and CEO of the International Rescue Committee, told the US Senate: “The proximate cause of this starvation crisis is the international economic policy, which has been adopted since August and which has cut off financial flows not just to the public sector, but in the private sector in Afghanistan as well.”<sup>5</sup> Sanctions and the blocking of access to external assets clearly exacerbate the contractionary effects of the reduction in foreign exchange inflows. Lack of access to international reserves and to emergency international assistance deprives the country of the means to stabilize its economy by smoothing external adjustment, and imposes significant costs on humanitarian agencies that would choose to remain involved despite the change in authorities. They also significantly complicate remittance transfers, which accounted for nearly \$800 million in foreign currency inflows prior to the Taliban takeover.

While the Biden administration has issued a set of licenses to facilitate humanitarian transactions with the Afghan government, the licenses do not authorize contracting for services with government institutions, thus permitting interaction with the government only to the extent that it is incidental to third-party transactions. There are numerous examples, both before and after the issuance of these licenses, of sanctions constraining or impeding transactions that could have helped alleviate the Afghan crisis.

***Venezuela sanctions drove a collapse in oil revenues, contributing to the largest peacetime contraction in modern history.***

Broad economic sanctions, beginning with limitations on financing, were first imposed on Venezuela in 2017, when the Trump administration barred financing and dividend payments to Venezuela’s government and state-owned oil company, *Petróleos de Venezuela, S.A. (PDVSA)*. The US also used personal sanctions — first selectively imposed by the Obama administration in 2015 — to target top government officials and political figures as well as private-sector actors believed to be connected with the Maduro government. Since these designations preclude dealing with designated persons in their official capacity, they essentially brought to an end all interactions with the Venezuelan government not previously authorized by the US government.

In August 2017, President Trump issued an executive order prohibiting the purchase of new debt issued by the Government of Venezuela or by PDVSA, forcing Venezuela to default on existing obligations and impeding a restructuring of Venezuelan debt. The order also barred dividend

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<sup>5</sup> Afghanistan: The Humanitarian Crisis and U.S. Response: Hearing Before the Subcommittee on Near East Asia, South Asia, Central Asia and Counterterrorism of the Senate Foreign Relations Committee, 117th Congress (2022).

payments to Venezuela, impeding the government from using profits from its offshore subsidiaries to fund its budget. In January 2019, the US barred trade with Venezuela's state-owned oil monopoly and recognized Juan Guaidó as the country's interim president, transferring to his administration control of all of Venezuela's offshore assets under US jurisdiction. In February 2020, the US sanctioned two subsidiaries of the Russian energy company Rosneft that at the time were handling around 75 percent of Venezuela's oil sales and the near totality of its gasoline imports. Venezuela began to suffer severe gasoline shortages shortly after Rosneft halted all trade with it and divested from its Venezuela operations in response to the sanctions.

Each round of sanctions (2017 financial, 2019 primary oil, and 2020 secondary oil) was followed by a decline in Venezuelan oil production, which, as measured by independent agencies, had been stable for an eight-year period starting in 2008. Though it had begun to decline in early 2016, prior to the 2017 economic sanctions, this decline appears to have been a consequence of the collapse in oil prices that occurred at the time and affected most other high-cost producers. But even when oil prices began to recover in 2017, Venezuela's oil production accelerated its decline even as production stabilized or recovered in comparable economies.

Studies using trend interruption estimates and synthetic control methods all confirm that the adoption of sanctions was associated with a decline of oil production compared to a no-sanctions counterfactual. The range of estimates of these studies puts the cost of the decline at between \$13 and \$21 billion a year, or between two and three times the 2020 level of exports. These results are confirmed by a recent study using firm-level data to compare firms that had access to external finance at the time of sanctions with those that lacked that access. The estimates show that financial sanctions significantly affected the growth of firms with prior access to finance, explaining around 46 percent of their loss of production.

The resulting decline in oil exports severely circumscribed the ability of a traditionally import-dependent economy to buy imports of food as well as intermediate and capital goods for its agricultural sector, driving the economy into a major humanitarian crisis. Total imports fell by 91 percent, while food imports declined by 78 percent. The decline in the economy's capacity to import made it impossible to maintain past levels of essential goods. Even if Venezuela were importing only food today (i.e., if it had decided to reduce to zero all other imports, including other essentials as well as capital and intermediate goods for its oil industry) it would not be able to pay for more than four-fifths of the food it imported in 2012.

Venezuela's deep deterioration in indicators of health, nutrition, and food security occurred alongside the largest economic collapse, outside of wartime, since 1950. The collapse in oil

revenues drove the economic contraction, which caused the deterioration in socioeconomic indicators. By contributing to lowering the country's oil production, sanctions also contributed to lowering per capita income and living standards, and are a key driver of the country's health crisis, including its increase in child and adult mortality.

Only one study disputes this conclusion. A policy brief published in January 2021 by ANOVA, a Venezuelan consultancy firm with links to the country's opposition, argues that sanctions were followed by an improvement in imports of essentials, reflecting the positive effects of sanctions-induced economic liberalization. This is also the sole paper in our survey that contends that sanctions are associated with an improvement in living standards. The argument is based on the alleged finding of a break in trend at the time of the imposition of the August 2017 sanctions in ordinary least squares time series regressions that model food and medicines imports as a function of time. The study has been widely reported in the Venezuelan press and is often invoked by pro-opposition leaders and influencers.

We replicate the ANOVA results and find that they are due to an artifact of several questionable modeling choices and at least one crucial coding error. These include the choice of an arbitrary bandwidth that is three times as large as that chosen by methods standard in the literature on regression discontinuity, the specification of the dependent variable in absolute US dollars instead of the more conventional logarithmic specification used in macroeconomic time series studies, and the omission of several import categories accounting for around four-fifths of the economy's food imports at the time of sanctions. Once these errors are corrected, any evidence of an improvement in the level or rate of change in food imports disappears. Neither close inspection of the corrected data nor a battery of statistical tests shows evidence of any sustained significant improvement in food or medicines imports following the 2017 financial sanctions.

***Economic sanctions severely harm the most vulnerable.***

The evidence surveyed in this paper shows that economic sanctions are associated with declines in living standards and severely impact the most vulnerable groups in target countries. It is hard to think of other cases of policy interventions that continue to be pursued despite the accumulation of a similar array of evidence of their adverse effects on vulnerable populations. This is perhaps even more surprising in light of the extremely spotty record of economic sanctions in terms of achieving their intended objectives of inducing changes in the conduct of targeted states.

Attempts to redesign the sanctions regime, some of which are without doubt well-intended, can easily become distorted because of perverse policymaker incentives. Largely ineffective humanitarian exceptions are often used to falsely claim that sanctions do not impede or create obstacles to humanitarian assistance. By design or by omission, regulatory ambiguity generates incentives for generalized de-risking by private-sector actors — who can cause considerable damage to the economy and population by avoiding various commercial interactions with sanctioned countries even if there are “exceptions” that would allow them. These “exceptions” allow officials to characterize the problem as one of “over-compliance” rather than one of inadequate institutional design.

Regrettably, the populations most affected by sanctions are also voiceless in decisions about their adoption. Often, the decision to adopt or tighten sanctions responds to domestic political incentives in sanctioning countries, such as the electoral relevance of politically active diasporas in US swing states. Expanding the space of reasoned and critical public debate will be indispensable to revert this imbalance in the power to decide on the adoption of policies that can harm the lives of millions of people and cause the death of many thousands.

# Introduction

Recent decades have seen a significant increase in the use of economic sanctions by some of the world's most important economies. While there is ample variation in the contexts and specific goals pursued by sanctioning governments, their adoption is almost invariably framed as part of an attempt to deter or dissuade target governments and individuals from actions claimed to undermine global security, democracy, or human rights. Among the most prominent uses of sanctions in recent times are those aimed at the governments of Iran, North Korea, Russia, Cuba, and Venezuela.

A considerable body of research has investigated the effectiveness of sanctions in achieving their intended objectives. By and large, this literature finds that sanctions usually fail to generate the sought-for changes in the conduct of their targets. And while less effort has been devoted to understanding the implications of sanctions for the persons living in target countries, it is often considered a sign of effectiveness when they harm the targeted economy. That has led to growing concern regarding the consequences of economic sanctions on vulnerable groups in target countries, and it is increasingly common to find sanctions regimes accompanied by a plethora of humanitarian exceptions ostensibly designed to help mitigate or offset the collateral effects of economic restrictions.

This paper reviews the current state of knowledge regarding the human consequences of economic sanctions. We discuss the effect of sanctions on socioeconomic conditions in target jurisdictions, including their effect on the economy, poverty and income distribution, health, mortality, nutrition, and human rights. To do this, we provide a systematic survey of the empirical literature using both cross-country panel and country-level data sets. We find a remarkable level of consensus across studies in the conclusion that sanctions have strongly negative and often long-lasting effects on the living conditions of the majority of people in target countries.

We supplement this discussion with three case studies that illustrate the channels through which sanctions have affected mortality and living conditions in target states: Iran since 1979, Afghanistan since 1999, and Venezuela since 2017. These case studies help us to look more closely at the main channels of causation through which sanctions affect the economy and living standards as well as why safeguard mechanisms such as humanitarian exceptions often fail to offset these collateral effects.

We begin, in section 2, with a review of the evolution of the use of sanctions and how their design has varied in attention to concerns about their collateral effects. Section 3 goes on to discuss the results of research using cross-country panel data to assess the impact of standardized measures of sanctions on outcome variables such as income, health, or human rights. Section 4 analyzes in detail the cases of Iran, Afghanistan, and Venezuela. Section 5 provides concluding comments.

### 3. Intended and Unintended Consequences of Economic Sanctions

A long historical tradition traces the use of sanctions to at least the fifth century BCE, when the city-state of Athens barred ships from neighboring Megara from accessing its ports in response to Megara's military actions against Athenian allies. The resulting standoff led to the Peloponnesian War, which ended in a devastating defeat for Athens and the end of Athenian democracy. Ironically, the first documented instance of sanctions is also an example of spectacular failure.

Nevertheless, sanctions were commonly seen as a complement to military strategy up to recent times, with their more extreme form being that of siege warfare. Thus, their consequences on civilian populations were both understood and intended. In the aftermath of World War I, world powers began conceptualizing sanctions as a possible alternative to military action.<sup>6</sup> US president Woodrow Wilson, a staunch believer in the ability of sanctions to hold together a new world order, described sanctions as “something more tremendous than war.”<sup>7</sup> Sanctions were incorporated in Article 16 of the covenant of the League of Nations, which sought to dissuade members from settling disputes through force by threatening the complete severing of trade and financial relations. In 1935, the League of Nations condemned Italy's invasion of Ethiopia and imposed an economic and financial embargo on Italy in response; Italy refused to back down and maintained its occupation until its defeat in World War II.<sup>8</sup>

Sanctions became increasingly common in the postwar period and were used for purposes as diverse as isolating the white-rule government of Southern Rhodesia (1966–1979), responding to the Soviet Union's occupation of Afghanistan (1979–1981), and punishing Argentina's exercise of its territorial claim in 1982 over the Falkland/Malvinas Islands. Among the most

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<sup>6</sup> Mulder (2022).

<sup>7</sup> Wilson (1923).

<sup>8</sup> Baer (1976).



controversial applications were sanctions imposed by the United Nations Security Council (UNSC) on Iraq after its invasion of Kuwait in 1990. Concerns about sanctions causing a widespread humanitarian crisis in Iraq led to the launch of the Oil-for-Food Program in 1996 in an attempt to mitigate the consequences on Iraqi living standards.<sup>9</sup>

Growing awareness of the unintended consequences of sanctions on civilians and third parties led to a call for the development of “smart sanctions” more directly aimed at the actors whose change of conduct was sought.<sup>10</sup> The revamp of sanctions policy spurred the emergence of vast national and international regulatory architectures that aimed to identify wrongdoers and impose selective measures to constrain their economic transactions.<sup>11</sup> While blanket embargoes persist in some cases, it is increasingly common for sanctions regimes to focus on barring individuals and entities from international travel or from conducting international financial or commercial transactions. Regardless of whether they are imposed by the United Nations, multinational organizations, or other countries, economic sanctions today are almost invariably accompanied by humanitarian exceptions, though the effectiveness of these exceptions is often questioned.

Broadly speaking, there are two levels of legal frameworks for the imposition of sanctions. Articles 39 and 41 of the United Nations Charter empower the UNSC to adopt “measures not involving the use of armed force” in response to the existence of “any threat to the peace, breach of the peace, or act of aggression.” While the powers granted to the Council are broad, the conditions for their application are strongly restrictive, requiring that they be issued in response to threats to security and receive, at the very least, the acquiescence of all veto-wielding permanent members. In the absence of UNSC decisions, governments often take it into their own hands to enact restrictions on international transactions to induce a change of conduct from other international actors. Unlike sanctions approved by the UNSC, such “unilateral coercive measures” are, according to the UN and many legal experts, contrary to international law and violate the UN Charter.<sup>12</sup>

In the United States, Congress has partially delegated to the president its constitutional authority to regulate commerce with foreign nations in case of a national emergency, allowing the White House “to deal with any unusual and extraordinary threat, which has its source in

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<sup>9</sup> Gordon (2020).

<sup>10</sup> Cortright and Lopez (2002).

<sup>11</sup> Nephew (2017).

<sup>12</sup> UN Office of the High Commissioner for Human Rights (n.d.).

whole or substantial part outside the United States.”<sup>13</sup> The president declares national emergencies through the issuance of executive orders that delegate to the Treasury Department the determination of what actors to sanction. The Treasury Department’s Office of Foreign Assets Control (OFAC) regularly publishes decisions on additions and removals from its lists of persons and entities known as Specially Designated Nationals (SDNs). The inclusion of a person or entity on the SDN list implies the immediate blocking or freezing of all their assets under US jurisdiction and makes it illegal for a US person to conduct any type of economic transaction with them.

**Figure 1** plots the evolution of the number of countries subject to trade sanctions imposed by the United Nations, the United States, or the European Union (EU). The figure is based on the Global Sanctions Database (GSDB), the most comprehensive data set on sanctions available to date.<sup>14</sup> According to this series, 54 countries — 27 percent of all countries — are currently subject to sanctions. By contrast, in the 1960s the number of sanctioned countries averaged around five, or only 4 percent of countries in existence at the time. In other words, one out of four countries today is subject to sanctions, as opposed to one in fifty six decades ago. **Figure 2** considers the share of world GDP in countries under trade sanctions. Here we find slightly greater percentages, with 29 percent of the world economy currently impacted by trade sanctions — as opposed to around 4 percent in the early 1960s.

Figures 1 and 2 are based on data on the number of countries targeted in sanctions regimes imposed by other governments or international organizations. Yet sanctions are now increasingly leveled at persons, entities, or groups rather than at countries as a whole. For example, as we discuss in section 5.2 in greater detail, neither the United Nations nor the United States have sanctioned the government of Afghanistan; rather, they have issued sanctions on the Taliban, the religious and political movement that holds de facto control of state institutions. Even in cases where there are explicit sanctions on governments — such as Iran, Russia, or Venezuela — these are implemented through the designation of specific persons or entities associated with those governments. There are also cases like Mexico, where the US has imposed sanctions on persons for specific reasons, such as alleged links to drug trafficking, without there being any open hostility between the governments of the two nations.

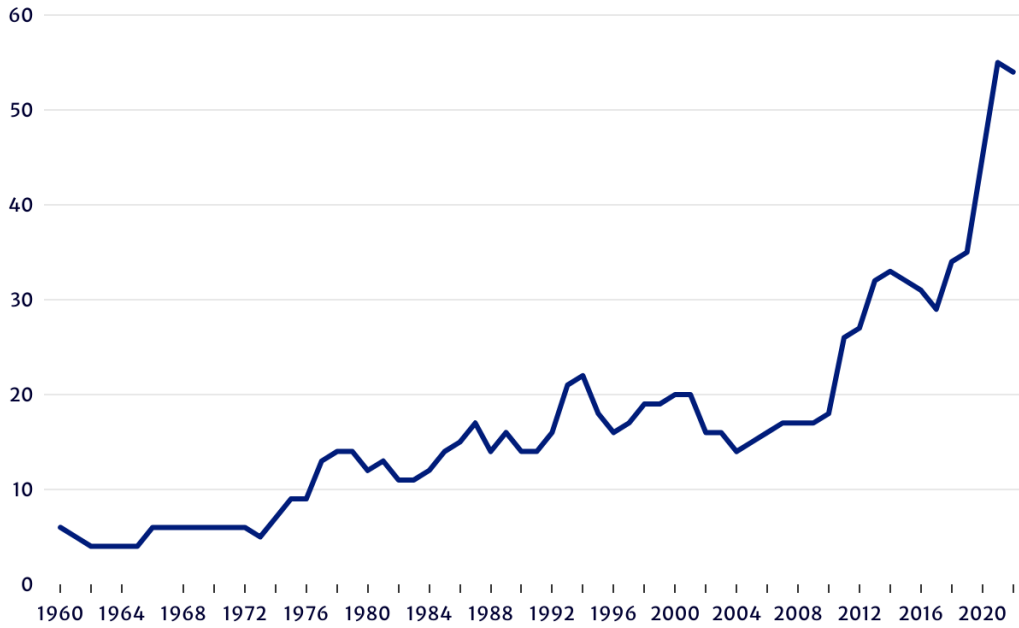
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<sup>13</sup> United States Code (2011).

<sup>14</sup> Felbermayr et al. (2020).

**Figure 1**

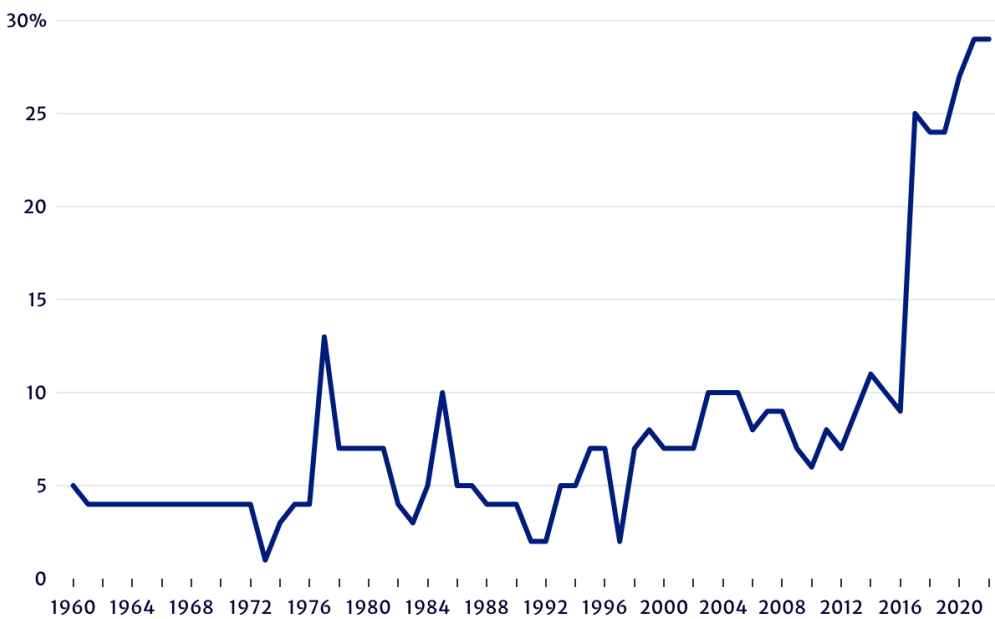
**Number of Countries under UN, EU, or US Trade Sanctions, 1960–2022**



Source: Author's calculations based on World Bank Group and Felbermayr et al. (2020).

**Figure 2**

**Share of World GDP under UN, EU, or US Trade Sanctions, 1960–2022**

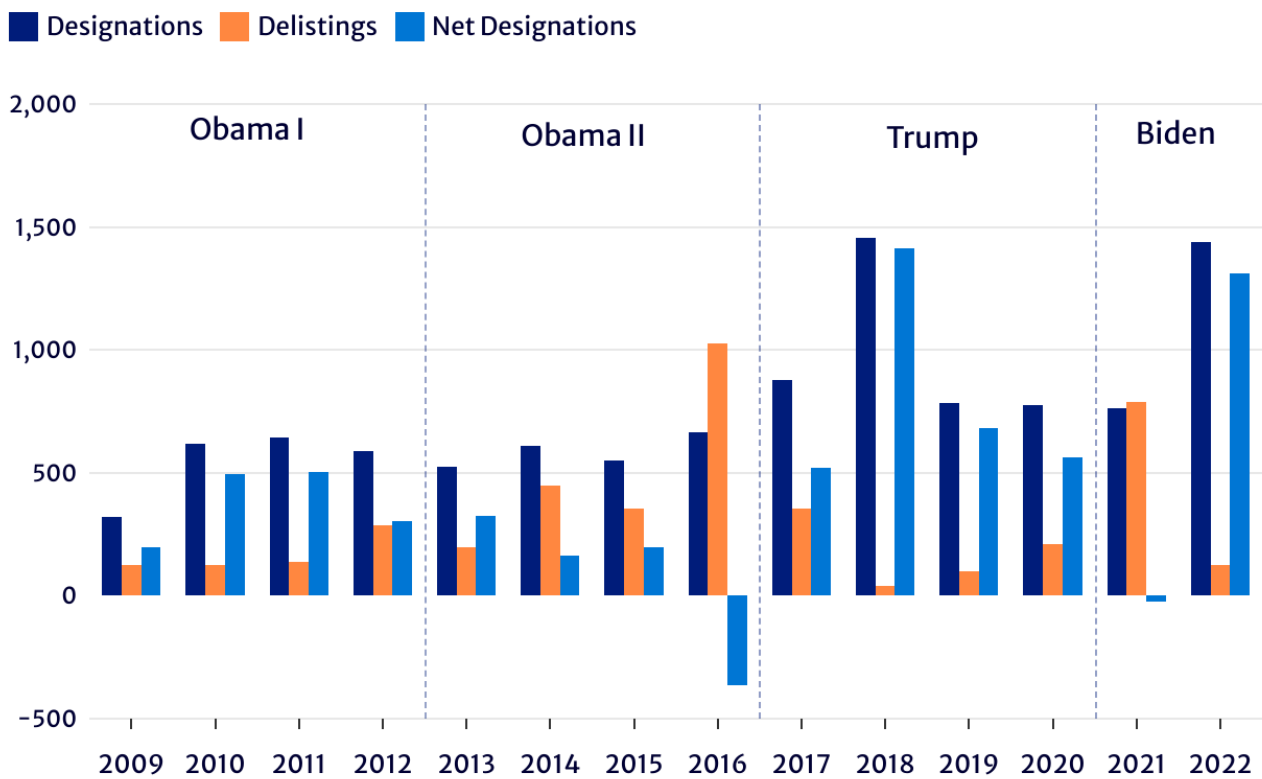


Source: Author's calculations based on World Bank Group and Felbermayr et al. (2020).

**Figure 3** traces the number of changes to the SDN list carried out by the US government since 2009. The data show a clear upward trend. During the first Obama administration, there was an average of 544 new designations per year; in the Trump administration, there were 975 designations per year, a 79 percent increase. These totals have continued increasing during the Biden administration, largely as a result of sanctions on Russia due to its invasion of Ukraine, rising to an average of 1,151 designations per year (18 percent higher than under Trump).<sup>15</sup> If we instead focus on net designations (listings minus delistings) we find a similar rising trend, with the number of net designations per year nearly doubling between the first Obama and the Biden administrations.

**Figure 3**

**US Sanctions Designations and Delistings, 2009–2022**



Source: Author's calculations based on Dorshimer and Shin (2021), US Department of the Treasury (2023).

<sup>15</sup> Data for 2022 count designations up to July 14, and thus are likely to underestimate the average annual increase with respect to previous periods.

Even before Russia's invasion of Ukraine, the Biden administration imposed a similar number of sanctions per year (821) compared with the last two years of the Trump administration (781 per year). Both numbers are substantially higher than any year before Trump reached office. Apart from Russia, Biden's sanctions primarily targeted entities related to Belarus, Myanmar, and China.<sup>16</sup> Meanwhile, Biden removed as many persons from the SDN list as were added in 2021, in part because of his decision to collaborate in implementation of Colombia's 2016 peace accords and to revoke Trump's designation of personnel of the International Criminal Court.<sup>17</sup>

In October 2021, the Biden administration released the results of a review of US financial and economic sanctions. The seven-page document contains little analytical material and largely consists of a restatement of the aims of sanctions, together with some broad recommendations on how to modernize the sanctions regime. The recommendations refer primarily to ways to enhance sanctions' effectiveness by more clearly linking them with objectives, seeking multilateral cooperation, and strengthening the sanctions-enforcement infrastructure.<sup>18</sup>

One of the five recommendations in the review refers to calibrating sanctions "to mitigate unintended economic, political and humanitarian impacts," including those suffered by "*non-targeted* populations abroad" (emphasis added). The language implies that sanctions, under some conditions, can be intended to have a humanitarian impact and that some populations could be targeted to suffer that impact. The report recommends that Treasury expand sanctions exceptions to support legitimate humanitarian activity "where possible and appropriate."

Despite the increasing focus on blocking individual and firm-level transactions and the proliferation of humanitarian exceptions (so-called "smart" sanctions), critics highlight their effects on target economies and on the living conditions of vulnerable groups. In 2014, the UN Human Rights Council adopted a resolution stating it was "deeply disturbed by the negative impact of unilateral coercive measures," and "alarmed by the disproportionate and indiscriminate human costs of unilateral sanctions and their negative effects on the civilian population."<sup>19</sup> The council appointed a special rapporteur tasked with gathering all relevant information and producing studies on the effects of sanctions on human rights. The special rapporteur's office has concluded that unilateral sanctions lacking UNSC authorization are illegal

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<sup>16</sup> Bartlett and Bae (2022).

<sup>17</sup> The White House (2021).

<sup>18</sup> OFAC (2021).

<sup>19</sup> UN Human Rights Council (2014).

under international law<sup>20</sup> and found that sanctions on Syria, Venezuela, and Zimbabwe, among other cases, limit the enjoyment of fundamental human rights.<sup>21</sup>

It appears clear that some of the economic and humanitarian impacts of sanctions on target populations is intended. For example, a statement issued by the UK government after freezing Russian central bank assets in February 2022 stated unambiguously that “sanctions will devastate Russia’s economy.” US president Joe Biden boasted on Twitter in March 2022 that “as a result of our unprecedented sanctions, the ruble was almost immediately reduced to rubble” and predicted that the size of Russia’s economy would be cut in half.<sup>22</sup> In February 2019, US Secretary of State Mike Pompeo stated, “Things are much worse for the Iranian people, and we are convinced that will lead the Iranian people to rise up and change the behavior of the regime.”<sup>23</sup> Pompeo made similar statements about US sanctions in Venezuela the following month.<sup>24</sup> Then National Security Advisor John Bolton projected the lost export proceeds to Venezuela as a result of US sanctions imposed in January 2019 to be \$11 billion per year.<sup>25</sup>

From another perspective, the chair of the US House Rules Committee, Congressman Jim McGovern, wrote to President Biden in May 2021, asking him to “lift all secondary and sectoral sanctions imposed on Venezuela by the Trump Administration.”<sup>26</sup> In the letter he noted:

...the impact of sectoral and secondary sanctions is indiscriminate, and purposely so. Although US officials regularly say that the sanctions target the government and not the people, the whole point of the “maximum pressure” campaign is to increase the economic cost to Venezuela. ... Economic pain is the means by which the sanctions are supposed to work. But it is not Venezuelan officials who suffer the costs. It is the Venezuelan people. Credible sources have consistently found that sanctions have worsened the humanitarian crisis in the country.

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<sup>20</sup> UN Human Rights Council (2021a).

<sup>21</sup> UN Office of the High Commissioner for Human Rights (2021a, 2021b); Human Rights Council (2020, 2021b, and 2021c).

<sup>22</sup> Biden (2022).

<sup>23</sup> Human Rights Watch (2019).

<sup>24</sup> Weisbrot and Sachs (2019).

<sup>25</sup> C-SPAN (2019).

<sup>26</sup> McGovern (2021).

### 3. Econometric Evidence from Cross-National Panel Data

The first attempt at quantifying the effect of sanctions on economic conditions in target economies appears to be that of Hufbauer, et al.<sup>27</sup> Rather than providing regression-based estimates, the authors present a simple calibration exercise to numerically approximate the economic effects of sanctions. To do so, they rely on direct estimates of market losses due to sanctions constructed from their detailed country studies of 204 sanctions events. For example, they approximate market access losses by the value of exports from the target to the sender country prior to the adoption of sanctions. These market loss estimates are then multiplied by ad hoc “sanctions multipliers” to attempt to estimate lost consumer or producers’ surplus. The multipliers, which range from 0.50 to 5.0, are intended to reflect assumptions on the export supply and import demand elasticities in various settings; the authors recognize that “as a general proposition, we have tried to err on the side of overestimating the ‘sanctions multiplier.’”<sup>28</sup> They conclude that comprehensive sanctions regimes (i.e., those that include both trade and financial sanctions) result in a cost to the target equal on average to 4.2 percent of GDP (2.9 percent if Iraq is excluded).<sup>29</sup>

An attempt to get at these issues comes from Neuenkirch and Neumeier,<sup>30</sup> who use a cross-country panel regression framework to assess the effects of sanctions on economic growth. Their data set covers 160 countries during the 1976–2012 period, of which 67 experienced economic sanctions. The authors combine the datasets by Hufbauer et al. (2007) and Wood (2008) for UN and US sanctions, assessing the effect of these as separate interventions. They treat annual GDP growth as the dependent variable and use a set of controls that are for the most part standard from the empirical growth literature. They find a strong, statistically negative effect of multilateral UN sanctions on growth, with the imposition of sanctions associated with a 2.0 percentage point reduction in growth; the effect of US sanctions is statistically weaker and numerically smaller, at 0.9 percentage points. They also find that the effect of sanctions diminishes over time, yet persists for as long as 10 years. The cumulative effect of the imposition

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<sup>27</sup> Hufbauer et al. (1985, 2007).

<sup>28</sup> Hufbauer et al. (2007), 214.

<sup>29</sup> Despite the ad hoc nature of some of these assumptions, the Hufbauer et al. (2007) estimate provides a convenient measure that continues to be used as a measure of the economic costs of sanctions in many recent cross-country studies.

<sup>30</sup> Neuenkirch and Neumeier (2015).

of UN sanctions is an average decline in per capita GDP of 26 percent, while that of US sanctions is 13 percent.

Neuenkirch and Neumeier address potential biases from endogeneity or omitted variables through various mechanisms. These include using lagged explanatory variables on the right-hand side of the regression, reducing the sample by excluding countries that are never sanctioned, and restricting the pre-sanctions window of time. They also show that pre-sanctions growth rates are not systematically lower in periods of up to five years immediately preceding the sanctions, contrary to what one would expect if sanctions targeted countries with weaker growth. They further propose an alternative way of constructing a counterfactual that tells us how target economies could have performed in the absence of sanctions by comparing sanctioned economies with those that were “nearly” sanctioned. The latter is a group of countries for which the UNSC considered sanctions, yet failed to impose them when a permanent member of the council vetoed the resolution. Comparing only sanctioned countries with countries for which sanctions were vetoed, the authors continue to find a strongly negative coefficient on sanctions. Furthermore, they find that countries that benefited from vetoes did not experience slower growth in the years immediately following the vetoes.

More recently, Gutmann, Neuenkirch, and Neumeier<sup>31</sup> use an event-study approach as well as panel difference-in-difference regressions to estimate the effect of sanctions on economic growth and its components. In order to address causality concerns, they rely on comparing sanctioned countries with those only threatened with sanctions. They find that sanctions have a negative effect on GDP growth and its components (consumption, investment, and government expenditures), as well as on trade and foreign direct investment. A sanctions episode leads to a drop in per capita GDP of 2.8 percent during the first two years after sanctions are imposed, with no evidence of recovery even three years after sanctions have been lifted. The detrimental effect is mainly driven by US unilateral sanctions and by financial sanctions, and the authors find that in response to sanctions, democracies shift expenditures toward the military.

Splinter and Klomp<sup>32</sup> also evaluate the growth effects of international sanctions, but rather than try to identify a linear effect on the growth rate, they focus on the possibility that sanctions trigger turning points in growth episodes. Concretely, they study whether sanctions generate collapses in economic activity, which they define as growth decelerations where average annual growth falls by 2.0 percent or more for at least four years and in which there is a decline in

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<sup>31</sup> Gutmann, Neuenkirch, and Neumeier (2021).

<sup>32</sup> Splinter and Klomp (2021).



absolute per capita GDP. They use a linear probability model and find that the likelihood of experiencing a growth collapse rises by 9 percent in the first three years after sanctions are imposed. Interestingly, they don't find a sanctions effect for longer windows, suggesting that economies adapt to sanctions over time. The effect is only borderline significant at 10 percent; it becomes stronger when they use only sanctions threats, suggesting that credible threats of sanctions may lead economic actors to anticipate the effects of their imposition. Splinter and Klomp address the endogeneity issue by using instrumental variables in their baseline estimation, choosing as instruments a measure of the violation of human rights taken from Freedom House and a measure of the diplomatic clout of a country commonly used in the international relations literature.<sup>33</sup>

Other papers have looked more directly at the effects on well-being that go beyond aggregate economic conditions. One important question is which groups within a society bear the cost of sanctions. Neuenkirch and Neumeier consider the effect of US economic sanctions on poverty.<sup>34</sup> Their dependent variable is the poverty gap — the amount of income that would be necessary to bring all individuals living in poverty to the poverty line — measured at the international poverty line of USD 1.25 a day, adjusted for differences in purchasing power parity. Their empirical approach is based on matching methods, which construct a counterfactual control group by matching countries subject to sanctions with a set of countries as similar as possible to them in a set of pre-sanctions characteristics. Matching is implemented through a procedure known as entropy balancing, which constructs an artificial treatment group as a linear combination of non-sanctioned countries where the weights are calculated to approximate as closely as possible the pre-sanctions characteristic of the sanctioned economies.

The authors find that the poverty gap is 3.8 percentage points of GDP higher when a country is sanctioned by the United States. The adverse effect of US sanctions grows to 7.9 percentage points in the case of the most severe sanctions and is reinforced when US sanctions receive multilateral support. The poverty effect of sanctions grows over time, so that after 21 years an economy that is sanctioned would experience a rise in its poverty gap of 14 percentage points. They also find evidence that before they are sanctioned, target economies tend to be more open to trade, international investment, and foreign aid than other economies, yet experience significant drops in all these indicators, suggesting that at least some of the adverse effects on poverty come from the ability of sanctions to reduce the target country's role in the global economy.

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<sup>33</sup> Banks and Wilson (2022).

<sup>34</sup> Neuenkirch and Neumeier (2016).

Gutmann, Neuenkirch, and Neumeier use a similar matching approach to assess the effect of economic sanctions on life expectancy and its gender gap.<sup>35</sup> In their baseline estimates, they find that UN sanctions are associated with a decrease in life expectancy of 1.2 years for men and 1.4 years for women, while US sanctions are associated with a smaller decline of 0.4 years for men and 0.5 years for women. In both cases, not only are the coefficient estimates significant but so are the differences between genders. Among the authors' robustness checks is testing for the effect of sanctions threats that are not carried out. They argue that, in principle, countries that are threatened with sanctions, but where sanctions are not ultimately imposed, should be similar in terms of sanctions determinants to countries where the threat is ultimately carried out. They find that, in contrast to cases in which sanctions are actually imposed, life expectancy does not deteriorate in countries that are merely threatened with sanctions.

Other papers consider the evidence of sanctions' effects of on children's health. Kim uses the Threat and Imposition of Sanctions (TIES) data set to assess the effect of sanctions on children's HIV infections and AIDS-related deaths.<sup>36</sup> Using lagged explanatory variables to address issues of endogeneity, he finds that a sanctions episode leads to an increase in the HIV infection rate of children of 2.5 percent and an increase in AIDS-related deaths of 1 percent.

Petrescu uses individual-level micro data from 68 demographic and health surveys to assess the effect of sanctions on infant weight, child health, and mortality.<sup>37</sup> Her database covers 228,000 children under age three and includes information on both live and dead children. She estimates a panel regression with country, year, and cohort fixed effects to measure the effect of in utero exposure to sanctions on the weight, height, and probability of death of children. She estimates that being exposed to sanctions during the entire duration of a pregnancy leads to a decrease of 0.07 standard deviations in a child's weight. The effect of being exposed to nine months of sanctions is approximately one-sixth of being exposed to war, one-third that of having no electricity, and two-thirds that of not having access to medical care.

Afersorgbor and Mahadevan consider the effect of sanctions on income inequality using a panel of 68 target states from 1960 to 2008.<sup>38</sup> Using the Hufbauer et al. measures<sup>39</sup> as their sanctions indicators, they find that a sanctions episode increases the Gini coefficient by 1.7 points, while

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<sup>35</sup> Gutmann, Neuenkirch, and Neumeier (2017).

<sup>36</sup> Kim (2019).

<sup>37</sup> Petrescu (2016).

<sup>38</sup> Afesorgbor and Mahadevan (2016).

<sup>39</sup> Hufbauer et al. (2007).

each additional year of sanctions adds 0.3 points to the Gini. They also show that sanctions lead to significant decreases in the income shares of the four lowest quintiles and an increase in that of the highest quintile. They address endogeneity issues by using lagged covariates as regressors, lagged values of possible endogenous variables as instruments, and restricting estimates to three years around the treatment windows.

Choi and Luo argue that by intensifying pressure on the poor, economic sanctions lead to increases in incidents of international terrorism in the target country.<sup>40</sup> International terrorism incidents are those in which the origin of the victims, targets, or perpetrators can be traced back to at least two different countries and are typically aimed at foreign nationals. Choi and Luo use several panel specifications, including pooled and fixed effects negative binomial regressions, and find a consistent effect of sanctions on terrorism, with the imposition of sanctions leading to a 93 percent increase in incidents of international terrorism. They also argue that one of the channels through which sanctions drive terrorism is by raising inequality, and estimate systems of simultaneous equations in which sanctions lead to increases in inequality and higher inequality leads to increases in terrorism. Choi and Luo estimate instrumental variables regressions to address concerns with reverse causation. Although they use three instruments — trade, economic growth, and lagged sanctions — only the last of these is significant, suggesting that any identification comes from assuming away any correlation between lagged sanctions and unobserved determinants of terrorism.

Peksen considers the effect of sanctions on public health.<sup>41</sup> His key dependent variable is the mortality rate of children under 5 years of age, with data drawn from UNICEF and the World Health Organization. He estimates a series of cross-country panel regressions for the 1970–2000 period, using both an autoregressive AR (1) specification and a lagged dependent variable to account for different types of serial dependence in the error terms. The author finds no evidence of an effect of a dichotomous sanction variable, but does find an effect of a continuous variable measuring the economic cost of sanctions, as well as a specific effect of sanctions imposed by the United States. A one-standard deviation increase in the cost of sanctions leads to a 4 percent increase in mortality, while imposition of US sanctions leads to a 35 percent increase in mortality.

Remarkably, US sanctions lead to four times as many deaths as a civil war. Being one of the earliest contributions in the literature, Peksen does little to address causality issues and uses a

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<sup>40</sup> Choi and Luo (2013).

<sup>41</sup> Peksen (2011).

pooled ordinary least squares specification that is problematic if there are country-specific unobserved effects correlated with the error term.

Allen and Letktzian also assess the effect of sanctions on public health.<sup>42</sup> Using a cross-country panel data set covering the years between 1990 and 2007, the authors employ a random effects population-averaged generalized estimating equations model (GEE) and a Heckman selection model to estimate the effect of sanctions on government health expenditure, total food supply, immunization rates, life expectancy, and health-adjusted life expectancy (HALE). They find that sanctions negatively impact immunization rates and government health expenditures and that major sanctions — those imposing costs greater than 4 percent of GDP — negatively impact HALE, but find no effect on life expectancy or food supply. The authors argue that while sanctions are less likely to result in deaths than military conflict, they can have a similar effect on impeding individuals from living healthy lives.

More recently, Ha and Nam studied the effect of sanctions on life expectancy in the target country.<sup>43</sup> The researchers estimated a cross-country fixed effects panel regression in a data set covering the 1995–2018 period; they also used propensity score matching to address endogeneity concerns. Their baseline estimate finds that a sanctions episode leads to a decline in average life expectancy of 0.3 years. They argue that this effect is mediated by financial development and institutional quality, with countries with more developed financial markets and institutions proving more capable of attenuating these effects.

Clearly, most economic sanctions attempt to affect target economies by creating obstacles to international trade. Often, sanctions directly target trade by enacting import or export bans; other types of sanctions, such as financial sanctions, impair a country's capacity to participate in the international payments system and thus constrain its international exchange of goods and services. Dai et al. use the Global Sanctions Database<sup>44</sup> to assess the magnitude and timing of the effect of sanctions on international trade.<sup>45</sup> They use bilateral gravity equations, which model the trade between country pairs as a function of the characteristics of each country and of the relationship between the countries, to estimate how sanctions impact trade between two countries. Each equation controls for country-time effects for both countries, country-pair fixed effects, leads and lags of trade sanctions effects, non-trade sanctions, and membership in international trade agreements.

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<sup>42</sup> Allen and Letktzian (2012).

<sup>43</sup> Ha and Nam (2022).

<sup>44</sup> Felbermayr et al. (2020).

<sup>45</sup> Dai et al. (2021).

Dai et al. find that complete trade sanctions — those that apply to imports and exports as a whole — have a significantly negative effect on trade.<sup>46</sup> In their baseline estimate, the imposition of sanctions leads to a 77 percent decline in bilateral trade. They also find that declines in trade tend to precede the imposition of sanctions by up to 10 years, and that trade reverts slowly to pre-sanctions levels over a seven-to-eight-year period. Controlling for these effects, however, increases the point estimate of the contemporaneous effect of trade on sanctions to 82 percent. They explain the lead declines as potentially reflecting increasing frictions between countries prior to the sanctions, as well as anticipation of the imposition of sanctions by economic actors, and the lags as reflecting the gradual adaptation of economies to sanctions and weaker enforcement over time. The negative effect of sanctions on trade in the sample is mostly driven by sanctions episodes lasting more than five years.

Wen et al. study the effect of different types of sanctions on the target country's energy security, using a cross-country database covering the years 1996–2014.<sup>47</sup> The main indicator of energy security is energy imports as a percentage of energy use. Estimation of the baseline model is done through a static panel data model with country and year fixed effects, with an additional dynamic specification controlling for lagged dependent variables. They find that unilateral and economic sanctions, as well as US-imposed sanctions,<sup>48</sup> lead the target country's energy imports to rise, but fail to find that effect for EU, UN, and noneconomic sanctions. They also find that sanctions' adverse effect on energy security rises with the sanctions' intensity. One possible explanation of these results is that they reflect the greater likelihood that the US will make use of economic sanctions, as compared to the EU or UN.

Wood examines the hypothesis that sanctions could lead to an increase in government repression and adversely affect human rights, on a panel of 157 countries for the years 1976–2001.<sup>49</sup> He uses a measure of physical repression that includes abuses such as torture, extrajudicial killings, forced disappearances, and political imprisonment drawn from the Political Terror Scale Project.<sup>50</sup> His baseline specification uses ordered probit regressions to assess the effect of sanctions on repression, finding that sanctions are positively associated with repression, that multilateral UN sanctions have a stronger effect than US sanctions, and that

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<sup>46</sup> Dai et al. (2021).

<sup>47</sup> Wen et al. (2020).

<sup>48</sup> Wen et al. (2020) categorize unilateral, US, and economic sanctions separately, although the categories overlap in many cases. Unilateral sanctions represent cases in which a target is sanctioned by either the US or EU only. US sanctions refers to American sanctions regardless of whether they were imposed in parallel to other senders. Economic sanctions refer to measures intended to affect the target's economy.

<sup>49</sup> Wood (2008).

<sup>50</sup> Haschke (2020).

repression increases the more severe the sanctions regimes become. The most severe UN sanctions lead to an increase in the probability of repression from 5 to 25 percent; for US sanctions the increase is 16 percent. He also finds some evidence that increases in repression in response to sanctions are less likely to occur in democratic countries. He recognizes that a causal interpretation of these regressions is problematic and offers a system of equations estimated through Seemingly Unrelated Regressions (SUR), where an equation linking sanctions and repression is complemented with three additional regressions in which political dissent, economic conditions, and sanctions, respectively, are the dependent variables.

Similarly, Peksen examines the effect of sanctions on the physical integrity rights of citizens.<sup>51</sup> He uses cross-country panel data covering the period between 1981 and 2000 to run fixed-effect regressions using four measures of the physical integrity of citizens: extrajudicial killings, forced disappearances, political imprisonment, and torture. Peksen found that sanctions lead to increases in all of these measures as well as composite indices, a result that is by and large robust across several specifications. In more recent work, Lucena and Apolinário investigate the effect of targeted sanctions on human rights violations in a panel data set of African countries.<sup>52</sup> They find that the effect of targeted sanctions is not statistically different from conventional sanctions, and estimate that the protection against loss of life and torture is 1.74 times as likely to worsen under targeted sanctions compared to no sanctions.

Peksen and Cooper Drury look more broadly at how economic sanctions reduce democratic freedoms.<sup>53</sup> They argue that leaders facing economic sanctions can manipulate the hardship caused by these measures as a strategic tool to enhance their political support, while the introduction of external threats to the leadership's political survival creates incentives for the targeted regime to restrict democratic freedoms to undermine any challenge to its authority. Consistent with these predictions, Peksen and Drury find a significant negative effect of sanctions on democracy, with the model predicting a 7 percent reduction in the average Freedom House democracy score the year after sanctions are imposed, an effect that rises to 16 percent in the case of extensive sanctions. The authors also estimate an additional model that tries to quantify longer-term effects, with extensive sanctions being associated with a more than 50 percent decline in democracy scores if sustained over a 15-year period. This is a huge effect, which indicates that sustained sanctions, applied to a country like Argentina over a 15-year period, would lead democratic rights to decline to the level of those in Azerbaijan. Peksen and Cooper Drury also rely on the use of lagged explanatory variables to address endogeneity

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<sup>51</sup> Peksen (2009).

<sup>52</sup> Lucena Cerneiro and Apolinário (2016).

<sup>53</sup> Peksen and Cooper Drury (2010).

concerns. Their baseline specifications are either in first-differences or include a lagged dependent variable. Among their robustness tests are specifications in which the explanatory variable is lagged up to four years, and instrumental variables (IV) estimations. They also separate sanctions not imposed with an objective of regime reform that have as strong an adverse effect on democracy as those that aim at restoring democratic freedoms.

In more recent work, Gutmann, Neuenkirch, Neumeier, and Steinbach evaluate the effect of US sanctions on human rights.<sup>54</sup> Their approach is to adopt an endogenous treatment specification to distinguish the effect on outcome indicators when countries selected to be sanctioned are systematically different from those that are not. As instruments, they use physical distance from the United States, a measure of genetic similarities between the population of the US and that of the sanctioned country, and a measure of proximity of the target country's positions to those of the US in the UN General Assembly. This paper is the only case among the cross-country studies that finds ambiguous significant effects, with US sanctions associated with a deterioration of political rights but an improvement in women's emancipatory rights. Interestingly, it is sanctions not aimed at responding to human rights violations that are positively associated with women's rights, while both human rights- and non-human rights-motivated sanctions are associated with deteriorations in political rights.

The results of these studies are summarized in **Appendix 1**. **Appendix 2** summarizes the results of country-level studies that use statistical methods to assess sanctions' effect on human and economic development, some of which is discussed in more detail in section 4. Of the 32 papers surveyed, 30 find significant negative long-run effects on indicators of human and economic development, and one<sup>55</sup> finds ambiguous effects, depending on the indicator used. There is only one paper<sup>56</sup> that contends that sanctions have a positive effect on living standards. We take a closer look at this study in section 5.3, where we find that its results are based on the use of an inadequate econometric specification and on coding errors.

Together, these studies constitute an impressive array of evidence on the negative effects of economic and even targeted sanctions on living conditions in target countries. Virtually all the studies based on cross-national data identified in our literature search find negative effects from sanctions on their main variables of interest, ranging from economic growth to poverty and

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<sup>54</sup> Gutmann et al. (2018).

<sup>55</sup> Gutmann et al. (2018).

<sup>56</sup> Equipo ANOVA (2021).

inequality, health conditions, or human rights.<sup>57</sup> We have found no instances of work using cross-national data that finds consistent positive effects from sanctions on living conditions in target countries, and only a handful that find some ambiguous or nonsignificant results.

Nevertheless, there is clearly room for more research to identify the causal mechanisms at work. The publications surveyed were mostly written over a period during which standards on what are considered satisfactory ways to address causality issues have varied enormously. The use of lagged explanatory variables and the estimation of reasonable systems of equations, which were deemed acceptable ways to address endogeneity concerns a decade and a half ago, are rarely considered satisfactory nowadays. There have also been significant advances in the measurement of sanctions, yet almost all the papers we discussed in this section rely partly or completely on older databases such as that of Hufbauer et al.<sup>58</sup> Furthermore, as discussed in section 2, the use of sanctions has evolved toward targeting individuals and entities within countries, suggesting that even results that were valid for coarser measures used in the past may not work in the same way under more recent instruments.

## 5. Case Studies

In this section, we focus on three recent cases of economies subject to international sanctions barring or significantly impeding economic transactions: Iran, Afghanistan, and Venezuela. The purpose of these case studies is to provide a clearer understanding of the mechanisms through which sanctions affect living conditions in target economies and how these have evolved in the recent past. For this reason, we focus on three cases where sanctions are still in force, allowing us to observe how recent developments not adequately captured by the cross-national data — such as the shift to personal sanctions, or the proliferation of humanitarian exceptions — have affected vulnerable groups in target economies.

While all three countries are under sanctions regimes today, they are substantively different in many respects. They range from an economy that has been under sanctions for more than four decades (Iran) to one in which economic sanctions were first imposed just five years ago (Venezuela). The purported aims of the sanctions are quite different, ranging from nuclear

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<sup>57</sup> To select these studies, we ran a series of searches on Google, Google Scholar, and JSTOR combining the words “economic sanctions” with the following keywords: econometric model, human rights, life expectancy, mortality, political terror score (PTS), institutional quality, human development index, gender gap, sanctions, health welfare, income inequality, Gini index, food insecurity, energy, education, cross-country data, database, model calibration, and general equilibrium.

<sup>58</sup> Hufbauer et al. (2007).



nonproliferation (Iran), to combating international terrorism (Afghanistan), to restoring democracy (Venezuela). Iran and Venezuela are both oil exporters, but Afghanistan's economy is primarily dependent on agricultural exports. The three cases also illustrate variations in the instruments of statecraft used to affect target economies: in Afghanistan and Venezuela — but not in Iran — a key obstacle to economic transactions involving the state comes from the lack of international recognition of governments that hold de facto control over their territory.

## 5.1 Iran, 1979–2021

### 5.1.1 Historical Overview

The modern history of western economic sanctions against Iran goes back to 1952, when Great Britain froze Iranian assets and imposed an oil embargo in response to the Mossadeq government's nationalization of the country's oil industry.<sup>59</sup> The sanctions were lifted after a coup, partly engineered by the US, led to Mossadeq's overthrow and fostered a new government under Shah Mohammad Reza Pahlevi that entered into profit-sharing agreements with western oil companies.<sup>60</sup> In 1979, the Islamic Revolution led to the overthrow of the western-backed government and to Iran's retaking control of its oil industry's operations and profits.

US sanctions on Iran followed the Islamic Revolution, and were issued in response to the November 1979 takeover of the US Embassy in Tehran by students who were supported by the new Iranian government. The Carter administration banned oil imports from Iran and froze Iranian government assets that month and banned US exports to Iran and prohibited financial transactions the following year.<sup>61</sup>

In what has since become a standard procedure for imposing sanctions, the November 1979 asset freeze was implemented through the issuance of an executive order finding that the situation in Iran constituted an “unusual and extraordinary threat” to the national security of the United States and declaring a national emergency to deal with that threat. That allowed the White House to invoke the International Emergency Economic Powers Act and block assets of actors associated with that threat.<sup>62</sup> To date, the November 1979 Executive Order remains the longest-standing declaration of a US national emergency.

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<sup>59</sup> The New York Times (1951); Associated Press (1952).

<sup>60</sup> Kinzer (2008).

<sup>61</sup> Nada et al. (2023).

<sup>62</sup> Executive Order 12170 (1979).

The asset freeze blocked USD 12 billion in assets — an amount equal to 13 percent of the GDP and 70 percent of the international reserves of Iran at the time. Since the US was by far Iran’s largest trading partner before the revolution, accounting for approximately one-fifth of the country’s total trade, the trade embargo caused significant losses.<sup>63</sup> US –Iran trade collapsed immediately after the sanctions and never recovered to its previous levels, even in periods when sanctions were eased (Figure 4).

It is of course hard to isolate the effect of sanctions from the decisions of the revolutionary government to reshape its relationship with the United States. US companies owned 40 percent of Iran’s Oil Consortium (the United Kingdom held 40 percent, with Shell and Total holding the remaining 20 percent). The foreign-owned consortium received half of the profits from Iranian oil production.<sup>64</sup> The revolutionary government immediately ended that arrangement, a de facto expropriation of the assets of the Western oil companies.<sup>65</sup> Large US oil companies, with the support of the US government, agreed to boycott Iranian oil on world markets at the time. Iran’s oil infrastructure also suffered from the war with Iraq, in which both countries targeted their adversaries’ oil installations.<sup>66</sup>

The US sanctions were lifted in 1981 as a result of the Algiers Accords.<sup>67</sup> Iran agreed to release the hostages in exchange for a US commitment to remove sanctions. The bulk of the frozen funds, however, was not returned to Iran, but rather was used to repay debts and settle claims by Americans against the Iranian government. The US national emergency declaration remained in place, establishing a framework for future sanctions. Trade between Iran and the US plummeted after the revolution; exports to the US recovered only partially after the sanctions were lifted, to around one-sixth of their prerevolution levels, while imports remained at near-zero levels for nearly a decade (Figure 4).

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<sup>63</sup> Bilger (2013).

<sup>64</sup> Askari (1994).

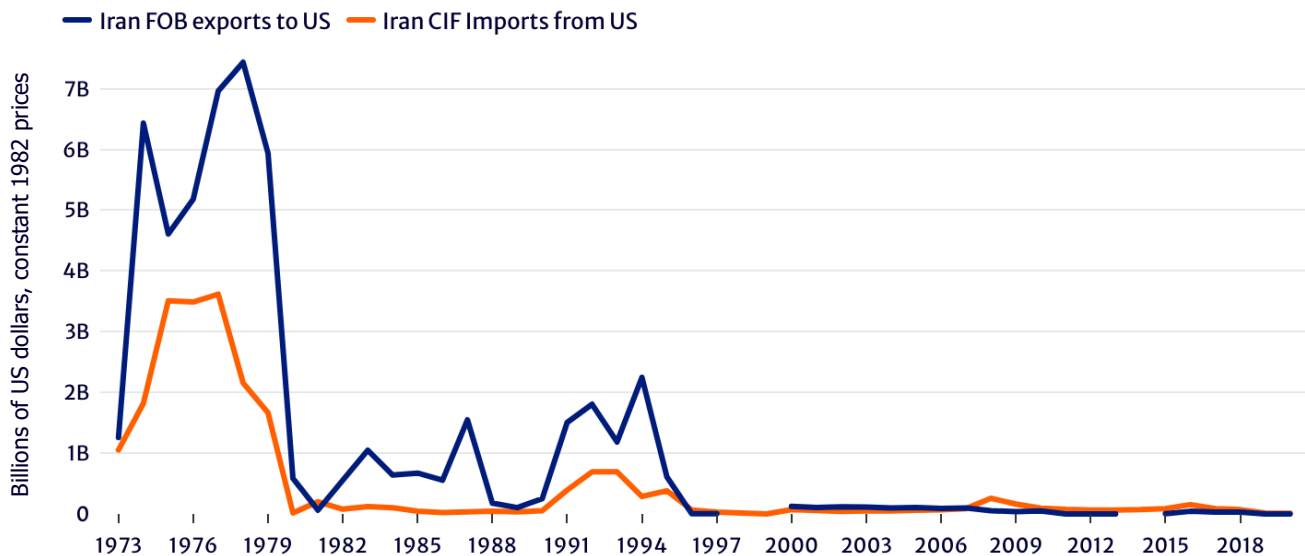
<sup>65</sup> Branigin (1979).

<sup>66</sup> Jenkins (1980).

<sup>67</sup> The Algiers Accords refer to two agreements signed on January 19, 1981, between the United States and Iran. The first agreement provided for the release of 52 American hostages held in Iran. In exchange for the hostages’ release, the United States agreed to unfreeze Iranian assets and refrain from interfering in Iran’s internal affairs. The second agreement established a framework for future relations between the two countries, recognizing the sovereignty of both nations and establishing a claims tribunal to resolve outstanding legal disputes.

**Figure 4**

## Trade between the United States and Iran, 1973–2020



Source: International Monetary Fund: Direction of Trade Statistics.

Tensions remained high between Iran and the US even after the Algiers Accords. They took a turn for the worse after the 1983 bombing of Beirut barracks housing US and French soldiers, and groups allegedly backed by the Iranian government were held responsible. In 1984, the US included Iran on the list of state sponsors of terrorism.<sup>68</sup> The designation restricted sales of US dual-use items, required the US to oppose multilateral lending to Iran, and withheld US aid to countries or organizations that assisted Iran. At first, the designation had little effect on trade between the countries, as the US continued purchasing Iranian oil, and US exports to Iran had already virtually disappeared after 1980. In response to criticisms that the US was indirectly financing the Iranian regime by permitting oil purchases to continue, Congress passed a law banning Iranian oil imports, and President Reagan ordered a ban on all imports and most exports in 1987.<sup>69</sup>

US oil companies quickly found a way around the ban and began refining Iranian oil outside the US, sending it to the US as a finished product. Since Iran reflected these sales as trade with the US in its statistics, they explain the recovery in Iran-US exports seen in Figure 4.<sup>70</sup> The Clinton

<sup>68</sup> US Department of State (2013).

<sup>69</sup> Fritz (1987); Sciolino (1987).

<sup>70</sup> Iran began counting sales to US companies as exports to the US in its statistics in 1992. This explains a large discrepancy between Iranian data on exports to the US, shown in Figure 4, and US data on imports from Iran, which are near-zero for this period. See Askari et al (2001), fn. 9

administration imposed a total trade and investment ban in 1995 in response to growing concerns about Iran's nuclear program. This decision effectively closed existing loopholes and brought to an end US trade with Iran.<sup>71</sup> In 1996, Congress approved the Iran–Libya Sanctions Act (dubbed ILSA), which imposed penalties on persons investing more than USD 20 million in Iran's oil sector.<sup>72</sup>

Much of the international community initially viewed the US actions as unjustified, deriving from the country's hostile diplomatic relationship with Iran after the 1979 revolution. The sanctions thus had little international traction and had some pushback, and the EU even threatened to file a grievance against ILSA with the World Trade Organization<sup>73</sup> and forbade EU persons from complying with US regulations against Iran and Cuba that jeopardized the EU's trade commitments.<sup>74</sup>

Key international actors began to change their position as evidence surfaced in 2002 regarding Iran's construction of two secret research facilities for producing enriched uranium and heavy water.<sup>75</sup> During the next three years, repeated International Atomic Energy Agency (IAEA) inspections led to the progressive disclosure of information on Iran's nuclear operations. Iran argued that its decision to hide the programs responded to US hostility even against publicly acknowledged activities.<sup>76</sup> In August 2005, Iranian president Mahmoud Ahmadinejad reneged on commitments made by his predecessor and announced that Iran would resume uranium conversion activities. In the following month, the IAEA found that Iran was out of compliance with its obligations under the Treaty on the Non–Proliferation of Nuclear Weapons.<sup>77</sup>

These findings formed the basis for the first United Nations sanctions, issued through a set of Security Council resolutions approved in 2006.<sup>78</sup> The decisions froze the assets of entities and persons involved in the program, prohibited the transfer of nuclear items to Iran, banned Iranian arms exports and investment abroad in uranium mining, and called for restraint and vigilance on financing involving Iran and transactions with Iranian banks, including with the Central Bank. In parallel, the US issued Executive Order 13382, which froze assets belonging to listed persons identified as proliferators of weapons of mass destruction.<sup>79</sup>

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<sup>71</sup> Haas (1998).

<sup>72</sup> Iran and Libya Sanctions Act of 1996.

<sup>73</sup> Haas (1998).

<sup>74</sup> Council of the European Union (1996).

<sup>75</sup> Iran Watch (2002).

<sup>76</sup> Shire and Albright (2006).

<sup>77</sup> International Atomic Energy Agency (2005).

<sup>78</sup> UN Security Council (2006, 2007, 2010).

<sup>79</sup> Executive Order 13382 (2005).

One important distinction of the new round of sanctions was the targeting of financial institutions. In January 2007, the US designated Bank Sepah, Iran’s oldest bank, for facilitating the country’s weapons program.<sup>80</sup> Two months later, Bank Sepah was added to the UNSC’s list of entities involved in nuclear activities, effectively barring international transactions with it. In October, the US added three Iranian banks, including Bank Melli, the nation’s largest bank at the time, to the list.<sup>81</sup> Predictably, these decisions imposed new obligations on global financial institutions, which now had to guarantee that their operations with Iran were not supporting these banks or proxies for any sanctioned Iranian entities, raising the cost of interactions with Iran and generating a broader process of financial toxification. The EU, Australia, and Canada followed suit, imposing restrictions on related transactions and imports.

UN sanctions on Iran were focused on its ability to develop nuclear weapons. They never targeted the oil industry, even though they granted member states significant leeway to interfere with Iranian commercial and financial activities if there were reasons to suspect that they were related to Iran’s nuclear program. Nevertheless, the US and some of its allies used the UNSC resolutions to develop a stricter framework that sought to significantly restrict Iran’s economic interactions with the global economy. The language of a 2010 UNSC resolution, which highlighted the “potential connection between Iran’s revenues derived from its energy sector and the funding of Iran’s proliferation-sensitive nuclear activities”<sup>82</sup> legitimized restrictions on Iran’s oil sector. The EU, Japan, and South Korea joined the US in agreeing to forgo investments in Iran’s oil and gas sector and in adopting stringent requirements on approval for various financial transactions.<sup>83</sup> At the same time, the US adopted the Comprehensive Iran Sanctions, Accountability, and Divestment Act (CISADA). One of its provisions gave the US government the power to turn off foreign bank access to the US if those banks were found to be processing transactions for sanctioned Iranian entities.

UN resolutions also served to create a framework for multilateral negotiations with Iran. In 2006, China, Russia, and the US joined three European countries (France, Germany, and the United Kingdom), which had previously been negotiating with Iran, to create a broader negotiation group that became known as the P5+1 (as it included the five permanent UN members, plus Germany). At the same time, the US began to coordinate with its European allies on how to impose stricter restrictions on Iran’s commercial and financial activities beyond the US mandate.

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<sup>80</sup> US Department of the Treasury (2007).

<sup>81</sup> Reuters (2007).

<sup>82</sup> UN Security Council (2010).

<sup>83</sup> Nephew (2017).

In January 2012, the EU joined the US in banning all Iranian crude oil and petroleum products, though it allowed an initial six-month period to wind down existing contracts.<sup>84</sup> That followed even more stringent action by the US Congress, which required the president to prevent any foreign bank — including any foreign central bank — that engaged in Iranian oil transactions from operating in the US. The legislation also created a waiver from sanctions for countries that could show that they had significantly reduced purchases of Iranian oil in the previous six months — called Significant Reduction Exceptions (SREs).<sup>85</sup>

Negotiations restarted in 2013, leading to an interim agreement between Iran and the P5+1 in November 2013 called the Joint Plan of Action (JPA).<sup>86</sup> While a more complete plan was being negotiated, Iran agreed to cuts in uranium production and reductions of fissile material stockpiles, as well as to allow exhaustive IAEA inspections. The P5+1 agreed to pause efforts to reduce Iran's oil sales, suspend EU and US sanctions on oil sales and associated services, allow Iran to repatriate USD 4.2 billion in frozen funds, give Iran access to oil revenue held abroad for the purchase of humanitarian goods and services, and refrain from imposing further sanctions or issuing new UNSC resolutions.<sup>87</sup>

The full agreement, called the Joint Comprehensive Plan of Action (JCPOA), took effect in October 2015 with the goal of the progressive reduction of Iran's enriched uranium stockpile and enrichment operations and changes in key infrastructure so that it could only be used to produce nuclear energy for nonmilitary purposes. The EU oil embargo and US sanctions against Iran's oil and banking sector ceased at the implementation date. In contrast, arms and nuclear-related UN, EU, and US sanctions were only to be removed gradually after 5–10 years from the agreement's implementation.<sup>88</sup>

In May 2018, the Trump administration withdrew the United States from the JCPOA and reinstated all sanctions on Iran. President Trump, who had been openly critical of the deal during his 2016 presidential campaign, called the agreement “a horrible one-sided deal that should have never, ever been made.”<sup>89</sup> The US relisted all persons who had been removed from the list of specially designated nationals and suspended a waiver on sanctions that had been approved to

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<sup>84</sup> Council of the European Union (2012); Borger, (2012).

<sup>85</sup> These included Belgium, China, the Czech Republic, France, Germany, Greece, India, Italy, Japan, Malaysia, the Netherlands, Poland, Singapore, South Africa, South Korea, Spain, Sri Lanka, Turkey, Taiwan, and the UK.

<sup>86</sup> Kemp (2013).

<sup>87</sup> Arms Control Association (2022).

<sup>88</sup> Arms Control Association (2022).

<sup>89</sup> Landler (2018).

implement the JPA and JCPOA.<sup>90</sup> The Trump administration initially issued SREs to eight countries, yet suspended all SREs in April 2019.<sup>91</sup>

The EU immediately distanced itself from the US's disavowal of the JCPOA, issuing a statement expressing deep regret at the announcement and reaffirming that as long as Iran complied with its nuclear-related commitments, the EU would remain “committed to the continued full and effective implementation of the nuclear deal.”<sup>92</sup> In response to the US's withdrawal, Iran announced that the agreement's commitments would no longer bind it, and began accumulating uranium over the limits set in the deal.<sup>93</sup> Nevertheless, the UNSC rejected a US proposal to reinstate some Iran sanctions based on the argument that these “snapback provisions” would enter into force when Iran stopped abiding by the 2015 deal's commitments.<sup>94</sup>

While the Biden administration has participated in negotiations attempting to revive some version of the JCPOA, these have been unsuccessful so far. There has been little change in US sanctions against Iran under the new administration. Meanwhile, the US government has rolled out new sanctions against entities involved in sales of Iranian oil.<sup>95</sup> One commonly voiced concern is that returning to the pre-2018 situation, corresponding to full compliance with the JCPOA, may not be feasible given that Iran has made significant progress toward acquiring nuclear weapons technology in the years since the US left the agreement.<sup>96</sup> The apparent logic of these new designations appears to be a continuation of the Trump-era “maximum pressure” strategy, according to which any refusal by Iran to consent to terms proposed by the United States should be met with an increase in sanctions-induced restrictions.

## 5.1.2 Economic and Social Consequences

**Figure 5** shows the evolution of Iranian GDP per capita since 1960, measured in constant national prices. Iran grew robustly between 1960 and 1976, with real per capita income expanding at an average annual rate of 7.8 percent. GDP per head peaked shortly before the Islamic Revolution of 1979 and began a steep decline, falling by 54 percent in the subsequent five years. It then went into a period of pronounced stagnation, experiencing virtually no growth in the last two decades

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<sup>90</sup> US Department of State (2018).

<sup>91</sup> Executive Order 13846 (2018).

<sup>92</sup> Council of the European Union (2018).

<sup>93</sup> Chappell (2019).

<sup>94</sup> Hansler and Roth (2020).

<sup>95</sup> Atwood (2022).

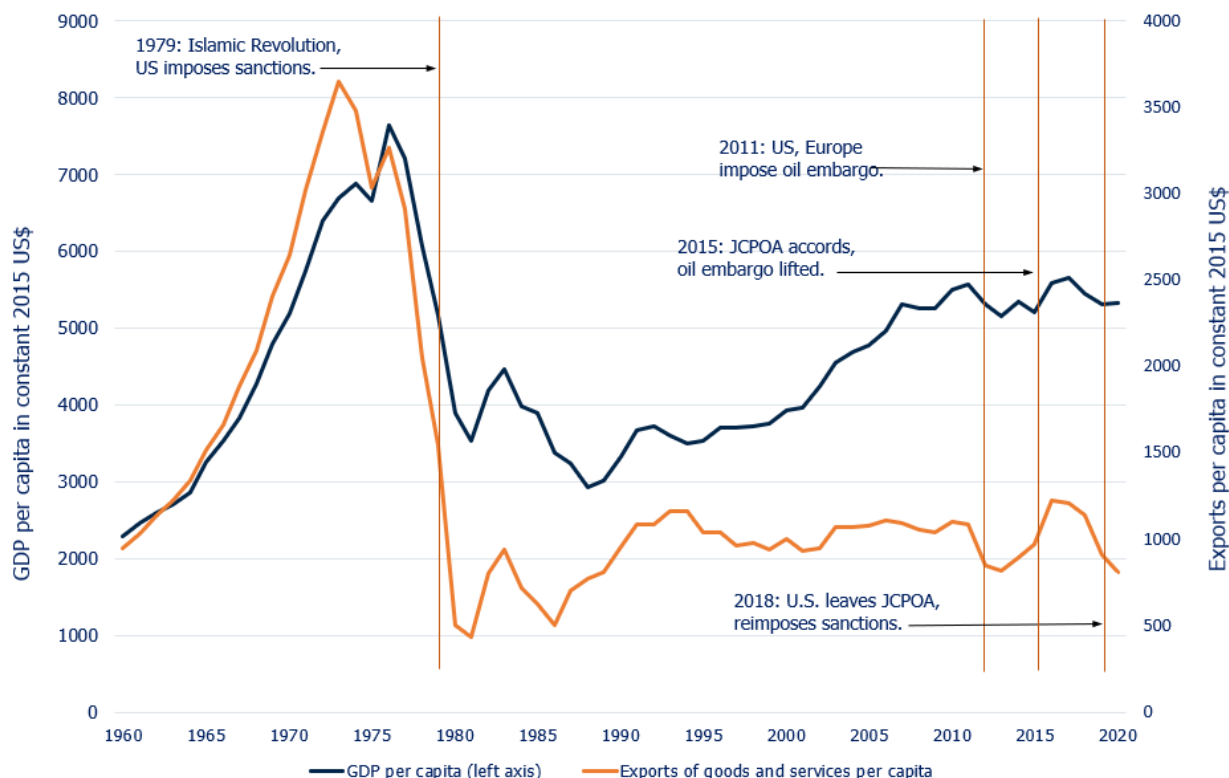
<sup>96</sup> UK Mission to the UN in Vienna (2021); House Comm. on Foreign Affairs (2022).

of the twentieth century. It recovered to a moderate pace of growth around the turn of the century, growing 3.2 percent annually between 2000 and 2011, and then stagnated again after 2011, contracting at an average rate of 0.5 percent annually in the last nine years.

The series shows that the political and social upheavals that accompanied the Islamic revolution were associated with a significant decline in the economy’s production of goods and services. Measured in constant domestic prices, per capita income today continues to be well below the level it had reached at the time of the revolution.<sup>97</sup> The series also shows that the 2011 and 2018 sanctions coincided with drops in per capita income; the lifting of sanctions resulting from the 2015 JCPOA accords coincided with the start of growth recovery. This pattern is consistent with the hypothesis that sanctions significantly affected Iranian economic growth at different moments in the last four and a half decades.

**Figure 5**

**Iran GDP and Exports Per Capita at Constant Prices, 1960–2020**



Source: Author’s calculations based on UNCTAD Merchandise Trade: Trade Indicators.

<sup>97</sup> This does not necessarily mean that real incomes are lower. When GDP is measured at constant prices, income effects from terms of trade improvements, such as those generated by the sustained increases in the price of oil after the 1970s, are disregarded. Some (but not all) series adjusted for purchasing power parity make an allowance for these improvements. According to the Penn World Table PPP-adjusted expenditure-chained series, real per capita income in 2020 was 50 percent higher than at its prerevolution peak in 1976.



Many other factors, of course, influence growth. Definitive hypotheses about causal hypotheses can seldom, if ever, be settled by inspection of a single economic time series, and this is no exception. Furthermore, the time series displays key turning and inflection points that do not clearly coincide with the timing of sanctions, strongly suggesting other factors at play. For one, most of the drop in GDP precedes the Islamic Revolution by a few years, while the growth contractions that follow the 2011 and 2018 sanctions appear quite small by comparison with the drop of the late '70s.

The key empirical question in assessing the effect of sanctions on time series such as those shown in Figure 5 is what is a reasonable estimate of the counterfactual evolution of GDP in the absence of sanctions. This may be a near impossibility for a period of intense economic and political turmoil and wholesale changes in the economic structure of Iranian society, such as that of the late 1970s. It may be more feasible to do so for the sanctions episodes of the 2010s, provided that we can find other economies with similar structural characteristics that can serve as a reasonable approximation of what would have happened to an oil-producing economy like Iran in the absence of sanctions.

Gharehgozli<sup>98</sup> and Ghomi<sup>99</sup> tackle the question of constructing reasonable counterfactuals using the method of synthetic controls.<sup>100</sup> This consists in comparing the post-sanctions performance of Iran with that of a weighted combination of other countries constructed to resemble the pre-sanctions characteristics of the economy. Gharehgozli<sup>101</sup> finds that the synthetic control group continued to grow after 2011, the same period during which Iran's GDP declined sharply. Iran's GDP, according to the study, was 12 percent lower after one year of sanctions, and 17 percent lower after three years of sanctions, then it would have been in their absence. Ghomi<sup>102</sup> uses a slightly different specification, with a longer time period, to estimate the weights as well as the post-sanctions period. The results are very similar, with a 13 percent decline in GDP relative to the counterfactual in the first year of sanctions, rising to 19 percent in 2015, the last year before sanctions were eased.<sup>103</sup> Ghomi also finds the effect to be persistent, with GDP remaining 5 points below the synthetic group two years after sanctions were lifted.

An alternative approach is to try to construct structural estimates of the welfare effects of sanctions based on quantifying the induced trade reductions' impact on income. This approach

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<sup>98</sup> Gharehgozli (2017).

<sup>99</sup> Ghomi (2021).

<sup>100</sup> Abadie and Gardeazabal (2003); Abadie, Diamond, and Hainmueller (2010).

<sup>101</sup> Gharehgozli (2017).

<sup>102</sup> Ghomi (2021).

<sup>103</sup> Ghomi (2015).

was initially taken by Hufbauer et al, who estimated the effect of the US's 1979 and 1984 sanctions at 3.8 and 0.4 percent of GDP, respectively.<sup>104</sup> As discussed in section 2, these estimates are constructed as partial equilibrium approximations of lost consumer surplus based on observed trade reductions and ad hoc elasticity assumptions. Interestingly, Hufbauer et al. assign a much greater effect of 14.3 percent of GDP to the 1951–1953 sanctions that followed Iran's nationalization of its oil industry, and which ended in the coup that brought the Shah Reza Pahlevi back to power.<sup>105</sup>

Felbermayr, Syropoulos, Yalcon, and Yotov use a more fleshed-out general equilibrium international trade model to estimate the effect of the more recent episodes of sanctions on Iran.<sup>106</sup> They begin with estimating an econometric gravity equation model that specifies bilateral trade flows between pairs of countries as a function of origin, destination, and country-pair variables. They then insert these estimates into a general equilibrium competitive model of world trade to quantify the effects of multiple sanctions on trade and per capita income. Using this approach, they estimate that lifting all sanctions would lead Iran's income to rise by about 4.2 percent. Also using a general equilibrium approach, Farzanegan, Mohammadikhabbazan, and Sadeghi calibrate a computable general equilibrium (CGE) model of the Iranian economy and estimate that a banning of oil imports by the EU and Japan would lead to a decline in imports by 20 percent and declines in GDP and private consumption by 2.2 percent and 3.9 percent, respectively.<sup>107</sup>

These trade-based estimates of sanctions' output effect tend to deliver results an order of magnitude smaller than synthetic control methods. This is not actually that surprising, as general equilibrium models of trade tend to deliver quantitatively small estimates of the gains from trade.<sup>108</sup> This may be due to the fact that the elasticity estimates used in these general equilibrium models are poor approximations of the effects of large changes in trade exposure. They may also reflect that the largest economic effects of sanctions do not come from the reduction in international trade in homogeneous products, but from the loss of access to goods and services that cannot be easily substituted, such as specialized inputs for the oil industry, or the ability to conduct international financial transactions through established payments systems.

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<sup>104</sup> Hufbauer et al. (2007).

<sup>105</sup> Hufbauer et al. (2007).

<sup>106</sup> Felbermayr et al. (2020).

<sup>107</sup> Farzanegan et al. (2015).

<sup>108</sup> Costinot and Rodríguez-Clare (2014).

It is worth bearing in mind that the assumptions that go into many standard general equilibrium analyses used to estimate gains from trade are not necessarily innocuous. For example, a reduction in oil exports caused by sanctions would typically be modeled as a decline in the price at which that oil can be sold on international markets; however, if the economy is producing other tradable goods, then resources would flow into these alternative industries, which would expand to offset the effect of what is essentially a negative terms of trade shock. Yet, it is often the case that these economies are best modeled as being completely specialized in oil production,<sup>109</sup> in which case GDP will decline much more strongly as a result of the fact that resources can only flow into non-tradables. Furthermore, these models tend to assume away externalities from having access to a large variety of imported intermediate inputs in international markets, yet there is considerable evidence that import externalities are an important driver of productivity and that import contractions help to explain productivity declines in oil exporting economies.<sup>110</sup> Models premised on complete specialization — in the sense of exports in energy or energy-intensive industries being the only competitive export sectors in equilibrium — therefore deliver a much more significant effect of export declines on GDP.<sup>111</sup>

The data are strongly consistent with the hypothesis that the bulk of changes in Iran's growth performance have been driven by changes in exports. Figure 5 also shows the evolution of exports, measured in the same per capita constant price metric as GDP. The GDP and export series show a remarkably strong association, with a correlation of 0.75 in growth rates. This is similar to the pattern found in many oil-exporting economies, as well as with the prediction of theoretical models of resource-abundant economies. The result also suggests that the effects measured in some computable general equilibrium models, which assume competitive pricing at interior solutions, are likely to be underestimated.

As we have already highlighted, the data in Figure 5 suggest that there are other drivers of economic performance in addition to sanctions. One of them is oil prices. Figure 5 measures exports and GDP using the conventional metric of constant production prices, and thus abstracts from effects on the domestic economy regarding trade improvements. In other words, the measures displayed in Figure 5 are essentially measures of the volumes of production and exports, but not of their value. A consistent term of trade series generated by UNCTAD is available from 2000 (Figure 6).<sup>112</sup> The series shows a significant improvement in terms of trade

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<sup>109</sup> Rodríguez and Sachs (1999); Hausmann and Rodríguez (2014).

<sup>110</sup> Halpern, Koren, and Szeidl (2015); Kasahara and Rodríguez (2008); Ahn and Choi (2016).

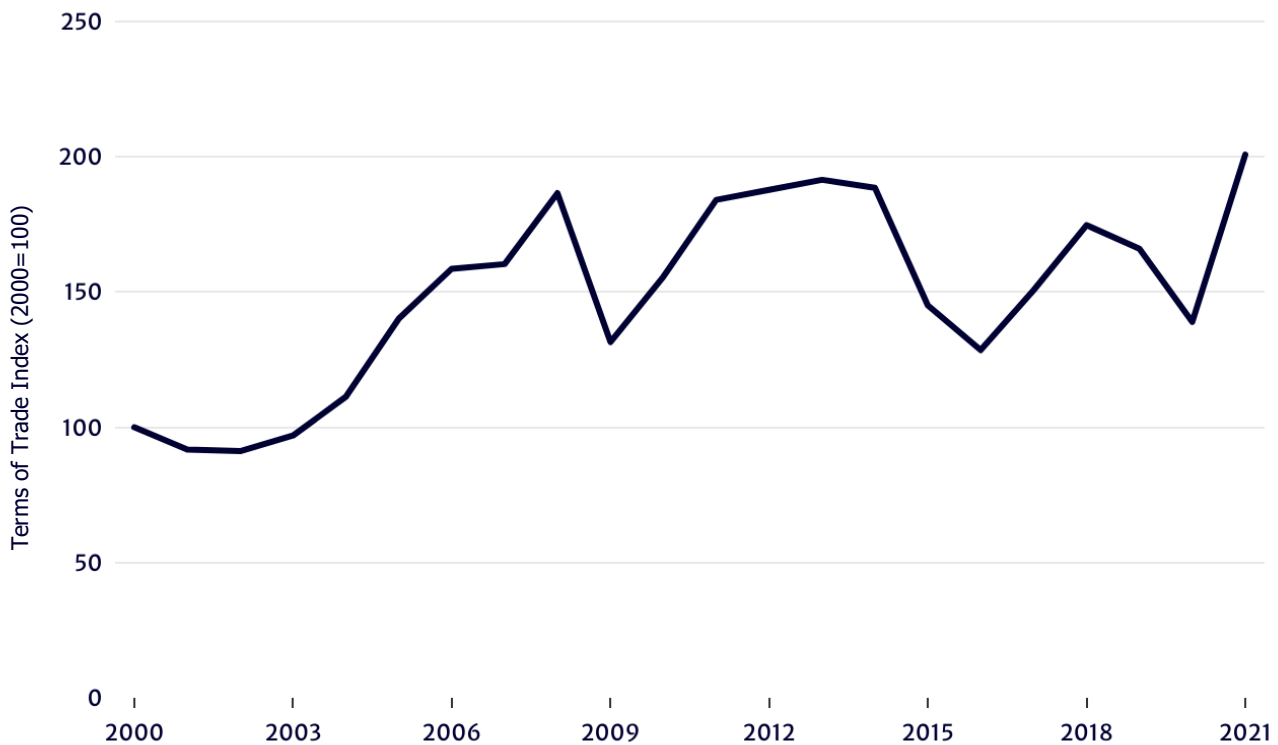
<sup>111</sup> Rodríguez (2021), chapter 4.

<sup>112</sup> A longer-run series can be derived from the national accounts export and import deflators, though it is not strictly comparable to the UNCTAD series. Nevertheless, it shows similar behavior in the post-2000 period.

during the 2000s, caused by a substantial increase in oil prices, which is the likely explanation for why Iran’s GDP was able to grow rapidly in this period despite stabilization of the export volumes shown in Figure 5.

**Figure 6**

**Terms of Trade, Iran, 2000–2021**



Source: Source: Author's calculations based on UNCTAD Merchandise Trade: Trade Indicators.

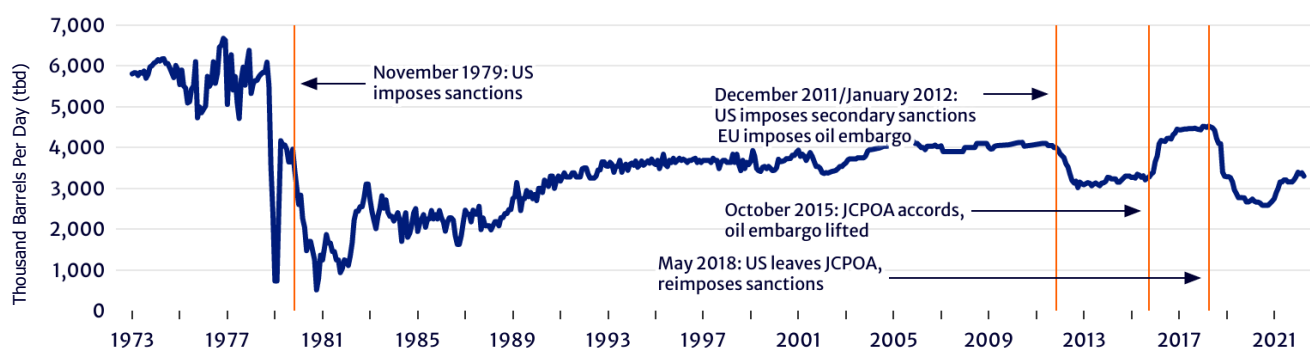
The data suggest that Iran’s resilience to external constraints has changed over time. Note that in contrast to what happened in the 1970s, the export declines of the 2010s occurred alongside relatively moderate drops in GDP. In the 1976–1988 period, incomes fell by 0.8 percentage points for every percentage point decline in exports; in 2010–2014 and 2018–2020, the ratio was a much smaller 0.1 percentage points. Furthermore, while the economy appears to have been able to take advantage of the terms of trade increase in the 2000s to turn it into positive growth, the positive oil price shocks of the late ‘70s and early ‘80s appear to have done little or nothing to offset the effect of declining export volumes.<sup>113</sup>

<sup>113</sup> According to the national accounts deflator-based series, the terms of trade rose by 44 percent between 1976 and 1979, so that the value of per capita exports measured in terms of imports fell by 32 percent in this period, less than the 53 percent drop in export volumes.

To understand the effect that sanctions may have had on oil production, it is useful to consider the patterns directly as they affect the oil industry, which also has the benefit of having available more fine-grained higher-frequency monthly data. **Figure 7** shows monthly data on crude oil production, including condensates, in Iran since 1973 as compiled by the US Energy Information Administration.<sup>114</sup> The monthly oil output data show large discrete declines in oil production occurring immediately after the three most important instances of sanctions being imposed (November 1979, December 2011, and May 2018), as well as a rapid recovery to pre-sanctions levels when these were lifted (October 2015).

**Figure 7**

### Iran Oil Production, 1973–2021



Source: US Energy Information Administration Open Data

The case of sanctions immediately following the Islamic Revolution is worth considering in more detail. At first sight, it is not altogether clear how to disentangle the revolution's effect from that of sanctions in the less fine-grained annual data. Yet once we zero in on the monthly series, we find an interesting pattern. Prior to the revolution, oil output had remained relatively stable at around six million barrels per day up until September 1978. It dropped by three-fifths in the last months of 1978 during a nationwide oil strike led by oil sector workers.<sup>115</sup> It then collapsed to less than 800,000 barrels per day in the two initial months of political upheaval in 1979, during which two governments claimed de facto control, and which ended in the consolidation of Ayatollah Khomeini's theocratic rule. After the new government consolidated power, oil output stabilized at an average of 3.9 million barrels per day between April and October of 1979. It was only after the US imposed sanctions in November 1979 that output dropped precipitously, averaging only 1.5 million barrels per day in 1980–1981. It then began to gradually recover, reaching the pre-sanctions production level by the 2000s.

<sup>114</sup> EIA (n.d.).

<sup>115</sup> Jafari (2013).

**Table 1****Change in Oil Production Before and After the Imposition of Sanctions on Iran**

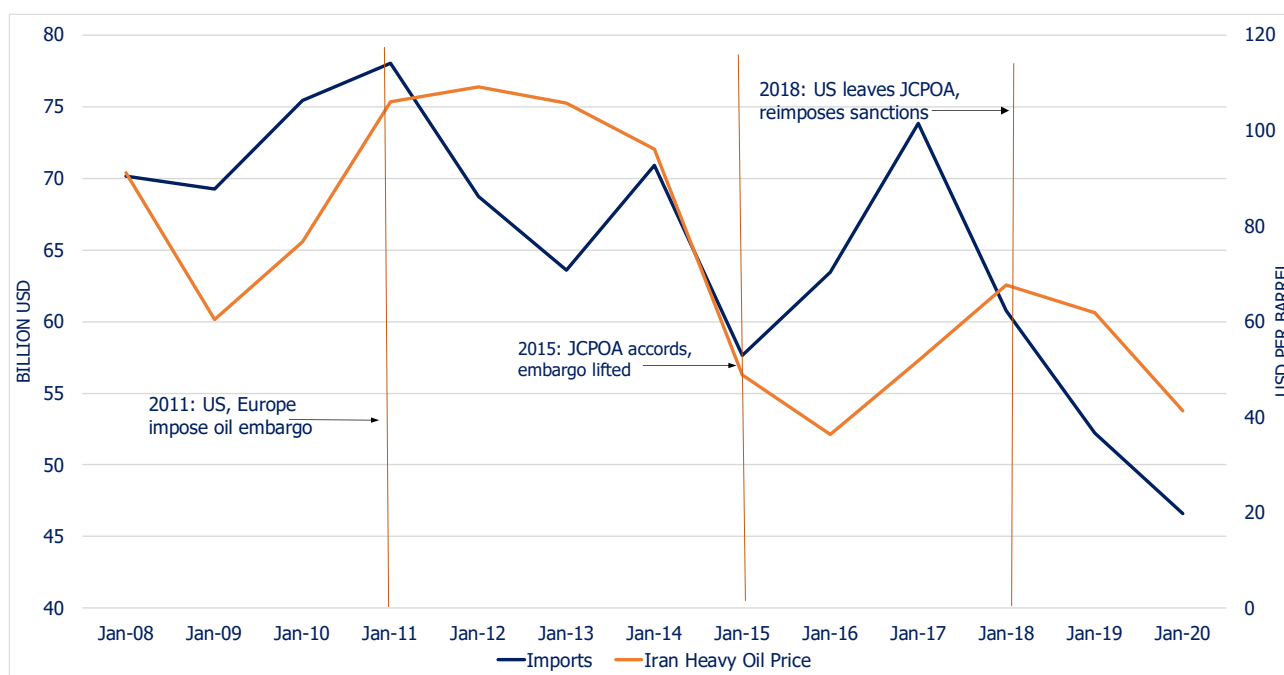
Month of Sanctions	Six Months Before Sanctions	Six Months After Sanctions
November 1979	-5.0%	-48.5%
December 2011	-2.4%	-11.9%
May 2018	1.6%	-24.6%
October 2015 (lifting)	0.1%	25.8%

Source: Author's calculation based on OPEC: Monthly Oil Market Report.

The strong temporal association in the monthly data is summarized in **Table 1**, which compares the six-month period immediately preceding the imposition of sanctions with the subsequent period that begins with the adoption of sanctions. In all cases, there are significant drops in output in the immediate aftermath of sanctions events that are not a continuation of pre-sanctions trends. Similarly, in the one instance of a significant easing of sanctions, starting in October 2015 with the signing of the JCPOA accords, we see a significant recovery of oil production that is also not a continuation of prior trends.

**Figure 8**

## Iran Imports and Oil Prices, 2008–2020



Source: Central Bank of Iran: Statistics.

Lower oil production brings about declines in living standards through several channels. First, oil accounted for a large part of GDP (approximately one-fifth of GDP at the time the 2011 sanctions were adopted), so a decline in oil output should be directly associated with a decline in national output. Second, oil accounts for an even larger share of exports (around 80 percent at the same time) so declines in exports lead to declines in import capacity that can directly affect a large part of the non-oil industry. Third, a decline in oil export revenues will lead to a depreciation in the equilibrium real exchange rate, making imported goods more expensive and leading to declines in real consumption.

The last two of these effects — lower availability of foreign currency for imports leading to lower imports of inputs for domestic industry, and lower consumption levels — operate through declines in the levels of imports. **Figure 8** confirms that imports declined strongly in the aftermath of both the 2011 and the 2018 sanctions, and recovered strongly after the JCPOA accords. In the case of the 2011 sanctions (imposed in December 2011 by the US and in January 2012 by Europe), we see imports decline by 19 percent in the following two years, while in the case of the 2018 sanctions, imposed in May of that year, we see imports begin to fall in 2018 and decline by 29 percent between 2017 and 2019. In the case of the JCPOA accord lifting of sanctions, which took place in October 2015, we see an import recovery of 10 percent in 2016, and

of 16 percent in 2017. The first of these is quite remarkable because 2016 was a year in which Iranian oil prices fell by 19 percent, a decline that under normal conditions would have strongly curtailed import capacity.

Lower availability of foreign currency for imports essentially implies that the economy is poorer, and should be reflected in declining real incomes. Batmanghelidj has suggested that sanctions that cause a decline in the availability of foreign exchange — either due to lower exports, or because the Central Bank loses access to international reserves needed to defend the currency — will be reflected in an increase in inflation that will lower real incomes.<sup>116</sup> Whether higher inflation is the channel through which the external shock is transmitted to incomes will depend on several factors, including how monetary and exchange rate policies react to the shock. Typically, an external shock will cause a depreciation of the currency that will, in part, pass through to inflation, leading to a depreciation of the real exchange rate and a decline in real wages. However, if authorities intervene to defend the currency, the transmission will not occur immediately. In the more complex case of Iran, which since 2018 has had a three-tier exchange rate system (with two official rates and a parallel market), transmission will also depend on the fiscal policy stance: if the government reacts to the decline of fiscal revenue by maintaining spending and monetizing the deficit, then the inflationary acceleration will occur not through exchange rate pass-through, but rather as a consequence of the monetary expansion.

In fact, the data show that both episodes of sanctions were followed by some price acceleration, but the 2018 episodes were much more marked. Prices did not immediately rise in the aftermath of the 2011 sanctions, and only accelerated mildly in mid-2013. Even before sanctions were lifted in 2015, inflation eased to pre-sanctions levels. (An argument can be made that the pre-2011 acceleration of inflation reflects an anticipation of sanctions, and the deceleration that started in late 2013 occurred on the back of the provisional November 2012 Joint Plan of Action.) In 2018, it is clear that inflation strongly accelerated right after the US reimposed sanctions, and that it has remained well above previous highs.

Another explanation for this dissimilar reaction in 2011 and 2018 appears to be related to the fact that Iran was in much better fiscal shape prior to the 2011 sanctions than when the 2018 sanctions hit. Iran's fiscal deficit was only 0.8 percent of GDP in 2011, giving it ample room to run a countercyclical fiscal policy once sanctions were imposed. Iran's central bank let the currency float in July 2013, allowing for a 50 percent depreciation that had only a temporary limited pass-through to inflation. In contrast, in 2018, the year after sanctions were reimposed, Iran posted a

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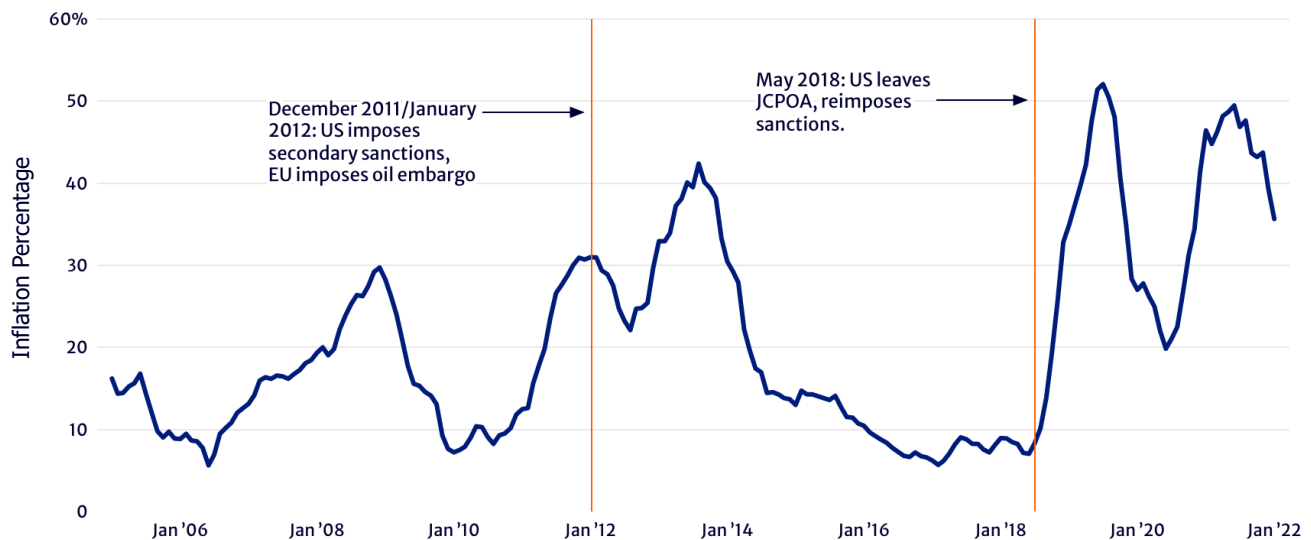
<sup>116</sup> Batmanghelidj (2020).



deficit of 4.5 percent of GDP. Iran was left with virtually no access to its international reserves, and decided to maintain its exchange rate peg, leading to significant overvaluation and deficit financing, and thus prompting a significant inflationary acceleration.

**Figure 9**

### Iran Consumer Price Index Inflation, 2005–2022



Source: International Monetary Fund: International Financial Statistics.

Advocates of sanctions often highlight the way in which the more recent generation of sanctions used against Iran were targeted at elites and were ostensibly designed to protect more vulnerable groups. But the evidence shows little success in achieving those goals. Ghomi uses household survey data to trace the effects of sanctions on the dynamics of poverty among households in Iran.<sup>117</sup> Constructing a synthetic panel using observable characteristics of household groups in a repeated cross section, he estimates the probabilities of each group transitioning into or out of poverty between 2011–2012 and 2014–2015. He finds that rural households, households belonging to low- and middle-income groups, or those headed by old and unemployed persons, had the highest likelihood of moving into poverty in the sanctions period, while households working in the public sector and those headed by highly educated persons were least likely to move into poverty.

Aside from their adverse effects on income and poverty, there is evidence that sanctions significantly affected other social dimensions, including health. One channel was the enforced

<sup>117</sup> Ghomi (2021).

scarcity of medicine. Setayesh and Mackey identify shortages of 73 drugs in Iran during the shortage period, of which 32 were also on the World Health Organization's list of essential medicines.<sup>118</sup> Interestingly, 70 of the 73 drugs fell under an OFAC general license to export drugs to Iran, suggesting that these types of authorizations have little practical effect. This is consistent with abundant anecdotal evidence of medicine imports being blocked even when they are, in principle, legal. For example, a \$60 million order for an antirejection drug for liver transplants failed to reach Iran, despite having all the required OFAC licenses, because no bank would perform the transaction.<sup>119</sup>

Kheirandish, Varahrami, Kebriaeezade, and Cheraghali studied the availability of drugs in Iran during the sanctions period and found that it fell significantly in 13 of 26 cases, with 10 other cases showing nonsignificant reductions, and only 3 showing increases.<sup>120</sup> Furthermore, imported drugs and drugs using imported raw materials were more likely to be affected. The estimated effects on scarcity from the initial 2011 sanctions rose, in many cases, after the 2012 blacklisting of the Central Bank of Iran. Cancer drugs were most affected, with the availability of 9 of 14 drugs significantly reduced.

These results are consistent with reports from medical associations. For example, the mean per capita use of factor VIII<sup>121</sup> in Iran was 0.5 international units (IU) after sanctions were imposed in 2006, down from 1.6 before, leaving around a thousand hemophilia patients with physical impairment as a result of bleeding into their joints, and causing some deaths as a result of uncontrolled bleeding. After sanctions were lifted, the per capita use of factor VIII rose to 2.7 IU.<sup>122</sup> Another study found that the number of pharmacies in Tehran that could provide all essential asthma medicines fell from 60 percent in July 2012 to 28 percent in March 2013, as sanctions intensified.<sup>123</sup>

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<sup>118</sup> Setayesh and Mackey (2016).

<sup>119</sup> Namazi (2013).

<sup>120</sup> Kheirandish et al. (2018).

<sup>121</sup> Factor VIII is a protein in the blood that plays a crucial role in the blood clotting process. It is produced in the liver and released into the bloodstream when a blood vessel is injured. Factor VIII is one of several clotting factors that work together to form a clot, which stops bleeding and helps to heal the damaged tissue. Hemophilia is a genetic disorder that affects the ability of the blood to clot. Patients with severe hemophilia may not have enough factor VIII in their blood or may have factor VIII that does not work properly. As a result, these patients may need to receive factor VIII or other clotting factors as part of their treatment. Factor VIII replacement therapy involves infusing the patient with concentrated factor VIII to help restore their ability to form blood clots and prevent bleeding. Factor VIII is typically administered intravenously and requires careful monitoring to ensure the patient receives the appropriate dose.

<sup>122</sup> Heidari, Akbariqomi, and Tavoosidana (2017).

<sup>123</sup> Ghiasi et al. (2016)

**Table 2** looks at the evolution of selected mortality and health indicators for Iran in the 2000–2019 period. We distinguish between the pre-sanctions period of 2000–2012, the sanctions period of 2012–2016, and the post-sanctions period from 2016.<sup>124</sup> Of the five series, only one appears unaffected by sanctions: the infant mortality rate, which progressively declined throughout the three periods. The other four series show patterns indicative of breaks in trend, although the sample sizes are too small to conduct meaningful statistical testing. In the case of male mortality, previous improvements in death rates faltered during the sanctions period, and then resumed in the post-sanctions era.

The same pattern is present, yet more accentuated, in the case of female mortality. Regarding female anemia and stunting, we see complete reversions of the pre-sanctions declines, so that both indicators deteriorate (increase) in the sanctions period. In these cases, the change in trend continues into the post-sanctions period, suggesting that the effects that led to the reversion in trend are persistent.

**Table 2**

**Evolution of Mortality and Health Indicators, Iran, 2000–2019**

Period	Infant Mortality	Male Mortality	Female Mortality	Female Anemia	Stunting
2000 – 2012	–5.3%	–4.4%	–5.7%	–1.7%	–7.6%
2012 – 2016	–3.8%	–1.9%	–2.0%	0.3%	0.4%
2016 – 2019	–3.4%	–6.3%	–7.1%	1.4%	0.5%

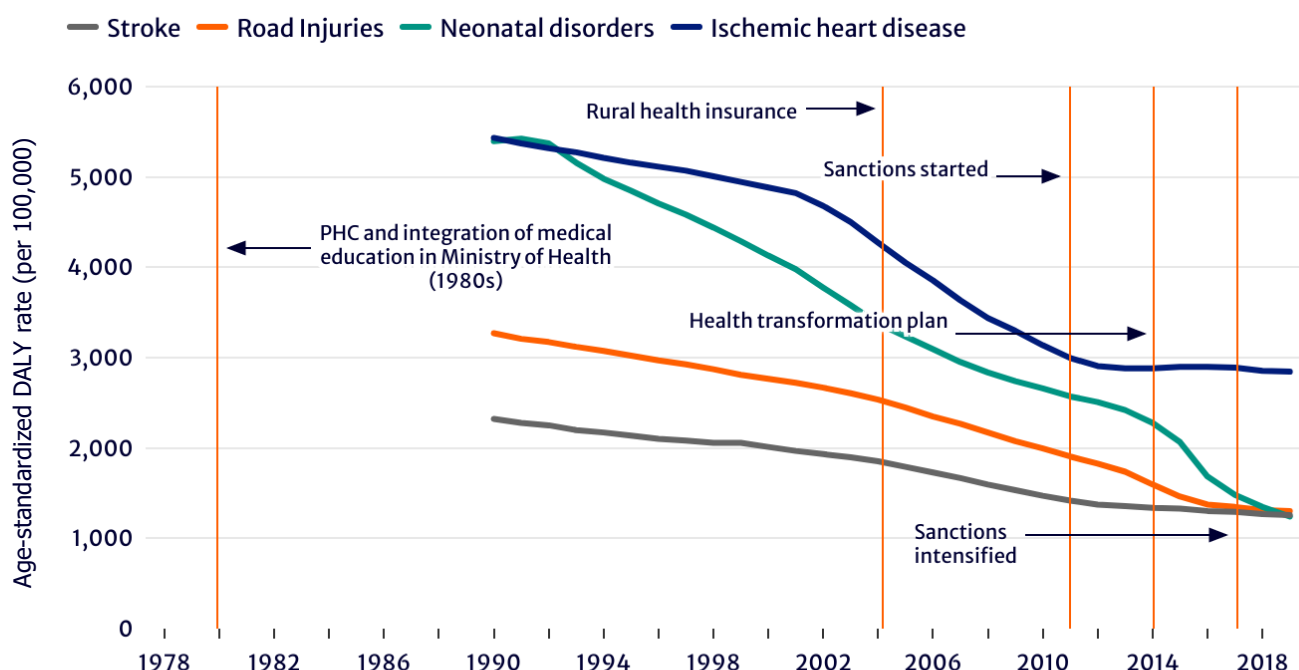
Source: Author's calculations based on UN-IGME, UN Department of Economic and Social Affairs (2022), and World Bank Group.

<sup>124</sup> Note that we take as the endpoint of each of these intervals the year after sanctions are imposed or lifted, in contrast to much of our discussion in the prior section. This is because it is natural to expect health indicators to react with a minimal time lag to the deterioration of economic conditions. Results are substantively similar if we take 2011 and 2015 as cut points. Because of these lags and the confounding effects of the COVID pandemic, we do not attempt to separate out the effect of the post-2018 sanctions.

These patterns, while indicative, are consistent with those that come out of more detailed specific studies. GBD 2019 Iran Collaborators, for example, use subnational data from the Global Burden of Disease Study 2019 and find a significant slowing of the rate of decrease of age-standardized disability-adjusted life years after 2011, with the most detrimental effects concentrated on noncommunicable diseases (Figure 10).<sup>125</sup>

**Figure 10**

**Disability-Adjusted Life Years Caused by Major Diseases and Risk Factors, Iran, 1990–2019**



\*DALY refers to disability-adjusted life years. PHC refers to primary health care.

Source: GBD (2019).

<sup>125</sup> GBD 2019 Iran Collaborators (2019).

## 5.2 Afghanistan, 1999–2021

### 5.2.1 Historical Overview

Restrictions on international economic transactions with Afghanistan date from the rise of the Taliban faction to power in 1996, after a prolonged civil war. The first restriction — and arguably the most important one — was a by-product of decisions by almost all countries to withhold recognition of the Taliban government. This functioned as de facto sanctioning, by impeding officials from accessing assets or entering into contracts on behalf of the Afghan state.<sup>126</sup> Formal sanctions date from 1999, when the United States and the United Nations froze Taliban assets and barred flights into or out of Taliban-controlled territory in response to the Taliban's decision to provide shelter and training grounds to international terrorists (among them al-Qaeda leader Osama bin Laden, who had already been indicted in the US for his role in planning the 1998 bombings of US embassies in Kenya and Tanzania).<sup>127</sup> Both US and UN sanctions against the Taliban expanded progressively in the following years, especially after the September 2011 terrorist attack on US soil masterminded by al-Qaeda.

The Taliban, a fundamentalist Islamic group founded by religious students from the Pashtun tribes of Southern Afghanistan, established control of Afghanistan's capital, Kabul, and approximately three-fourths of the country's territory by late 1996. The rise of the Taliban came at the end of a seven-year civil war that followed the collapse of a Soviet-backed Marxist government. Although the Taliban were initially seen sympathetically by the US, and almost certainly received indirect US support,<sup>128</sup> international public opinion quickly turned against them as they imposed the strictest version of sharia law in the world, banning all women from work, prohibiting female education in schools or homes, and outlawing television, music, and all games. They quickly clashed with UN agencies on issues of gender, leading to the suspension of UN programs after the Taliban refused to let women participate in them.<sup>129</sup> Only three countries (Pakistan, Saudi Arabia, and the United Arab Emirates) recognized the Taliban government at the time.

Although deposed president Burhanuddin Rabbani, whose government led the resistance to the Taliban and continued to control an area of territory around the Panjshir Valley, claimed to be

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<sup>126</sup> Congressional Research Service (2021).

<sup>127</sup> United States Attorney Southern District of New York (1998).

<sup>128</sup> Rubin (2002).

<sup>129</sup> Rashid (2010), 65.

Afghanistan's legitimate head of state, the United States and most western nations decided not to recognize any Afghan government after 1996.<sup>130</sup> For the US, this was a continuation of a policy that went back to at least 1989, when it closed its embassy in Kabul due to security concerns after the pullout of Soviet troops led the country to descend into anarchy. The United Nations credentials committee repeatedly deferred a decision on recognition, a stance that in practical terms allowed the incumbent Rabbani government to retain representation until 2001.<sup>131</sup>

For this reason, neither the UN resolutions nor the US executive orders imposing sanctions refer explicitly to the government of Afghanistan, as there is no formally recognized Afghan government to sanction. Rather, the sanctions refer directly to “the Afghan faction known as the Taliban” (UN Resolution 1267) or “the political/military entity...that as of the date of this order exercises de facto control over the territory of Afghanistan” (US Executive Order 13129). Nevertheless, because the Taliban controlled virtually all Afghan state institutions as of 1996, sanctions on the Taliban effectively blocked access to any assets and severely limited the ability of the Afghan government to engage in global trade. Even before formal sanctions were imposed, the deliberate lack of recognition impeded the Taliban government from accessing international accounts or entering into binding contracts on behalf of the Afghan state. A case in point: Taliban appointees were never able to claim control over \$254 million in gold reserves held by Da Afghanistan Bank, the Afghan central bank, at the US Federal Reserve.<sup>132</sup> The funds were only released in 2002 after the US recognized the new Afghan government and formally lifted sanctions.<sup>133</sup>

Because nonrecognition acts as a de facto imposition of sanctions on a government, it makes little sense to draw a distinction between the timing of accession of the Taliban to power in Afghanistan in 1996 and the imposition of sanctions three years later. Any meaningful economic interactions between the Taliban government and other states or international organizations were precluded as of 1996. Yet, it is also extremely difficult to construct an uncontroversial counterfactual of what Afghanistan's economic ties would have looked like if the Taliban had been recognized as Afghanistan's government and sanctions not been imposed. The Taliban's reclusive style of governing and its ideology made them hostile to even the more basic interactions with international organizations, but nothing in their economic and social agenda was inherently incompatible with openness to foreign investment on terms similar to those of other authoritarian or theocratic states. Indeed, one of the reasons they gained power in

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<sup>130</sup> US Department of State (1997).

<sup>131</sup> Barber (2021).

<sup>132</sup> Sipress (2002).

<sup>133</sup> US Department of the Treasury (2002).

Afghanistan was because key allies like Pakistan saw them as helping to facilitate international trade routes.

## 5.2.2 Economic and Social Consequences

There are serious data limitations on any attempt to evaluate the aggregate performance of Afghanistan's economy during the period of Taliban rule or to disentangle the effect of sanctions from that of Taliban rule. Aggregate data collection appears to have effectively ceased long before the Taliban takeover, generating a paucity of statistics on relevant human development outcomes. The World Bank does not publish any GDP statistics for Afghanistan for the 1982–2001 period, and the country is one of twenty-six UN member states completely excluded from the Penn World Tables data. Only the United Nations Statistics Division publishes an estimate, which combines interpolations with partial estimates from prior Asian Development Bank studies, to infer data for the 1980s and 1990s.

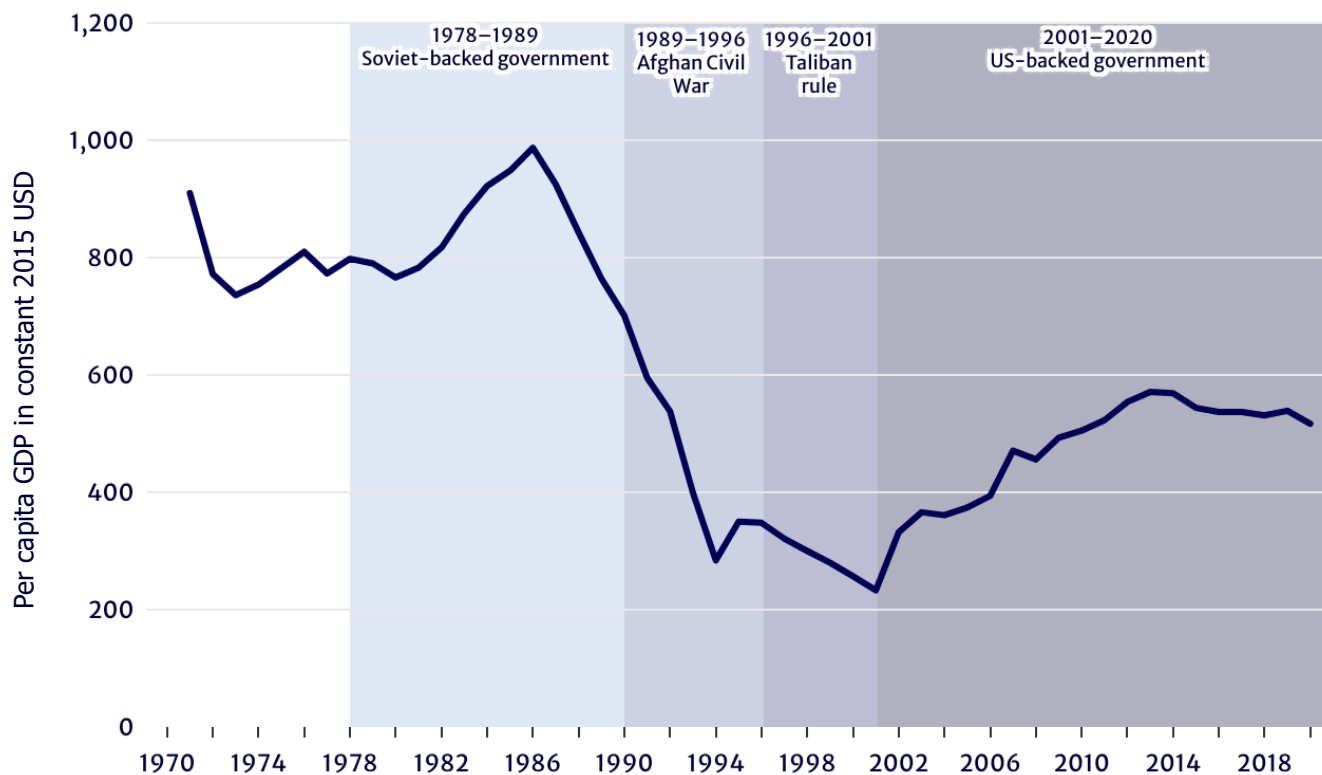
The results, shown in **Figure 11**, indicate a decline of 76 percent in real per capita incomes between 1986 and 2001, which would put this in line with some of the largest economic collapses observed in modern world history. It's worth noting that the decline appears to have been slower during the Taliban period (7.7 percent annual) than during the collapse of the Soviet regime and ensuing civil war (9.9 percent), although it is unclear what, if any, inferences should be drawn from this comparison given the weakness of the base data, significant use of imputation, and the simple fact that it is natural to expect a slower rate of decline as the economy approaches subsistence levels. Whatever genuine information there is in these statistics, they appear to reflect economic activity in major urban areas and to completely exclude poppy production, which was estimated to account for nearly one-fourth of GDP at the end of Taliban rule.<sup>134</sup>

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<sup>134</sup> Asian Development Bank (2003), 105.

**Figure 11**

## Afghanistan's GDP Per Capita at Constant 2015 Prices in USD, 1970–2020



Source: UNCTAD: Merchandise Trade: Trade Indicators.

The UN Inter-Agency Group for Child Mortality Estimation (UN-IGME) produces annual infant and child mortality estimates for Afghanistan from 1957 to 2020. The series displays a relatively steady decline in mortality through the past six decades, which appears largely to be uninterrupted by the period of Taliban rule, economic sanctions, or even the Afghan Civil War (Figure 12). However, their model is based on statistical techniques and assumptions that appear poorly suited to inferring annual data for a country with sparse and sometimes conflicting information.<sup>135</sup> In our opinion, the UN-IGME methods severely distort the resulting trend patterns and limit their informativeness in these cases.<sup>136</sup>

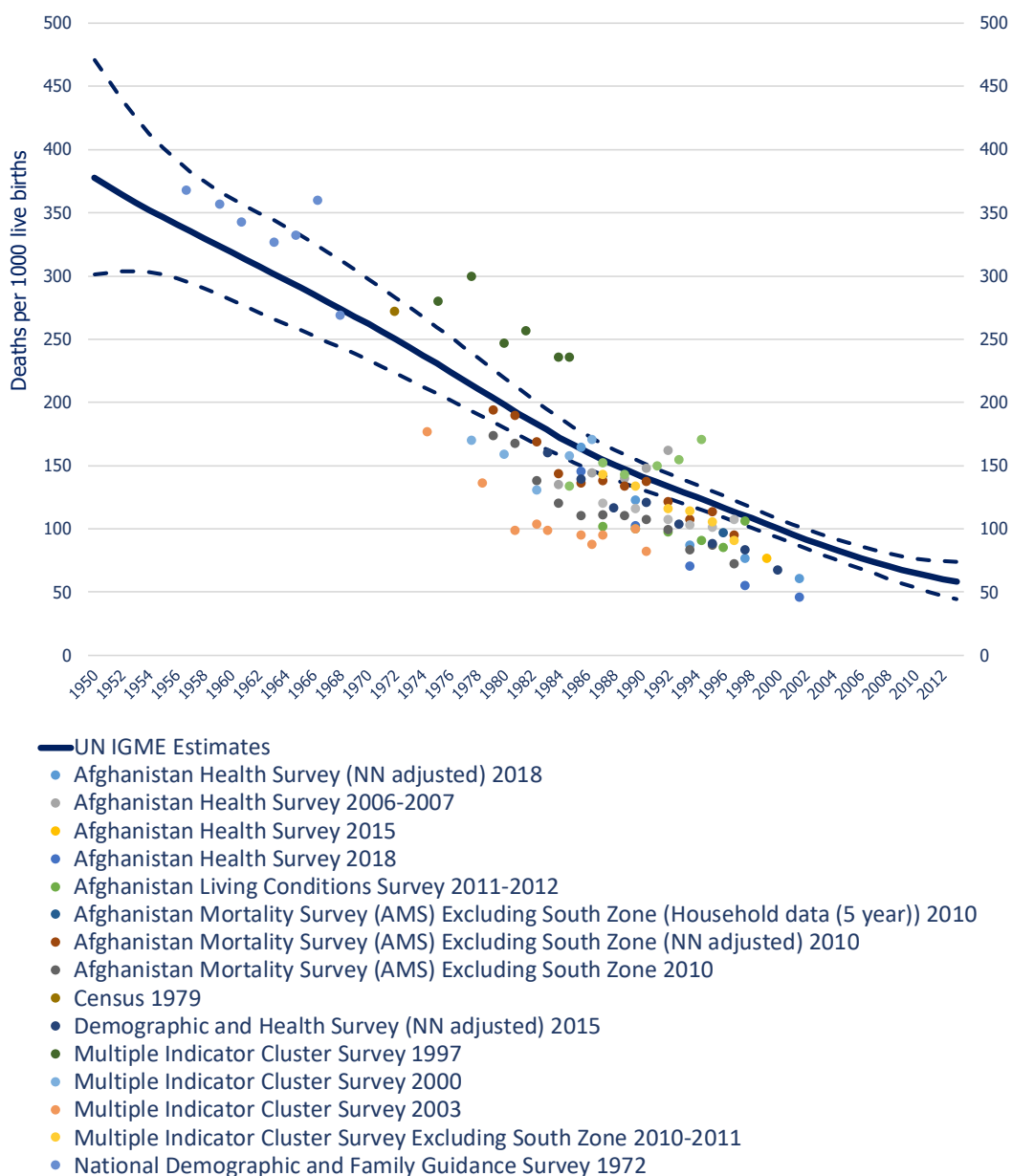
<sup>135</sup> Alkema and New (2014); UN-IGME (n.d.).

<sup>136</sup> The estimates, which rely on fitting a Bayesian B-splines bias-adjusted model to the cross-national data (see CME Info – Child Mortality Estimates), do not allow for separate estimation of country-level variance parameters (Alkema and New, 2014, 9). One consequence of this modeling choice can be excessively narrow confidence intervals which, as shown in Figure 14, fail at times even to include the only observations available for certain time intervals.



Figure 12

## Afghanistan's Under-Five Mortality Rate, 1957–2020



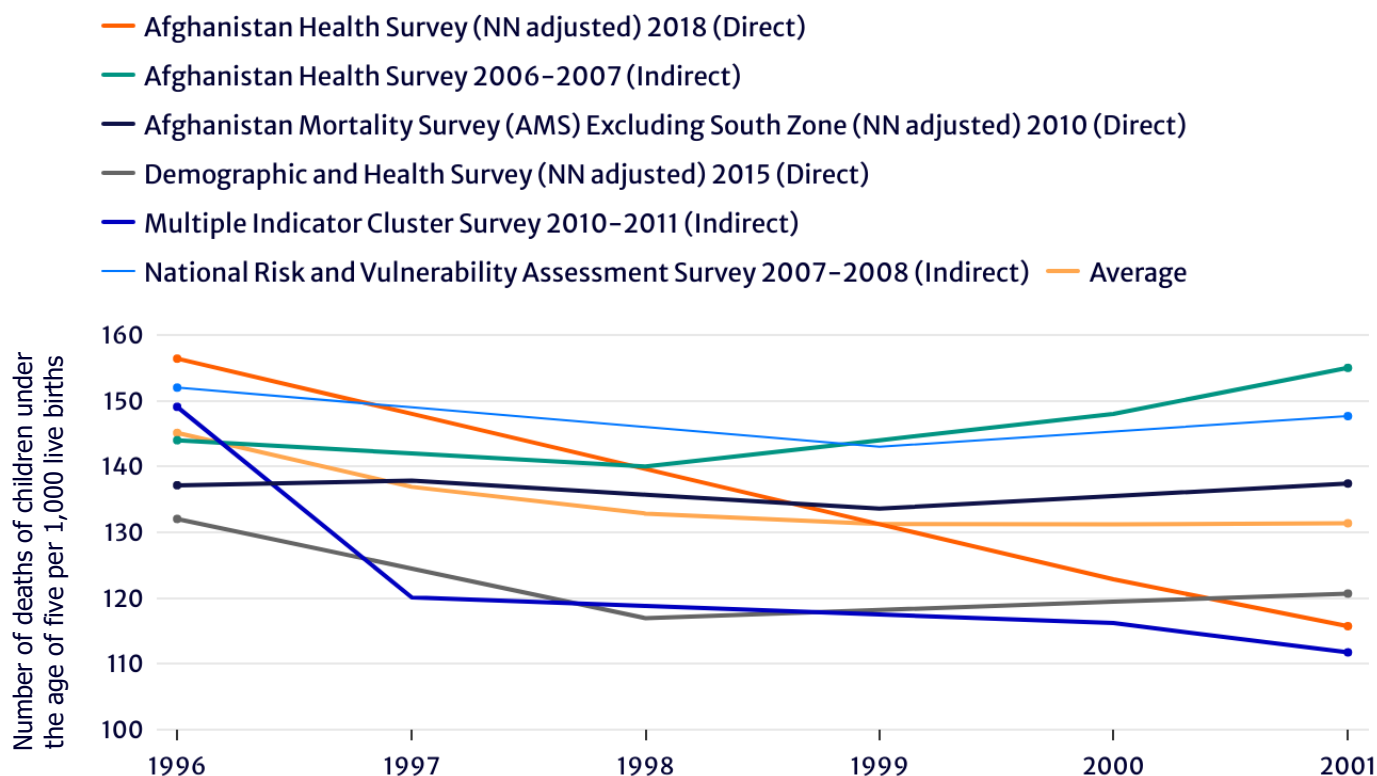
Source: UN-IGME

Figure 13 zeroes in on the actual data used to construct the UN-IGME estimates, putting aside the model estimates. Of the six available series, four show declines in the 1996–2001 period treated as a whole, while two show increases. Four of the series also show increases in the post-sanctions 1999–2001 period, while only two continue to show declines. The average of the series shows a decline in 1996–1998, which then stalls in 1999–2000 and marginally rises in 2001. The data are at the very least consistent with the hypothesis that child mortality rates rose during the

period of Taliban rule, and especially in the last two years, which included the imposition of sanctions and the US invasion.

**Figure 13**

### Afghanistan's Under-Five Mortality Rate According to Various Sources, 1996–2001



Source: Author's calculations based on UN-IGME.

UN-IGME estimates are based on retrospective assessments using surveys or censuses with full and summary birth histories carried out between 2006 and 2015. Much less systematic data collected at or nearer to the times of interest are also consistent with the picture of a severe deterioration in mortality during the period of Taliban rule and sanctions. A survey carried out by Doctors Without Borders in January 2001 found the mortality rate among children under five, in a sample of eight villages, to be an alarming 5.2 per 10,000 per day. The severe undernourishment was affected by both drought and conflicts, with wheat crops falling by as much as 65 percent in rain-fed areas and livestock herd size falling by 70–80 percent.<sup>137</sup> A 1997 UNICEF survey found

<sup>137</sup> IRIN News (2001).

that children in Afghanistan were twice as likely to die before their first birthday as children born in neighboring South Asian countries.<sup>138</sup>

Nongovernmental organizations and UN agencies were highly critical of the sanctions' effect at the time. A 2000 study commissioned by the Office of the UN Coordinator for Afghanistan concluded that UN sanctions had a tangible negative direct effect on the Afghan economy as well as a substantial indirect impact on the humanitarian situation.<sup>139</sup> The study highlighted how the banning of Ariana Airlines impeded hospitals' access to medical supplies and how having a functioning airline was a basic condition for a functioning economy. On the eve of new UNSC sanctions in December 2000, Doctors Without Borders warned that the sanctions would be devastating for a country without a functioning health care system,<sup>140</sup> and even UN Secretary-General Kofi Anan seemed to lament the thrust of the resolution, stating before its adoption that it "is not going to facilitate our humanitarian work."<sup>141</sup>

The Taliban returned to power in 2021 after a major offensive that followed the withdrawal of US troops. Because both UN and US sanctions aimed at the Taliban had never been lifted, they went into force immediately, restricting any interactions with the new Afghan authorities. As with the situation 25 years earlier, lack of formal recognition of the Taliban government mimics the effect of government sanctions, impeding the carrying out of international legal, commercial, or financial transactions involving the Afghan government. In contrast to the earlier takeover, in which the Taliban gained the recognition of three governments, to date no government has recognized the new authorities.<sup>142</sup> Once again, the UN credentials committee has deferred a decision on recognition, thereby allowing representatives of the deposed government to continue to represent the country.<sup>143</sup>

Blocking the Taliban's access to the country's central bank assets is even more damaging than in the past. The Central Bank now has significantly larger holdings than it did in 1996, valued at \$9.6 billion in the last available data (May 2021). This is equivalent to nearly half of the country's GDP and nearly 18 months of imports (calculated at 2020 values). In real per capita terms, it is 3.8 times the size of reserves at the time of the Taliban takeover in 1996.<sup>144</sup> Taliban-appointed central bank authorities were immediately precluded from access to these funds both because

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<sup>138</sup> Office of the UN Coordinator for Afghanistan (2000).

<sup>139</sup> Office of the UN Coordinator for Afghanistan (2000).

<sup>140</sup> Ahmad (2001).

<sup>141</sup> Crossette (2000).

<sup>142</sup> Gul (2022).

<sup>143</sup> UN Affairs (2021).

<sup>144</sup> Calculation uses the last available reserves figure of \$516 million before the takeover, which corresponds to March 1992. See International Monetary Fund (2022).

they were not appointed by a recognized government and because any assets managed by the Taliban are blocked as a result of standing US executive orders. Approximately \$7 billion of these funds are deposited at the Federal Reserve Bank of New York, while another \$2 billion is held in the United Kingdom, Germany, the United Arab Emirates, and the Bank for International Settlements in Switzerland.<sup>145</sup> According to a former Da Afghanistan Bank director, the Taliban may be able to access only about \$20 million, or 0.2 percent of total reserves.<sup>146</sup>

On February 11, 2022, President Biden issued an executive order formally blocking all Afghanistan central bank reserves held in the United States.<sup>147</sup> Soon thereafter, the Treasury Department issued a license enabling the transfer of \$3.5 billion, or half of the reserves held in the US, to a trust fund set up to “ensure that that money is used for the benefit of the Afghan people.”<sup>148</sup> In September 2022, the United States and the Swiss government unveiled the Afghan Fund, a Geneva-based foundation with accounts at the Bank for International Settlements that will be in charge of managing and safeguarding those \$3.5 billion.<sup>149</sup> The other \$3.5 billion will remain in the New York Federal Reserve account to potentially satisfy awards issued by US courts to victims of the September 11, 2001 attacks. Several groups of victims are seeking awards, and some have been granted orders of attachment for funds of DAB.<sup>150</sup> It is unclear whether any of these suits will ultimately be successful, as seizure of a central bank’s assets would contravene the Foreign Sovereign Immunities Act, which protects the assets of sovereign countries from attachment to satisfy judgments. The US Attorney General’s Office has advised the court that allowing the seizure of these assets would expose the US to “the risk of reciprocal challenges to American property abroad.”<sup>151</sup> In August 2022, a federal magistrate judge issued a recommendation to dismiss the motions granting the turnover of central bank assets to the victims of the September 11 attacks on the grounds that the creditors had not overcome DAB’s immunity from jurisdiction.<sup>152</sup>

In principle, it may appear odd that the United States was able to transfer the international reserves of another country to a private foundation. To do this, the Department of State first certified two Afghan nationals as “having joint authority to receive, control, or dispose of property from the DAB’s account”; these two persons then co-founded the Afghan Fund. One of these two Afghan nationals, Shah Mehrabi, was a member of the Supreme Council of DAB — the

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<sup>145</sup> Nelson and Rappeport (2021).

<sup>146</sup> Ahmady (2021).

<sup>147</sup> Executive Order 14064 (2022).

<sup>148</sup> White House (2022).

<sup>149</sup> US Department of State (2022).

<sup>150</sup> Savage (2022).

<sup>151</sup> United States District Court Southern District of New York (2022).

<sup>152</sup> Statement of Interest of the United States of America. (2022).

bank's highest policy and decision-making body — at the time of the Taliban's 2021 seizure of power.<sup>153</sup> Since Mehrabi's appointment has not been revoked by a government recognized by the US, the Department of State could certify him as having the authority to receive, control, or dispose of DAB property based on the claim that he continues to hold the position of Supreme Council member.

More interesting, there is no evidence that Mehrabi's appointment was ever revoked by the Taliban. Mehrabi continues to be listed as a member of the Supreme Council on the Taliban-controlled webpage of DAB. While the Taliban-controlled DAB issued a statement in February 2022 labeling the US decision to block Afghanistan's reserves as an "injustice to the people of Afghanistan,"<sup>154</sup> it has not publicly questioned the September 2022 creation of the Afghan Fund. This suggests that Mehrabi's appointment may have at least the tacit support of the Taliban. This interpretation would also be consistent with July 2022 press reports indicating that US and Taliban officials were close to an agreement on the use of DAB reserves, in which the US would condition certification of DAB directors on the presumed independence of these directors, as well as acquiescence by the Taliban that the funds, while owned by DAB, could be managed by an independent trust fund.<sup>155</sup> In December 2022, Mehrabi was invited to attend a meeting of the DAB Supreme Council in Kabul, further strengthening the interpretation that the Taliban accepted the appointment. The ability of the US to indefinitely block access to these funds could have enabled it to obtain the Taliban's acquiescence to its proposals for the conditioned use of the funds.<sup>156</sup>

No official statistics have been published since the Taliban's assumption of power in August 2021. Afghanistan is one of only three countries (the other two being Syria and Lebanon) for which the IMF World Economic Outlook publishes no growth estimates or projections after 2020.<sup>157</sup> The World Bank estimates that per capita incomes declined by 34 percent year-on-year in the last four months of 2021.<sup>158</sup> This could be a conservative estimate, given the oversized role that external aid played in the Afghan economy. Afghanistan's trade deficit averaged 33 percent of GDP in the 2016–2020 period and was almost entirely financed by international cooperation and foreign lending. Export proceeds could only pay for 21 percent of the economy's imports, so the closing off of external financing must have led to a massive decline in imports to balance the country's external accounts.

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<sup>153</sup> The other appointee is Anwar-il Haq Ahady, a former central bank governor.

<sup>154</sup> Da Afghanistan Bank (2022).

<sup>155</sup> Greenfield and Landay (2022).

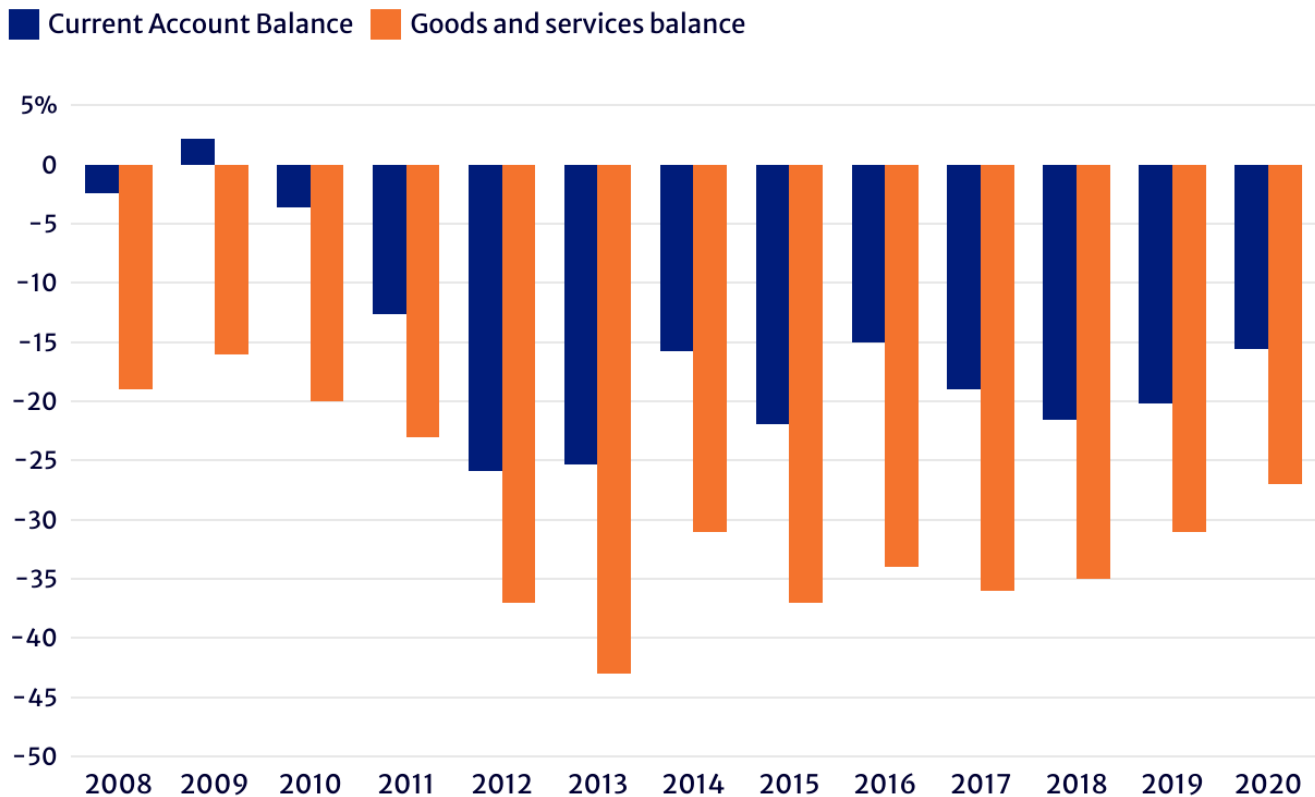
<sup>156</sup> Pakistan Observer (2022).

<sup>157</sup> IMF (2022).

<sup>158</sup> World Bank Group (2022b).

Figure 14

## Balance of Payments Components, Afghanistan, 2008–2020



Source: Author's calculations based on World Bank Group.

Sanctions and the blocking of access to external assets clearly exacerbate contractionary effects from the reduction in foreign exchange inflows. Certainly, the fact that international cooperation and financing came to a standstill following the Taliban's seizure of power is primarily a reflection of the international community's unwillingness to engage on the same terms with the incoming authorities as with the previous ones. Yet it is also clear that there are key international actors that would like to remain involved in Afghanistan precisely because of the country's dire humanitarian emergency. Lack of access to international reserves and emergency international assistance deprives the Afghan economy of the means to stabilize the economy by smoothing the external adjustment and imposes significant costs on humanitarian agencies that would like to remain involved despite the change in authorities. They also significantly complicate remittance transfers, which accounted for nearly \$800 million in foreign currency inflows prior to the Taliban takeover.<sup>159</sup>

<sup>159</sup> World Bank Group (2022a).

The Biden administration has issued a set of licenses to facilitate humanitarian transactions with the Afghan government, including a general license allowing transfers involving payments of taxes, permits, or licenses.<sup>160</sup> Nevertheless, the licenses do not authorize contracting for services with government institutions, permitting interaction with the Taliban government only to the extent that it is incidental to third-party transactions. It is also unclear how financial entities are supposed to process transactions involving government institutions if the representatives of those institutions are not duly appointed by a recognized government. For example, a US-based financial institution cannot process a wire transfer from an account belonging to the Afghan government unless it can certify that the signatories on the account have been legally appointed according to the laws of the jurisdiction of incorporation. This is impossible to do as long as the government that appointed those representatives is not recognized by the US as Afghanistan's government. Since this impediment is a consequence of nonrecognition rather than of official sanctions, there is nothing that an OFAC license can do to mitigate it.

There is no shortage of examples of sanctions constraining or impeding transactions that otherwise could have helped alleviate Afghanistan's dire crisis. An Indian firm tapped to build electric utility transmission lines brought to a halt its five projects in the country in August 2021, claiming that the US had "choked all funding lines to Afghanistan."<sup>161</sup> A law firm serving government contractors alerted its clients at the time that it was "very difficult for contractors and grantees to know whether standard transactions with the Government of Afghanistan...will result in funds passing to the Taliban or its leaders in control of various branches of the Afghan government."<sup>162</sup> It doesn't help that the Treasury Department's sanctions policy clarifications are issued through its Frequently Asked Questions website,<sup>163</sup> which US courts have established are not necessarily binding.<sup>164</sup> Banks and multinational firms are often hesitant to pay large legal fees to review hundreds of pages of not necessarily binding Treasury Department guidelines to be able to engage in trade with Afghanistan. In the words of a director of the nonprofit organization Women for Afghan Women, "the moment that the banks see any sanction or any sort of restriction, they just walk away from doing any transactions ... The banks are not willing to take our business, and no amount of OFAC licenses is going to satisfy their needs."<sup>165</sup>

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<sup>160</sup> OFAC (2022a).

<sup>161</sup> Fang (2021).

<sup>162</sup> Centrella, Nichols, and Chvotkin (2021).

<sup>163</sup> US Department of the Treasury (n.d.).

<sup>164</sup> For example, a Delaware court decision stated: "the Court has performed its reviewing function, disagrees with FAQ 809, and finds no basis to accord any deference to FAQ 809." (*Crystallex International Corporation v. Bolivarian Republic of Venezuela*, 2020).

<sup>165</sup> Fang (2021).

## 5.3 Venezuela, 2017–2021

### 5.3.1 Historical Overview

Economic sanctions were first imposed on Venezuela in 2017, when the Trump administration barred financing and dividend payments to Venezuela’s government and state-owned oil company. Though restrictions on some state activities go back to 2005, and personal sanctions on some government officials go back to 2008, none of these were on a scale that was large or systematic enough in our view to significantly affect the functioning of the Venezuelan economy until at least early 2017.<sup>166</sup>

As in the case of other countries, current Venezuela sanctions — with some exceptions — are imposed in the context of a framework created in 2015 by the Obama administration through a national emergency declaration.<sup>167</sup> At the time, US authorities used the national emergency declaration somewhat selectively, sanctioning only seven individuals, six of whom were security force officers allegedly involved in human rights violations related to 2014 protests (the other was a prosecutor who had filed conspiracy charges against opposition leaders).<sup>168</sup>

The first step taken by the Trump administration to increase the reach of personal sanctions was to direct them at some of the highest-ranking members of the government. These began with the designation of Vice President Tareck El Aissami in February 2017, a month after his appointment to the post, and were subsequently increased to cover several cabinet members, supreme court justices, high-ranking officials of Venezuela’s government and state-owned oil company, *Petróleos de Venezuela, S.A. (PDVSA)*, the president, first lady, and many of their close associates.<sup>169</sup>

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<sup>166</sup> It is not unusual for some experts to date the start of Venezuelan sanctions as far back as 2005, the year that the Bush administration declared Venezuela to be a major drug transit country (e.g., UN Human Rights Council, 2021b, 3). This seems hard to justify, as the designation had little practical effect and included 12 other Latin American nations, some of which, such as Colombia, Peru, and Mexico, were strong US allies at the time. A stronger case could be made for the determination that the country was not fully cooperating with anti-terrorism efforts in 2006, which led to the imposition of an arms embargo. Venezuelans associated with the Chávez government were first added to the list of sanctioned individuals, also known as Specially Designated Nationals (SDN), as far back as 2008 for providing assistance to terrorist organizations like Hezbollah or for drug-related offenses. See Executive Order 13382 (2005); MacAskill (2006).

<sup>167</sup> Executive Order 13692 (2015).

<sup>168</sup> In total, the Obama administration designated 20 Venezuelan individuals or entities. Only seven designations, however, were issued within the framework of the 2015 national emergency declaration. The remaining designations were issued within the framework of anti-terrorism or anti-drug regulations (Bartlett and Ophel, 2021).

<sup>169</sup> While El Aissami’s 2017 designation was done in the context of the Kingpin Act related to drug-trafficking activities, most other designations were done within the framework of Obama’s national emergency declaration. El Aissami has since been charged with sanctions violations in a 2019 indictment (Agence France-Presse, 2019), yet was



In contrast to the 2015 designations, the addition to the OFAC list of high-ranking government officials had a chilling effect on interactions with the Venezuelan government. When the Venezuelan government invited creditors to Caracas for talks on debt renegotiations in November 2017, almost no international bondholders showed up. “For some, the meeting could land them behind bars,” read a Bloomberg article published ahead of the meeting, titled “The Drug Kingpin Running Venezuela’s Bond Negotiations.”<sup>170</sup>

That personal sanctions should affect dealings with a government is not a straightforward conclusion from existing sanctions regulations. It would be natural, in contrast, to assume that “smart sanctions” would be designed not to interfere with the capacity of officials to carry out tasks necessary for the functioning of the states that they represent. Nevertheless, OFAC has affirmed the principle that these designations preclude dealing with SDNs in their official capacity, a principle it reiterated immediately after Vice President El Aissami’s designation.<sup>171</sup>

From a legal standpoint, these clarifications, issued through OFAC’s Frequently Asked Questions site, are simply the US government’s interpretation of existing laws and regulations, and could be found by a court to be incorrect.<sup>172</sup> Yet from a practical standpoint, and given the reputational and financial costs of being found in violation of sanctions, this advice from OFAC was sure to bring to a halt any transactions involving the individuals in question. For example, lawyers for firms involved in dealings with Venezuela advised their clients to take care not to enter into any contracts executed by PDVSA’s CFO, sanctioned in August 2017, “as that would apparently be construed as a direct or indirect dealing with an SDN.”<sup>173</sup>

On August 24, 2017, President Trump issued an executive order prohibiting the purchase of new debt issued by the Government of Venezuela or PDVSA, and that of previously issued debt held directly or indirectly by the Venezuelan government. It also barred dividend payments to Venezuela, impeding the government from using profits from its offshore subsidiaries to fund its budget. Exceptions were built in for short-term commercial debt, winding down of existing contracts, and transactions related to the financing of purchases of agricultural commodities or medical goods from the United States.

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not included in a set of 2019 indictments charging Nicolás Maduro and other government officials for conspiring to export drugs to the United States (US Department of Justice, 2020).

<sup>170</sup> Laya and Rosati (2017).

<sup>171</sup> OFAC (2017); OFAC (2023a).

<sup>172</sup> In US administrative law, the deference accorded to interpretation by federal agencies of its own regulations is known as Auer deference. In a 2019 decision, the Supreme Court strongly circumscribed this deference to cases where there is genuine ambiguity about the interpretation and the agency’s interpretation is considered reasonable, among other conditions (US Supreme Court, 2019).

<sup>173</sup> West of England P&I (2017).

In November 2018, the US issued an executive order that laid the groundwork for more explicit trade sanctions by allowing the Secretary of the Treasury to determine that actors in a given sector of the Venezuelan economy were contributing to the national emergency. Although US authorities presented the order as aimed at restricting trade in the country's gold sector, it gave the US government the leeway to target any sector of the economy.

Eventually, the Trump administration determined that four broad economic sectors were contributing to the national emergency: gold (November 2018), oil (January 2019), finance (March 2019), and defense and security (May 2019). It subsequently added several private- and public-sector entities belonging to these sectors to the SDN list. The designations were broad enough to essentially preclude US actors from doing business with anyone in these sectors of the Venezuelan economy, and thus constituted a trade embargo on almost all Venezuelan exports.

Oil, accounting for 93 percent of exports and 12 percent of GDP at the time of the January 2019 sanctions, was by and large the most relevant of the targeted sectors. The US announced the decision to designate PDVSA in January 2019 as part of a major ratcheting up of pressure on the Venezuelan government, with National Security Advisor John Bolton saying that he expected PDVSA to lose USD 11 billion in export proceeds — a number equivalent to more than a third of the country's oil exports at the time — in addition to the effect of freezing USD 7 billion in assets.<sup>174</sup> The decision was made public just five days after the US decision to recognize Juan Guaidó as the country's interim president, and its announcement included a direct exhortation to Venezuelan security forces “to accept the peaceful, democratic and constitutional transfer of power” to the new government.<sup>175</sup>

Throughout 2019, the Trump administration exerted pressure on non-US firms to cut oil purchases from Venezuela. In August 2019, it adopted a new executive order that blocked any transactions with the government of Venezuela and that also gave the executive branch the power to sanction non-US persons for having “materially assisted” the Venezuelan government or its state-owned entities. From a legal standpoint, the order was essentially redundant, as all Venezuelan public sector entities at the time had their accounts blocked as a result of past sanctions, or transferred to Guaidó administration control. Yet US authorities were quick to use the order to issue a stern warning to other countries, with National Security Adviser John Bolton publicly stating after the order was made public: “We want to send a message to third parties

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<sup>174</sup> De Young, Mufson, and Faiola (2019).

<sup>175</sup> McClatchy (2019).

wanting to do business with the Maduro regime: There's no need to risk your business interests in the U.S. for the purposes of profiting from a corrupt and dying government."<sup>176</sup>

These signals, however, were insufficient to deter some relevant non-US actors from continuing to engage with Venezuela. In an October 2019 interview with the Financial Times, the finance minister of India — which, together with China, had become one of the main purchasers of Venezuelan oil after the closing off of the US market — acknowledged that the US had tried to persuade India to stop buying Venezuelan oil, but said that the country also needed to maintain its own strength and strategic interests. “India is a strategic partner for the United States of America and you want a strategic partner to be strong and not weakened,” the minister said he had told US representatives in response to their request to pare down Venezuela oil purchases.<sup>177</sup>

In other words, the fact that the US government had the legal capacity to impose secondary sanctions on non-US actors for buying Venezuelan oil was not necessarily sufficient to deter some from continuing to deal with the Maduro government. US authorities thus decided to ratchet up pressure on Maduro in February 2020, on the heels of Guaidó's visit to the United States. The key new decision was to sanction two subsidiaries of the Russian energy company Rosneft, which had been responsible for marketing more than half of Venezuelan international sales.<sup>178</sup> The US also sanctioned two Mexican companies that had signed oil-for-food deals with Venezuela.<sup>179</sup> Rosneft at the time was handling around 75 percent of Venezuela's oil sales because of other partners' caution at doing direct business with the country.<sup>180</sup> It had also supplied almost all the gasoline imported by the country during the previous year, as Venezuela's refining infrastructure remained beset by operational problems.<sup>181</sup> Predictably, the country began suffering severe gasoline shortages shortly after Rosneft halted all trade with Venezuela and divested from its Venezuela operations in response to the sanctions.

In November 2022, OFAC issued a license allowing Chevron, the sole US firm still active in extracting Venezuelan oil, to produce Venezuelan oil for sale in the US.<sup>182</sup> Chevron is a minority partner in four joint ventures with PDVSA that currently produce around 100 thousand barrels per day, most of which are sold to China or used for domestic consumption.<sup>183</sup> The decision was announced on the same day that the Maduro government and an opposition coalition resumed

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<sup>176</sup> Kurmanaev and Jakes (2019).

<sup>177</sup> Reuters (2019).

<sup>178</sup> Mohsin and Millard (2020); OFAC (2023b).

<sup>179</sup> Kassai (2020).

<sup>180</sup> Yagova, Aizhu, and Párraga (2019).

<sup>181</sup> Argus Media (2019).

<sup>182</sup> OFAC (2022b).

<sup>183</sup> Rodríguez (2022a).

Norway-mediated talks in Mexico City that had been suspended for more than a year. It also came eight months after a delegation from the Biden administration traveled to Caracas and met with Maduro, in an about-face from the previous strategy of not interacting with his government.<sup>184</sup> It is unclear at this stage whether there will be further easing of sanctions, as the talks in Mexico appear to have stalled following their resumption.<sup>185</sup>

One month later, National Assembly legislators elected in 2015 (2015AN) dissolved the interim government and elected a new board headed by legislator Dinorah Figuera, effectively putting an end to Guaidó's claim to head a legitimate government.<sup>186</sup> The 2015AN also created a committee to oversee management of the nation's assets and announced that it would appoint a new PDVSA board. Although the US announced that it continued to recognize the 2015AN as "the last remaining democratic institution in Venezuela,"<sup>187</sup> it has yet to certify its appointees to manage Venezuelan government assets. It is also unclear what validity US and UK courts will assign to appointments made by a body that explicitly claims that it no longer acts as the country's executive branch.

## 5.3.2 Economic and Social Consequences

The logical starting point for assessing the effects of sanctions and other statecraft actions on the Venezuelan economy is by studying their effect on the country's oil sector. The reason for this is twofold. First, the oil sector has clearly been the primary focus of the most important measures taken by the United States — by far the most active actor in this strategy. Both the January 2019 designation of PDVSA, and the February–March 2020 secondary sanctions on PDVSA partners, were directly aimed at the country's oil sector. Even the August 2017 financial sanctions, which were in principle aimed at both the government and PDVSA were, for all practical purposes, targeted at sectors of the oil industry that were Venezuela's only recipients of international financing at the time.

Second, by and large, oil revenues are the most important determinant of changes in Venezuela's economic growth. This is a consequence of the economy's high dependence on oil exports, which in 2016 — the last year prior to financial sanctions — accounted for 95 percent of all exports. An extensive literature has analyzed the Venezuelan economy's oil dependence and has traced the large swings in its economic growth to changes in oil revenues.<sup>188</sup> Furthermore, Venezuela's

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<sup>184</sup> Hudson and Schmidt (2022).

<sup>185</sup> Buitrago (2022).

<sup>186</sup> Asamblea Nacional de Venezuela (2022).

<sup>187</sup> US Department of State (2023).

<sup>188</sup> Hausmann and Rodríguez (2013).

humanitarian crisis is essentially a consequence of the collapse of its per capita income, discussed in the previous section, and particularly of its capacity to import basic goods and services.<sup>189</sup> Therefore, it makes sense to expect that any effect of statecraft actions aimed at the oil industry would have important repercussions for the economy's health.<sup>190</sup>

**Figure 15** plots the evolution of Venezuela's oil production between 2008 and 2021, according to data reported by secondary sources to the Organization of Petroleum Exporting Countries (OPEC).<sup>191</sup> This series shows remarkable stability until 2016, and a sustained decline after that. The series also shows four inflection points associated with clear changes in trends. The series begins to decline at the start of 2016, then accelerates around September 2016, and suffers two further discrete declines around January 2019 and February 2020.

The first inflection point, at the start of 2016, occurred at a time of deep convulsions in global oil markets, when the price of oil sold by Venezuela fell by 76 percent from its mid-2014 levels to a 12-year low of \$24 per barrel in February 2016. The other three correspond to sanctions events. Following the August 2017 financial sanctions, the decline in Venezuelan oil production accelerated from an average of 1 percent since January 2016, to a fall of 3 percent per month over the following 16 months. The series then suffers two additional discrete drops: a 35.2 percent plunge (405 thousand barrels per day, or tbd) between January and March of 2019 — immediately after the imposition of oil sanctions and recognition of the Guaidó government — and a 55.7 percent drop (423 tbd) between February and June of 2020 after the imposition of secondary sanctions on Russian and Mexican companies that assisted in selling Venezuelan oil in non-US markets.<sup>192</sup>

Regarding the first inflection point, many high-cost producers in the region, including Colombia, Mexico, and Argentina, suffered similar declines during the 2016 oil glut. Yet oil production

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<sup>189</sup> Rodríguez (2022d).

<sup>190</sup> See Rodríguez and Sachs (1999), Hausmann and Rigobón (2002), and Hausmann and Rodríguez (2013) for alternative characterizations of this relationship. A summary of the channels through which oil production can impact growth can be found in chapter 4 of Rodríguez (2021).

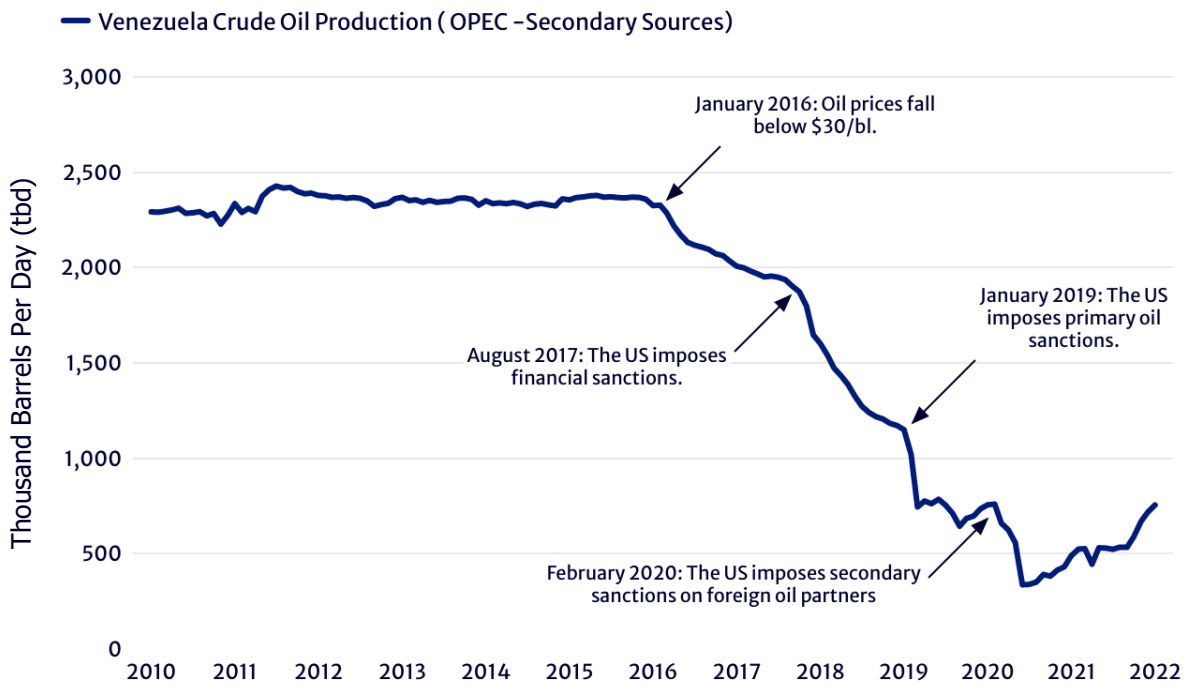
<sup>191</sup> The results are broadly consistent with those found in other series of Venezuelan oil production. All four series with consistent monthly data show breaks in trend around the August 2017 financial sanctions and the 2019 oil sanctions. Three series produced by independent agencies show stability in the 2008–15 period, while the one produced by Venezuelan authorities shows a decline for that period. See Rodríguez (2022a) for a more detailed discussion.

<sup>192</sup> I first pointed to the acceleration of the decline in oil production after the August 2017 financial sanctions, and contrasted this experience with that of neighboring Colombia, in a 2018 article written for the Washington Office on Latin America's Venezuela Human Rights Blog (Rodríguez, 2018). Weisbrot and Sachs (2019) rely on this observation to claim that it is virtually certain that sanctions made a substantial contribution to the increase in mortality observed between 2017 and 2018, thus resulting in tens of thousands of deaths. Hausmann and Muci (2019) and Bahar et al. (2019) dispute this claim on various grounds. Yet given the strong link between incomes and mortality, it is almost axiomatic that a large decline in per capita income caused by lower oil revenues would lead to increased deaths. See Rodríguez (2022b) for a more in-depth discussion of the connection between the decline in Venezuela's import capacity and its humanitarian crisis.

stabilized or recovered in these other cases when oil prices began rising again in late 2016. Bilateral comparisons with 36 other oil-producing countries show that the only country that suffered a change in trend similar to Venezuela in that period was Yemen, whose oil fields were the target of a Saudi bombing campaign at the time.<sup>193</sup> Put differently, the collapse in Venezuela's oil production is of a dimension seen only when armies blow up oil fields.

**Figure 15**

### Venezuela Oil Production, 2008–2022

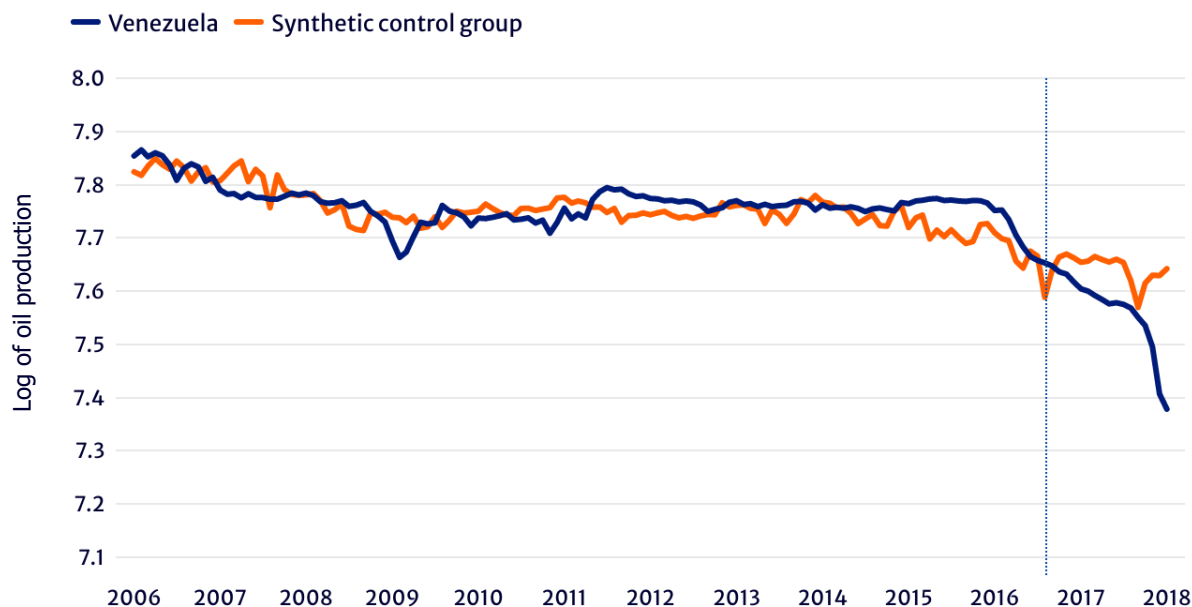


Source: Author's elaboration based on OPEC: Monthly Oil Market Report.

<sup>193</sup> Rodríguez (2019).

Figure 16

## Venezuela Synthetic Control Group Production, 2005–2018



Source: Rodríguez (2019).

In Rodríguez (2019), I use cross-country oil production panel data to choose an adequate counterfactual using synthetic control methods, which construct a comparison unit as a linear combination of other oil producers that accurately approximates the values of a set of predictors of oil.<sup>194</sup> The results of this method, shown in Figure 16, predict that in the absence of the 2017 financial sanctions, Venezuela’s oil production would have remained stable after August 2017. The method thus attributes the loss of 797,000 barrels per day of production, or USD 16.4 billion a year at current prices, to sanctions.<sup>195</sup> Equipo ANOVA produces a trend interruption estimate of the break in trend oil output at the time of sanctions, which associates the sanctions with a decline of 698,000 barrels per day, or USD 14.4 billion a year in current oil prices.<sup>196</sup> Oliveros presents counterfactual exercises based on extrapolations of prior trends and concludes that sanctions can be associated with a decline in production of 616,000–1,023,000 barrels per day, or USD 12.7–21.0 billion a year at current oil prices.<sup>197</sup> The range of estimates from these different

<sup>194</sup> Abadie and Gardeazabal (2003); Abadie, Diamond, and Hainmueller (2010).

<sup>195</sup> All calculations use a current price of USD 56.4 per barrel of Venezuelan oil. Venezuela has not published data on its average basket price since March 2020. The current price estimate is based on the historical relationship between the Venezuelan basket and the price of Venezuela’s Merely crude blend, published monthly by OPEC.

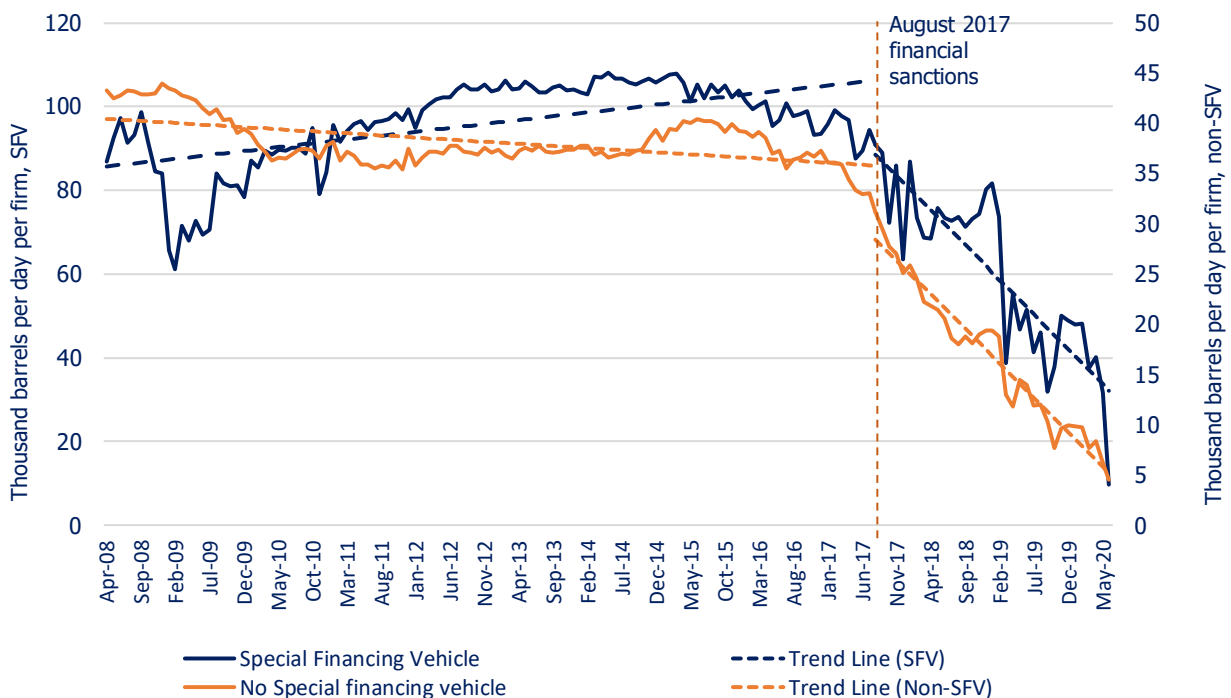
<sup>196</sup> Equipo ANOVA (2021).

<sup>197</sup> Oliveros (2020). Note, however, that these estimates use different end points, so that the magnitudes of decline are not completely comparable. Rodríguez (2019, 2022d) uses September 2005 to September 2018; Oliveros (2020) uses October 2014 to July 2020.

exercises (USD 12.7–21.0 billion ) would be equivalent to between 1.9 and 3.1 times the country’s estimated 2020 exports.

**Figure 17**

**Oil Production and Pre-Sanctions Financial Access, Venezuela’s Orinoco Basin, 2008–2021**



Source: Rodríguez (2022b).

In Rodríguez (2022b), I take a different approach by using firm-level data after financing in the country’s Orinoco Basin was closed off. Using a differences-in-differences specification, I compare the effect of the 2017 financial sanctions on firms that had access to external finance at the time of sanctions, through special agreements with foreign partners, with those that lacked that access. By controlling for industry-wide time-varying factors, the differences-in-differences method removes the effects of causes of variation in oil sector performance that affected the whole sector. This includes those presented as potential alternative explanations for the collapse, such as militarization, leadership purges, and investment cuts, and allows us to focus on the differential impact of the financial sanctions.

The estimates show that financial sanctions significantly affected the growth of firms with access to special financing deals prior to sanctions, relative to those that lacked that access, supporting the hypothesis that closing international capital markets was an important driver of



oil production. According to these estimates, around 46 percent of production loss for firms with prior access to finance can be explained as a result of sanctions. The implication for the whole economy depends on whether we adopt a passive counterfactual scenario, in which only firms with prior financial access would have continued to have access in the absence of sanctions, or an active scenario in which the Maduro administration would have extended the use of the highly successful financing arrangements for the whole industry in the absence of sanctions. The range of estimates is thus broad from a quantitative standpoint, from 235,000 to 1,142,000 barrels per day, or USD 4.8–23.5 billion per year.

The resulting decline in oil exports severely circumscribed the ability of a traditionally import-dependent economy to buy imports of food as well as intermediate and capital goods for its agricultural sector, driving the economy into a major humanitarian crisis.<sup>198</sup> **Figures 18 and 19** show the contraction in the country's imports and its food imports during 2012–20. Total imports of goods declined by 91 percent during this period, while food imports declined by 77.7 percent.<sup>199</sup> The decline in the economy's capacity to import made it impossible to maintain past levels of essential goods. Even if the economy were importing only food (i.e., if Venezuela had somehow decided to reduce to zero all other imports, including other essentials such as medicines, as well as capital and intermediate goods for its oil industry), it would only be able to pay for 82 percent of the food it imported in 2012.

The data show food imports stabilized in the 2017–2020 period, despite a continued decline in total imports and a general economic contraction. Food imports in 2020 are similar to those in 2017 (\$2.0 billion in 2017, \$1.8 billion in 2020) despite total imports and GDP falling by around 50 percent during that period.<sup>200</sup> The decline in import capacity that occurred after 2016 did not lead to lower food import levels because the government found a way to prioritize food imports. An overhaul of public sector food assistance policies, and in particular the launch of a system of nationwide distribution of food packages (known by the acronym CLAP, for Local Committees of Supply and Production) to families in need in 2016, appears to have played an important role in addressing food insecurity. In 2020, the subsidy received by families through the CLAP system was \$855 million, or almost 50 percent of the country's total food imports.<sup>201</sup>

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<sup>198</sup> Doocy et al. (2019); Grillet et al. (2019); Correa-Salazar and Amon (2020); ENCOVI (2021); Rodríguez (2022c).

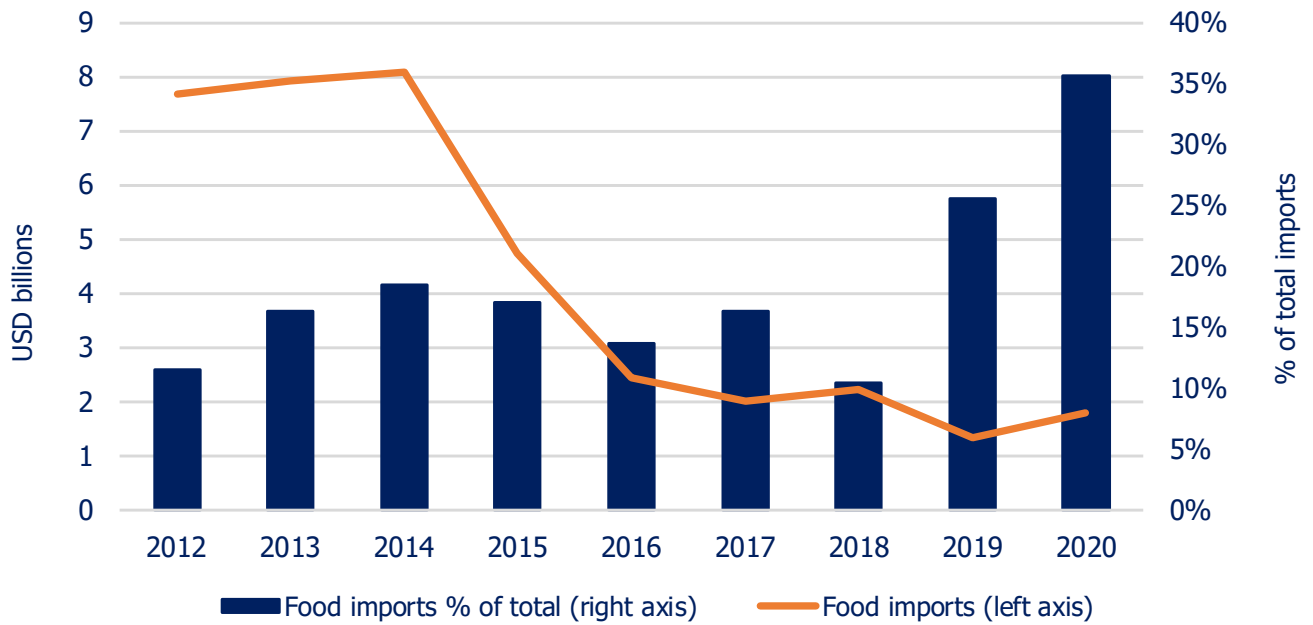
<sup>199</sup> Figure 21 is drawn from data published by the United Nations Comtrade database, constructed using information provided by the country's trading partners. Because of the difference in sources as well as differences in definitions and coverage, the data do not coincide perfectly, although the general picture is consistent.

<sup>200</sup> Decline in total imports cited refers to the Comtrade data.

<sup>201</sup> Rodríguez (2022c).

**Figure 18**

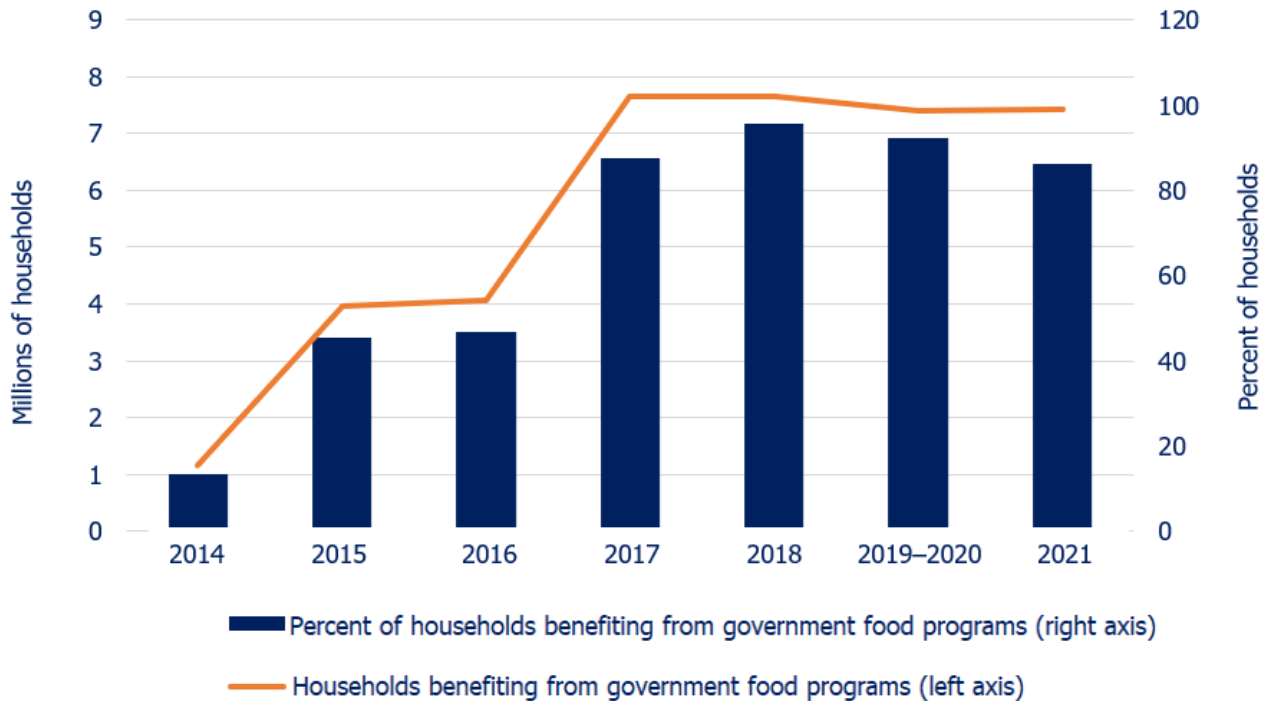
**Venezuela's Food Imports, 2012–2020**



Source: Author's calculations based on UN Comtrade Database.

**Figure 19**

**Food-Related Government Program Beneficiaries, 2014–2021**



Source: Author's calculations based on ENCOVI (2021).

Venezuela's deep deterioration in health, nutrition, and food security indicators occurred alongside the largest economic collapse outside of wartime since 1950.<sup>202</sup> This is not surprising; an extensive literature has investigated the links between per capita GDP and a vast array of health and broader living standard indicators.<sup>203</sup> Nearly all the cross-national variation in health outcomes can be explained because of changes in per capita income and other socioeconomic variables.<sup>204</sup> Past time-series data on socioeconomic indicators for Venezuela also show a very strong correlation of health and nutrition indicators with income.

Weisbrot and Sachs contend that economic sanctions played an important role in mortality rate increases in 2018, resulting in tens of thousands of deaths.<sup>205</sup> They rely on mortality estimates of the Encuesta de Condiciones de Vida (ENCOVI), carried out by a consortium of universities, and in particular on the observation that mortality rose by 31 percent in the year after sanctions.<sup>206</sup> Data published since by the United Nations Population Division and the World Bank confirm the large increase in mortality in 2018 (see **Figure 20**). Hausmann and Muci<sup>207</sup> and Bahar et al.<sup>208</sup> criticized their argument by questioning whether the decline in oil revenues could be traced exclusively to the 2017 sanctions. This response seems to miss the forest for the trees. To the extent that sanctions against Venezuela contributed to lowering the country's oil production — and the prior discussion appears to leave no doubt that they did — they also contributed to lowering per capita income and living standards and are a key driver of the country's health crisis, including its increase in child and adult mortality.

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<sup>202</sup> Rodríguez and Imam (2022).

<sup>203</sup> Pritchett and Summers (1996); UN Development Programme (2010).

<sup>204</sup> Filmer and Pritchett (1997).

<sup>205</sup> Weisbrot and Sachs (2019).

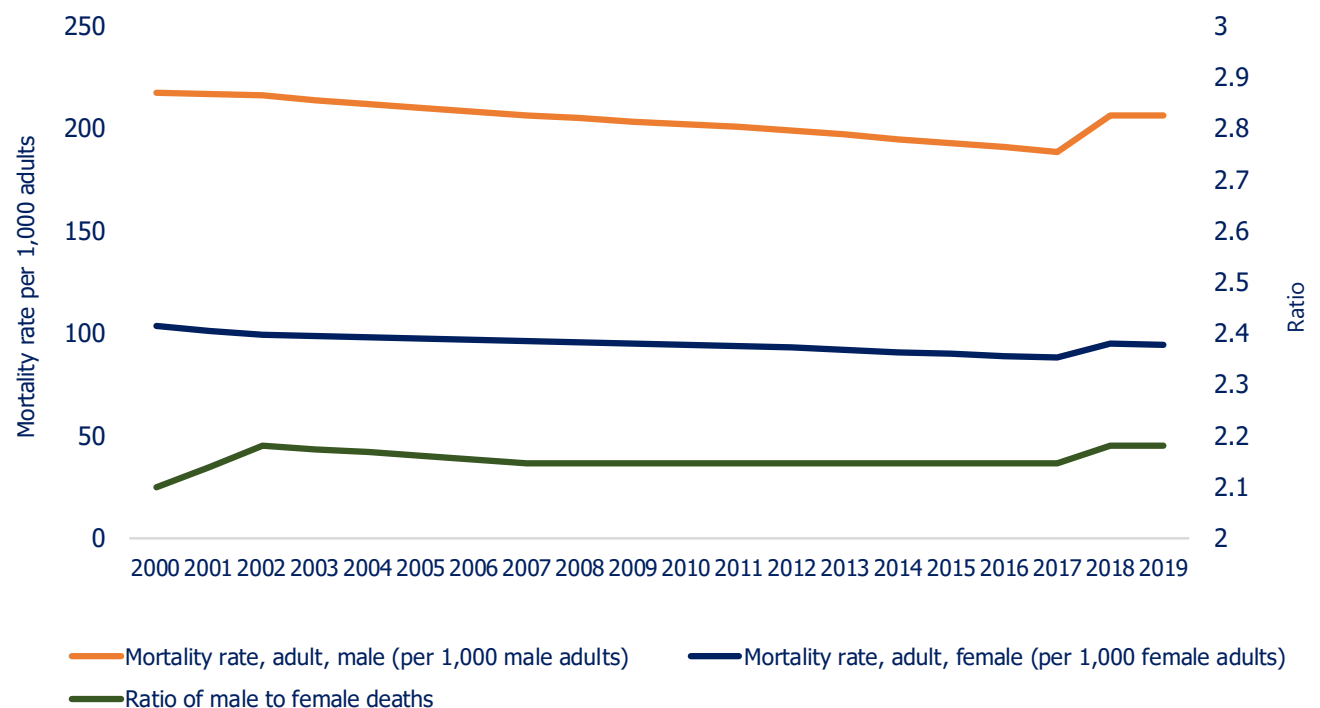
<sup>206</sup> ENCOVI (2019).

<sup>207</sup> Hausmann and Muci (2019).

<sup>208</sup> Bahar et al. (2019).

**Figure 20**

**Adult Mortality Indicators, Venezuela, 2000–2019**

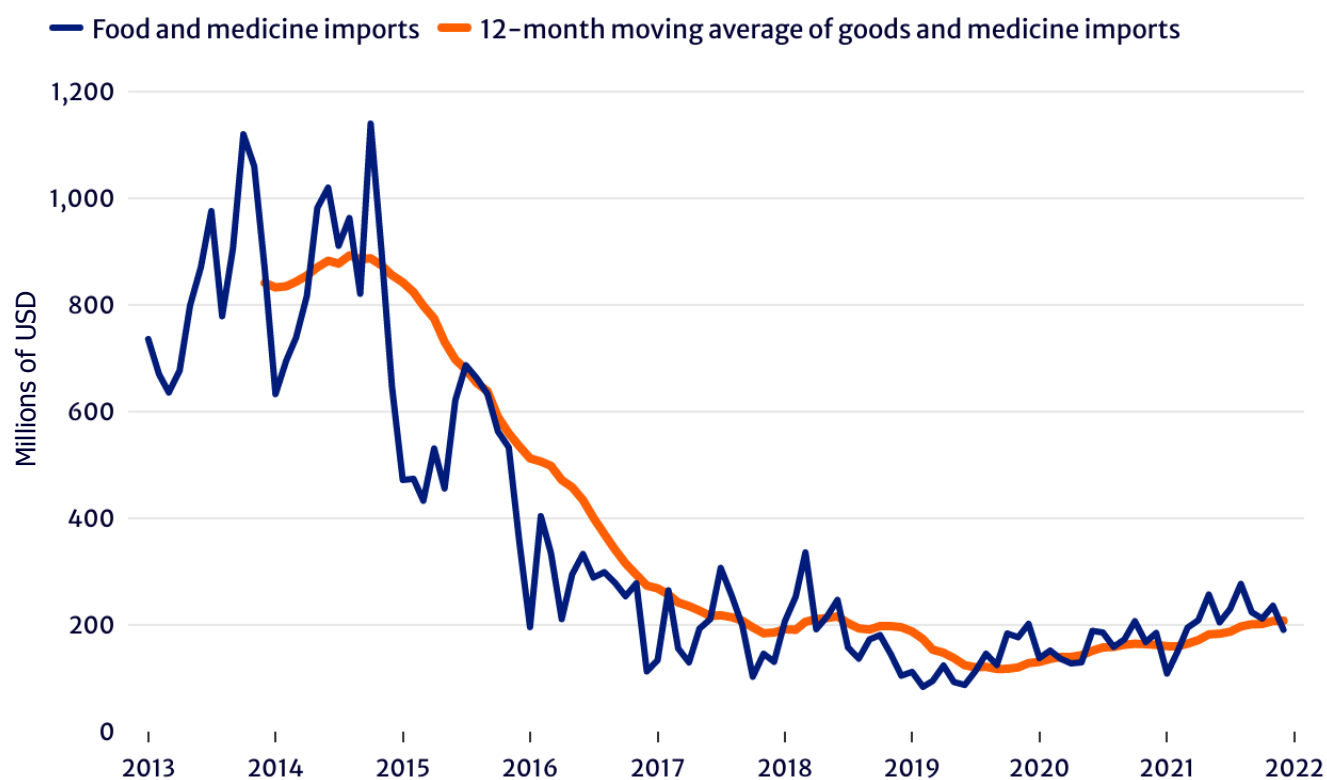


Source: Author's calculations based on World Bank Group and UN Department of Economic and Social Affairs (2022).

**Figure 21** traces the evolution of food and medicine imports between 2013 and 2021 according to data reported by Venezuelan trading partners and compiled by the United Nations Comtrade database. The series shows a steady decline from mid-2014 to 2019, the period of collapse in oil revenues. The series also shows a moderate recovery in the last two years (2020–2021) with respect to its mid-2019 lows. It's worth noting that the series reaches its historical minimum in February 2019, the month after the imposition of oil sanctions, while the minimum of the 12-month moving average is reached in September 2019.

**Figure 21**

## Monthly Venezuelan Imports of Essential Goods, 2013–2021



Source: Author's calculations based on UN Comtrade Database.

Essential imports hit their lows in the first half of 2019, likely reflecting the strong disruptive effect of the January 2019 sanctions on the capacity of public- and private-sector actors to make purchases abroad. Strikingly, the economy appears to have run a current account surplus in 2019, despite the government defaulting on virtually all external debt. This suggests that some of the 2019 drop in imports was caused not by the actual decline in export revenues but as a result of the severing of many of the economy's trade and financial links due to sanctions.<sup>209</sup> It also helps to explain why imports recovered from their lows in 2020 as the economy began to rebuild some of its global trade links.<sup>210</sup>

<sup>209</sup> See the forecaster survey of FocusEconomics (2021), according to which the 2019 current account balance was USD 6.3 billion, or 8.4 percent of GDP. By 2020, the same survey estimates that the economy was running a deficit of USD 1.8 billion, or 3.1 percent of GDP.

<sup>210</sup> According to Comtrade data, imports of all goods fell to a minimum in 2020 and grew in 2021. A Focus Economics survey of private-sector forecasters put economic growth in 2021 at 3.9 percent and import growth at 11.6 percent.

Despite the evidence that imports of essentials declined until the second half of 2019, an influential study published in January 2021 by Venezuelan consultancy firm ANOVA contends that the 2017 financial sanctions were associated with an increase and stabilization of imports of food and medicines.<sup>211</sup> The argument is based on the claim that there was a break in the earlier trend at the time of the August 2017 sanctions on food and medicines imports. In the words of the study's lead author, "there is a strong temporal association between the start of the first economic sanctions in 2021 and the recovery of imports of humanitarian goods, in particular food and medicines."<sup>212</sup> As noted in section 3, this is the only published quantitative study that we have identified that claims that sanctions are unequivocally associated with a positive effect on living conditions in a target country (see Appendix 1 and 2).

The Equipo ANOVA study has been widely reported in the local press and is often invoked by pro-opposition leaders and influencers.<sup>213</sup> Opposition leader Juan Guaidó, who until very recently was recognized by the United States and a handful of other countries as interim president of Venezuela, claimed in a recent speech, "thanks to the sanctions today the [US] dollar is used in Venezuela "; in another recent interview, he claimed that sanctions had allowed the economy to experience a "dead cat bounce" in economic activity.<sup>214</sup> Legislator Armando Armas, who served as president of the Foreign Relations Committee of the opposition-controlled National Assembly elected in 2015, wrote: "To those who think the country is improving ... I'll remind you that this is due to the policy of international sanctions on the regime and its collaborators."<sup>215</sup> Both leaders echo the arguments of Equipo ANOVA, which claim "it is possible to argue that the change in policy orientation of the government, which finally led to the flexibilization of the web of controls, was also an immediate consequence of the hardening of financial sanctions on PDVSA."<sup>216</sup>

It is worth looking in more detail at the estimates presented by Equipo ANOVA.<sup>217</sup> Formally, they estimate a simple linear trend model on data on a time series of Venezuelan import data ranging from April 2015 to December 2019:

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<sup>211</sup> Equipo ANOVA (2021).

<sup>212</sup> Zambrano (2022).

<sup>213</sup> Amaya (2021); Mendez Jaimes (2021); Política UCAB (2021); Iturbe (2021).

<sup>214</sup> Guaidó (2022a, 2022b).

<sup>215</sup> Armas (2022).

<sup>216</sup> Equipo ANOVA (2021), 3.

<sup>217</sup> For the remainder of this paper, any references to ANOVA are to the Venezuelan consultancy firm that published the study (<https://thinkanova.org/>), rather than to the analysis of variance statistical technique known by the same name.

$$Imports = \alpha_0 + \alpha_1 D + \alpha_2 t + \alpha_3 tD$$

(1)

where  $t$  denotes a time trend and  $D$  is an indicator variable taking the value 1 on and after the adoption of sanctions in August 2017 and 0 before that date. Normalizing, they go on to estimate equation (1) on medicines and food imports separately and test the hypotheses that  $\alpha_1 = 0$  and  $\alpha_3 = 0$  to evaluate, respectively, the change in level and rate of change of imports over time.

It is worth highlighting that, while Equipo ANOVA labels its estimates a regression discontinuity in time (RDiT) approach,<sup>218</sup> equation (1) differs significantly from what is typically understood in the literature as a regression discontinuity estimate. Regression discontinuity estimation relies on the use of nonparametric regression methods to estimate treatment effects on a subset of the data in the vicinity of a cutoff.<sup>219</sup> Typically, these studies use a variety of methods to select a window of data around the intervention of interest — also called a bandwidth — and use data inside that window to estimate treatment effects. Its implementation generally requires large data sets that contain many observations both before and after the intervention being evaluated.<sup>220</sup>

In contrast, Equipo ANOVA preselected a sample of 28 months before and after sanctions to carry out parametric estimation of (1) via ordinary least squares, presenting no argument as to why this would be an appropriate bandwidth choice. This choice is problematic because a key assumption of regression discontinuity approaches is that the bandwidth is small enough to preclude major changes in other determinants of the dependent variable.<sup>221</sup> Yet the period over which Equipo ANOVA estimates regression (1) was also one during which major events with significant economic impacts took place, including a collapse in the price of the economy's main export; the overhaul of government food policies; reforms in price and exchange control

<sup>218</sup> A term commonly used to refer to time-series variants of the regression discontinuity design (RDD) framework; see Hausman and Rapson (2018).

<sup>219</sup> Imbens and Lemieux (2007); Lee and Lemieux (2010); Lee (2016).

<sup>220</sup> As discussed by Cunningham (2021), 252: “We need a lot of data *around* the discontinuities, which itself implies that the data sets useful for RDD are likely very large. In fact, large sample sizes are characteristic features of the RDD. This is also because in the face of strong trends in the running variable, sample-size requirements get even larger. Researchers are typically using administrative data or settings such as birth records where there are many observations.” (Emphasis in original).

<sup>221</sup> In the words of Hausman and Rapson (2018), 535, the one reference cited by Equipo ANOVA on regression discontinuity methods: “The use in RDiT of observations remote (in time) from the threshold is a substantial conceptual departure from the identifying assumptions used in a cross-sectional RD, and we show it can lead to bias resulting from unobservable confounders and/or the time series properties of the data-generating process.” Hausman and Rapson (2018), 535.

regulations; the imposition of additional oil sanctions at periods different from the cutoff; and the holding of parliamentary, regional, constitutional, and presidential elections, to name just a few potential confounding events.<sup>222</sup>

Aside from the debatable choice of estimation method and its interpretation, there are two additional major problems with the Equipo ANOVA estimates. One is their choice to use as a dependent variable a measure of import levels in US dollars, instead of the standard logarithmic specification used in the literature on macroeconomic time series. The other is the omission of several import categories accounting for around four-fifths of the economy's food imports at the time of sanctions. We discuss each of these in turn.

When estimating equation (1), Equipo ANOVA specifies their dependent variable as the level of imports measured in current US dollars. This implies that the pre- and post-sanctions parameters  $\alpha_2$  and  $\alpha_3$  will measure the change in absolute dollar amounts per period of time. In other words, a constant rate of decline in the Equipo ANOVA setup will not mean a constant rate of percentage decline, but rather a continued decline of a specific amount of dollars per year. Even if the percentage rate of change were to remain constant, changes in absolute dollar amounts would be captured by their estimation method as a break in trend.

Clearly, this decision strongly biases the method toward finding a break in trend in any setting in which there is a sustained decline (or increase) in the dependent variable. To see why, it's useful to think of it in actual numbers. In 2014, Venezuela spent \$7.5 billion in food imports; by 2017 those imports had fallen to \$1.9 billion. Thus, on average they declined by \$1.8 billion per year  $[(7.5-1.9)/3]$ . Yet specification (1) in levels implies that in the absence of a break in trend, we should have expected those imports to continue declining at \$1.8 billion per year over the following 28 months. That is clearly impossible, as imports cannot fall below zero.

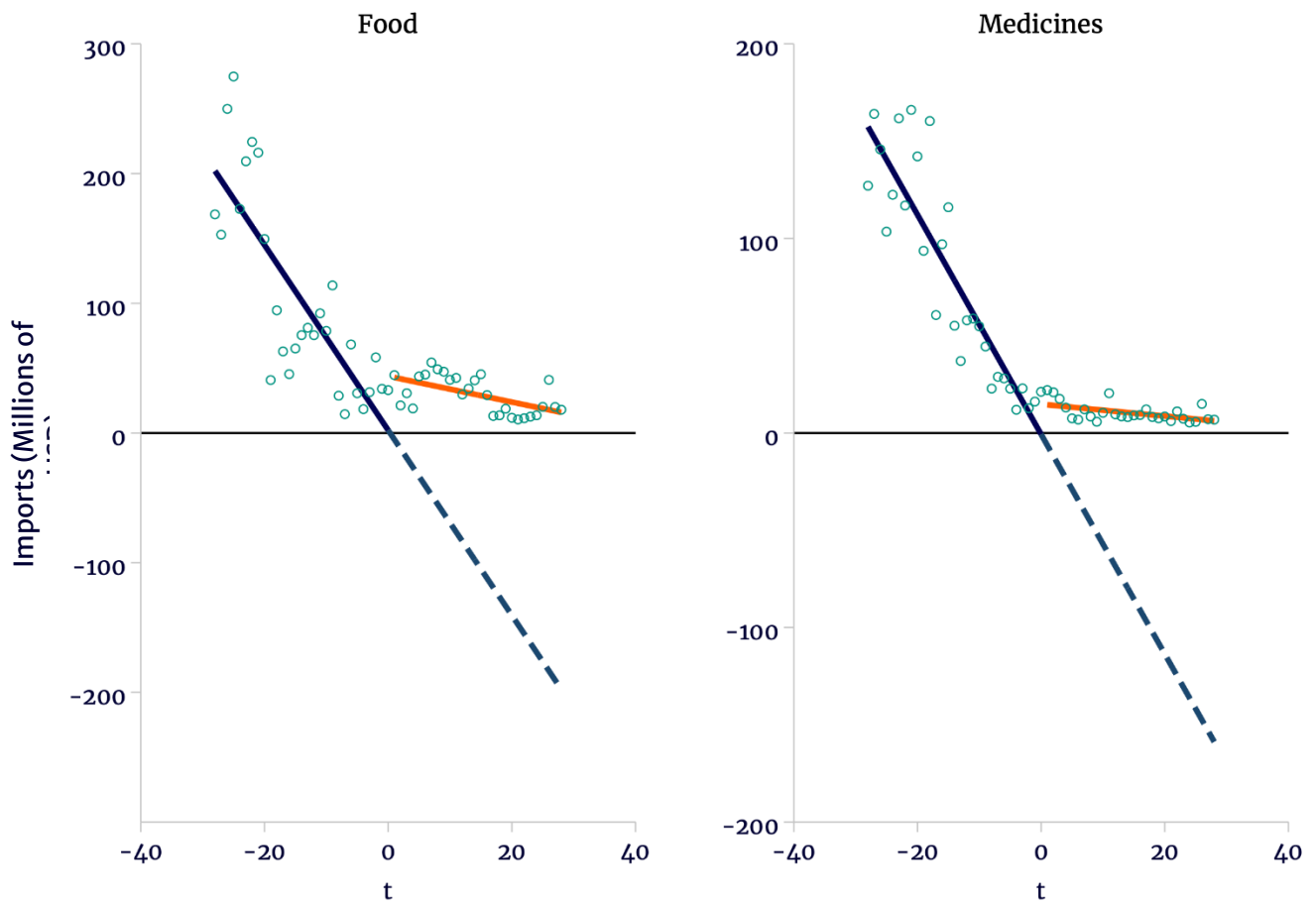
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<sup>222</sup> Equipo ANOVA recognizes that the adoption of price, exchange, and import controls coincides with the post-sanctions period and that this fact clouds causal interpretation of the parameter. However, they then go on to offer the interpretation that “the change in orientation of government policies, which finally ended in the flexibilization of the framework of controls, would also be an immediate consequence of the tightening of financial sanctions against PDVSA.” (2021), 3.



**Figure 22**

**Implicit Counterfactual Trend in ANOVA Estimates**



Sources: Author's calculations based on Equipo ANOVA (2021) and UN Comtrade Database.

**Figure 22** illustrates this point graphically. The figure reproduces the Equipo ANOVA estimates for both food and medicine imports, yet expands the y axis scale to allow us to display the counterfactual prediction of the evolution of imports in the absence of sanctions implied by their estimates.<sup>223</sup> The solid lines show the Equipo ANOVA estimates for both the pre- and post-sanctions periods, while the shaded line shows their projection of the pre-sanctions trend estimate to the post-sanctions period. Note that the Equipo ANOVA statistical tests for slope changes are essentially a comparison of the shaded line and the solid post-sanctions line. Yet, this counterfactual is clearly inadequate, as it implies that food imports would have fallen to

<sup>223</sup> ANOVA did not respond to our request for their data set and code, so all our estimates are based on our reconstruction of their data. Details on our methodology for reconstruction and a comparison against the results and figures published in their paper are available upon request at this time and will be published as part of a separate note.

around –\$208 million per month, and medicine imports to –\$167 million per month, by December 2019 in the absence of sanctions.

The second major problem in the Equipo ANOVA results has to do with the omission of important categories of food items from the dependent variable for which they report results. Although Equipo ANOVA claims to use the same two–digit international Harmonised System categories from the UN Comtrade database as used in another recent study on Venezuelan food imports,<sup>224</sup> this is not correct. The Equipo ANOVA study omits 10 two–digit import categories, including cereals, mill products, oils, and sugars from their food import calculations (for ease of exposition, we will henceforth refer to these categories jointly as “cereals and oils”). In the year of sanctions, these categories accounted for 79.7 percent of all food imports, as calculated by Bahar et al.<sup>225</sup> In other words, the Equipo ANOVA results are based on a food imports series that covers around just one–fifth of food imports at the time of sanctions.

An additional issue with the Equipo ANOVA study refers to the availability of data for their period of study at the time of collection. Because Venezuela reports no disaggregated import data to the United Nations, the Comtrade estimates of the country’s imports are based on disaggregated export data reported by Venezuela’s trading partners. Since countries report and update these data to the UN with variable delays (generally up to 24 months), Equipo ANOVA was not using a complete data series of imports for the post–sanctions period at the time, but rather a series based on a subset of countries that had reported data up to the end of the Equipo ANOVA sample when their study was written at the end of 2020.<sup>226</sup>

As we show in **Table 3**, correcting for these omissions makes the Equipo ANOVA results on food imports disappear completely.<sup>227</sup> The columns of Table 3 report results according to different specifications of the dependent variable, while the rows are organized by panels that vary the functional form and econometric method. Thus, the first column reports the food import series

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<sup>224</sup> Bahar et al. (2019).

<sup>225</sup> The omission of these categories appears to have been an inadvertent error caused by a typo in footnote 2 on page 6 of Bahar et al. (2019), which fails to mention that the authors included 1–digit Harmonised System code 1 in their calculations. Nevertheless, revision of the code published by Bahar et al. (2019) verifies that all code 1 categories were included in their study. Equipo ANOVA claim to have also constructed an alternate series including most of the omitted code 1 categories in their footnote 1 and to have obtained similar results, yet do not report these. Their claim is consistent with our findings. Our reconstruction of their alternate measure finds that the trend break results hold only in the misspecified levels specification that they use in their paper, yet not in the logarithmic one.

<sup>226</sup> To be fair on this point, the EA data were the best available data given their choice of window at the moment of writing. Yet given what we know about the delays in reporting, the data were clearly still preliminary at the moment and, as we show below, their results are additionally weakened when we use the updated data.

<sup>227</sup> Note that by “most recent data,” we refer to the updated data for the same period of study (April 2015–December 2019).

used by Equipo ANOVA, which excludes cereals and oils, the second column reports the full Comtrade food import series that includes cereals and oils, and the third column reports results using medicines imports. We highlight in bold and shade the cells corresponding to the results reported in their note in the first row, and those of the fully corrected specifications in the third row. Once we use the full Comtrade food imports series and a logarithmic specification, the change in slope for food imports is no longer significant, while the change in levels is only significant at  $p=.094$ . Even that very weak result disappears once we use the updated data, which drives both coefficients below standard significance levels, as shown in the last panel of Table 3.<sup>228</sup>

**Table 3**  
**Trend Interruption Specifications**

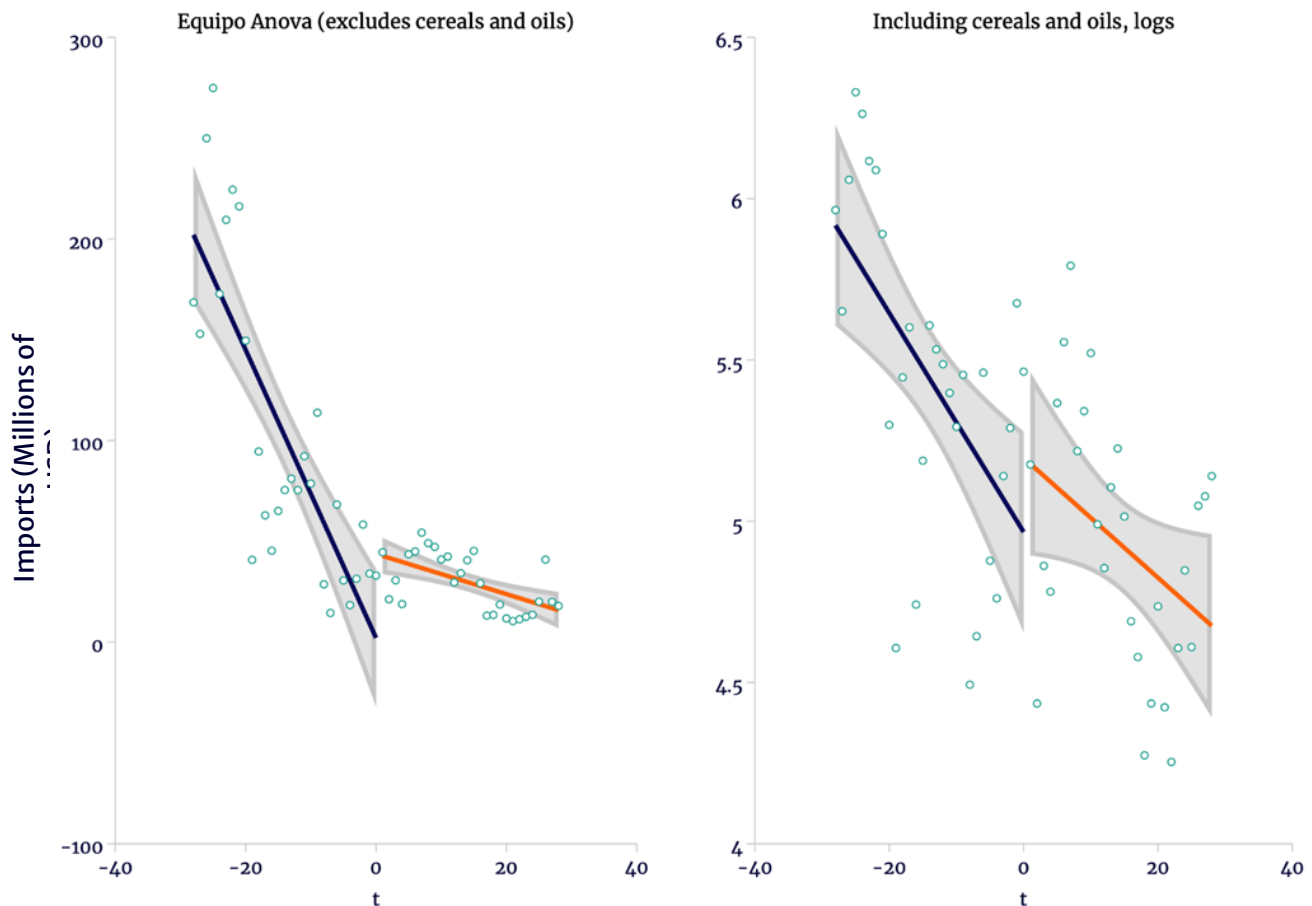
			Anova Food Imports (excluding cereals and oils)	Food Imports (including cereals and oils)	Medicine imports
Levels	Data available as of October 2020	Change in level	44.86*** (13.82)	91.94** (42.62)	19.6*** (5.70)
		Change in slope	6.46*** (1.09)	6.21** (2.79)	5.47*** (0.49)
Logarithms	Data available as of October 2020	Change in level	0.53** (0.25)	0.38* (0.22)	-0.05 (0.19)
		Change in slope	0.04*** (0.01)	0.01 (0.01)	0.07*** (0.01)
Logarithms	Data available as of December 2022	Change in level	0.56** (0.26)	-0.22 (0.20)	-0.22 (0.20)
		Change in slope	0.05*** (0.01)	0.1*** (0.01)	0.1*** (0.01)
Specifications originally reported by Equipo Anova (2021)					
Specifications that correct data omissions and functional misspecification using most recent data					

Source: Author's calculations based on UN Comtrade Database.

<sup>228</sup> In response to earlier critiques of his functional form choice, lead Equipo ANOVA researcher Omar Zambrano posted scatter plots on Twitter showing results using a logarithmic specification. However, his food results are based on the restricted food import series that excludes cereals and oils and thus correspond to those in column 1 of our table. See Zambrano (2021a) and (2021b).

**Figure 23**

## Trend Interruption Estimates, Food Imports



Sources: Author's calculations based on UN Comtrade Database.

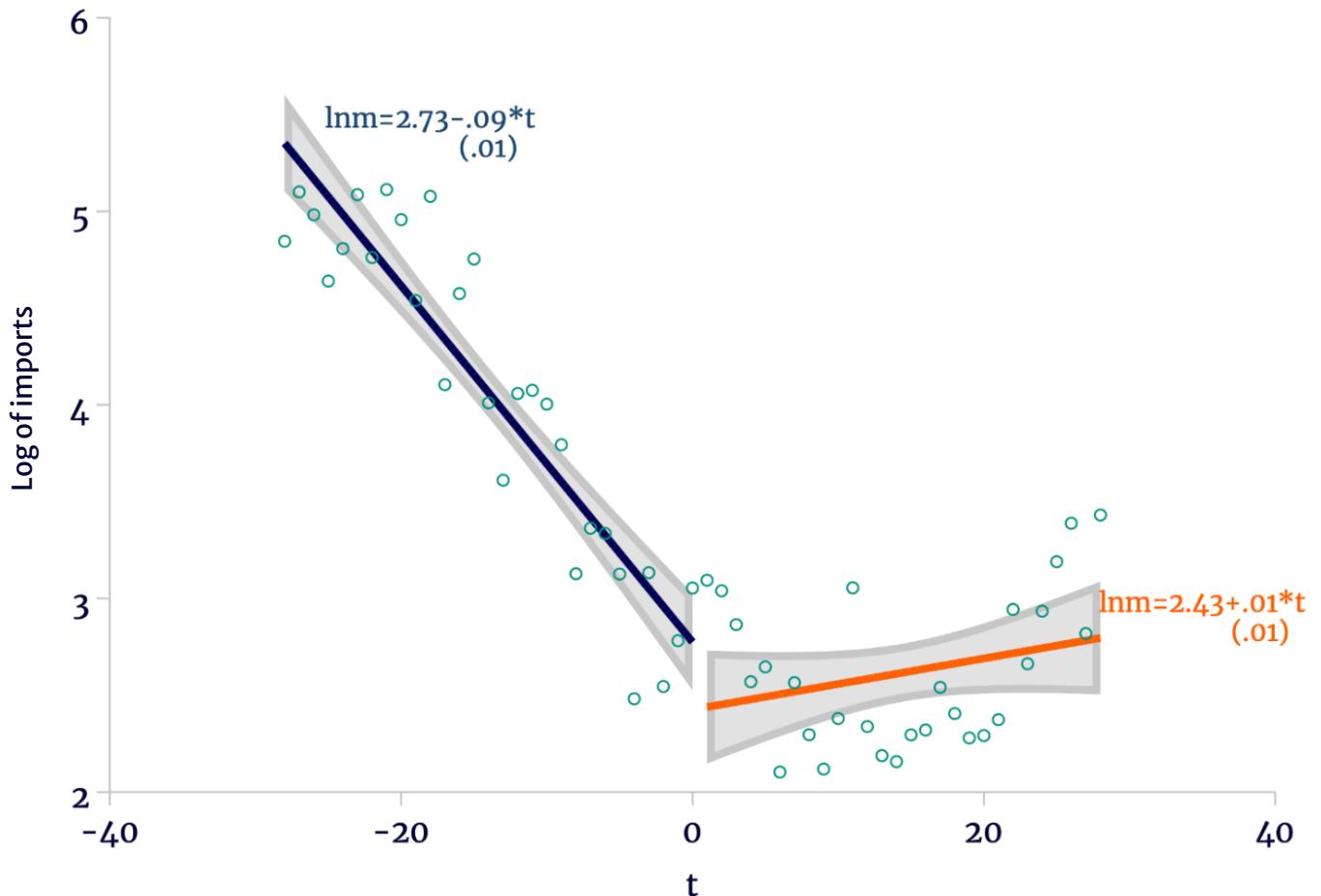
The last column of Table 3 shows results for medicine imports. In this case, the estimated increase in import levels at the time of sanctions also disappears once we adopt a logarithmic specification. In fact, the point estimate on the level's coefficient turns negative (albeit insignificant). The trend coefficient, in contrast, remains strongly positive, indicating an increase in the rate of growth of food imports.

**Figure 24** considers this result in greater detail. Note that medicine imports were declining at a rate of 9 log points per month, or the equivalent of a 66 percent decline per year, before the 2017 sanctions. Since this decline was strongly statistically significant ( $t=12.6$ ), just a stabilization of imports at very low levels would be enough to result in a statistically significant break in trend. That is what the data show happened. After August 2017, the data show no statistically significant trend of increase ( $t=1.5$ ). In other words, the change in trend result essentially captures the fact that medicine imports stabilized at very low levels. The fact that the trend

coefficient is positive — though not significant — in the post-sanctions period also appears to be mostly driven by observations from the last months of 2019, when the economy had begun to experience some recovery in oil output, rather than anything that happened in the vicinity of the imposition of the 2017 financial sanctions.<sup>229</sup>

**Figure 24**

**Trend Interruption Estimates, Medicine Imports**



Sources: Author’s calculations based on UN Comtrade Database.

Here it makes sense to think again in terms of implicit counterfactuals. Had medicine imports continued to decline at the pre-intervention rate of 9 log points per month after August 2017, they would have fallen from USD 21 million per month at the time of sanctions (and USD 123 million per month two years before sanctions) to USD 1.5 million per month at the end of the

<sup>229</sup> Venezuela’s oil output hit a low of 644 tbd in September 2019 and rose by 14 percent in the last three months of 2019, which also corresponds to the last three months of the Equipo ANOVA sample and the highest post-sanctions levels of medicines imports.

sample in December 2019. While the logarithmic specification ensures that the projection of medicine imports at the end of the sample is positive and thus mathematically feasible, that does not mean that it is a realistic counterfactual of what would have happened to medicine imports in the absence of sanctions. Put differently, what the Equipo ANOVA estimate for medicines tells us is simply that medicine imports did not continue shrinking at a rate of two-thirds per year. It in no way establishes that it is reasonable to think of a sustained rate of decline to near-zero import levels as a reasonable scenario of what would have happened had sanctions not been imposed.

In fact, an extensive empirical literature shows that demand for medicines is income inelastic, implying that the share of income devoted to medicine purchases increases as incomes drop.<sup>230</sup> Therefore, a country that suffers a sustained decline in incomes like Venezuela should see a relative stabilization of the demand for medicines with the decline in imports, even in the absence of changes in public policies. In other words, even the logarithmic specification may be insufficient to capture nonlinearities in the expected path of the economy that we choose to use as counterfactual.<sup>231</sup>

We have also tested for the existence of breaks in trend with a more appropriate regression discontinuity design using local polynomial estimators with robust bias-corrected intervals, a triangular kernel, and a mean-squared error optimal bandwidth selector, as suggested by Calonico, Cattaneo, Farrell, and Titiunik.<sup>232</sup> We find that both the level and the slope of food imports decline around the time of sanctions, with the change in slope being borderline significant. Thus, if anything, the data point in the direction of suggesting that a deterioration in food imports availability occurred at the time of sanctions. In the case of medicine imports, we find a statistically significant increase in the level of imports at the time of sanctions accompanied by a borderline significant decline in the slope of the trend. This suggests that there may have been a short-lived rise in medicine imports at the time of sanctions (possibly driven by rising oil prices in the fourth quarter of 2017), which was offset in less than four months by the increase in the trend rate of decline.

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<sup>230</sup> Danzon, Mulcahy, and Towse (2015); Ringel et al. (2005); and Farag et al. (2012). Generally, most values in the literature tend to be between 0.6 and 0.9. See also Fan and Savedoff (2014); Gerdtham and Jonsson (2000); Baltagi and Moscone (2010); Zhou et al. (2011); Lépine (2015); Tangtipongkul (2016); Jeetoo and Jaunky (2022); Dubey (2020); and Magsi et al. (2021).

<sup>231</sup> The issue is not just one of functional form, but rather of the incompleteness of the univariate framework to adequately assess the effect of an intervention such as sanctions when many other relevant covariates are changing strongly. A more adequate framework for assessing this question could be to ask the extent to which medicine purchases deviated from those that would have been expected, given the country's economic contraction and existing income elasticity estimates. Exploring this and other alternative frameworks is a possible direction for future research.

<sup>232</sup> Calonico, Cattaneo, Farrell, and Titiunik (2017).

In sum, the data show no evidence of the improvement in food and medicine imports following the imposition of sanctions as claimed by Equipo ANOVA.<sup>233</sup> We find that the results presented in their note, and frequently cited in the Venezuelan public policy space, are a consequence of data coding errors and questionable methodological choices. Among these is the choice of an unreasonable functional form that implies a counterfactual of negative imports in the absence of sanctions and the omission of data accounting for four-fifths of the country's food imports at the time of sanctions. Once these errors are corrected, any evidence of an improvement in the level or rate of change in food imports disappears. While we do find that medicine imports stabilized at very low levels after sanctions, the most reasonable explanation for this appears to be that it is a consequence of the low-income elasticity of demand for medicines in the context of a significant drop in incomes. In sum, neither close inspection of the corrected data nor a battery of statistical tests shows evidence of any sustained significant improvement in food or medicine imports following the 2017 financial sanctions, as claimed by Equipo ANOVA.<sup>234</sup>

## 5. Rethinking Economic Sanctions

This paper has reviewed the state of the evidence regarding the consequences of economic sanctions on living conditions in target countries. There is a remarkable consensus among all the cross-national studies surveyed that economic sanctions generate significant levels of distress in target economies. These are reflected in lower growth, higher likelihood of economic collapse, increases in poverty and inequality, worsening health conditions, excess deaths, and deteriorations in human rights and democracy. The case studies highlight how reductions in export revenues and the blocking of state institutions' access to international payments systems severely impair governments' capacity to provide basic services and restrict the ability of nongovernment actors to mobilize assistance to vulnerable populations.

It is hard to think of other policy interventions that continue to be pursued amid so much evidence of their adverse and often deadly effects on vulnerable populations. This is perhaps even more surprising in light of economic sanctions' extremely spotty record in achieving their stated objectives of inducing changes in the conduct of targeted states.

It is possible to take different normative positions with respect to the role of sanctions. One strand of thinking views them as collective punishment of civilians and thus as a violation of

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<sup>233</sup> Equipo ANOVA (2021).

<sup>234</sup> Equipo ANOVA (2021).

international law, akin to the use of siege warfare, which is currently considered a war crime.<sup>235</sup> Others have argued that only well-targeted sanctions, properly designed to protect vulnerable populations, should be applied by the international community.<sup>236</sup> Yet others characterize the pain imposed on target populations as necessary collateral damage, justified by the ability of adequately designed sanctions to achieve their objectives.<sup>237</sup>

Attempts to redesign sanctions regimes, some of which are without a doubt well-intended, can easily become distorted as a result of perverse policy-making incentives. For example, largely ineffective humanitarian sanctions waivers can be used to falsely claim that sanctions do not impede or create obstacles to humanitarian assistance. As shown in the case studies discussed in this paper, the US has increasingly used sanctions that are, in principle, designed to target specific persons or entities to replicate the effect of wholesale trade and financial embargoes. By design or omission, regulatory ambiguity generates incentives for private sector actors to minimize any risk of running afoul of sanctions, allowing officials to characterize the problem as one of “over-compliance” rather than one of inadequate institutional design.

Regrettably, the populations most often harmed, and in some cases killed, by sanctions are also voiceless in decisions about their adoption. Instead, the decision to adopt or tighten sanctions often responds to domestic political incentives in sanctioning countries, such as the electoral relevance of politically active diasporas in US swing states.<sup>238</sup> Expanding the space for reasoned and critical public debate will be indispensable to escape this power imbalance in adopting policies that can harm the lives of millions of people.

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<sup>235</sup> Shagabudinova and Berejikian (2007); UN Office of the High Commissioner for Human Rights (2019); and Zakrisson and Muntaner (2019).

<sup>236</sup> Cortright and Lopez (2000, 2002); and Fabre (2018).

<sup>237</sup> Nephew (2017); and Hausmann and Morales-Arilla (2021).

<sup>238</sup> Kustra (2021).



## Appendix 1.1

### Summary of Cross-Country Panel Data Studies

Authors	Title	Period	Outcome variable	Method	Results	Sanctions indicators
Hufbauer et al, (1985, 1990, 2007)	Economic Sanctions Reconsidered	1915–2000	Economic cost to target countries	Calibration combines estimates of losses in market access quantified from country studies with ad hoc import demand and export supply elasticities to estimate consumer surplus losses in target countries.	Average cost to target of comprehensive sanctions regimes is 4.2% of GDP	Constructed by authors
Wood (2008)	“A Hand upon the Throat of the Nation”: Economic Sanctions and State Repression, 1976–2001	1976–2001	Human Rights Abuses	Pooled ordered probit on cross-country panel	The most severe UN sanctions lead to an increase in the probability of repression from 5 to 25 percent; for US sanctions the increase is to 16 percent.	Hufbauer et al. (1990) complemented with other sources including Institute for International Economics (2005) and United Nations (2005).
Peksen (2009)	Better or Worse? The Effect of Economic Sanctions on Human Rights.	1981–2000	Physical integrity rights of citizens	Ordered probit panel fixed effect regressions.	Economic sanctions lead to significant increases in human rights violations in all measures of physical integrity considered as well as in aggregate indices,	Morgan et al. (2014).
Peksen and Cooper (2010)	Coercive or Corrosive: The Negative Impact of Economic Sanctions on Democracy	1972–2000	Democracy	Cross-country panel fixed effect regressions	Sanctions lead to a 7% reduction in the average Freedom House democracy score the year after sanctions are imposed, an effect that rises to 16% in the case of extensive sanctions	Hufbauer et al. (1997, 2008) and Morgan et al. (2014).
Peksen (2011)	Economic Sanctions and Human Security: The Public Health Effect of Economic Sanctions	1970–2000	Under-five child mortality rates	Cross-country panel pooled OLS with lagged dependent variables and AR1 terms	A one-standard deviation increase in the cost of sanctions leads to 4 percent increase in mortality. U.S. sanctions leads to a 35 percent increase in mortality.	Hufbauer et al. (2007).
Allen and Lektzian (2012)	Economic Sanctions: a blunt instrument?	1990–2007	Public health	Random effects panel data model estimated via population-averaged generalized estimating equations model (GEE) and a Heckman selection model.	Sanctions that have a large economic effect on target states can have severe public health consequences. These consequences are substantively similar to those associated with major military conflicts.	Hufbauer et al. (2007).
Choi and Lio (2013)	Economic Sanctions, Poverty, and International Terrorism: An Empirical Analysis	1968–2004	Incidents of international terrorism	Cross-country panel fixed effect and negative binomial regressions	The imposition of sanctions leads to a 93% increase in incidents of international terrorism	Hufbauer et al. (2008) supplemented with other sources such as Drezner (1999) and O’Sullivan (2003).
Neuenkirch and Neumeier (2015)	The impact of UN and US economic sanctions on GDP growth.	1976–2012	Economic growth	Cross-country panel fixed effect regressions	UN sanctions cause 2.0% decline in growth at time of sanctions, rising to a cumulative 26% over 10 years. US sanctions lower growth by 0.9% and cumulative 13%.	Wood (2008), Hufbauer et al (2007), authors’ modifications
Afesorgbor and Mahadevan (2016)	The Impact of Economic Sanctions on Income Inequality of Target States.	1960–2008	Income Inequality	Cross-country panel fixed effect regressions	A sanctions episode increases the Gini coefficient by 1.7 points, while each additional year of sanctions adds 0.3 points to the Gini	Hufbauer et al. (2007)
Lucena and Apolinário (2016)	Targeted Versus Conventional Economic Sanctions: What Is at Stake for Human Rights?	1992–2008	Human Rights Abuses	Cross-country panel ordered logistic regression on data of African countries	Protection against loss of life and torture is 1.7 times more likely to worsen under targeted sanctions than under no sanctions. The effect of targeted sanctions is not different from that of conventional sanctions.	Morgan et al. (2014), and Biersteker et al. (2018)

Source: Author’s elaboration.



## Appendix 1.2

### Summary of Cross-Country Panel Data Studies

Authors	Title	Period	Outcome variable	Method	Results	Sanctions indicators
Petrescu (2016)	The Humanitarian Impact of Economic Sanctions	1914–2006	Weight, height and probability of death of children	Individual panel fixed effect regressions using data from Demographic and Health Surveys	Being exposed to sanctions during the whole duration of a pregnancy leads to a decrease of .07 standard deviations in a child's weight	Hufbauer et al. (2007).
Neuenkirch and Neumeier (2016)	The impact of US sanctions on poverty	1982–2011	Poverty gap	Cross-country panel fixed effects with controls reweighted through entropy balancing.	US sanctions lead to increases in the poverty gap by 3.8 % of GDP. The effect grows to 7.9 % for most severe sanctions and is reinforced with multilateral support.	US sanctions episodes based on Wood (2008); Hufbauer et al. (2007) and Neuenkirch and Neumeier (2015)
Gutmann et al. (2017)	Sanctioned to Death? The Impact of Economic Sanctions on Life Expectancy and its Gender Gap	1977–2012	Life expectancy for males and females	Cross-country panel fixed effects with controls reweighted through entropy balancing.	UN sanctions are associated with a decrease in life expectancy of 1.2 years for men and 1.4 years for women, while US sanctions are associated with a smaller decline of 0.4 years for men and 0.5 years for women	Data on UN and US sanction episodes based on Wood (2008), Hufbauer et al. (2009), and Neuenkirch and Neumeier (2015).
Gutmann, et al. (2018)	Economic sanctions and human rights: Quantifying the legal proportionality principle	1976–2012	Overall human rights, basic human rights, economic rights, emancipatory rights, and political rights	Endogenous treatment regressions	US economic sanctions are associated with a deterioration of political rights but an improvement in women's emancipatory rights. The effect on emancipatory rights comes from sanctions that are not targeted at human rights goals and that are imposed unilaterally by the US, while multilateral and human-rights targeted sanctions are not associated with improvements in women's rights but are associated with deteriorations in political rights.	Neuenkirch and Neumeier (2015)
Kim (2019)	Economic sanctions and child HIV	1990–2012	HIV infections, aid-related deaths	Cross-country panel fixed effect regressions	Sanctions episodes lead to increase in the HIV infection rate of children by 2.5% and an increase in AIDS-related deaths by 1%.	Morgan et al. (2014).
Wen et al (2020)	The impact of international sanctions on energy security.	1996–2014	Energy imports	Static and dynamic panel data models with fixed country and time effects	Unilateral sanctions lead to increases in energy imports, as do US sanctions, economic sanctions, and greater sanctions intensity. Plurilateral, EU and UN sanctions have no significant effects.	Portela and von Soest (2012).
Dai et al (2021)	Timing the Impact of Sanctions on Trade	1948–2006	Trade flows between countries	Bilateral gravity equations	The imposition of sanctions leads to a 77–82% decline in bilateral trade.	Felbermayr et al. (2021)
Ha, L. and Nam, P. (2021)	An investigation of relationship between global economic sanction and life expectancy: do financial and institutional system matter?	1995–2018	Life expectancy	Cross-country panel fixed effects regressions.	The imposition of economic sanctions reduces average life expectancy by 0.3 years. The effect is present only for trade and other sanctions. Countries with more developed financial systems and institutions are better able to alleviate the effect of sanctions on health.	Felbermayr et al. (2021)
Splinter and Klomp (2021)	Do Sanctions Cause Economic Growth Collapses?	1960–2010	Growth collapses	Cross-country panel fixed effect linear probability regressions	The likelihood of experiencing a growth collapse rises by 9% in the first three years after sanctions are imposed	Morgan et al. (2014).
Gutmann, et al. (2021)	The Economic Effects of International Sanctions: An Event Study	1960–2016	Growth in GDP and its components.	Event study design and panel difference-in-differences	International sanctions slow GDP growth in the first (2.2 pp) and second (1.8 pp) years of a sanctions episode. The effect seems to be mostly caused by US unilateral sanctions and financial sanctions, and operates through a decline in foreign direct investment, which drops by 39% in the first year of an episode of sanctions.	Felbermayr et al. (2021)

Source: Author's elaboration.



## Appendix 2.1

### Summary of Country-Level Studies

Authors	Title	Period	Countries	Outcome variable	Method	Results
Van Bergeijk (2015)	Sanctions against Iran – A preliminary economic assessment	1959–2006	Iran	Political outcomes, GDP, oil and gas rents, government consumption, imports	Vector auto regressions.	Sanctions lead to a decline in GDP that is statistically significant only in the short term. Sanctions have no statistically significant effect on democracy either in the short nor long term.
Farzanegan et al. (2016)	Effects of Oil Sanctions on Iran's Economy and Household Welfare: New Evidence from A CGE Model. Economic Welfare and Inequality in Iran	2001	Iran	Macroeconomic Variables and Household welfare	Computable general equilibrium model	Sanctions lead to a decline in total imports by 20%, total exports by 16.5%, private consumption by 3.9%, capital income by 3.8% and GDP by 2.2%
Warburton (2016)	The International Law and Economics of Coercive Diplomacy: Macroeconomic effects and empirical findings.	1960–2013	Iran, Liberia, Rwanda, Sierra Leone,	GDP Growth, Exports/GDP, Inflation.	Binary logit model	Sanctions detrimentally affect the target's macroeconomic performance
Gharehgozlia (2017)	An Estimation of the Economic Cost of Recent Sanctions on Iran Using the Synthetic Control Method	1980–2014	Iran	Real GDP	Synthetic control method.	Sanctions caused a 17.3 percent decline in real GDP in 3 years. The highest effect of the sanctions took place 2012, with a 12.0 percent drop.
Parker et al. (2017)	Unintended Consequences of Sanctions for Human Rights: Conflict Minerals and Infant Mortality.	2007–2012	Five eastern Congo provinces	Children mortality	Linear probability triple difference-in-differences	The authors focused on sanctions designed to stop human rights violations through 3T mines in DRC. They found that infant mortality rates rose in villages that depend economically on armed groups. Also, they found that infant mortality rates increased in villages that depend economically on "conflict-free" minerals.
Kholodilin and Netšunajev (2018)	Crimea and punishment: the impact of sanctions on Russian economy and economies of the euro area	1997–2018	Russia and euro area.	GDP Growth	Structural vector autoregressions	Sanctions had a weak negative effect on the growth rate of Russian GDP.

Source: Author's elaboration.

## Appendix 2.2

### Summary of Country-Level Studies

Authors	Title	Period	Country(ies)	Outcome variable	Method	Results
Rodríguez (2019)	Sanctions and the Venezuelan economy: What the data say	2017–2019	Venezuela	Venezuelan oil production	Synthetic control method	Financial sanctions are associated with losses in oil revenues of USD 16.9 billion per year
Felbermayr et al. (2020)	On the Heterogeneous Effects of Sanctions on Trade and Welfare: Evidence from the Sanctions on Iran and a New Database	1950–2016	Iran	International trade	Global general equilibrium model based on gravity model estimates.	Sanctions reduce trade with the target, with an effect that is economically significant and heterogeneous across countries and sectors.
Equipo ANOVA (2021)	Impacto de las Sanciones Financieras Internacionales contra Venezuela: Nueva Evidencia	2015–2019	Venezuela	Essential goods imports and oil production	Interrupted time series	Financial sanctions are associated with an improvement in imports of essential goods but an acceleration in the rate of decline in oil production.
Morteza (2021)	Who is afraid of sanctions? The macroeconomic and distributional effects of the sanctions against Iran	2012–2015	Iran	Real GDP	Synthetic control method	The study finds that sanctions caused a 12.5% fall in Iran's real GDP in the first year and a 19.1% decline 4 years after the application of the sanctions, while real GDP remained 5% lower than its counterfactual 2 years after the removal of sanctions.
Hejazi and Emamgholipour (2022)	The Effects of the Re-imposition of US Sanctions on Food Security in Iran.	2011–2018	Iran	Food prices, food security and dietary quality	Interrupted time series	Sanctions caused a significant increase in food prices. The share of urban and rural households that were prone to food insecurity increased from 8.8% and 25.2% to 11.2% and 29.2%, respectively, from 2017 to 2019.
Rodríguez (2022)	Sanctions and Oil Production: Evidence from Venezuela's Orinoco Basin	2008–2020	Venezuela	Venezuelan Oil output	Firm-level difference-in-differences with control for pre-treatment differences in trends.	Sanctions caused large losses in oil production among firms that had access to finance prior to sanctions compared to a control group that lacked that access. The effect of sanctions explained around half of the output drop observed in those firms.

Source: Author's elaboration.



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