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FEBRUARY 2026

Research Report 481

Economic implications for Europe of a potential reintegration of Iran into the world economy

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Study on behalf of Initiative Neue Soziale Marktwirtschaft (INSM).

The statistical support provided by Aleksandr Arsenev is greatly appreciated.

Abstract

How would fundamental political change in Iran, leading to a democratic system with a free and rules-based economic order, affect Germany and the EU economically? In the event of change, sanctions could be scaled back, allowing Iran to rejoin the global economy. This study quantifies the economic effects of such a transformation. It neither advocates for nor legitimises the lifting or easing of sanctions under the current regime or without far-reaching and credible reforms that fully address the concerns underlying the sanctions currently in place.

Using the newest available data and quantitative methods, the results indicate that lifting EU sanctions alone could raise Iran's real GDP by more than 80% in the long run while generating moderate but economically meaningful gains for Germany and the EU of around 0.3-0.4% of GDP. These gains are driven by expanded trade, lower energy and input prices, and improved allocative efficiency. When sanctions removal is combined with plausible scenarios of productivity catch-up with Turkey or South Korea, Iran's GDP would increase by 240-388% and the gains for Europe would increase further, underscoring the strong complementarity between trade integration and productivity growth. Moreover, Iran's reintegration would reduce energy price volatility, improve the security of maritime trade routes, and lower migration pressures.

Overall, the findings suggest that a negotiated transition and rules-based reintegration of Iran would generate substantial mutual economic benefits while contributing to regional and global stability.

Keywords: Iran; economic sanctions; regime transition; trade integration; energy markets; oil and gas prices; foreign direct investment; European Union; inflation; political economy

JEL classification: F13, F15, F51, Q41, Q48, O53

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Summary

1. **How would fundamental political change in Iran, leading to a democratic system with a free and rule-based economic order, affect Germany and the European Union (EU) economically?** In the event of change, sanctions could be scaled back, allowing Iran to rejoin the global economy. This study quantifies the economic effects of such a transformation. It neither advocates for nor legitimises the lifting or easing of sanctions under the current regime or without far-reaching and credible reforms that fully address the concerns underlying the sanctions currently in place.
2. **Western sanctions against Iran have strongly reduced the country's integration into the world economy,** particularly after 2012. The sectors that are relevant for Germany and show the largest negative trade effects are paper, plastic, metals, chemicals and, to a somewhat smaller extent, machinery. Sanctions have wiped out services trade almost completely, leaving Iran's economy severely crippled. However, domestic economic mismanagement is strongly important, too.
3. Quantitatively, the lifting of EU sanctions alone is estimated to increase Iran's real GDP by more than 80% in the long run, reflecting the extraordinary degree of trade and financial repression embedded in the current sanctions regime. **For Germany and the EU27, sanctions removal generates real GDP gains of approximately 0.3-0.4%, corresponding to about USD 15 and 64 billion, respectively,** in additional annual income. These gains are driven by expanded export opportunities, lower import prices (particularly for energy and energy-intensive inputs), and improved allocative efficiency through deeper international specialisation.
4. The analysis further highlights that the largest and most durable gains arise when sanctions removal is combined with productivity catch-up in Iran to Turkey and South Korea. Under combined scenarios, Iran's GDP could potentially increase by 240-388%, while **Germany and the EU27 experience gains approaching 0.49-0.53% and 0.61-0.7% of GDP, respectively.** These results underscore the complementarity between trade integration and productivity growth: sanctions removal enables access to inputs, technology and markets, while productivity improvements enhance competitiveness and amplify the gains from openness.
5. Beyond trade liberalisation, the report shows that Iran's reintegration could materially affect global energy markets. A restoration of Iran's oil production capacity to pre-revolution levels would constitute a non-negligible positive supply shock, with plausible **short-run reductions in the price of oil in the range of 6-15%** under conservative elasticity assumptions. In natural gas markets, the asymmetric development of the shared South Pars/North Field implies even larger potential effects: Iran's eventual entry into LNG markets could exert significant downward pressure on global and European gas prices, particularly in regions dependent on liquefied natural gas (LNG). Lower energy prices would benefit Europe through reduced production costs, improved real household incomes and lower inflationary pressures.
6. Finally, the report emphasises that economic reintegration is not merely a matter of trade and energy prices, as it also has broader implications for **regional stability, maritime trade routes, migration pressures and Europe's geopolitical environment**. While these effects are harder to quantify, they are potentially large and asymmetric, particularly in downside scenarios of disorderly transition or state failure.

1. Introduction

Iran has been witnessing the most severe suppression of its own population in its modern history. Between 8 and 10 January 2026 alone, thousands of protestors were reportedly killed by security forces. The protests began on 28 December 2025, when *bazaaris* (shopkeepers in Tehran's bazaars) initiated strikes in response to rapidly deteriorating economic conditions, the sharp depreciation of the national currency, and rumours of a possible removal of the preferential exchange rate. What initially emerged as an economically motivated protest quickly evolved into a nationwide movement, drawing in broad segments of society expressing long-accumulated grievances not only over economic hardship, but also over restrictions on social and political freedoms and the persistent lack of accepted political representation.

On 2 January 2026, US President Donald Trump warned via his Truth Social account that 'If Iran shots [*sic*] and violently kills peaceful protesters, which is their custom, the United States of America will come to their rescue.' At the same time, Prince Reza Pahlavi, a prominent opposition figure and the oldest son of the last shah of Iran, issued calls for mass mobilisation, urging millions of Iranians across hundreds of cities and provincial areas to take to the streets. In response, the Iranian authorities once again imposed a near-total digital blackout, effectively disconnecting the country from the outside world by disabling telecommunications and internet services, including attempts to jam satellite-based connections (e.g. Starlink).

Despite these restrictions, reports gradually emerged indicating an extremely high number of casualties. Images of large numbers of body bags reportedly appeared in forensic centres and morgues across many cities. According to various sources, between 16,500 (Lamb 2025) and 36,500 (Iran International 2026) Iranians may have been killed by security forces within a matter of two days. The Iranian authorities, however, have rejected these accounts, characterising the victims as 'terrorists' and attributing the unrest to foreign interference by the US and Israel. Official narratives have framed the events as part of a broader campaign of 'sedition', allegedly linked to the 12-day conflict between Israel and Iran in June 2025.

Against this backdrop, it has become increasingly necessary to assess the potential economic implications for Europe of a regime transition in Iran and its possible reintegration into the global economy after nearly five decades of authoritarian theocratic rule. This report seeks to provide such an assessment, examining the issue from multiple perspectives, including trade, investment, energy markets and geopolitical stability.

1.1. FROM CONTAINMENT TO TRANSITION: A RUPTURE OF THE STATUS QUO

Since early January 2026, the political status-quo surrounding the Islamic Republic of Iran has undergone a profound and potentially irreversible shift. The scale of the state response to nationwide unrest has significantly altered international perceptions of Iran and narrowed the scope for incremental, status-quo–oriented policy approaches by European governments.

As a consequence, scenarios that were previously considered remote – ranging from abrupt regime collapse to a negotiated political transition – have become part of policy planning. This shift carries important implications for Europe. The existing sanctions regime was primarily designed for containment under conditions of political continuity, not for managing rapid political change or large-scale economic reintegration. The developments of January 2026 therefore raise a new and urgent question for European policy makers: how prepared are Germany and the European Union (EU) for the economic consequences of a potential reintegration of Iran into the global economy under fundamentally altered institutional conditions?

1.2. EUROPE'S POLICY DILEMMA: MORAL CLARITY VERSUS ECONOMIC PREPAREDNESS

From a normative perspective, Europe's position vis-à-vis Iran has become increasingly clear. The scale of repression has rendered any notion of 'business as usual' politically untenable. At the same time, moral clarity does not eliminate economic interdependence. Regardless of political preferences or diplomatic stances, developments in Iran will affect Europe through multiple economic channels. Iran is a large economy by regional standards, endowed with vast hydrocarbon resources, a sizeable industrial base, and a population of more than 91 million people. It occupies a strategically central position linking the Middle East, Central Asia and key maritime trade routes. Decades of sanctions, political isolation and ill-mannered policies that prioritise ideologies over national interests have suppressed Iran's economic potential, but they have not eliminated its relevance to global energy markets, international shipping, migration dynamics or geopolitical stability.

For Germany and the EU, the core dilemma is therefore not whether to endorse or oppose political change in Iran, but how to anticipate and manage its economic consequences. A sudden easing or removal of sanctions – whether following regime change, a transitional authority or a negotiated settlement – would have immediate and far-reaching effects on trade flows, investment patterns, energy prices and regional security. Conversely, a disorderly collapse without a coordinated reintegration strategy could generate severe negative spill-overs, including supply chain disruptions, increased refugee flows and heightened instability along critical transport corridors. This study is motivated by the need to provide a rigorous economic assessment of these potential outcomes, thereby supporting informed and proactive policy choices in Berlin and Brussels.

1.3. PURPOSE AND SCOPE OF THE STUDY

The objective of this study is to quantify and contextualise the economic effects of a reintegration of Iran into the global economy for Germany and the EU. Reintegration is understood here as a scenario in which sanctions related to trade, finance, energy and investment are lifted or substantially relaxed, allowing Iran to re-establish normal economic relations with Europe and the wider world and to catch up in terms of productivity. Crucially, this analysis is not predicated on the continuation of the current political regime in Iran. Nor does it imply political recognition, endorsement or legitimisation of past or present actions by Iranian authorities. Instead, the study adopts a forward-looking and conditional perspective: it examines the economic implications for Europe under the assumption that political conditions emerge under which reintegration becomes possible. The study also does not aim to assess the internal political feasibility or desirability of different transition paths within Iran, as such questions lie outside the remit of economic analysis. Rather, the focus is on external economic effects – specifically, on European output, welfare and strategic interests – that arise once reintegration occurs, irrespective of the precise political mechanism that enables it.

There are several reasons why such an economic assessment of Iran's potential reintegration is particularly urgent at the present juncture.

First, fossil energy markets remain fragile. Europe continues to adjust to the structural consequences of Russia's full-scale invasion of Ukraine, including reduced access to Russian oil and gas. Iran's re-entry into global and European energy markets would affect oil and gas prices not only in the short term, through increased supply, but also in the longer term, by reshaping expectations, investment incentives and geopolitical risk premiums.

Second, maritime trade routes linking Europe and Asia have become increasingly exposed to geopolitical tensions, particularly in the Red Sea and the wider Middle East. A stabilisation or, conversely, further destabilisation of Iran's regional role would have direct consequences for shipping costs, insurance premiums and the resilience of European supply chains.

Third, migration pressures are likely to intensify under scenarios of continued repression or state failure in Iran. Conversely, economic reconstruction and reintegration could reduce forced migration while opening new channels for skilled mobility, including return migration and diaspora engagement.

Fourth, Iran's long period of isolation and stagnant growth implies substantial 'catching-up' potential. If reintegration were accompanied by institutional improvements and access to foreign technology and capital, productivity gains could be significant. Rather than being confined to Iran, these gains would generate demand spill-overs for European exporters and investors, particularly in capital goods, infrastructure and advanced services.

This study builds on existing empirical and quantitative research on the economic effects of sanctions, trade liberalisation and international reintegration. In particular, it draws on state-of-the-art gravity models of trade, large-scale general equilibrium models of international trade, and scenario-based assessments of foreign direct investment (FDI), energy markets and regional stability.

Throughout this report, any discussion of sanctions relief or economic reintegration is explicitly framed as conditional on a fundamental political transition in Iran towards a democratic system with a free and rules-based economic order. The analysis does not support, nor should it be read as calling for, sanctions relief under the current political system or in the absence of reforms that fully address the political, legal and human-rights concerns that motivated the imposition of sanctions.

The remainder of the study is organised as follows. Section 2 provides a brief overview of the history of sanctions against Iran, the current sanctions regime, and the present state of the Iranian economy. This section establishes the baseline from which reintegration scenarios are assessed. Section 3 presents the quantitative assessment of Iran's reintegration into the global economy and its effects on Germany and the EU. It examines, in turn, the impact of lifting trade and investment restrictions; changes in energy prices; regional pacification and its effects on trade routes and migration; productivity gains from reconstruction; and the economic role of the Iranian diaspora in Europe. Section 4 discusses qualitative effects that are difficult to quantify but nonetheless economically and strategically relevant, including implications for Europe's geopolitical position and economic resilience. Finally, Section 5 summarises the main findings and derives policy recommendations for Berlin, Brussels and other European capitals, with a view to enhancing preparedness for a range of plausible post-sanctions and post-transition scenarios.

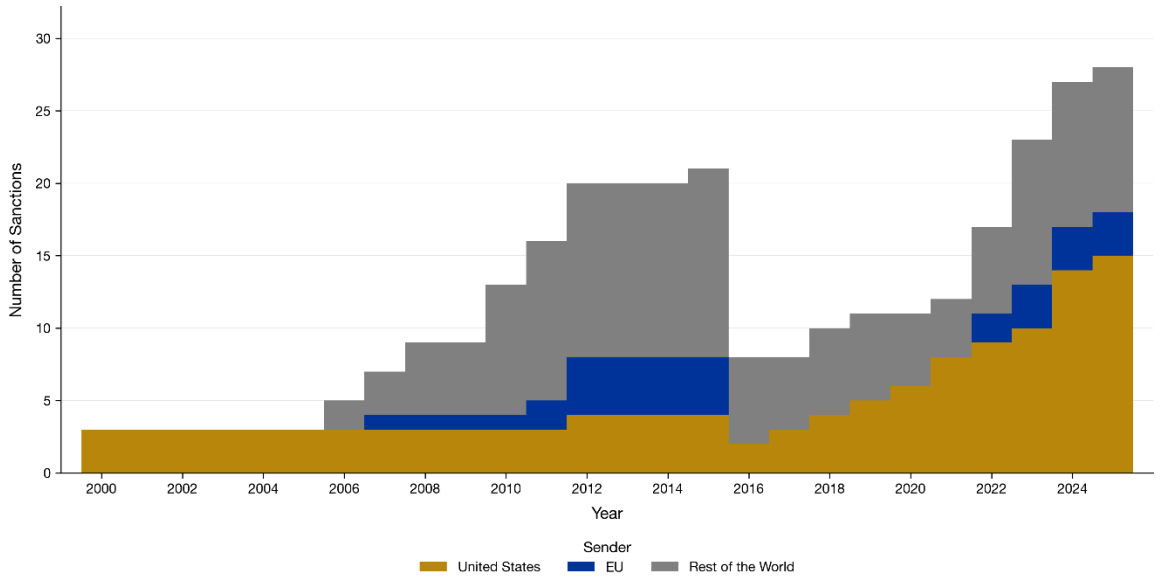
2. The Sanctions Regime and Iran's Economy

2.1. DEVELOPMENT OF SANCTIONS

Iran is among the most heavily sanctioned countries in the world (Felbermayr et al. 2021). Sanctions were first imposed in the aftermath of the 1979-1980 Islamic Revolution, following the hostage-taking of US diplomats in Tehran. Since then, relations between Iran and Western countries have remained strained, reflecting concerns over Iran's regional policies, human rights record and nuclear programme. In 2002, revelations about undeclared nuclear facilities near the Iranian cities of Natanz and Arak raised doubts about Iran's compliance with its obligations under the Non-Proliferation Treaty (NPT). Diplomatic efforts throughout the 2000s yielded only limited and temporary progress, while Iran's continued enrichment activities led to the gradual expansion of multilateral sanctions by the United Nations (UN), the EU and other advanced economies.

Figure 1 shows a steady accumulation of sanctions against Iran since the early 2000s, punctuated by four key turning points: the introduction of multilateral UN and EU sanctions in 2006, the intensification of sanctions imposed by the EU and the international community in 2011-2012, the temporary easing following the Joint Comprehensive Plan of Action (JCPOA) in 2015, and the sharp escalation associated with the 'maximum pressure' strategy of the US from 2018 onwards.

Figure 1 / Number of sanctions against Iran imposed by the EU, US and rest of the world (RoW)



Source: Global Sanctions Database (GSDB), based on Yalcin et al. (2025); authors' illustration

2.1.1. Intensifying EU sanctions on Iran in 2011-2012

In 2011, the European Union introduced targeted restrictive measures against Iran in response to serious human rights violations. These measures consisted primarily of travel bans and asset freezes imposed on Iranian individuals and entities responsible for grave abuses, including torture, arbitrary detention and the excessive use of the death penalty.

In 2012, the EU significantly escalated its sanctions regime by adopting comprehensive sectoral and financial restrictions under Council Regulation (EU) No 267/2012. These measures included a full embargo on Iranian crude oil, petroleum and petrochemical products; a ban on imports of Iranian natural gas; and a prohibition on new investments in Iran's oil, gas and petrochemical sectors. The EU also imposed far-reaching financial sanctions, including the freezing of assets of the Central Bank of Iran, restrictions on Iranian banks' access to international financial messaging services, and bans on insurance and reinsurance related to sanctioned trade.

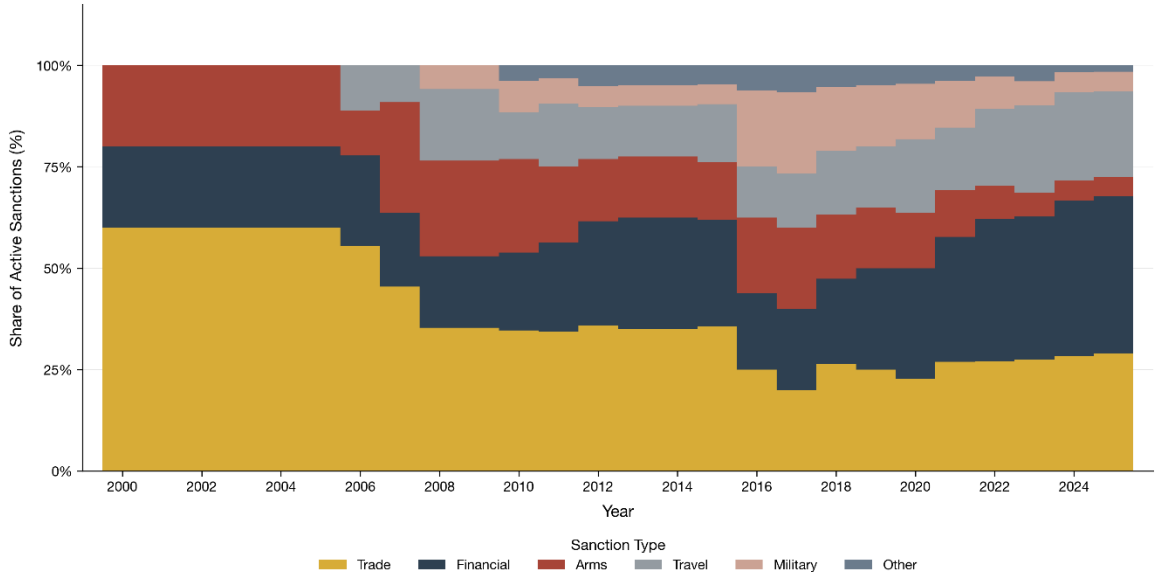
In addition, the 2012 measures introduced extensive trade and industrial restrictions covering dual-use goods, graphite, aluminium, steel and industrial software alongside maritime and shipping sanctions affecting tankers, shipbuilding, flagging and port services. Parallel to these nuclear-related measures, the EU expanded human rights sanctions by imposing an embargo on equipment that could be used for internal repression or for monitoring and intercepting communications.

2.1.2. Diplomatic back-and-forth

A diplomatic breakthrough was reached in 2015 with the JCPOA, agreed between Iran and the P5+1 (the US, China, Russia, the UK and France plus Germany) resulting in a partial lifting of sanctions (i.e. those related to nuclear activities), while sanctions related to other areas of concerns remained in force. This phase proved short-lived. Following the withdrawal of the US from the agreement in 2018 and the reimposition of sanctions, European efforts to preserve the JCPOA through alternative financial mechanisms failed to deliver meaningful economic relief (Farzanegan and Batmanghelidj 2024). Since 2022, the EU and the US have further expanded sanctions in response to human rights violations and Iran's regional military activities as well as supplying of manufactured military equipment to Russia. In September 2025, renewed findings of non-compliance with the JCPOA triggered the snapback mechanism of the deal, leading to the reimposition of broad economic and financial sanctions by the EU and the UN, marking the most comprehensive cumulative sanctions regime against Iran to date.

While early sanctions against Iran relied heavily on trade restrictions and arms bans, the composition of sanctions has changed markedly over time (Figure 2). Since the mid-2000s, and increasingly after 2012, financial sanctions have become the dominant instrument. These include restrictions on banking relationships and access to international payment systems (via SWIFT) as well as limitations on financing, insurance and investment. Unlike traditional trade sanctions, financial measures affect a broad range of economic activities indirectly by raising transaction costs, increasing compliance risks and discouraging private-sector engagement. As a result, even in periods of partial sanctions relief, trade and investment flows have often remained constrained by limited financial connectivity and pervasive de-risking by international banks and businesses (Ghasseminejad and Jahan-Parvar 2021; Raynor 2022).

Figure 2 / Composition of sanctions imposed on Iran by type, 2000-2025



Source: Global Sanctions Database (GSDB), based on Yalcin et al. (2025); authors' illustration

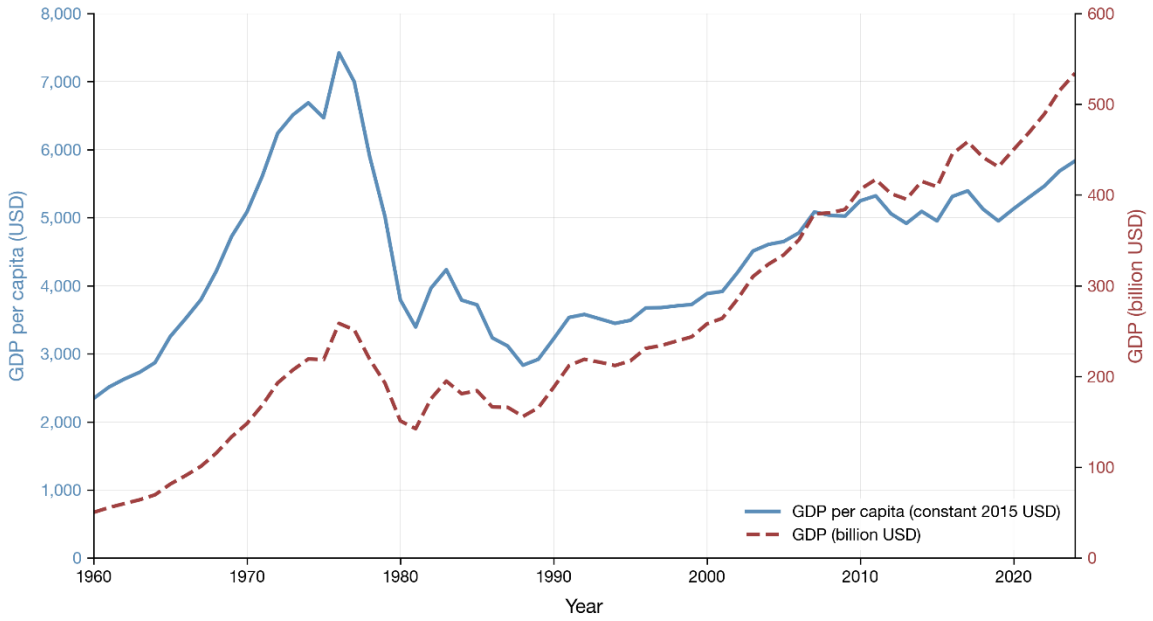
2.2. IRAN'S ECONOMIC DEVELOPMENT IN THE PAST HALF CENTURY

2.2.1. Developments after the Islamic Revolution in 1979

As shown in Figure 3, Iran reached its peak level of real GDP per capita in 1976, three years before the Islamic Revolution, mostly driven by high oil prices. At that time, under the rule of Mohammad Reza Pahlavi, the late shah of Iran, the country maintained strong economic relations with the international community and was producing approximately 5.9 million barrels of oil per day, or around 20% of the total production of the Organization of the Petroleum Exporting Countries (OPEC). The surge in oil revenues enabled the shah's government to expand public expenditure and make substantial investments across the economy.

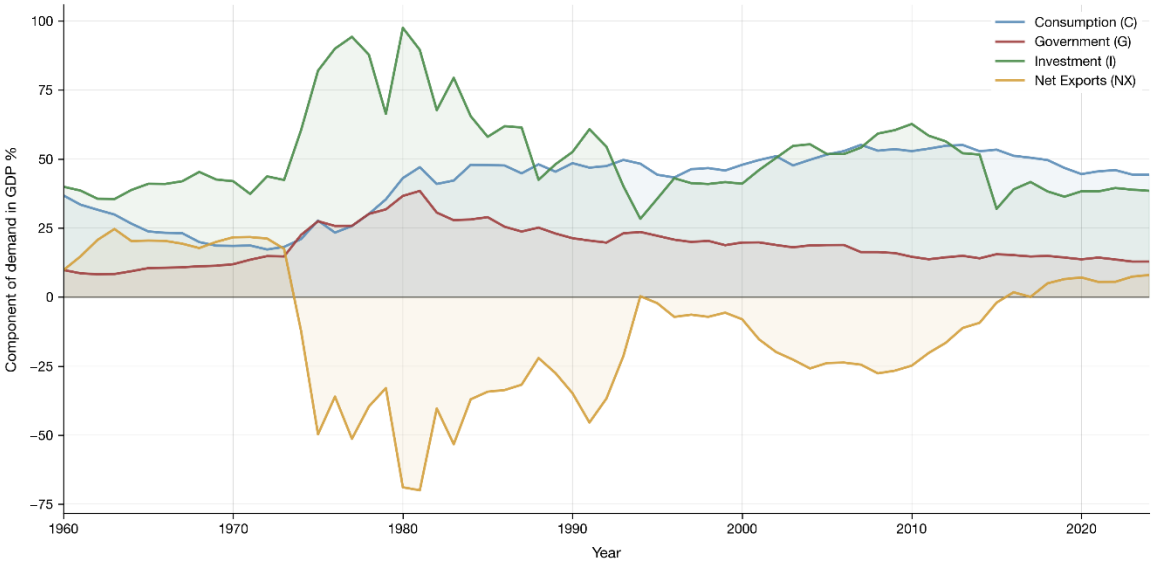
As illustrated in Figure 4, investment (gross capital formation, *I*) accounted for the largest share of aggregate demand up until the early 1980s. Following the establishment of the Islamic Republic in 1979, neither investment nor general government final consumption expenditure (*G*) has returned to its pre-revolution peak levels. In contrast, final consumption expenditure (*C*) of households and non-profit institutions serving households (NPISHs) has steadily increased its share in Iran's GDP. This pattern suggests a persistent shift away from development-oriented policies towards a more consumption-driven growth model. In particular, the Islamic Republic appears to have prioritised short-term, populist measures aimed at sustaining household consumption rather than investing in public infrastructure and fostering private-sector development.

Figure 3 / Iran's development of GDP and GDP per capita, 1960-2024



Source: WDI World Bank; authors' illustration

Figure 4 / Share of components of demand in GDP, 1960-2024

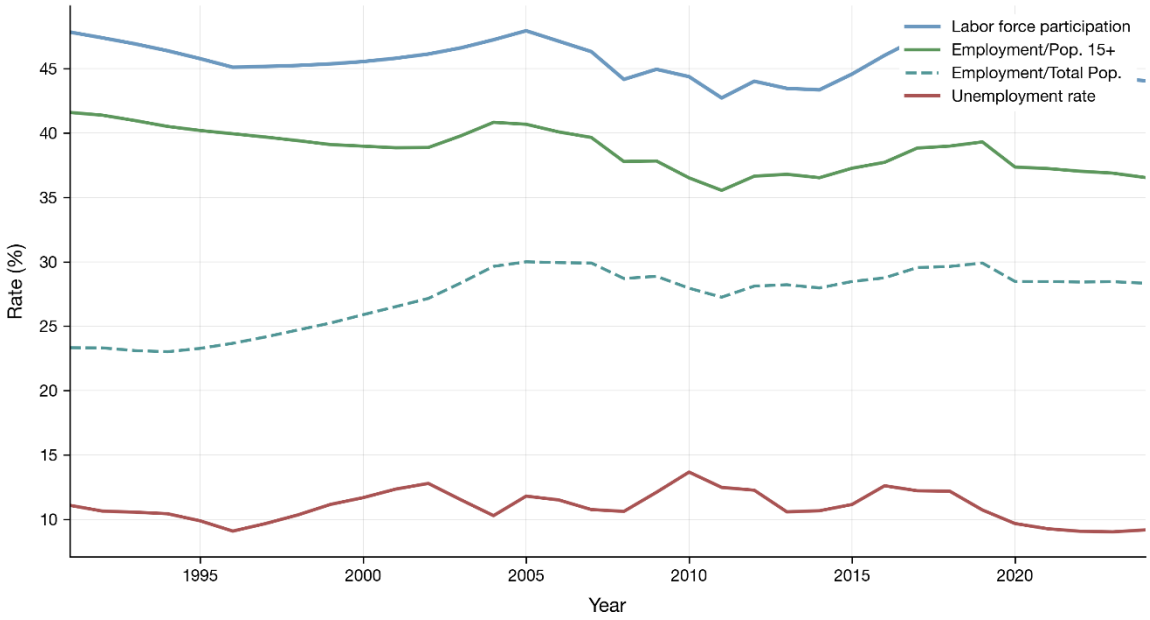


Source: WDI World Bank; authors' illustration

Iran's population has increased steadily, from 38.4 million in 1979 to 91.6 million in 2024, while successive five-year development plans have consistently failed to meet their stated targets. Although the official unemployment rate has declined in several periods (as shown in Figure 5), this improvement partly reflects a contraction of the labour force due to discouraged workers exiting the job market. Over the same period, the employment rate – defined as the ratio of employed persons to the population aged

15 and above – fell from 41.6% in 1991 to 36.5% in 2024. As a result of both weak labour-market performance and demographic changes, only 28.3% of Iran's total population was officially employed in 2024. By comparison, labour market outcomes in neighbouring and advanced economies are substantially stronger. For example, in 2024, the employment-to-population ratio for those aged 15 and above stood at 49.2% in Turkey and 57.3% in Austria.

Figure 5 / Labour market conditions, 1991-2024



Source: WDI World Bank; authors' illustration

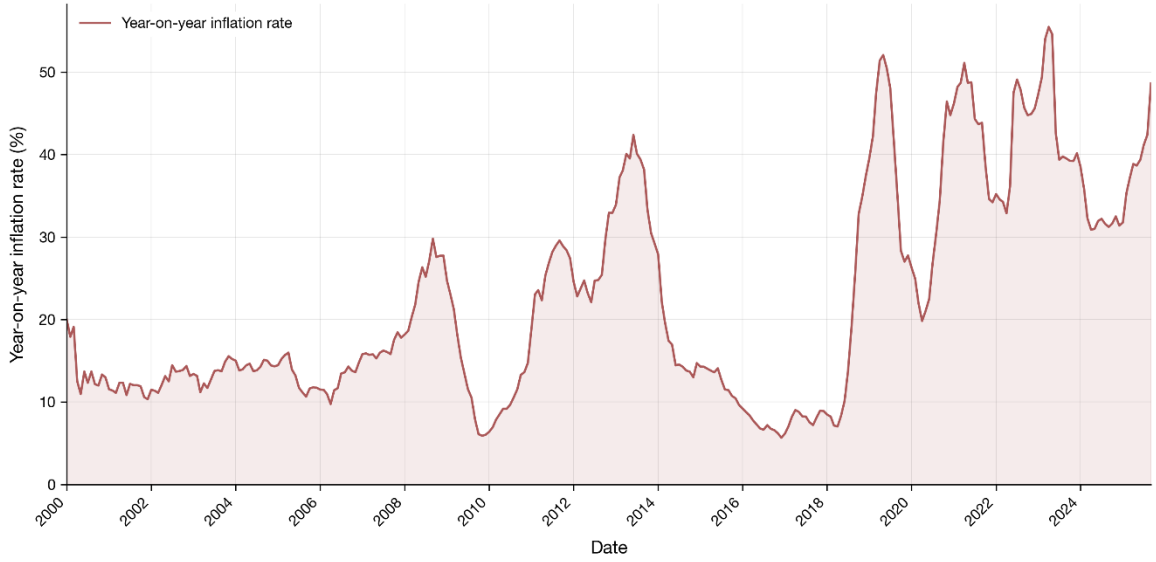
2.2.2. Exacerbating economic conditions since 2007

As noted earlier, the sanctions regime against Iran intensified during the 2006-2012 period. In 2006, the EU28 was Iran's largest trading partner, importing Iranian oil and exporting a wide range of goods and services (Ghodsi et al. 2018). GDP per capita between 2007 and 2020 remained largely stagnant and only began to increase after 2020 (Figure 3), presumably due to higher oil prices and the government's ability to bypass sanctions, as the administration of US President Joe Biden appeared to turn a blind eye to Iran's rising oil exports in an effort to reduce regional tensions (Blas 2023). Nevertheless, sanctions deprived Iran of its most important trading partner and simultaneously deprived the EU of a substantial source of revenue and resources.

With the implementation of the JCPOA on 16 January 2016, Iran had an opportunity to reintegrate into the global economy and actively invited foreign firms to sign memoranda of understanding (MoUs), aiming to attract billions of dollars in investment. However, regional tensions and ballistic missile issues remained unresolved, and Supreme Leader Ali Khamenei opposed the expansion of negotiations to other areas of concern. This stance ultimately prompted President Trump to withdraw the US from the JCPOA, reimpose previous sanctions, and introduce secondary sanctions that prohibited extraterritorial business engagement with Iran.

This hostile business environment severely weakened investment sentiment, resulting in capital depreciation exceeding gross fixed capital formation. It also triggered bankruptcies in the private sector and enabled the expanding public sector to encroach upon private economic activity. Government expenditure – including spending by ministries and all public and semi-public enterprises – reached approximately 80% of GDP, signalling the increasingly extractive nature of Iran's economic institutions. At the same time, secondary sanctions restricting oil exports drastically reduced fiscal space. Unable to finance its own budget, the government resorted to so-called 'resistance economy' policies primarily to maintain political power.

Figure 6 / Iran's year-over-year change in consumer price index (CPI), 2000-2025, %



Source: Statistical Center of Iran; authors' illustration

These policies included extensive borrowing from the Central Bank of Iran, which significantly expanded the money supply and fuelled inflation (see Figure 6). Moreover, to increase oil revenues in rials (IRR), the government has frequently devalued the national currency – often a few months before the fiscal year ends on 20 March – further raising prices through higher import costs. To mitigate the impact on basic necessities, the government introduced a preferential exchange rate for imports of essential goods (e.g. food, livestock feed and medicine). This rate was first implemented in April 2018 under President Hassan Rouhani and fixed at IRR 42,000 per US dollar, while the market exchange rate remained floating (BBC News Persian 2018).

Due to limited foreign-exchange reserves, the government was unable to stabilise the market rate. Escalating geopolitical tensions, combined with persistent sanctions, accelerated capital flight as households sought to protect their savings by converting rials into foreign currencies, thereby intensifying depreciation. Furthermore, with nominal bank interest rates capped at around 20% – far below inflation levels hovering near 40% – the resulting deeply negative real interest rates further encouraged capital flight and discouraged rial-denominated savings despite Iran's isolation from international financial markets.

Collectively, these dynamics contributed to the depreciation of the rial from approximately IRR 36,000 per US dollar in autumn 2016 to nearly IRR 1,600,000 per US dollar recently. As the gap between the preferential and market exchange rates widened, importers benefiting from subsidised foreign currency sold their goods at prices close to the market rate. In addition to accelerating inflation, this practice also generated substantial leakages in foreign-exchange reserves and financial markets, reinforcing rent-seeking behaviour and corruption.

These distortions eventually compelled Iran's parliament and the government of Ebrahim Raisi to abolish the preferential exchange rate in spring 2022 (VOA 2021) and to allow imports at the floating market rate, which was around IRR 270,000 per US dollar. The immediate consequence was a surge of more than 100% in the prices of basic commodities and food products. The resulting vicious cycle of inflation and depreciation forced the government to introduce a new preferential exchange rate of IRR 285,000 per US dollar in winter 2022. The immediate trigger for the most recent uprising in Iran, which was initiated by *bazaaris*, was the widespread rumours that the government intended to abolish this preferential rate as well in an attempt to curb foreign-exchange leakages at a time when the rial was already in sharp decline.

As noted earlier, the economy has been stagnating since 2007, and the persistent lack of investment has failed to generate sufficient employment. The public sector has continued to expand, while mounting budgetary constraints have forced the government to implement austerity measures. In recent years, the government has been unable to adjust minimum wages and public-sector salaries in line with inflation. In the context of persistently high inflation, the real incomes of households across several income deciles have declined by an estimated one third to one quarter. According to official statistics, approximately one third of the population lives below the absolute poverty line (BBC News Persian 2024); however, this figure is likely to underestimate the true extent of poverty given the widespread erosion of real incomes.

The decline in real incomes has translated into shrinking aggregate consumption and weakened domestic demand. As the rial has depreciated sharply, far fewer Iranians have been able to afford imported goods (e.g. electronics, mobile phones and laptops). Consequently, shopkeepers in traditional bazaars have experienced a severe decline in turnover. The combined effects of the falling rial and rumours in December regarding the abolition of the preferential exchange rate – which would have significantly increased the prices of imported necessities – triggered the first large-scale protests by *bazaaris* in the history of the Islamic Republic.

These economic indicators suggest that Iran's developmental failure cannot be attributed to sanctions alone – sanctions that themselves reflect the lack of foresight of the country's ideological leadership – but also to chronic policy mismanagement and weak development strategies. Collectively, these dynamics are characteristic of an extractive institutional framework (Robinson and Acemoglu 2012) that has not only generated political rents but has also systematically eroded the economic well-being of its citizens.

3. Quantitative assessment of the reintegration of Iran into the global economy on the European and German economies

The scenarios examined in this section are hypothetical and rest on the assumption of a comprehensive political transformation in Iran. They do not constitute a policy recommendation to lift or relax sanctions in the absence of deep and credible reforms, and they do not endorse engagement with the current regime under present conditions.

This section is organised into eight subsections. Subsection 1 provides a brief descriptive analysis of Iran's trade relations with the EU and Germany. Subsection 2 assesses the effects of sanctions on Iran's trade flows using a gravity model of trade. In Subsection 3, we analyse the general equilibrium (GE) effects of lifting sanctions on GDP across the three regions. Subsection 4 examines the GE effects of sanctions removal on bilateral trade flows. Subsection 5 analyses the GE effects of lifting sanctions on sectoral production in Iran. Subsection 6 evaluates the GE effects of reconstructing Iran's economy through productivity gains associated with convergence towards Turkey and South Korea. Subsection 7 discusses the effects of lower oil and gas prices on the EU. Finally, Subsection 8 briefly examines the potential effects of actively utilising the large and well-educated Iranian diaspora in Europe and Germany.

3.1. TRADE RELATIONS OF IRAN WITH THE EU AND GERMANY

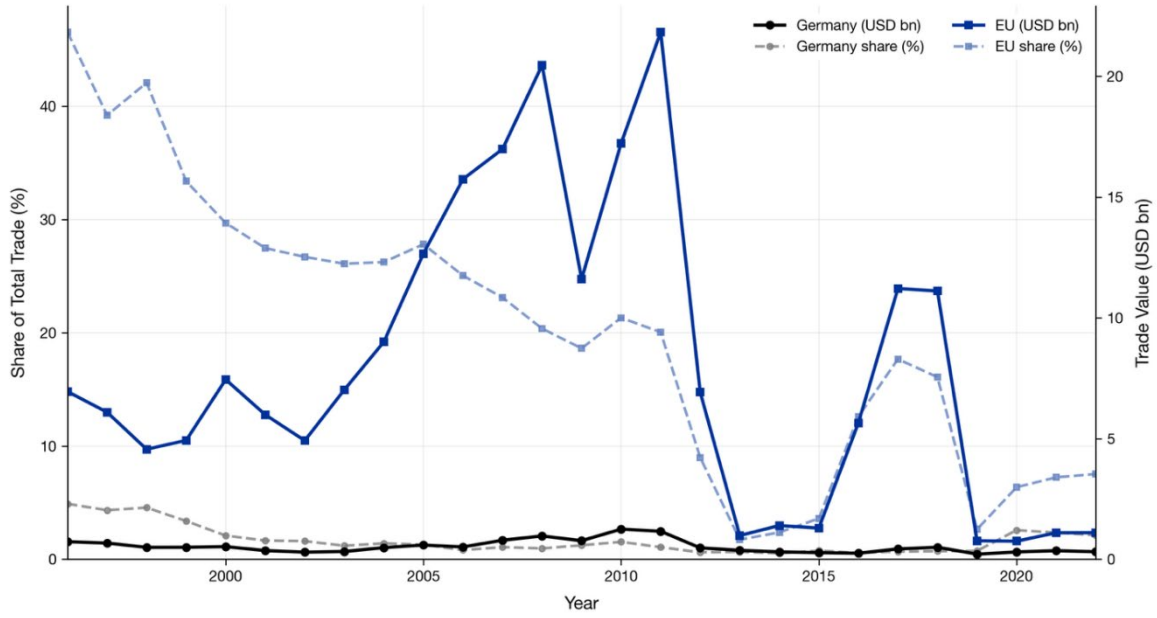
Figure 7 illustrates Iran's exports to Germany and the EU, both in absolute terms and as a share of Iran's total exports, as reported by importing countries on a cost, insurance and freight (CIF) basis. Figure 8 presents Iran's imports from Germany and the EU, again in levels and as a share of Iran's total imports, as reported by exporting countries on a free on board (FOB) basis.

The figures show that Iran has historically exported only limited amounts to Germany, while its exports to the EU as a whole have been substantially larger. However, Iran's exports to the EU have declined markedly over time. In particular, following the intensification of EU sanctions against Iran in the 2011-2012 period, Iranian exports to the EU were severely constrained, with their share in Iran's total exports falling from over 20% in 2011 to less than 1% in 2013. With the adoption of the JCPOA in October 2015, Iran's exports to the EU recovered and increased. However, after President Trump withdrew the US from the JCPOA and imposed secondary sanctions on third parties, Iranian exports once again declined, reaching their lowest levels since 2019.

As Figure 8 illustrates, Germany consistently exports more to Iran than it imports from it. EU exports to Iran began to increase around 2000, coinciding with the third year of the reformist presidency of Mohammad Khatami. A partial normalisation of relations between Iran and the EU in the early 2000s created a more favourable environment for economic engagement, leading to a renewed inflow of European FDI in Iran. This investment contributed to higher oil production and supported broader

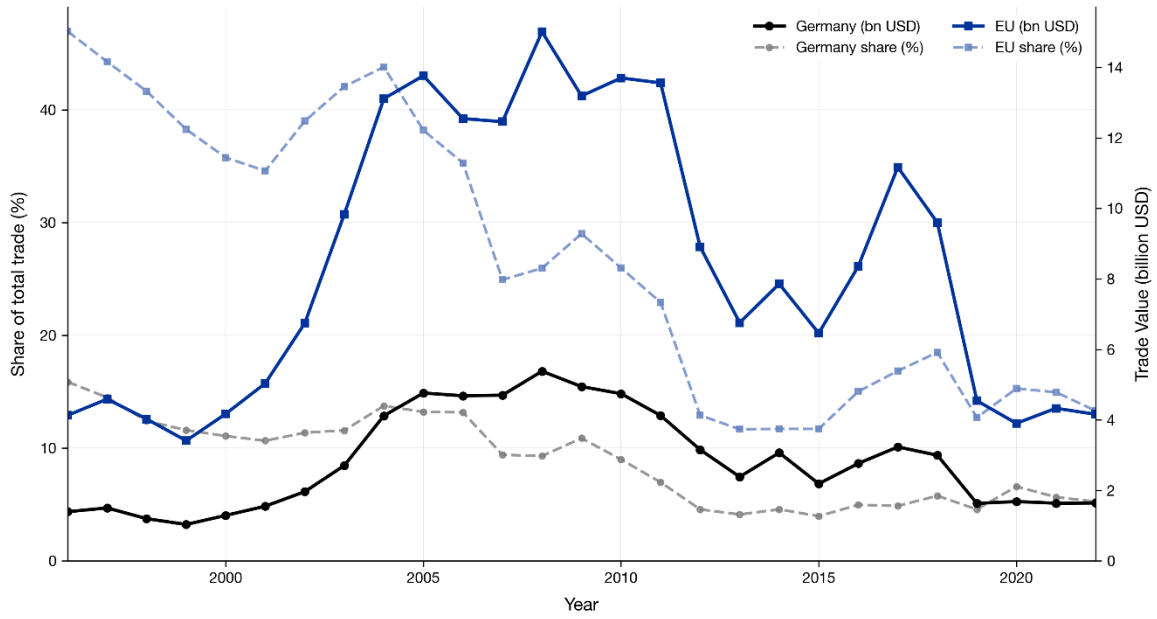
economic activity. Institutional reforms reinforced this process, most notably the adoption of the Foreign Investment Promotion and Protection Act (FIPPA) in 2002, which was enacted by a reform-oriented parliament and introduced legal safeguards and incentives aimed at attracting foreign investment.

Figure 7 / Iran's exports to Germany and the EU reported by importers, in CIF



Sources: The World Integrated Trade Solution (WITS), UN COMTRADE

Figure 8 / Iran's imports from Germany and the EU reported by exporters, in FOB



Sources: The World Integrated Trade Solution (WITS), UN COMTRADE

EU exports to Iran peaked at over USD 15.8 billion in 2008. Following the intensification of EU sanctions in 2011, EU exports to Iran amounted to USD 13.8 billion but subsequently declined sharply, falling to USD 6.9 billion by 2013. After the adoption of the JCPOA, EU exports recovered, rising from USD 6.6 billion in 2015 to USD 8.6 billion in 2016 and, further, to USD 11.5 billion in 2018. However, following the reimposition of secondary US sanctions in November 2018, EU exports once again declined, falling to around USD 4 billion in 2019. As noted earlier (in Figure 3), Iran experienced deep economic recessions in 2012, 2013, 2018 and 2019, years that closely followed major sanctions episodes.

3.2. THE IMPACT OF SANCTIONS ON TRADE FLOWS

To quantify the effects of sanctions on Iran as well as to assess the implications of their removal for trade, investment and GDP in Germany and the EU, we rely on the gravity model, which is the standard empirical framework used to analyse bilateral trade relationships. This framework is widely regarded as the workhorse model in international trade and is well suited to evaluating the trade effects of policy measures such as sanctions. The estimation strategy follows established best-practice recommendations for gravity models (Larch et al. 2025) and builds on recent work that documents heterogeneous sanctions effects across countries, sectors and types of measures (Felbermayr et al. 2025; Larch et al. 2022).

The empirical analysis is based on a comprehensive international dataset that combines bilateral trade flows with detailed information on trade policy measures, including sanctions. Trade data are drawn from the International Trade and Production Database for Estimation (ITPD-E), originally developed by Borchert et al. (2021) and used here in its most recent edition. The dataset covers more than 200 countries (including Iran) and around 170 industries – spanning agriculture, mining/energy, manufacturing and services – over the period from the mid-1980s to the early 2020s. A key advantage of the ITPD-E is that it includes both international and domestic trade flows, which improves the credibility of counterfactual analyses and ensures consistency with economy-wide assessments. In addition, the database is constructed directly from official trade and production statistics rather than from model-based input-output tables, making it particularly well suited for econometric estimation. The analysis distinguishes between three types of sanctions affecting Iran: EU sanctions imposed before 2012, EU sanctions imposed after 2012, and sanctions imposed by non-EU countries. Our main estimates are obtained at the sectoral level by pooling industries together. The corresponding industry-level estimates are reported in Table A.1 in Appendix A, while sectoral estimates are summarised in Table 1 in the main text and visualised in Figures 9a–c.

Across sectors, the results show that EU sanctions imposed after 2012 had the strongest and most pervasive negative impact on Iran's trade (Table 1; Figures 9a-c). As noted earlier, the EU significantly intensified and broadened its sanctions regime against Iran's economy in the 2011-2012 period. On average, these post-2012 EU sanctions reduced trade substantially more than earlier EU measures and far more than sanctions imposed by non-EU countries. This pattern is consistent with the tightening and broadening of EU restrictions after 2012 and highlights the central role of EU policy in shaping Iran's external economic relations.

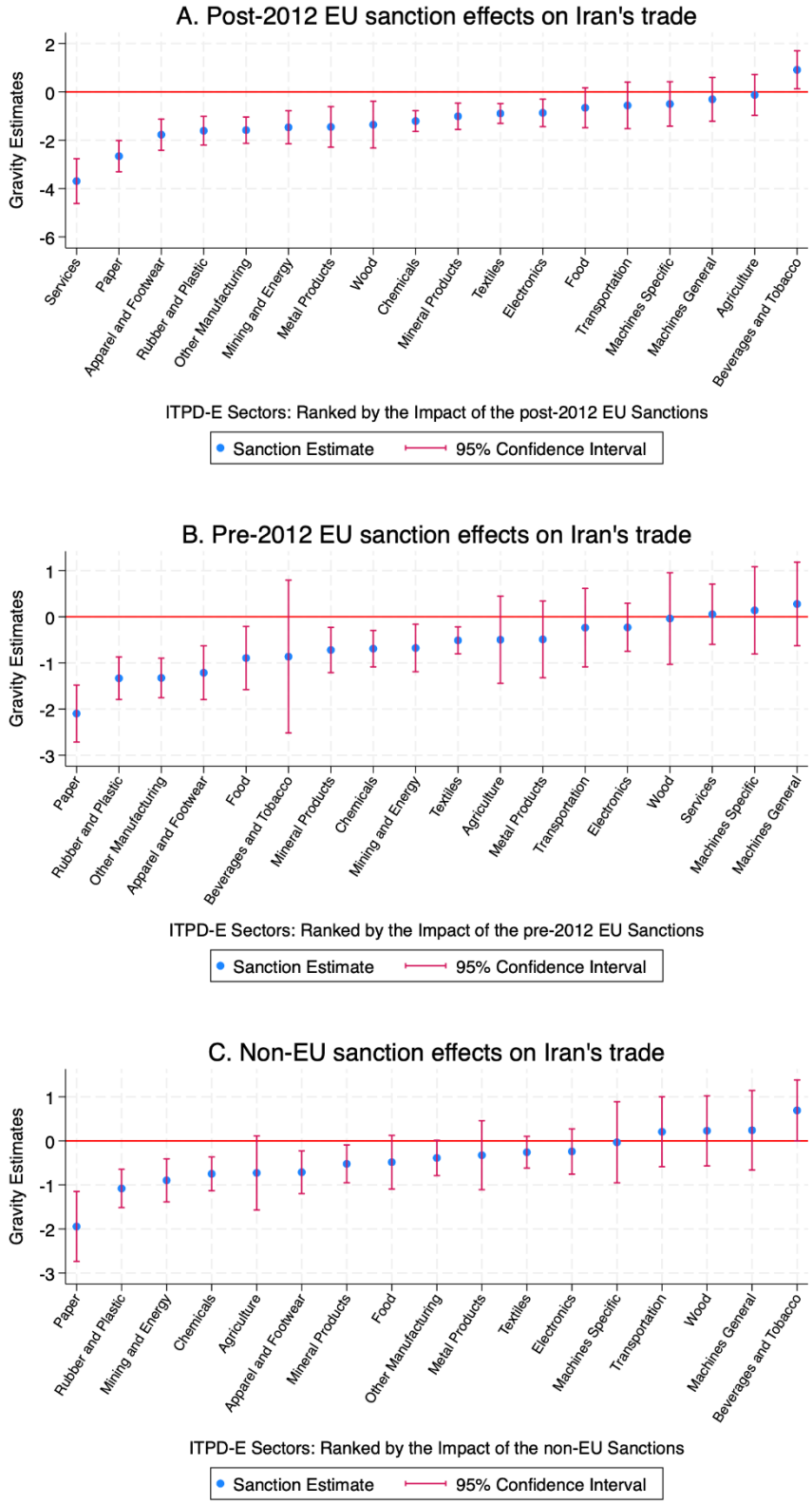
Table 1 / Sector-level estimates of the effects of the sanctions on Iran

Sector ID	Sector Description	A. Post-2012 EU		B. Pre-2012 EU		C. Non-EU	
		Est.	Std. Err.	Est.	Std. Err.	Est.	Std. Err.
1	Agriculture	-.124	(0.433)	-.498	(0.482)	-.728	(0.429)
2	Mining and Energy	-1.465	(0.349) ****	-.677	(0.262) **	-.897	(0.249) ***
3	Food	-.656	(0.421)	-.895	(0.349) *	-.484	(0.31)
4	Beverages and Tobacco	.913	(0.402) *	-.865	(0.845)	.691	(0.352) *
5	Textiles	-.893	(0.211) ****	-.512	(0.149) ***	-.259	(0.184)
6	Apparel and Footwear	-1.77	(0.328) ****	-1.214	(0.297) ****	-.712	(0.248) **
7	Wood	-1.357	(0.492) **	-.039	(0.506)	.228	(0.406)
8	Paper	-2.659	(0.33) ****	-2.098	(0.315) ****	-1.945	(0.406) ****
9	Chemicals	-1.207	(0.219) ****	-.692	(0.201) ***	-.749	(0.195) ***
10	Rubber and Plastic	-1.607	(0.302) ****	-1.333	(0.235) ****	-1.082	(0.221) ****
11	Mineral Products	-1.009	(0.277) ***	-.721	(0.25) **	-.523	(0.219) *
12	Metal Products	-1.448	(0.428) ***	-.491	(0.424)	-.325	(0.4)
13	Machines General	-.307	(0.462)	.276	(0.462)	.241	(0.46)
14	Machines Specific	-.5	(0.469)	.138	(0.482)	-.034	(0.47)
15	Electronics	-.866	(0.29) **	-.231	(0.266)	-.241	(0.262)
16	Transportation	-.56	(0.49)	-.237	(0.434)	.206	(0.406)
17	Other Manufacturing	-1.582	(0.278) ****	-1.326	(0.217) ****	-.387	(0.203)
18	Services	-3.691	(0.474) ****	.053	(0.332)		

Note: Robust standard errors in parentheses: * p<0.05, ** p<0.01, *** p<0.001, **** p <0.0001
Source: authors' estimations based on ITPD-E(R3)

When industries are grouped into 18 broad sectors – including agriculture, mining/energy, services and manufacturing – the results become more precise and economically intuitive (Table 1). Almost all sectors experienced large and statistically meaningful trade reductions following the post-2012 EU sanctions, with only one minor exception. By contrast, the effects of pre-2012 EU sanctions are generally smaller and less consistently significant across sectors. In nearly all cases, the negative impact of post-2012 EU sanctions exceed that of earlier EU measures, indicating a clear structural break in Iran's trade integration with Europe.

Figure 9 / The effects of sanctions on sectoral trade volume between Iran and the EU

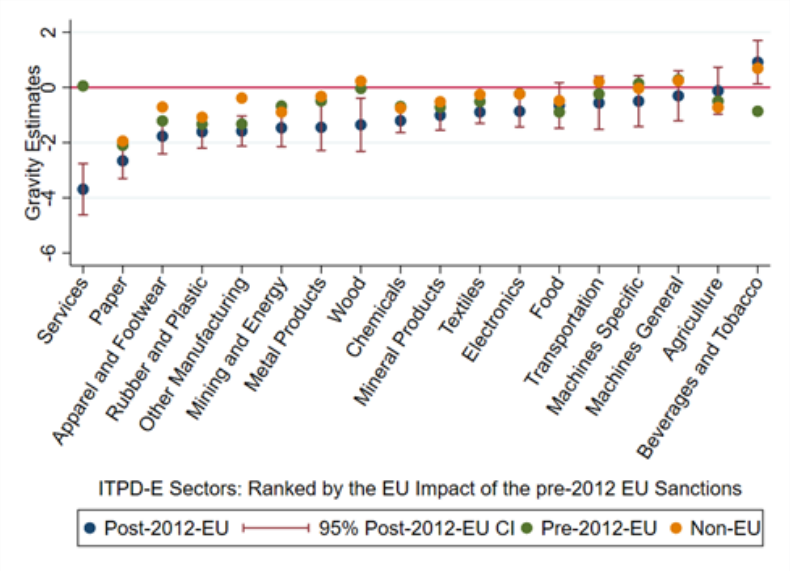


Source: authors' estimations based on ITPD-E(R3)

Sanctions imposed by non-EU countries are estimated to have significantly smaller effects at the sectoral level than EU sanctions (Table 1; Figure 9c). While these effects may still imply substantial losses for Iran – given the large number of non-EU trading partners – they are clearly less restrictive than EU measures. Overall, the sectoral results are coherent and robust, and they form the basis for the subsequent counterfactual analysis of how lifting sanctions and reintegrating Iran into global markets would affect trade, investment and GDP in Germany and the EU.

Based on the sectoral gravity coefficients for the post-2012 EU sanctions – estimated separately for 18 sectors – we construct a policy counterfactual by 'switching off' these sanctions and evaluating the implied trade response in 2022 at sectoral EU-Iran trade levels (i.e. aggregating sector-specific effects using 2022 trade as weights). This yields a rough aggregate estimate that EU-Iran bilateral trade would increase to USD 12.6 billion. As noted above, EU exports to Iran peaked at over USD 15.8 billion in 2008 and reached approximately USD 11.5 billion in 2018 following the JCPOA. Removing the post-2012 sanctions would therefore restore EU-Iran trade to a substantial level. The gains are strongly concentrated: four sectors each contribute more than USD 1 billion to the total – chemicals (USD 4.6bn), agriculture (USD 1.4bn), electronics (USD 1.4bn) and metals (USD 1.3bn) – highlighting that the implied rebound in EU-Iran trade is driven by a small set of high-impact sectors rather than being broadly diffuse.

Figure 10 / Post-2012 EU vs pre-2012 EU vs non-EU sanctions effects



Source: authors' estimations based on ITPD-E(R3)

3.3. THE EFFECTS OF LIFTING SANCTIONS ON GDP

To translate the gravity model estimates into economy-wide impacts on GDP, trade flows and sectoral production, we employ the KITE computable general equilibrium (CGE) model (Hinz et al. 2025; Felbermayr et al. 2023), which is based on the theoretical framework developed by Caliendo and Parro (2015). The KITE model is a multi-country, multi-sector general equilibrium trade model that incorporates input-output linkages across sectors and captures the full general equilibrium effects of trade policy changes through adjustments in wages, prices and resource allocation (see Appendix B for more discussion of the model).[1]

The model is calibrated to the Global Trade Analysis Project (GTAP) Database (version 11), with 2017 as the baseline year, updated to incorporate the most recent trade flow and value-added data as of November 2024. The database covers 141 countries and regions as well as 65 sectors, spanning agriculture, manufacturing, energy, and services. The calibration includes bilateral trade flows, production data, input-output relationships and trade costs. We use sector-specific trade elasticities to capture heterogeneous responsiveness to trade cost changes across industries.

All scenarios are simulated in the long run, so that production factors, trade patterns and consumption across countries and sectors have fully adjusted (5-10 years). Long-run elasticities imply that trade flows are more responsive to cost changes compared to the short run, reflecting the time needed for firms to establish new supply relationships and for resources to reallocate across industries.

Building on the gravity model estimates presented in Table 1, we construct a sanction-lifting scenario that quantifies the economy-wide effects of removing trade barriers on Iran. This scenario translates the gravity estimates of sanctions effects into changes in non-tariff barriers (NTBs) affecting Iran's trade. The gravity estimates indicate that post-2012 EU sanctions had the strongest negative impact on Iran's trade across most sectors (Table 1). Removing these sanctions corresponds to substantial trade facilitation: on average, trade costs would decline by approximately 60-80% for key sectors (e.g. chemicals, services and manufactured goods) and by 40-50% for mining and energy products. These reductions are applied bilaterally to all trade flows involving Iran – both exports from Iran to partner countries and imports to Iran from partners.

This scenario isolates the pure trade policy effect, holding productivity and other structural factors constant. We also examine combined scenarios that incorporate both sanctions removal and potential productivity growth in Iran; however, the productivity dimension is analysed separately in Section 3.4, which explores how Iran's economic reconstruction and catch-up could amplify the effects of trade normalisation.

Table 2 and Figure 11 present the long-run changes in real GDP (measured as welfare changes in the model) for Iran, Germany, the EU27 and the global economy under the sanctions-lifting scenario.

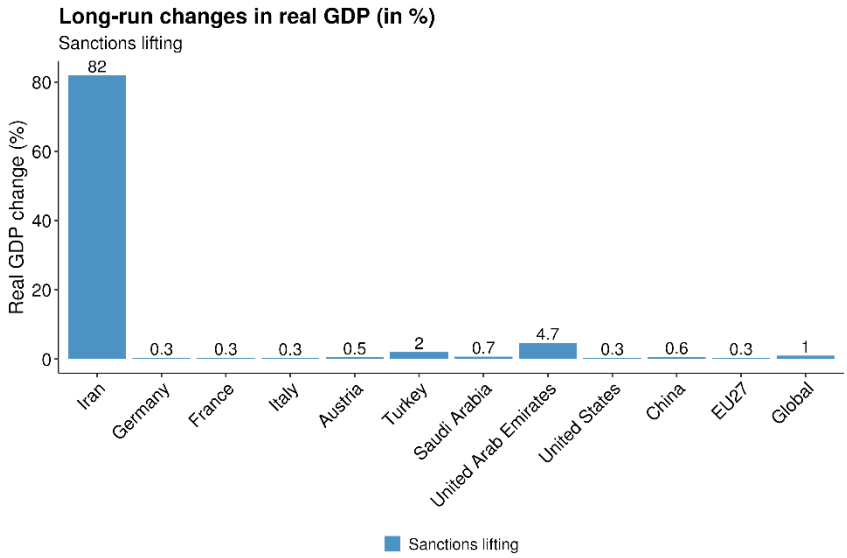
[1] KITE is a real general-equilibrium trade model and determines nominal prices and wages only up to a normalisation (numeraire). We solve the model in relative changes with a current-account closure that holds each country's trade balance fixed in baseline value terms (from GTAP). This pins the nominal scale in baseline USD units; nominal aggregates reported in USD should therefore be interpreted as baseline-dollar-valued changes, while real income changes are invariant to normalisation.

Table 2 / Real GDP changes under sanctions-lifting scenario (long run, %)

Country/Region	Sanctions Lifting
Iran	82.0
Germany	0.32
EU27	0.33
Global	0.97

Source: KITE model simulations based on GTAP 11 database (baseline year 2017, updated November 2024) and gravity model estimates from Table 1. See Section 4 for productivity-only and combined scenario results.

Figure 11 / Real GDP changes under sanctions-lifting scenario



Source: KITE model simulations based on GTAP 11 database (baseline year 2017, updated November 2024) and gravity model estimates from Table 1. See Section 3.4 for productivity-only and combined scenario results.

Iran's GDP gains

According to these calculations, Iran experiences dramatic GDP gains from sanctions removal alone: real GDP increases by 82.0% (Table 2; Figure 11). This extraordinarily large effect reflects the severity of Iran's current economic isolation. Sanctions have essentially cut Iran off from efficient participation in global value chains, limited its access to intermediate goods and capital equipment, and prevented it from exploiting its comparative advantages in energy, chemicals and other sectors.

The 82% GDP gain operates through several channels:

1. Direct trade expansion: Removing barriers allows Iran to export more goods to markets where it has a comparative advantage and to import goods that can be produced more cheaply abroad.
2. Access to intermediate inputs: Iranian firms gain access to foreign intermediate goods and capital equipment that are essential for production but were previously unavailable or prohibitively expensive due to sanctions.

3. Global value chain integration: Iran can participate in multi-stage production processes, both as a supplier of inputs and as an assembler of final goods.
4. Scale economies and variety gains: Larger export markets allow Iranian firms to achieve economies of scale, while consumers benefit from greater variety of imported goods.
5. Competitive pressures: Exposure to international competition forces efficiency improvements and resource reallocation towards more productive uses.

To put the 82% GDP increase in perspective, this would represent a transformative economic shift comparable to the gains experienced by formerly centrally planned economies following their integration into global markets in the 1990s (e.g. Vietnam, Poland) or by China following its accession to the World Trade Organization (WTO) in 2001.

Effects on Germany and the EU27

For Germany and the EU27, sanctions lifting generates positive but more modest GDP gains. Germany's real GDP increases by 0.32% and the EU27's by 0.33% (Table 2; Figure 11). While these percentage changes may appear small relative to Iran's gains, they represent economically significant effects:

› Germany's GDP in 2017/2024 was approximately USD 3.7/4.7 trillion; thus, a 0.32% increase translates to roughly USD 11.8/15.0 billion in additional annual GDP (USD 180 per capita).

› For Austria, the increase of GDP would be USD 2.51 billion per year (USD 274 per capita)

› The EU27's combined GDP was approximately USD 15.3/19.5 trillion; a 0.33% increase corresponds to approximately USD 50.5/64.3 billion in additional annual GDP (USD 143 per capita).

These gains arise from three sources:

1. Export opportunities: European firms gain access to Iran's market of over 91 million consumers, with pent-up demand for capital goods, machinery, consumer durables and services.
2. Import benefits: Lower-cost Iranian products (especially energy and chemicals) reduce input costs for European manufacturers and lower prices for consumers.
3. Efficiency gains: Improved allocation of production across countries raises aggregate productivity as each country specialises more according to comparative advantage.

The positive spill-overs to Europe underscore an important point: sanctions removal generates mutual gains, not a zero-sum redistribution. Both Iran and Europe benefit from the restoration of trade relationships.

Global welfare effects

At the global level, sanctions lifting generates aggregate welfare gains of 0.97% (Table 2). These substantial positive spill-overs extend well beyond Iran and Europe to include emerging markets and advanced economies in Asia, the Americas and other regions. Global gains arise from improved allocative efficiency as Iran reintegrates into international production networks and contributes to global supply chains in sectors where it has a comparative advantage.

3.4. EFFECTS OF LIFTING SANCTIONS ON TRADE

Table 3 and Figures 12 and 13 show the changes in bilateral trade flows between Iran and its major partners under the sanctions-lifting scenario.

Table 3 / Trade flow changes under sanctions-lifting scenario (baseline and change in USD m)

Trade flow	Baseline (2017)	Change (USD m)	Multiple
Iran → Germany	1,936	+83,683	44.2x
Iran → EU27	15,271	+463,000	31.3x
Germany → Iran	4,888	+75,899	16.5x
EU27 → Iran	16,488	+325,848	20.8x

Source: KITE model simulations based on GTAP 11 database. Baseline values reflect trade suppression under existing sanctions.

Iranian exports

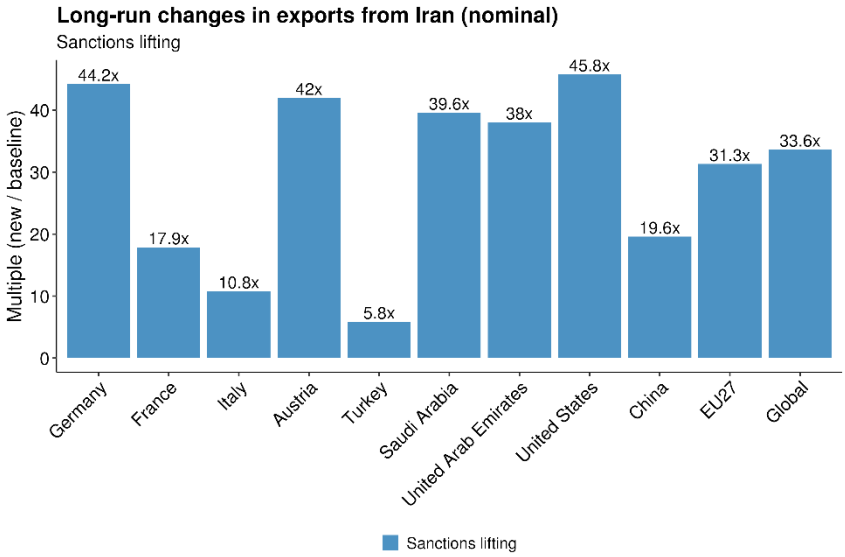
Sanctions lifting drives dramatic increases in Iranian exports to all major markets, as indicated in Figure 12:

› Exports to Germany increase by a factor of 44 (from a baseline of USD 1.9bn to USD 85.6bn)

› Exports to the EU27 as a whole increase by a factor of 31 (from USD 15.3bn to USD 478bn)

› Exports to China and other partners also show very large increases

Figure 12 / Changes in exports from Iran under sanctions-lifting scenario, in %



Source: KITE model simulations based on GTAP 11 database. Baseline values reflect trade suppression under existing sanctions.

These increases reflect both the removal of direct trade barriers and the expansion of Iran's productive capacity as it gains access to imported intermediates and capital goods necessary for production. The

sectoral composition of Iranian exports shows strong growth in energy and chemicals (i.e. Iran's traditional export sectors) but also substantial expansion in manufacturing and services, indicating potential for export diversification beyond commodities.

Imports to Iran (partner exports to Iran)

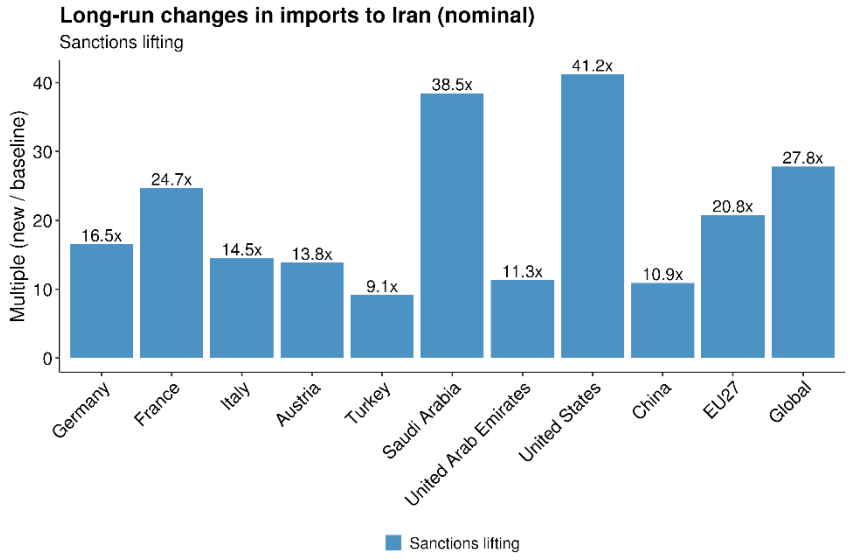
Sanctions removal also dramatically increases imports to Iran from major trading partners (Figure 13; Table 3):

› German exports to Iran rise by a factor of 16.5 (from a baseline of USD 4.9bn to USD 80.8bn)

› EU27 exports to Iran increase by a factor of 21 (from USD 16.5bn to USD 342bn)

These increases reflect pent-up demand for high-quality manufactured goods, machinery, transportation equipment and technology that Iran has been unable to access under sanctions. European exporters – particularly in machinery, automotive, chemicals and pharmaceuticals – stand to benefit substantially from renewed access to the Iranian market.

Figure 13 / Changes in imports to Iran under sanctions-lifting scenario, in %



Source: KITE model simulations based on GTAP 11 database. Baseline values reflect trade suppression under existing sanctions.

Trade changes in absolute terms

Under the sanctions-lifting scenario:

› Iranian exports to Germany would increase by approximately USD 83.7 billion annually (from a baseline of USD 1.9bn).

› Iranian exports to the EU27 would increase by approximately USD 463 billion annually (from a baseline of USD 15.3bn).

› German exports to Iran would increase by approximately USD 75.9 billion annually (from a baseline of USD 4.9bn).

› EU27 exports to Iran would increase by approximately USD 326 billion annually (from a baseline of USD 16.5bn).

These figures illustrate the substantial commercial opportunities that would arise from Iran's reintegration for European exporters and importers. The baseline trade values – which appear low – reflect the severe trade suppression already in effect under current sanctions. The very large percentage increases (1,500-4,300%) indicate the magnitude of the unrealised trade potential that sanctions have blocked.

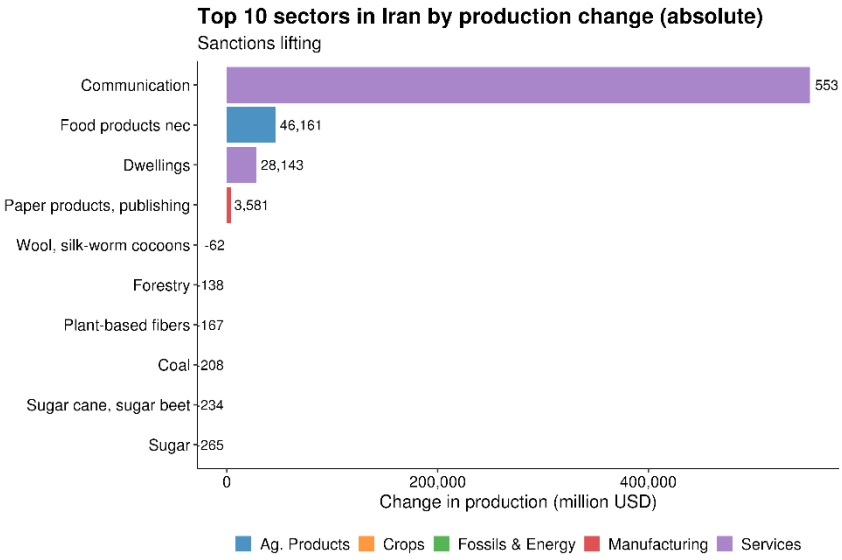
3.5. EFFECTS OF LIFTING SANCTIONS ON SECTORAL PRODUCTION IN IRAN

In absolute terms, the largest production increases occur in service and domestic-oriented sectors (Table 5, Figure 14):

1. Communication: +USD 553 billion
2. Food products: +USD 46 billion
3. Dwellings: +USD 28 billion
4. Paper products and publishing: +USD 3.6 billion

Notably, traditional export sectors (e.g. oil, petroleum products and chemicals) experience production declines as the economy undergoes structural transformation. This reflects the reorientation of resources towards services and domestic consumption as Iran reintegrates into global markets.

Figure 14 / Sectoral production changes in Iran in sanctions-lifting scenario (absolute, USD m)



Source: KITE model simulations based on GTAP 11 database. Baseline values reflect trade suppression under existing sanctions.

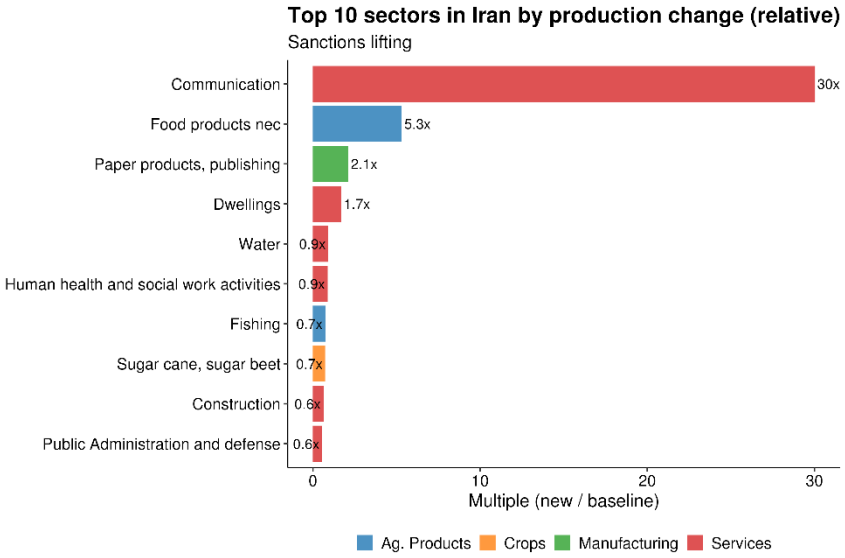
Relative production changes

In relative terms, the largest percentage increases occur in sectors that were most severely constrained by sanctions (Figure 15):

1. Communication: +2,903%
2. Food products: +431%
3. Paper products and publishing: +112%
4. Dwellings: +69%

These extraordinary growth rates in communication and food processing reflect the severe suppression of these sectors under sanctions and the enormous pent-up demand that would be unleashed by trade normalisation.

Figure 15 / Sectoral production changes in Iran in sanctions-lifting scenario (percentage)



Source: KITE model simulations based on GTAP 11 database. Baseline values reflect trade suppression under existing sanctions.

Implications for economic diversification

These sectoral results highlight a structural transformation of Iran's economy under sanctions removal. Rather than simply expanding existing export sectors, the economy reorients towards services, communication and domestic consumption. This transformation reflects several dynamics:

› **Import competition**: Traditional manufacturing and resource sectors face competition from more efficient foreign producers.

› **Domestic demand expansion**: Rising incomes from trade integration boost demand for services and consumer goods.

› **Resource reallocation**: Labour and capital shift from protected, inefficient sectors towards higher-productivity service activities.

Overall, this results in a more balanced, diversified economy that is less dependent on resource extraction.

3.6. EFFECTS OF THE RECONSTRUCTION OF THE DEVASTATED IRANIAN ECONOMY (PRODUCTIVITY GAINS THROUGH CATCHING UP)

Beyond the removal of trade barriers, a second critical dimension of Iran's potential economic reintegration concerns the reconstruction and modernisation of its productive capacity. Decades of international isolation, economic sanctions and restricted access to global markets have not only limited Iran's trade integration but also constrained its productivity growth. Sanctions have prevented Iranian firms from accessing advanced technologies, capital goods and management practices that are essential for productivity improvements. They have hindered FDI, technology transfer and participation in global value chains, all of which are key drivers of productivity catch-up in developing and emerging economies.

Iran's isolation has also resulted in aging capital stock, outdated production methods and limited exposure to competitive pressures that typically spur innovation and efficiency gains. Research on economic sanctions suggests that their productivity-dampening effects can be substantial and long-lasting while operating through multiple channels: restricted access to imported intermediate and capital goods, reduced knowledge spill-overs from international trade and investment, brain drain of skilled workers, and underinvestment due to economic uncertainty (Neuenkirch and Neumeier 2015; Ahn and Ludema 2020).

A regime transition that leads to sanctions relief and economic opening could reverse these trends, enabling Iran to embark on a productivity renaissance. Historical experience suggests that economic liberalisation and integration into global markets can trigger substantial productivity catch-up, particularly when countries adopt pro-growth policies, attract foreign investment and benefit from technology transfer. Examples include South Korea and Taiwan between the 1960s and 1980s, China following its opening after 1978 and, more recently, Vietnam and Turkey.

To quantify the potential economic impact of such a productivity recovery, we model three alternative scenarios that span a plausible range of productivity growth paths for Iran. These scenarios are based on historical precedents from countries that have experienced rapid productivity growth during periods of economic opening and structural transformation.

3.6.1. Productivity scenarios: benchmarks and calibration

We model productivity improvements in Iran using two benchmark countries based on current GDP per capita at purchasing power parity (PPP) ratios, representing moderate and optimistic convergence targets:

(i) Turkish growth rate (moderate scenario): This scenario assumes that Iran's productivity converges to Turkey's current level. According to World Bank data for 2024, Turkey's GDP per capita (PPP) is 2.07 times higher than Iran's. This scenario implies that Iranian productivity would need to more than double to reach Turkey's current level. Historical comparisons further support the relevance of this benchmark.

In 1976, Iran's real GDP per capita (in constant 2015 USD) stood at USD 7,422, substantially higher than Turkey's level of USD 4,092 (See Figure A1 in the Appendix A). By contrast, by 2024, Turkey's real GDP per capita had risen to USD 15,395, while Iran's had declined to USD 5,834, reflecting Turkey's markedly stronger long-term growth performance.

(ii) South Korean growth rate (optimistic scenario): This scenario represents an upper bound. South Korea's GDP per capita (PPP) is 3.15 times higher than Iran's. This scenario implies that Iranian productivity would need to more than triple to reach South Korea's current level. South Korea's real GDP per capita (in constant 2015 USD) was USD 3,294 in 1976, while it stood at USD 37,048 in 2024. South Korea's experience, often called the 'Miracle on the Han River', represents one of the most successful cases of productivity catch-up in economic history, and it was driven by aggressive export promotion, foreign technology adoption, and investments in education and infrastructure.

Differences in FDI further reinforce this assessment. According to OECD data, in 2024, inward FDI stocks amounted to around 17% of GDP in Turkey and to 15% in South Korea. While comparable stock data are not readily available for Iran, World Development Indicators (WDI) data show that over the period 1980-2024, Iran's average annual net FDI inflows amounted to only 0.46% of GDP, compared with about 0.82% in Turkey and 0.73% in South Korea. In Saudi Arabia, an energy-exporting economy that may be more comparable to Iran in terms of sectoral structure, average annual net FDI inflows stood at approximately 0.94% of GDP. These figures suggest that even a Turkey-based benchmark may remain conservative, as a post-transition Iran could plausibly attract substantially larger FDI inflows, strengthening absorptive capacity and accelerating productivity growth.

These productivity improvements are modelled as Hicks-neutral technology shocks applied uniformly across all sectors in the Iranian economy. In the KITE model, productivity changes affect the economy through several channels: they reduce production costs, increase real wages, alter comparative advantage across sectors, and affect Iran's terms of trade with the rest of the world.

3.6.2. Results: productivity-only scenarios

Table 4 presents the results of the productivity-only scenarios – that is, scenarios where Iran experiences productivity growth, but sanctions remain in place. These counterfactuals isolate the pure productivity effect, abstracting from trade policy changes.

Table 4 / Real GDP changes under productivity-only scenarios (long run, %)

Country/Region	Productivity (Turkish)	Productivity (S. Korean)
Iran	103.3	206.7
Germany	-0.03	-0.06
EU27	0.005	0.007
Global	0.65	1.3

Source: KITE model simulations based on GTAP 11 database (baseline year 2017, updated November 2024). Productivity changes are modelled as Hicks-neutral technology shocks applied uniformly across all sectors in Iran.

Iran experiences substantial GDP gains from productivity growth alone, even without sanctions removal. Iran's real GDP increases by 103.3% under the Turkish growth rate scenario and by 206.7% under the South Korean growth rate scenario (Table 4). These gains reflect the direct effect of productivity

improvements on Iran's productive capacity: higher productivity allows the same inputs (labour and capital) to generate more output, raising national income.

For Germany and the EU27, the productivity-only scenarios generate very small or slightly negative GDP effects (Table 4). Germany experiences GDP changes ranging from –0.03% to –0.06%, while the EU27 sees changes between +0.005% and +0.007%. These near-zero or mildly negative effects reflect terms-of-trade dynamics: as Iranian productivity rises, Iran's export prices decline (making Iranian goods more competitive), which benefits Iranian consumers but creates competitive pressure for producers in third countries. However, the magnitude of these effects is extremely small – and essentially negligible in economic terms.

At the global level, the productivity-only scenarios generate modest positive welfare gains of 0.65% to 13% of global GDP, depending on the scenario (Table 4). These gains arise because higher Iranian productivity increases the global supply of goods, reduces prices for Iranian exports, and improves allocative efficiency in international trade. However, these global effects are smaller than under the sanctions-lifting scenario because trade barriers continue to limit Iran's integration into global markets.

Price effects under productivity scenarios show Iran experiencing price declines of 3.9% to 7.3%, reflecting the deflationary impact of productivity growth (Table 5). In contrast, under sanctions lifting alone, Iran's price level rises by over 40%, driven by shifts in demand and resource reallocation. Germany and the EU27 experience small price declines (approximately 1.5% to 2.3%, respectively) under productivity-only scenarios, benefiting from lower prices for Iranian goods.

3.6.3. Mechanisms and channels of productivity growth

The productivity improvements modelled in these scenarios operate through several economic mechanisms:

› Technology transfer and capital deepening: Sanctions relief would enable Iran to import advanced machinery, equipment and intermediate goods that embody frontier technologies. This capital deepening – alongside better access to digital technologies, software and industrial processes – would raise labour productivity across manufacturing and service sectors.

› Knowledge spill-overs and learning-by-exporting: Integration into global value chains exposes domestic firms to international best-practices, quality standards and competitive pressures. Research shows that firms engaged in exporting experience faster productivity growth due to learning effects, scale economies and access to larger markets (Melitz 2003; Bernard et al. 2007).

› Foreign direct investment (FDI): Economic opening would attract FDI, which brings not only capital but also managerial expertise, organisational know-how and access to global distribution networks. FDI has been a key driver of productivity catch-up in East Asia, Eastern Europe and Latin America.

› Human capital and brain drain reversal: Economic isolation has contributed to significant emigration of skilled workers and educated professionals from Iran. A more open and dynamic economy could reverse some of this brain drain, attracting back talented expatriates and encouraging domestic retention of human capital.

› Competition and creative destruction: Exposure to international competition forces less efficient firms to exit or improve, reallocating resources towards more productive uses. This 'creative destruction' process is essential for sustained productivity growth.

3.6.4. Enabling factors and policy prerequisites

While the productivity scenarios modelled here assume substantial growth rates, achieving these outcomes in practice would require supportive policies and institutional reforms:

› Trade liberalisation and WTO accession: Full integration into the multilateral trading system would provide credible commitment to open markets and attract foreign investment.

› Investment in infrastructure: Decades of underinvestment in transportation, energy and digital infrastructure would need to be addressed to support productivity growth.

› Education and skills development: Upgrading technical and vocational education systems to align with modern industry needs would be essential for absorbing new technologies.

› Institutional quality and rule of law: Strengthening property rights, contract enforcement and regulatory quality would create a favourable environment for private-sector investment and innovation.

› Financial sector development: A well-functioning financial system is needed to allocate capital efficiently, support entrepreneurship and facilitate technology adoption.

The experiences of successful catch-up economies suggest that these factors are mutually reinforcing. Trade openness creates demand for better institutions, FDI brings pressure for regulatory improvements, and export success generates resources for infrastructure investment.

Comparison with the sanctions-lifting scenario

Comparing the productivity-only scenarios with the sanctions-lifting scenario (Section 3.1) reveals an important asymmetry:

› Sanctions lifting alone (without productivity growth) generates GDP gains of 82% for Iran and positive spill-overs of 0.32-0.33% for Germany and the EU27.

› Productivity convergence alone (without sanctions removal) generates GDP gains of 103-207% for Iran but near-zero or slightly negative effects for Germany and the EU.

This asymmetry reflects the different mechanisms at work. Sanctions lifting creates mutual gains through expanded trade: Iran gains access to imports and export markets, while European firms gain access to the Iranian market. In contrast, productivity growth in an isolated Iran primarily benefits Iran itself, with limited spill-overs to trading partners due to continued trade barriers.

Notably, productivity convergence generates larger GDP gains for Iran than sanctions lifting alone (103-207% vs. 82%, respectively), reflecting the substantial productivity gap that has accumulated over decades of isolation. However, these gains remain largely confined to Iran when trade barriers remain in place.

At the same time, the full potential of Iran's reintegration emerges when productivity growth and sanctions removal occur together, enabling Iran to modernise its economy while simultaneously integrating into global markets. This combination would generate transformative gains for Iran and substantial commercial opportunities for European firms while contributing to global economic welfare through improved efficiency and expanded trade. Those scenarios are described in the next section.

3.6.5. Combined scenarios: sanctions removal plus productivity growth

The most comprehensive and realistic reintegration scenarios combine both sanctions removal and productivity growth. These combined scenarios represent what full economic reconstruction would look like: Iran not only normalises its trade relations with the world but also embarks on a productivity renaissance enabled by access to technology, capital goods, foreign investment and integration into global value chains.

We model two combined scenarios, pairing sanctions lifting with each of the two productivity growth trajectories:

› Combined (Turkish): Sanctions removal + 103.3% productivity growth

› Combined (South Korean): Sanctions removal + 206.7% productivity growth

Table 5 presents the real GDP effects under the three combined scenarios.

Table 5 / Real GDP changes under combined scenarios (long run, %)

Country/Region	Combined (Turkish)	Combined (S. Korean)
Iran	239.9	388.5
Germany	0.49	0.61
EU27	0.53	0.70
Global	2.22	3.35

Source: KITE model simulations based on GTAP 11 database (baseline year 2017, updated November 2024)

Results: real GDP effects under combined scenarios

Iran's GDP gains under the combined scenarios are transformative, exceeding 100% (Table 5):

› Combined (Turkish): +239.9% (Iran's GDP nearly quadruples)

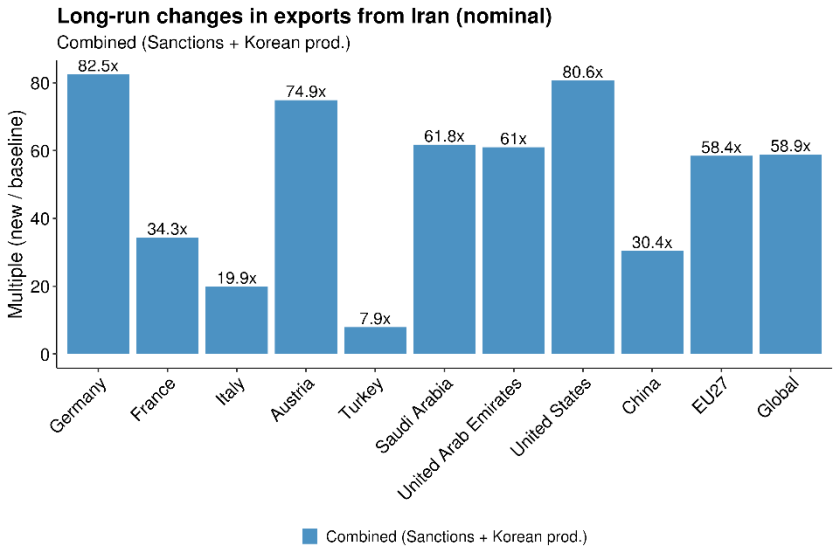
› Combined (South Korean): +388.5% (Iran's GDP nearly quintuples)

These results demonstrate that the combination of trade opening and productivity growth creates effects that are more than additive, as they are mutually reinforcing. Sanctions removal allows Iran to access the imported inputs and technology needed for productivity gains, while productivity improvements enhance Iran's competitiveness in newly opened export markets.

Trade flow effects under combined scenarios

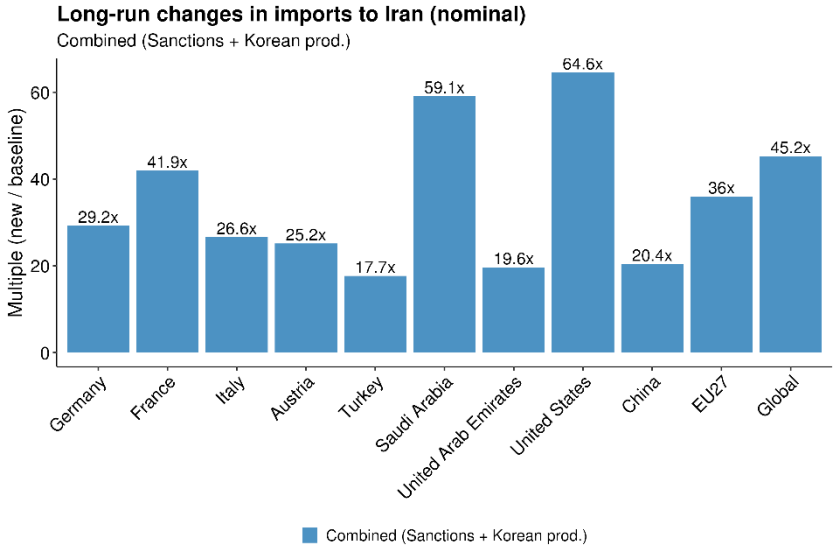
Figures 16 and 17 show trade flow changes under the combined (South Korean) scenario, which represents the most optimistic but still plausible reintegration path. Iranian exports expand dramatically (Figure 16), with exports to Germany increasing by a factor of 82.5 (+USD 157.9bn, from USD 1.9bn to USD 159.8bn) and to the EU27 by a factor of 58.4 (+USD 876.8bn, from USD 15.3bn to USD 892.0bn). Exports globally increase across all partners.

Figure 16 / Changes in exports from Iran – combined scenario (South Korean)



Source: KITE model simulations based on GTAP 11 database. Baseline values reflect trade suppression under existing sanctions.

Figure 17 / Changes in imports to Iran – combined scenario (South Korean)



Source: KITE model simulations based on GTAP 11 database. Baseline values reflect trade suppression under existing sanctions.

Imports to Iran also surge (Figure 17). German exports to Iran would increase by a factor of 29.2 (+USD 138.0bn, from USD 4.9bn to USD 142.9bn), and EU27 exports to Iran by a factor of 36.0 (+USD 576.7bn, from USD 16.5bn to USD 593.2bn). Again, imports from all major partners increase substantially.

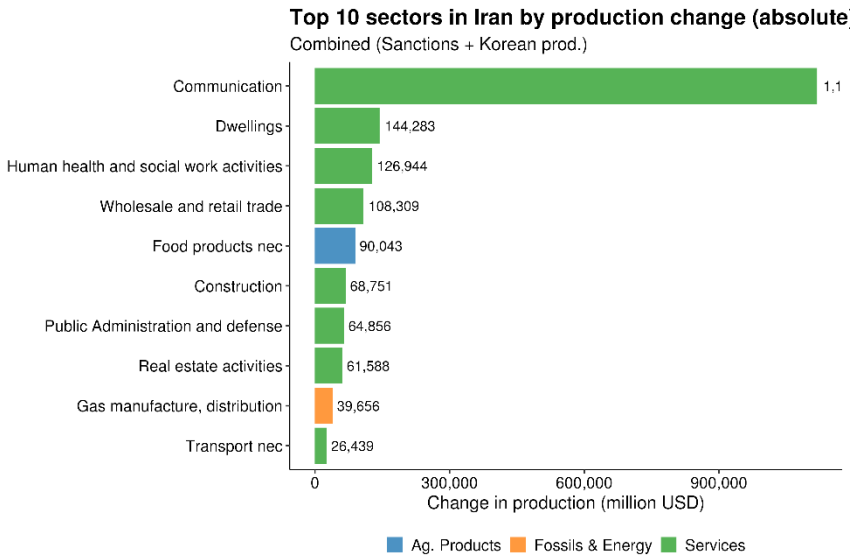
These trade flows illustrate the enormous commercial opportunities that comprehensive reintegration would create for European exporters, particularly in machinery, transportation equipment, chemicals and business services.

Price and sectoral effects

Unlike the sanctions-only scenario, where Iran experienced 40% price increases, the combined scenario shows Iran's price index rising by 34.3% – moderated by the deflationary effect of productivity growth. Germany and the EU27 experience price declines of approximately 4.2-4.3%, benefiting consumers and firms through lower costs.

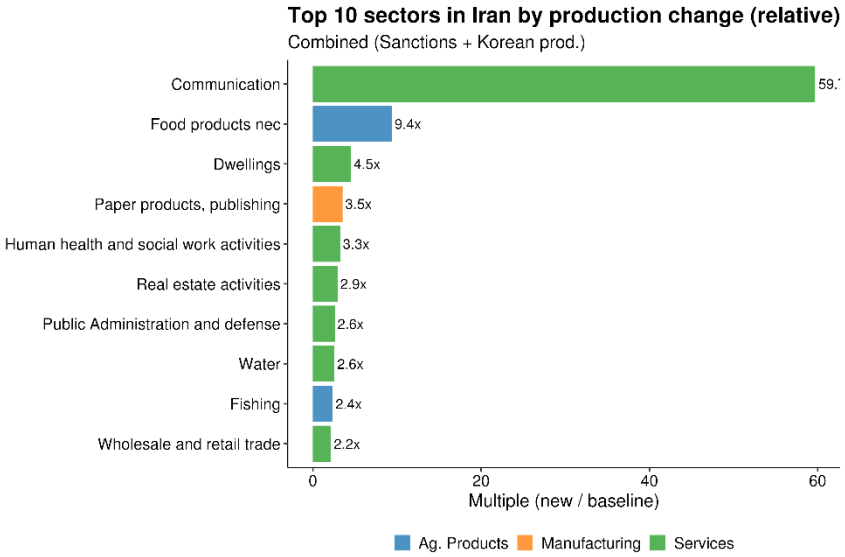
Figures 18 and 19 show sectoral production changes in Iran under the combined (South Korean) scenario. In absolute terms (Figure 18), the largest production increases occur in: (1) communication: +USD 1.12 trillion; (2) dwellings: +USD 144 billion; (3) education: +USD 40 billion; (4) construction: +USD 69 billion; and (5) food products: additional gains. Note that many traditional sectors (e.g. oil, chemicals, electricity) show production declines as the economy reorients towards services and domestic consumption. This reflects a structural transformation away from resource extraction towards a more diversified, service-oriented economy. In relative terms (Figure 19), the highest growth rates occur in: (1) communication: 59.7x baseline; (2) dwellings: 4.5x baseline; (3) fishing: 2.4x baseline; and (4) sugar crops: 2.1x baseline.

Figure 18 / Sectoral production changes in Iran (absolute) – combined scenario (South Korean)



Source: KITE model simulations based on GTAP 11 database. Baseline values reflect trade suppression under existing sanctions

Figure 19 / Sectoral production changes in Iran (percentage) – combined scenario (South Korean)



Source: KITE model simulations based on GTAP 11 database. Baseline values reflect trade suppression under existing sanctions.

These results indicate that Iran's reintegration would trigger a structural transformation of the economy. While traditional export sectors (e.g. oil, chemicals) may contract as they face international competition, service sectors and domestic-oriented industries would expand dramatically, reflecting the shift towards a more balanced and diversified economy.

3.6.6. Conclusion: full economic reintegration

Iran's full economic reintegration – combining sanctions removal with productivity catch-up – would represent one of the most significant economic transformations of the twenty-first century.

Table 6 / Complete summary of all scenarios

Country/Region	Sanctions Only	Productivity (Turkish)	Productivity (S. Korean)	Combined (Turkish)	Combined (S. Korean)
Iran	82.0	103.3	206.7	239.9	388.5
Germany	0.32	-0.03	-0.06	0.49	0.61
EU27	0.33	+0.005	+0.007	0.53	0.70
Global	0.97	0.65	1.30	2.22	3.35

Source: KITE model simulations. Shows selected scenarios for comparison.

The combined scenarios (see Table 6) show that:

1. Iran could see GDP gains of 240-390%, a four- to five-fold increase that would lift tens of millions out of poverty and create a modern, diversified economy integrated into global value chains.

2. Germany and the EU27 would gain substantially (+0.49-0.70% GDP), with bilateral trade flows increasing by tens to hundreds of billions of dollars annually, creating massive commercial opportunities for European firms.
3. The global economy would benefit (+2.2-3.3% welfare), with positive spill-overs extending worldwide through improved efficiency and expanded trade networks.
4. **Sanctions removal and productivity growth are strongly complementary**, creating mutually reinforcing dynamics that amplify the gains from each channel.

These findings have profound implications for policy. They demonstrate that a negotiated settlement leading to Iran's reintegration would generate substantial mutual gains for Iran, Europe and the global economy. The economic case for diplomacy and engagement is compelling: comprehensive reintegration would create a rare win-win-win outcome in international economics.

3.7. EFFECTS OF LOWER OIL AND GAS PRICES

3.7.1. Investment in Iran's oil production

As discussed earlier, before the Islamic Revolution in 1979, due to enormous FDI by the UK and the US, Iran had very large oil-producing capacities – of approximately 5.9 million barrels per day (mbd), or around 20% of OPEC production. Owing to tight sanctions and a lack of investment in Iran's oil fields in the past decade, it only has the capacity to produce around 3.2-3.6 mbd, out of which about 2 mbd are exported to global markets (mainly China and India through camouflage techniques and tanker swaps in open seas). In 2026, about 108.7 mbd will be produced globally (IEA 2026), 40% of which will be supplied by OPEC countries. This means that only about less than 3% of the global oil will be produced in Iran. Thus, one could expect that political change and the removal of sanctions would lead to an enormous inflow of FDI into Iran, which in turn would boost its production capacities to at least the pre-revolution level. Such an expansion would correspond to a 2.5% increase in the global oil supply.

A simple first-order approximation of the oil price response to a supply shock uses the standard small-change approximation, which assumes linear supply and demand curves around the initial equilibrium. In this framework, the percentage change in price ($\%\Delta P$) associated with a percentage change in quantity ($\%\Delta Q$) can be expressed as:

$$\%\Delta P = \frac{\%\Delta Q}{\varepsilon_d - \varepsilon_s}$$

where ε_d and ε_s are the short-run price elasticities of demand and supply, respectively.[2] This identity follows directly from totally differentiating linearised supply and demand equations and solving for the price adjustment that clears the market given a shift in supply. Using this expression, the estimated

[2] Using a standard first-order partial-equilibrium approximation, obtained by totally differentiating log-linear supply and demand around the initial equilibrium, the percentage change in price induced by an exogenous quantity shift can be expressed as the ratio of the supply shock to the difference between demand and supply elasticities (Varian 2010; Pindyck and Rubinfeld 2018). This approximation is widely used in the energy economics literature to translate estimated elasticities into price effects (e.g. Caldara et al. 2019). See the explanations in Appendix C.

effect of restoring Iran's oil output from 3.2 mbd to its pre-revolution capacity of 5.9 mbd implies a rise in the global supply of about 2.5%, as noted above.

Empirical evidence from structural vector autoregression (SVAR; Uría-Martínez et al. 2018) models and related meta-analyses indicates that short-run oil demand is highly inelastic, with many studies finding values close to zero or in the low negative range (i.e. small absolute values) when measured at monthly frequencies. For example, meta-analysis by Uría-Martínez et al. (2018) shows that the oil market literature often cites demand elasticities on the order of −0.07 to −0.14 in the short run, reflecting the limited immediate responsiveness of consumption to price changes at the global level. Similarly, short-run supply elasticities are typically estimated to be low as well (Caldara et al. 2016), with influential analyses using values around 0.10 for both supply and demand elasticities in the impact period of a shock. These estimates are drawn from SVAR-identification strategies that match meta-analysed elasticity targets to observed price and quantity dynamics in the global crude oil market. Under these parameterisations, a 2.5% positive supply shock mechanically translates into a roughly 6-15% reduction in the price of crude oil, holding other factors constant and abstracting from strategic responses by OPEC or other producers.

3.7.2. Investment in Iran's gas fields

As with oil, Iran's natural gas sector has been strongly shaped by sanctions and long-term underinvestment even though Iran possesses some of the world's largest proven reserves. Iran and Qatar jointly share the South Pars/North Field, the largest conventional gas field globally. While Qatar has been able to fully exploit its side of the field (i.e. the North Field, also referred to as the South Pars/North Dome field) through sustained FDI, advanced offshore technologies and large-scale liquefied natural gas (LNG) infrastructure, Iran's development of South Pars has proceeded slowly and unevenly, as it has been constrained by sanctions, limited access to capital, and technological bottlenecks. As a result, although Iran holds roughly 17% of global proven gas reserves, its effective participation in international gas markets remains limited.

By the mid-2020s, Iran's gross natural gas production stood at roughly 250-270 billion cubic metres (bcm) per year, making Iran one of the world's top producers overall. However, most of produced gas is absorbed domestically for power generation, household consumption, reinjection into aging oil fields, and subsidised industrial use with large inefficiencies, smuggling leakages and wastes. In contrast, Qatar produces over 180 bcm per year from the same geological structure and exports the bulk of it as LNG, accounting for nearly 20% of the global LNG supply. Iran's lack of LNG export capacity and insufficient pressure-maintenance investment in South Pars imply not only foregone export revenues but also a gradual loss of recoverable gas due to asymmetric drainage in the shared reservoir. In the event of political normalisation and sanctions relief, substantial FDI could enable Iran to accelerate upstream development, reduce flaring and reinjection inefficiencies, and, critically, enter LNG markets, potentially adding 50-80 bcm annually to the globally tradable gas supply over the medium term.

The price impact of such an expansion can be analysed using a framework analogous to the oil market, though with important differences. Unlike those for oil, natural gas markets – and that of LNG, in particular – are more regionally segmented, and short-run elasticities tend to be even lower due to infrastructure constraints, long-term contracts and limited fuel substitutability in power generation.

Empirical studies consistently find that short-run natural gas demand is highly inelastic, with elasticity estimates typically ranging between −0.05 and −0.20 (Labandeira et al. 2017; Bernstein and Griffin 2006). On the supply side, infrastructure constraints, particularly in LNG markets, imply very low short-run supply elasticities, often below 0.1 (Egging et al. 2010; IEA 2023).

Under these conditions, a sustained Iranian supply increase of, for example, 60 bcm per year (equivalent to roughly 1.5-2% of global gas production but a larger share of LNG-traded volumes) could exert meaningful downward pressure on international gas prices, particularly in LNG-importing regions. Mechanically, such an expansion could translate into price declines on the order of 10-20% in affected spot markets, holding demand constant and abstracting from strategic responses by Qatar, other LNG exporters or pipeline suppliers.

As with oil, these estimates represent a partial-equilibrium benchmark. In practice, Qatar and other major gas exporters may respond strategically by adjusting expansion timelines, renegotiating long-term contracts and/or delaying marginal LNG investments. Nonetheless, the asymmetric development of the South Pars/North Field highlights a substantial opportunity cost for Iran and underscores how political normalisation and FDI could materially reshape regional and global gas markets, arguably with even stronger price effects than in the case of oil given the tighter constraints and lower elasticities characterising the natural gas sector.

3.7.3. The additional effects of geopolitics on the energy market

The reintegration of the Iranian economy into global markets through the lifting of sanctions and associated productivity and supply gains would likely have positive and timely growth effects for Germany and the EU via lower and more stable energy prices. Empirical evidence shows that reductions in realised geopolitical risks (e.g. the easing of sanctions and the normalisation of trade and investment relations) tend to generate disproportionately large declines in oil prices relative to changes in political rhetoric alone (Bouoiyour et al. 2019). High-frequency estimates indicate that major geopolitical risk shocks move oil prices by amounts that are several times larger than normal daily fluctuations, with one standard-deviation changes in geopolitical risk raising oil prices by roughly 10 basis points in a single day, or around nine times the average daily oil price movement (Smales 2019). This implies that sustained geopolitical de-escalation and additional supply from Iran could translate into economically meaningful short-run growth gains for energy-importing economies by lowering production costs, supporting real household incomes and easing inflationary pressure.

Beyond the short run, the medium-term growth impact depends critically on energy price volatility, not only on price levels. The literature shows that geopolitical risk is a key driver of oil price volatility, with volatility responses that are around eight times larger for oil markets than for stock markets and with volatility spill-overs running persistently from oil prices into broader financial conditions (Smales 2019). Importantly, large and abrupt oil price swings tend to raise uncertainty and dampen investment, while periods of stable and predictable declines in energy prices are significantly more supportive of sustained growth. Panel data evidence suggests that oil price volatility increases geopolitical risk by up to 1-4% in the short run, whereas higher and more stable oil prices are associated with lower geopolitical risk over time (Ivanovski and Hailemariam 2022).

Furthermore, as Iran remains subject to international sanctions, a non-negligible share of its crude oil and refined petroleum products ultimately reaches European markets by being rerouted indirectly through third countries (e.g. India, the United Arab Emirates and other intermediary hubs). This indirect trade typically involves ship-to-ship transfers, the blending and relabelling of crude, and clandestine logistical arrangements (including so-called 'shadow fleets' operating with manipulated transponder data) to evade sanctions, imposing additional trade frictions and inefficiencies. Sanctioned barrels often sell at significant price discounts relative to global benchmarks: market reporting indicates that Iranian light crude was offered at more than USD 8 per barrel below Brent (with some bids at a discount of near USD 10 per barrel) in late 2025 as buyers sought to manage sanction risk and longer logistics (Iran International 2025). These discounted sales reflect both reduced bargaining power and the higher costs of sanction-evading trade. Similar analyses of sanctions on other major exporters demonstrate that trade rerouting and price differentials are endogenous outcomes of sanctions regimes that force exports into less efficient channels with below-market pricing.

Given that the EU imports approximately 9-10 million barrels per day of crude oil and petroleum products (European Commission 2024), even partial exposure to these rerouting discounts and inefficiencies implies higher effective landed costs compared with direct market access. In the event of political change in Iran and the removal of sanctions, Iranian oil and refined products could re-enter European markets through normal commercial channels, eliminating these frictions. If Iranian exports to the EU were to reach 1-1.5 mbd, consistent with pre-sanctions trade patterns, the reduction in sanction-related discounts and trade costs alone could lower the effective price paid by importers by several US dollars per barrel, corresponding to non-trivial reductions in wholesale oil and fuel prices under standard price pass-through assumptions (IMF 2022).

Such a reduction in effective oil import costs would also have clear macroeconomic implications for inflation in the euro area. European Central Bank (ECB) analyses show that movements in global oil prices are transmitted relatively quickly to the energy component of the Harmonised Index of Consumer Prices (HICP), making energy prices a key driver of headline inflation dynamics in the euro area (ECB 2021). Consistent with this, ECB staff projections explicitly identify declines in energy prices as an important factor behind projected reductions in headline inflation over the forecast horizon (ECB 2022). IMF assessments further indicate that a sustained decline in oil prices of the order implied above typically reduces euro-area headline inflation by several tenths of a percentage point within a year, with the effect concentrated in transport fuels and energy-intensive goods (IMF 2022). For Germany, where energy costs play a prominent role in both household consumption and industrial input prices, this pass-through is likely to be at least as strong as the euro-area average, implying a non-trivial easing of inflationary pressures in the event of sustained lower oil prices.

3.8. EFFECTS OF ACTIVELY UTILISING THE LARGE AND WELL-EDUCATED IRANIAN DIASPORA IN EUROPE AND GERMANY (TRADE, INVESTMENT, MIGRATION)

Since the 1979 revolution, the Iranian diaspora has grown rapidly and is characterised by relatively high levels of education and labour market integration in major destination countries (Behtoui 2022; Vahabi 2012). The number of Iranian-born emigrants increased from around half a million before the revolution to more than 3 million by 2019, representing a threefold rise relative to Iran's population (migrant-to-population ratio). The main destination countries are the US, Canada, Germany and the UK. In 2019 alone, around 130,000 Iranian-born students were enrolled at foreign universities, while the share of students returning to Iran after graduation has fallen from over 90% before 1979 to roughly 10% today. As a result, an estimated 110,000 scholars of Iranian origin are currently employed at universities and research institutions abroad – equivalent to roughly one third of Iran's total scientific workforce and likely an even larger share in terms of research output and impact. This sustained brain drain reflects both shifts in individual preferences (including rising secularism) and long-term structural factors (e.g. economic stagnation, institutional erosion and environmental degradation), all of which have been further amplified by sanctions, political repression and episodes of state violence (Azadi et al. 2022).

At the same time, the size, skills and transnational embeddedness of this diaspora also imply a potential role as a channel for early external engagement, as diaspora direct investment has been shown to be comparatively resilient in high-risk environments due to informational advantages and stronger ties to the country of origin (Rodríguez-Montemayor 2012). Knowledge and technology transfer can occur through two main channels: first, through diaspora investors and entrepreneurs who remain based in host countries but transmit technologies, managerial know-how and access to global networks to domestic firms; and, second, through return or temporary migration of highly skilled individuals who directly embed foreign knowledge and practices within Iran's research institutions, firms and public administration (Kotabe et al. 2013). In the context of a future reintegrated Iran, this diaspora represents a substantial reservoir of human capital with the potential to support productivity growth, innovation and institutional rebuilding.

Over the past decades, the EU and Germany have not managed to invest in the Iranian economy due to geopolitical risks and sanctions. Iran is a resourceful country with a population of more than 91 million, vast hydrocarbon reserves, a large domestic market and a relatively diversified industrial base by regional standards. Yet inward FDI has remained exceptionally low. Over the 1980-2024 period, Iran's average annual net FDI inflows only amounted to about 0.4-0.5% of GDP, compared with around 0.8% in Turkey, 0.7% in South Korea, and close to 1% in Saudi Arabia. In absolute terms, Iran attracted less than USD 2-3 billion of FDI annually in only a few years despite having an economy comparable in size to major emerging markets. This stands in stark contrast to the country's pre-revolutionary experience: in the 1960s and 1970s, Iran was a major destination for European and US multinational enterprises (MNEs), particularly in energy, chemicals, automotive production, infrastructure and heavy machinery.

During the brief JCPOA window (2016-2018), this latent investment potential became visible again. Several major European firms – including Siemens, Daimler, Volkswagen, PSA, Total, Eni, Airbus and BASF – either re-entered the Iranian market or signed MoUs covering power generation, rail infrastructure, automotive production, aviation, petrochemicals and industrial equipment. Germany, in particular, rapidly re-established its position as Iran's leading European supplier of capital goods,

machinery and intermediate inputs, with exports exceeding USD 3 billion in the 2017-2018 period. However, the re-imposition of US secondary sanctions abruptly halted these engagements, forcing European firms to withdraw despite strong commercial incentives. As a result, Iran's industrial upgrading stalled and European MNEs forfeited early-mover advantages in a large and underpenetrated market.

In the event of a regime change followed by credible political stabilisation and sanctions removal, Iran would likely experience a surge in FDI comparable to other post-isolation or post-transition economies. As a point of reference, Iran's nominal GDP in 2024 amounted to approximately USD 475 billion (WDI, World Bank). Under the combined sanctions-removal and productivity-catch-up scenarios analysed in this study, Iran's real GDP is projected to increase in the long run – by about 240% in the Turkish convergence case and nearly 390% in the South Korean convergence case. Applying these growth factors to current nominal GDP implies plausible decade-ahead GDP levels in the range of roughly USD 1.5 to 2.3 trillion. Convergence towards Turkey's current inward FDI stock (around 17% of GDP) at those income levels would therefore correspond to a long-run inward FDI stock on the order of USD 250-400 billion, accumulated gradually over time rather than instantaneously. German and European MNEs would be natural candidates to capture a significant share of this investment, particularly in sectors where Europe holds strong technological and organisational advantages. These include energy and petrochemicals (e.g. upstream investment, LNG infrastructure, refining and hydrogen), automotive and transport equipment, industrial machinery, chemicals and pharmaceuticals, renewable energy, logistics, construction and advanced business services. A number of German firms (e.g. Siemens, Bosch, BASF, Bayer, Volkswagen, Mercedes-Benz, SAP and Deutsche Bahn) already possess sector-specific expertise well suited to Iran's reconstruction and productivity-catch-up needs.

Importantly, the presence of a large, well-integrated Iranian diaspora in Germany and Europe could substantially lower entry barriers for European investors in the early post-transition phase. Diaspora entrepreneurs, engineers and managers could facilitate information flows, reduce cultural and institutional frictions, and support joint ventures between European MNEs and domestic firms. Empirical evidence suggests that diaspora-linked investment is more resilient in high-risk environments and tends to arrive earlier than purely foreign capital. This catalytic role is already observable in forward-looking investment signals by diaspora-linked corporate leaders in advanced economies. In the US, for example, Dara Khosrowshahi, the Iranian-born CEO of Uber, has publicly identified Iran as a large, underpenetrated market with substantial potential for technology-driven growth and has indicated interest in rapid market entry within the first 100 days following political stabilisation and sanctions removal. In this sense, the Iranian diaspora can act as a catalyst for European FDI, accelerating technology transfer, managerial upgrading and integration into European-centred value chains. Taken together, these dynamics suggest that Iran's reintegration would not only revive trade relations but could also trigger a structural wave of European (and particularly German) FDI, with long-lasting effects on productivity, employment and economic diversification in Iran, while also generating substantial commercial opportunities for European firms. Moreover, given its geographical proximity to Europe relative to East Asian economies, Iran could emerge as an attractive near-shoring location for human-capital-intensive and digital sectors, conditional on institutional normalisation.

4. A long and uncertain road ahead

As of now, it appears that the mullah regime has brutally suppressed the upheavals, with more than 5,000 people killed; other sources report even significantly higher numbers of between16,500 and 36,500, as mentioned earlier. Participants in the protests are still being hunted down and are likely to continue facing arrest, persecution and punishment. The number of people who have been or will be executed remains unpredictable. This is particularly alarming given that, in 2025 alone, the regime reportedly executed 2,228 individuals, according to the Iran Human Rights Society (2026). All of this implies that the near- and medium-term outlook is highly uncertain. On the one hand, the current unrest may have destabilised the regime, increasing the likelihood that future uprisings could ultimately lead to regime change. On the other hand, the authorities appear to have learned from these events and are likely to impose an even more rigid system of control, relying on intensified violent repression to prevent large-scale demonstrations and to suppress any emerging revolt at an early stage. Reports suggest that the internet will be blocked until Persian New Year's Day (Nowruz) on 20 March 2026. Reports from Iran indicate the imposition of curfews and the widespread deployment of heavy military forces on the streets. The regime has fully lost both internal and external legitimacy. It has also forfeited its international credibility by disseminating false narratives about the nature of the protesters, branding them as 'terrorists' in order to fabricate a pretext for mass killings.

A related question concerns whether and when a potential new upheaval could occur given the bloody suppression of the recent protests and the absence of a unified and credible opposition within the country. One development that has gained prominence in the media is the claim that Reza Pahlavi, the eldest son of the late shah, has managed to consolidate a political base inside Iran, as protesters in numerous cities – both domestically and abroad – reportedly chanted slogans calling for the return of the shah.

By contrast, non-monarchist republican and democratic forces remain fragmented, divided across multiple groups, and lacking unified leadership or representation. Many key figures associated with non-monarchist democratic movements are currently imprisoned. This includes Narges Mohammadi, the Nobel Peace Prize laureate, who was brutally arrested on 12 December 2025 during a memorial ceremony for the human rights defender Khosrow Alikordi, who was allegedly and suspiciously killed by the regime.

Beyond the two main opposition camps discussed above, other actors could also influence future political developments in Iran. These include the People's Mojahedin Organization of Iran (PMOI/MEK), an organisation widely characterised by its rigid ideology, hierarchical structure and past involvement in militant activities, as well as various Kurdish armed groups operating primarily in Iran's peripheral regions. Nevertheless, given the profound fragmentation of the broader opposition landscape, a regime change driven by internal elite realignments – such as a power struggle or coup involving senior commanders of the Islamic Revolutionary Guard Corps (IRGC) – may, in practice, have a higher probability of occurring than an opposition-led transition.

Such an outcome would not necessarily result in democratic governance, but it could instead lead to the emergence of a new secular authoritarian system that prioritises economic stabilisation and social development over ideological mobilisation. This scenario would also entail a fundamental reorientation of state priorities, including the abandonment of the current ideologically driven nuclear programme inherited from the theocratic system. While such a trajectory carries inherent risks and normative limitations, it may nonetheless represent a second-best outcome and a more plausible short- to medium-term transition scenario under prevailing conditions than an opposition-led process characterised by deep fragmentation.

However, a secular and democratic Iran that fully respects the principles enshrined in the Universal Declaration of Human Rights would represent the first-best outcome for achieving short-, medium- and long-term stability both domestically and across the wider region. Given the critical importance of a transition towards democracy, the EU and its member states – particularly Austria, with its neutral status – could play a pivotal role by offering to serve as a mediator among opposition groups committed to democratic governance and the preservation of Iran's territorial integrity. Only a united opposition front would be capable of facilitating a peaceful transition away from this brutal regime.

Consequently, even if regime change were to occur, it remains highly uncertain what form a successor regime would take and what stance it would adopt towards international relations. Much would depend on the extent of external involvement – particularly by actors such as the US – and on the role they choose to assume in shaping the transition, as recent developments in Gaza illustrate.

Another key aspect concerns the international and geopolitical dimension. In particular, the role and strategy of the US administration remain unclear. While President Trump continues to incite unrest through various public statements, it is uncertain whether and to what extent the US military would intervene under the current circumstances. Sasson-Gordis et al. (2026) outline several scenarios for potential US intervention, ranging from symbolic strikes and limited attacks on military targets to more extensive operations aimed at undermining the regime, albeit acknowledging the possibly constrained capacity of the US military. They also discuss a range of possible Iranian responses, including attacks on US military infrastructure in the Persian Gulf, direct or proxy strikes against Israel as a close US ally, the closure of the Strait of Hormuz, or, alternatively, a turn towards diplomatic engagement with Washington. Each of these scenarios would have distinct and far-reaching implications for Iran itself as well as for regional stability and global energy markets.

Finally, regime change in Iran could have profound repercussions for the entire region. Iran has long sustained an 'axis of resistance' encompassing allied groups in Lebanon, Iraq, Yemen, Gaza and Syria. In the event of escalation, these actors could become actively involved, potentially triggering – or significantly expanding – a regional war. It should be noted in this context that Iran is the only Shi'a-led state, and religious solidarity may serve as an additional mobilising factor for these groups.

Regional powers (e.g. Saudi Arabia, Egypt, the United Arab Emirates and Turkey) are unlikely to offer material support to Iran given their close strategic ties with the US. At the same time, they have not supported a forcible regime-change agenda for Iran and have reportedly engaged in mediation efforts with President Trump to prevent direct US military intervention.

Iran's major global partners, Russia and China, have condemned Israel's actions and have historically shielded Iran diplomatically at the United Nations. However, they currently show little inclination to escalate the situation by providing military support or directly confronting the US and Israel. Analysts suggest that this position would only be likely to change if the conflict were to expand substantially and Washington were to pursue an explicit regime-change strategy in Tehran given Russia's and China's strategic interest in Iran's stability. For the time being, direct intervention by either country is considered highly unlikely.[3]

Nevertheless, the systematic and large-scale killing of civilians could necessitate the activation of the Responsibility to Protect (R2P) doctrine within the UN Security Council. Such action, however, would only be possible in the absence of a veto by any permanent member, which remains a significant political constraint.

In conclusion, even if a regime change were to occur rapidly in Iran, the path and pace of the country's reintegration into the global economy would depend heavily on a complex set of internal and external developments, many of which are highly uncertain – particularly in light of ongoing and overlapping geopolitical disruptions. What is certain, however, is that the process would be long, difficult and fraught with challenges.

[3] This is summarised from an analysis in Mamouri (2025).

5. Summary and policy recommendations for Berlin and Brussels

5.1. SUMMARY OF MAIN FINDINGS

This report has examined the potential economic implications for Germany and the EU of a regime transition in Iran and its subsequent reintegration into the global economy. Drawing on gravity-model estimates, computable general equilibrium simulations and partial-equilibrium assessments of energy markets, the analysis highlights that Iran's prolonged isolation has imposed large economic costs not only on Iran itself but also on Europe and the global economy. The results consistently show that sanctions removal and economic reintegration would generate substantial welfare gains for Iran while producing moderate but economically meaningful gains for Germany and the EU, alongside broader positive spill-overs at the global level.

Quantitatively, the lifting of EU sanctions alone is estimated to increase Iran's real GDP by more than 80% in the long run, reflecting the extraordinary degree of trade and financial repression embedded in the current sanctions regime. For Germany and the EU27, sanctions removal generates real GDP gains of approximately 0.3-0.4%, corresponding to tens of billions of euros in additional annual income. These gains are driven by expanded export opportunities, lower import prices (particularly for energy and energy-intensive inputs), and improved allocative efficiency through deeper international specialisation.

The analysis further highlights that the largest and most durable gains arise when sanctions removal is combined with productivity catch-up in Iran. Specifically, scenarios in which productivity improvements allow Iran's GDP per capita to converge towards the levels observed in Turkey and South Korea are examined. Under the combined scenarios of sanctions removal and productivity convergence to Turkey (and South Korea), Iran's GDP would increase by approximately 240% (388%), while Germany and the EU27 would experience respective gains of about 0.49% and 0.53% (0.61% and 0.70%) relative to GDP. At the global level, GDP gains under the combined scenarios would reach approximately 2.22% (3.35%). These results underscore the complementarity between trade integration and productivity growth: sanctions removal facilitates access to inputs, technology and markets, while productivity improvements enhance competitiveness and amplify the gains from economic openness.

Beyond trade liberalisation, the report shows that Iran's reintegration could materially affect global energy markets. A restoration of Iran's oil-production capacity to pre-revolution levels would constitute a non-negligible positive supply shock with plausible short-run price reductions in the range of 6-15% under conservative elasticity assumptions. In natural gas markets, the asymmetric development of the shared South Pars/North Field implies even larger potential effects: Iran's eventual entry into LNG markets could exert significant downward pressure on global and European gas prices, particularly in LNG-dependent regions. Lower energy prices would benefit Europe through reduced production costs, improved real household incomes and lower inflationary pressures.

Finally, the report emphasises that economic reintegration is not merely a matter of trade and energy prices. Instead, it also has broader implications for regional stability, maritime trade routes, migration pressures and Europe's geopolitical environment. While these effects are harder to quantify, they are potentially large and asymmetric, particularly in downside scenarios of disorderly transition or state failure.

Finally, it bears emphasis that the economic outcomes discussed in this report are contingent on a fundamental regime change leading to democratic governance and a rules-based economic system. The analysis neither advocates for nor legitimises sanctions relief without such a transformation, and it should not be interpreted as supporting incremental or cosmetic reforms as a basis for easing sanctions.

5.2. POLICY RECOMMENDATIONS: PRE-TRANSITION PREPAREDNESS

Power vacuums and post-intervention instability

The collapse or forcible removal of a central authority without a viable successor structure has repeatedly resulted in prolonged instability, as illustrated by the cases of Iraq and Syria. Iran's size, social complexity and internal heterogeneity imply that a sudden power vacuum would carry a high risk of fragmentation, localised violence and protracted conflict. From an European perspective, such instability would generate substantial spill-overs, including refugee flows, disruption of energy markets and heightened regional insecurity, underscoring the importance of political coordination prior to any regime breakdown. Crucially, early engagement in the pre-transition phase would enable the EU to shape expectations and commitments regarding the future political order in Iran, including by offering credible assurances that a successor system would abandon malign nuclear, regional and missile programmes associated with the current theocratic regime as well as systematic human rights violations. Engagement with opposition actors and transition processes could therefore yield significant positive externalities for regional stability and broader geopolitical outcomes.

Opposition unity and pre-transition coordination

A peaceful transition to democracy through mass, non-violent mobilisation could achieve regime change if the opposition is unified, the regime is internally fractured, and information and coordination for mobilisation flow smoothly through organised command structures. A central lesson from historical episodes of authoritarian collapse is that the degree of opposition unity prior to regime breakdown is a decisive determinant of post-transition outcomes. Where opposition forces remain fragmented, regime collapse – if it occurs at all – is more likely to be followed by prolonged instability, violent power struggles and/or the re-emergence of coercive rule under a different guise. In the Iranian context, the scale and speed of recent repression suggest that the regime has crossed a threshold at which mass violence no longer undermines its internal cohesion but instead functions as a mechanism of deterrence. Under such conditions, fragmented mobilisation by uncoordinated opposition groups is unlikely to succeed and risks escalating violence without altering the underlying balance of power.

From a European policy perspective, this implies that pre-transition preparedness cannot be confined to economic contingency planning alone. It must also encompass systematic political risk assessment and conflict-prevention considerations. In particular, European governments have a clear interest in

facilitating the emergence of a unified yet pluralistic opposition framework capable of coordinating political action, articulating a credible transitional roadmap, and engaging externally as a coherent interlocutor. Achieving this objective requires not only the organisation of mediation initiatives, dialogue platforms and coordination forums, but also the provision of targeted institutional support that enables opposition actors to invest in organisational capacity-building and long-term coordination.

Within this context, Austria occupies a distinctive position for mediation. Its long-standing neutrality, tradition of diplomatic mediation, and historical role as a venue for multilateral negotiations give it comparative advantages that few other EU member states possess. Austria could serve as a facilitator of dialogue among Iranian opposition forces, particularly those committed to democratic governance and non-violent transition, by providing a neutral platform for coordination and confidence-building. Such a role would not require political endorsement of any specific actor, but rather support for inclusive processes aimed at reducing fragmentation and clarifying transitional commitments in advance of any regime collapse.

Systemic rupture and the limits of coercive stability

The large-scale killing of protesters raises the question of whether the threshold for invoking the Responsibility to Protect (R2P) doctrine has been crossed. While R2P is normatively grounded in the prevention of mass atrocities, its practical application is constrained by geopolitical realities and entails significant risks. Even if legal and political hurdles were overcome, experience from previous cases suggests that humanitarian justification alone does not guarantee political stabilisation. For European policy makers, the central concern is that external coercive action undertaken in the absence of a credible and unified domestic political alternative risks exacerbating violence rather than preventing it.

Against this background, any consideration of R2P must be closely linked to efforts aimed at unifying and coordinating the opposition in addition to prioritising peaceful and non-military measures designed to increase pressure on the regime. The systematic killing of protesters and their subsequent portrayal as ‘terrorists’ by state authorities constitutes a form of political violence intended to instil fear and suppress dissent. In this context, ongoing initiatives within the European Parliament to designate the Islamic Revolutionary Guard Corps (IRGC) and affiliated entities (e.g. the Basij) as terrorist organisations represent a potentially meaningful step. At the same time, responsibility for crimes against humanity cannot be attributed to a single institution alone, but must be understood as being embedded within a broader repressive political system. From a European perspective, this underscores the importance of recognising the voices of Iranian society and acknowledging the growing illegitimacy of a political order that relies systematically on violence and terror to maintain power.

As shown by Ghodsi and Karamelikli (2022), comprehensive EU sanctions have had a substantial and broad-based negative impact on EU-Iran trade across many sectors, whereas so-called ‘smart’ or targeted sanctions directed at specific Iranian individuals and entities have only produced limited and highly selective trade effects. This asymmetry reflects the political economy of the Iranian regime: key actors within its repressive apparatus – including members of the judiciary, senior IRGC commanders, and high-ranking conservative officials – generally have little interest in travelling to the EU or engaging in commercial relations with European firms. As a result, individual-level sanctions have tended to

impose minimal material costs on the regime's core power structures and have therefore had limited influence on its behaviour.

At the same time, Iran's diplomatic apparatus has increasingly functioned as an instrument for legitimising and whitewashing state repression abroad rather than as a channel for genuine diplomatic engagement. Against this background, EU policy responses that primarily rely on symbolic or narrowly targeted sanctions risk being ineffective. A more credible strategy would require measures that raise the regime's external accountability costs. One possible instrument – illustrative rather than prescriptive – would be the systematic reduction of non-consular diplomatic staff in Iranian embassies in response to documented executions or grave human rights violations. Such steps could increase political pressure without resorting to blanket economic measures while signalling that violations carry tangible diplomatic consequences.

Military footprints and retaliation risks

Any scenario involving foreign military intervention in Iran would require a substantial and sustained military presence to secure territory, protect infrastructure and prevent fragmentation, with the costs likely exceeding those of previous regional interventions. Moreover, the IRGC possesses extensive asymmetric capabilities, raising the risk of retaliation through regional escalation, maritime disruption and/or terrorist activity targeting Western interests, including within Europe. These risks imply that, for Berlin and Brussels, strategies that prioritise political coordination, mediation and internal transition dynamics are markedly less costly and less dangerous than those relying on coercive external intervention.

5.3. POLICY RECOMMENDATIONS: POST-TRANSITION ENGAGEMENT

In the event that political conditions emerge under which Iran's reintegration becomes feasible, this report suggests several priorities for post-transition engagement.

First, the EU should pursue a sequenced and conditional reintegration strategy, linking market access, investment facilitation and financial integration to clearly defined institutional benchmarks. Such an approach would help to mitigate political and governance risks while supporting productivity-enhancing reforms in Iran. Early engagement should prioritise the restoration of macroeconomic and financial stability, which constitutes a necessary precondition for sustainable economic recovery. As discussed above, a combination of prolonged sanctions and weak policy frameworks over the past two decades has produced a self-reinforcing cycle of high inflation, chronic fiscal constraints, repeated currency devaluations and private-sector erosion, resulting in a substantial decline in living standards.

Breaking this cycle would require restoring confidence in Iran's monetary and external position, notably through access to foreign currency reserves to stabilise the exchange rate as well as the normalisation of oil exports to rebuild fiscal and external buffers. Once basic macroeconomic stability is re-established, European engagement should prioritise sectors with strong spill-over effects and comparative advantages for both sides, including energy, chemicals, infrastructure, machinery and services. This sequencing would maximise economic returns while reducing the risk of renewed instability during the transition phase.

Second, Germany and the EU should actively support investment frameworks that crowd in private capital, including risk-sharing instruments, multilateral guarantees and cooperation with international financial institutions. Given Iran's vast reconstruction needs and the scale of required FDI, public policy should focus on reducing coordination failures rather than substituting for private investment.

Third, European policy makers should recognise the strategic value of the Iranian diaspora as a bridge for early economic engagement. Facilitating diaspora investment, knowledge transfer, and temporary return migration or commuting labour could accelerate productivity gains while reducing informational and institutional frictions during the transition phase.

Finally, Europe should approach Iran's reintegration not as a narrowly bilateral matter, but as part of a broader strategy aimed at strengthening economic resilience and stability across its wider neighbourhood. By supporting a rules-based and economically grounded reintegration process, Berlin and Brussels can contribute to lower energy-price volatility, more secure trade routes and reduced migration pressures – outcomes that closely align with Europe's long-term economic and strategic interests. Such an approach would be most effectively advanced through multilateral and bilateral trade and investment agreements as well as by facilitating Iran's accession to the WTO. Iran has long held observer status in the WTO, while its full accession has been blocked for political reasons, most notably by the US.

A post-transition Iran that abandons sustained confrontation with the international community could once again assume a constructive role in Eurasian trade networks. In particular, Iran's geographic position along the historical Silk Road provides significant potential to facilitate trade and connectivity between East Asia, the Middle East and Europe. Integrating Iran into global trade institutions and regional value chains would therefore not only support domestic economic stabilisation but also enhance Europe's strategic connectivity with the broader Asian region.

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Appendix A

Table A.1 / Industry-level estimates of the effects of the sanctions on Iran

Industry ID	Industry Description	A. Post-2012 EU Est.	A. Post-2012 EU Std. Err.	B. Pre-2012 EU Est.	B. Pre-2012 EU Std. Err.	C. Non-EU Est.	C. Non-EU Std. Err.
1	Wheat	-2.218	(1.544)	-2.452	(1.603)	-3.741	(1.392)
2	Rice (raw)	-3.949	(1.294)	-1.695	(0.395)	.014	(0.548)
3	Corn	.49	(0.543)	-1.748	(0.672)	-1.232	(0.666)
4	Other cereals	-6.722	(1.268)	-8.167	(1.334)	-7.407	(1.253)
5	Cereal products	-.658	(1.995)	-.734	(1.818)	-3.477	(1.507)
6	Soybeans	.502	(0.36)	-1.916	(0.295)	-.174	(0.455)
7	Other oilseeds (excluding peanuts)	1.329	(0.749)	.331	(0.844)	.37	(0.479)
8	Animal feed ingredients and pet foods	-.442	(1.415)	-.326	(1.435)	-.173	(1.366)
9	Raw and refined sugar and sugar crops	-3.852	(0)	-20.254	(0)	-5.548	(0)
10	Other sweeteners	-.673	(0.888)	.218	(0.921)	.032	(0.6)
11	Pulses and legumes, dried, preserved	-.25	(1.037)	-.409	(1.106)	-1.418	(1.074)
12	Fresh fruit	.72	(0.393)	1.035	(0.403)	.229	(0.433)
13	Fresh vegetables	-.333	(0.638)	-1.822	(0.6)	.273	(0.518)
14	Prepared fruits and fruit juices	1.279	(0.405)	1.837	(0.424)	2.106	(0.469)
16	Nuts	-.149	(0.36)	-.084	(0.446)	.093	(0.367)
17	Live cattle	-7.046	(1.936)	-17.857	(1.63)	-5.247	(1.232)
19	Eggs	2.457	(0.943)	2.682	(0.97)	3.382	(0.726)
20	Other meats, livestock products, and live animals	-.754	(0.718)	.084	(0.68)	-.352	(0.758)
21	Cocoa and cocoa products	-1.009	(1.028)	-1.126	(0.621)	1.908	(0.812)
22	Beverages, n.e.c.	-.051	(0.76)	.33	(0.788)	-.709	(0.563)
23	Cotton	-3.909	(1.147)	-1.392	(1.533)	-.673	(0.586)

contd.

Table A.1 / Continued

Industry ID	Industry Description	A. Post-2012 EU Est.	A. Post-2012 EU Std. Err.	B. Pre-2012 EU Est.	B. Pre-2012 EU Std. Err.	C. Non-EU Est.	C. Non-EU Std. Err.
24	Tobacco leaves and cigarettes	1.504	(1.032)	.039	(1.091)	1.673	(0.837)
25	Spices	-1.418	(1.05)	-.934	(0.957)	-2.163	(1.006)
26	Other agricultural products, n.e.c.	-.194	(0.446)	.248	(0.458)	.095	(0.394)
27	Forestry	1.877	(0.533)	1.507	(0.498)	1.195	(0.509)
28	Fishing	-2.876	(0.876)	-2.99	(0.754)	-2.626	(0.754)
29	Mining of hard coal	-3.551	(2.022)	-1.134	(2.013)	-3.386	(1.335)
30	Mining of lignite	.461	(2.825)	1.208	(3.146)	-.402	(1.364)
31	Extraction crude petroleum and natural gas	-1.3	(0.425)	-.509	(0.322)	-.737	(0.33)
32	Mining of iron ores	-8.081	(1.882)	-2.746	(1.195)	-3.114	(0.863)
33	Other mining and quarrying	-.242	(0.658)	.27	(0.642)	-.252	(0.607)
34	Electricity production, collection, and distribution	-.242	(0.658)	.27	(0.642)	-.252	(0.607)
35	Gas production and distribution	-.242	(0.658)	.27	(0.642)	-.252	(0.607)
36	Processing/preserving of meat	-1.86	(0.523)	-.598	(0.627)	1.093	(0.654)
37	Processing/preserving of fish	-3.36	(0.881)	-1.56	(0.849)	-.635	(0.861)
38	Processing/preserving of fruit and vegetables	-.949	(0.335)	-.516	(0.404)	-.116	(0.303)
39	Vegetable and animal oils and fats	1.595	(0.719)	.629	(0.862)	-.028	(0.697)
40	Dairy products	-4.23	(0.707)	-3.958	(0.717)	-3.489	(0.498)
41	Grain mill products	-2.677	(0.903)	-.265	(0.323)	.413	(0.583)
42	Starches and starch products	-1.092	(0.582)	-1.375	(0.661)	-.739	(0.595)
43	Prepared animal feeds	-1.696	(0.53)	-1.808	(0.633)	-2.602	(0.629)
44	Bakery products	.43	(0.567)	.886	(0.443)	-.092	(0.427)
45	Sugar	-1.398	(1.427)	-2.549	(1.318)	-1.377	(1.304)
46	Cocoa chocolate and sugar confectionery	-.695	(0.615)	-.606	(0.56)	-.598	(0.447)
47	Macaroni noodles and similar products	-1.546	(0.838)	-1.871	(0.819)	-2.457	(0.779)

contd.

Table A.1 / Continued

Industry ID	Industry Description	A. Post-2012 EU Est.	A. Post-2012 EU Std. Err.	B. Pre-2012 EU Est.	B. Pre-2012 EU Std. Err.	C. Non-EU Est.	C. Non-EU Std. Err.
48	Other food products n.e.c.	-1.311	(0.617)	-1.174	(0.659)	-1.188	(0.582)
49	Distilling rectifying and blending of spirits	1.016	(0.818)	1.44	(0.847)	1.644	(0.661)
50	Wines	1.45	(0.909)	.199	(0.874)	1.558	(0.932)
51	Malt liquors and malt	-.229	(1.419)	1.484	(1.445)	-.918	(1.303)
52	Soft drinks; mineral waters	-.376	(0.751)	1.647	(0.458)	.96	(0.435)
53	Tobacco products	1.255	(0.375)	-1.709	(0.846)	.609	(0.41)
54	Textile fibre preparation; textile weaving	-1.304	(0.414)	-1.496	(0.348)	-.806	(0.302)
55	Made-up textile articles except apparel	-1.54	(0.521)	-.671	(0.504)	-.386	(0.456)
56	Carpets and rugs	-.884	(0.185)	-.262	(0.233)	.071	(0.221)
57	Cordage rope twine and netting	-1.269	(0.91)	-.197	(0.898)	-.007	(0.665)
58	Other textiles n.e.c.	-.597	(0.425)	-.676	(0.385)	-.996	(0.38)
59	Knitted and crocheted fabrics and articles	-1.529	(0.923)	-.794	(0.921)	-.821	(0.713)
60	Wearing apparel except fur apparel	-2.121	(0.568)	-1.741	(0.512)	-.704	(0.377)
61	Dressing and dyeing of fur; processing of fur	-.383	(1.287)	-.109	(1.116)	-.612	(0.988)
62	Tanning and dressing of leather	-1.677	(0.467)	-.843	(0.468)	-.293	(0.408)
63	Luggage handbags etc.; saddlery and harness	-.443	(0.933)	.063	(0.913)	.074	(0.685)
64	Footwear	-1.122	(0.499)	-.579	(0.496)	-.763	(0.483)
65	Sawmilling and planing of wood	-1.967	(0.59)	-2.268	(0.508)	-.084	(0.465)
66	Veneer sheets plywood particle board etc.	-.125	(0.812)	1.844	(0.819)	1.572	(0.831)
67	Builders' carpentry and joinery	-2.461	(0.801)	-2.825	(0.873)	-3.239	(0.72)
68	Wooden containers	-1.838	(0.877)	-1.917	(0.92)	-1.045	(0.874)
69	Other wood products; articles of cork/straw	.23	(0.736)	.143	(0.734)	.346	(0.643)
70	Pulp paper and paperboard	-2.833	(0.447)	-2.256	(0.433)	-2.072	(0.535)
71	Corrugated paper and paperboard	-3.157	(0.741)	-2.966	(0.803)	-2.134	(0.598)

contd.

Table A.1 / Continued

Industry ID	Industry Description	A. Post-2012 EU Est.	A. Post-2012 EU Std. Err.	B. Pre-2012 EU Est.	B. Pre-2012 EU Std. Err.	C. Non-EU Est.	C. Non-EU Std. Err.
72	Other articles of paper and paperboard	-1.524	(0.594)	-1.097	(0.609)	-1.063	(0.623)
73	Publishing of books and other publications	-.926	(0.732)	.703	(0.526)	-.176	(0.5)
74	Publishing of newspapers journals etc.	-1.187	(0.803)	-.621	(0.709)	-.513	(0.953)
75	Publishing of recorded media	-1.207	(1.263)	-.938	(0.671)	-.939	(0.686)
76	Other publishing	-.632	(0.703)	-.426	(0.674)	-.328	(0.733)
77	Printing	.013	(0.497)	.095	(0.428)	1.051	(0.542)
78	Service activities related to printing	1.186	(1.212)	.304	(1.231)	-.452	(1.048)
79	Coke oven products	.941	(1.793)	4.008	(1.87)	1.715	(1.477)
80	Refined petroleum products	-1.344	(0.533)	-.372	(0.514)	-.7	(0.347)
81	Processing of nuclear fuel	2.415	(1.056)	3.239	(1.144)	7.043	(1.509)
82	Basic chemicals except fertilizers	-1.345	(0.412)	-.443	(0.341)	-.498	(0.321)
83	Fertilizers and nitrogen compounds	.816	(0.925)	.632	(0.846)	.304	(0.433)
84	Plastics in primary forms; synthetic rubber	-1.637	(0.386)	-.952	(0.351)	-.913	(0.435)
85	Pesticides and other agro-chemical products	-1.186	(0.704)	-.981	(0.653)	-.737	(0.669)
86	Paints varnishes printing ink and mastics	-1.269	(0.567)	-.47	(0.561)	-.442	(0.508)
87	Pharmaceuticals medicinal chemicals etc.	-.501	(0.394)	-.317	(0.406)	-.415	(0.393)
88	Soap cleaning and cosmetic preparations	-1.77	(0.432)	-1.492	(0.402)	-1.292	(0.336)
89	Other chemical products n.e.c.	-1.455	(0.417)	-1.002	(0.42)	-.859	(0.405)
90	Man-made fibres	-1.289	(0.371)	-1.362	(0.332)	-1.234	(0.268)
91	Rubber tyres and tubes	-1.917	(0.654)	-1.844	(0.615)	-1.416	(0.593)
92	Other rubber products	-1.083	(0.363)	-.856	(0.371)	-.73	(0.326)
93	Plastic products	-1.68	(0.295)	-1.103	(0.268)	-.635	(0.311)
94	Glass and glass products	-.897	(0.455)	-.609	(0.413)	-.259	(0.392)
95	Pottery china and earthenware	-.863	(0.746)	-.934	(0.518)	-.95	(0.469)

contd.

Table A.1 / Continued

Industry ID	Industry Description	A. Post-2012 EU Est.	A. Post-2012 EU Std. Err.	B. Pre-2012 EU Est.	B. Pre-2012 EU Std. Err.	C. Non-EU Est.	C. Non-EU Std. Err.
96	Refractory ceramic products	-1.882	(0.486)	-1.47	(0.469)	-1.213	(0.443)
97	Struct. non-refractory clay; ceramic products	-1.546	(0.564)	-1.039	(0.511)	-.998	(0.449)
98	Cement lime and plaster	-2.008	(0.643)	-1.06	(0.493)	.118	(0.389)
99	Articles of concrete cement and plaster	-2.585	(0.918)	-2.566	(1.23)	-1.857	(0.636)
100	Cutting shaping and finishing of stone	-.13	(0.383)	.53	(0.471)	-.811	(0.488)
101	Other non-metallic mineral products n.e.c.	-2.235	(0.678)	-1.943	(0.646)	-1.799	(0.591)
102	Basic iron and steel	-.874	(0.507)	.131	(0.498)	.234	(0.476)
103	Basic precious and non-ferrous metals	-2.2	(0.575)	-.655	(0.686)	-.342	(0.485)
104	Structural metal products	.989	(1.058)	.659	(1.046)	.298	(0.966)
105	Tanks reservoirs and containers of metal	.472	(0.895)	.536	(0.801)	.795	(0.737)
106	Steam generators	-1.133	(0.786)	-.22	(0.725)	-.31	(0.698)
107	Cutlery hand tools and general hardware	-1.742	(0.505)	-1.001	(0.484)	-.463	(0.46)
108	Other fabricated metal products n.e.c.	-1.209	(0.442)	-.985	(0.324)	-.681	(0.28)
109	Engines and turbines (not for transport equipment)	.554	(0.857)	1.177	(0.832)	1.399	(0.88)
110	Pumps compressors taps and valves	-.595	(0.589)	.199	(0.586)	.034	(0.576)
111	Bearings gears gearing and driving elements	.28	(0.403)	.955	(0.447)	.766	(0.495)
112	Ovens furnaces and furnace burners	.413	(0.443)	1.194	(0.448)	-.011	(0.479)
113	Lifting and handling equipment	.586	(0.859)	.691	(0.863)	.915	(0.836)
114	Other general purpose machinery	-.738	(0.646)	-.255	(0.648)	-.179	(0.639)
115	Agricultural and forestry machinery	.104	(0.702)	.516	(0.718)	.496	(0.619)
116	Machine tools	-.613	(0.452)	-.073	(0.455)	-.076	(0.498)
117	Machinery for metallurgy	.23	(0.895)	.776	(0.713)	.961	(0.743)
118	Machinery for mining and construction	.718	(0.851)	1.29	(0.838)	1.429	(0.816)
119	Food/beverage/tobacco processing machinery	-1.054	(0.651)	-.336	(0.62)	-.123	(0.599)

contd.

Table A.1 / Continued

Industry ID	Industry Description	A. Post-2012 EU Est.	A. Post-2012 EU Std. Err.	B. Pre-2012 EU Est.	B. Pre-2012 EU Std. Err.	C. Non-EU Est.	C. Non-EU Std. Err.
120	Machinery for textile apparel and leather	-1.108		-.897		-.621	
		(0.476)		(0.386)		(0.454)	
121	Weapons and ammunition	-2.466		.028		-1.162	
		(1.035)		(0.931)		(0.583)	
122	Other special purpose machinery	-.916		.006		-.941	
		(0.35)		(0.435)		(0.398)	
123	Domestic appliances n.e.c.	.39		.645		.795	
		(0.673)		(0.563)		(0.546)	
124	Office accounting and computing machinery	-.575		.105		-.294	
		(0.517)		(0.489)		(0.446)	
125	Electric motors generators and transformers	-.331		.138		.578	
		(0.835)		(0.826)		(0.785)	
126	Electricity distribution and control apparatus	-1.87		-.688		-.847	
		(0.408)		(0.379)		(0.399)	
127	Insulated wire and cable	-1.044		-.327		-.75	
		(1.159)		(1.042)		(0.981)	
128	Accumulators primary cells and batteries	-1.567		-1.789		-1.198	
		(0.604)		(0.562)		(0.506)	
129	Lighting equipment and electric lamps	-1.403		-.277		.22	
		(0.562)		(0.513)		(0.562)	
130	Other electrical equipment n.e.c.	-.84		.181		.165	
		(0.414)		(0.373)		(0.38)	
131	Electronic valves tubes etc.	-1.426		-1.284		-1.717	
		(1.075)		(1.056)		(1.141)	
132	TV/radio transmitters; line comm. apparatus	-.073		.455		.32	
		(0.998)		(0.649)		(0.572)	
133	TV and radio receivers and associated goods	-2.896		-1.509		-.088	
		(0.768)		(0.767)		(0.728)	
134	Medical surgical and orthopaedic equipment	-.259		.187		-.277	
		(0.298)		(0.25)		(0.224)	
135	Measuring/testing/navigating appliances etc.	-1.42		-.467		-.461	
		(0.481)		(0.494)		(0.586)	
136	Optical instruments and photographic equipment	-.697		-.251		.522	
		(0.899)		(0.884)		(0.973)	
137	Watches and clocks	-1.256		-1.33		-.73	
		(0.562)		(0.714)		(0.507)	
138	Motor vehicles	-.234		-.103		.598	
		(0.82)		(0.688)		(0.679)	
139	Automobile bodies trailers and semi-trailers	-2.183		-.986		.04	
		(1.373)		(1.394)		(1.314)	
140	Parts/accessories for automobiles	-1.182		-.27		.099	
		(0.48)		(0.514)		(0.421)	
141	Building and repairing of ships	2.171		1.372		1.55	
		(1.301)		(1.125)		(1.052)	
142	Building/repairing of pleasure/sport. boats	1.097		.405		3.372	
		(1.152)		(1.1)		(0.783)	
143	Railway/tramway locomotives and rolling stock	-1.398		-1.323		-1.373	
		(0.92)		(0.931)		(0.944)	

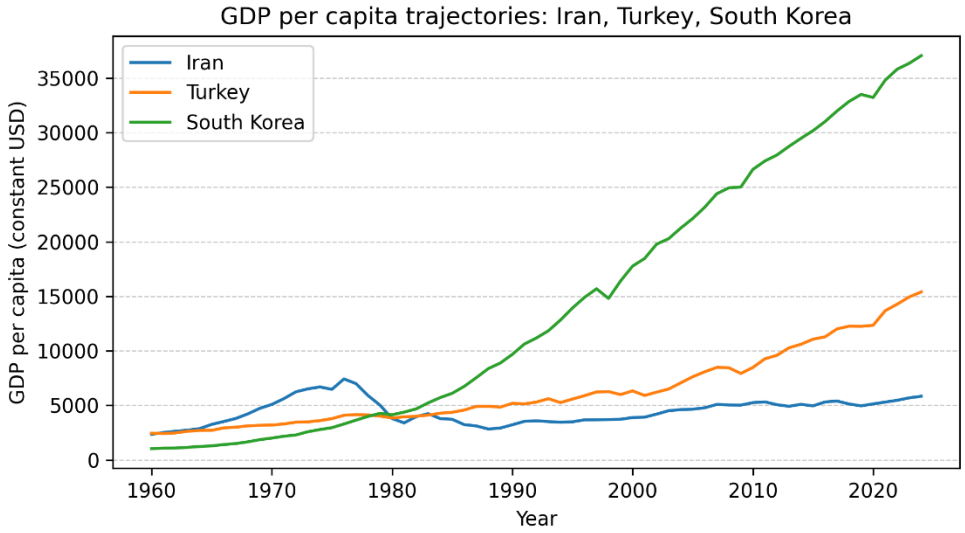
contd.

Table A.1 / Continued

Industry ID	Industry Description	A. Post-2012 EU Est.	A. Post-2012 EU Std. Err.	B. Pre-2012 EU Est.	B. Pre-2012 EU Std. Err.	C. Non-EU Est.	C. Non-EU Std. Err.
144	Aircraft and spacecraft	.529		-.366		-.331	
		(1.062)		(0.988)		(1.011)	
145	Motorcycles	-.42		-1.767		-.365	
		(0.578)		(0.677)		(0.452)	
146	Bicycles and invalid carriages	-.916		.493		.644	
		(0.379)		(0.274)		(0.342)	
147	Other transport equipment n.e.c.	-1.11		-1.62		-.619	
		(0.997)		(0.924)		(0.426)	
148	Furniture	-1.199		-1.595		-.856	
		(0.507)		(0.496)		(0.398)	
149	Jewellery and related articles	-3.676		-1.362		1.706	
		(1.46)		(1.411)		(0.966)	
150	Musical instruments	.27		.289		.17	
		(0.606)		(0.529)		(0.275)	
151	Sports goods	-1.332		-1.073		-.224	
		(0.369)		(0.253)		(0.317)	
152	Games and toys	.302		.587		.061	
		(0.778)		(0.765)		(0.523)	
153	Other manufacturing n.e.c.	-1.704		-1.388		-.481	
		(0.326)		(0.308)		(0.308)	
156	Transport	-5.647		-.966		-.52	
		(1.03)		(0.427)		(0.624)	
157	Travel	-1.294		.599		2.579	
		(0.664)		(0.416)		(0.652)	
158	Construction	-3.548		-.117		.804	
		(1.344)		(0.453)		(0.339)	
159	Insurance and pension services	-2.548		-1.034		-1.545	
		(1.031)		(0.637)		(0.985)	
160	Financial services	-12.364		-.453		1.82	
		(0.989)		(1.09)		(1.215)	
161	Charges for use of intellectual property	.983		1.14		1.982	
		(1.553)		(0.831)		(1.089)	
162	Telecom, computer, information services	-1.483		.422		4.639	
		(1.285)		(0.987)		(1.421)	
163	Other business services	-3.73		1.149		2.967	
		(1.047)		(0.461)		(0.677)	
166	Education services	1.288		4.31		.863	
		(1.072)		(1.515)		(0.812)	
167	Government goods and services n.i.e.	-11.305		-10.706		-9.48	
		(0)		(0)		(0)	
169	Trade-related services	-15.954		-10.496		7.897	
		(0.935)		(0.602)		(0.764)	

Note: Robust standard errors in parentheses: * p<0.05, ** p<0.01, *** p<0.001, **** p <0.0001.

Figure A.1 / GDP per capita trajectories in Iran, Turkey and South Korea, 1960-2024



Source: WDI World Bank

Appendix B - KITE Model Description

To quantify the economy-wide implications of trade-policy and productivity scenarios, we use the Kiel Trade model (KITE), a multi-country, multi-sector computable general equilibrium (CGE) trade model (Hinz et al. 2025; Felbermayr et al. 2023) grounded in the quantitative Ricardian framework of Caliendo and Parro (2015). In this class of models, sectoral and bilateral trade linkages, input-output relations and general-equilibrium adjustments jointly determine how changes in trade costs or technology propagate to wages, prices, production and welfare across countries and industries.

Economic environment and key mechanisms

KITE represents the global economy as a set of countries and sectors connected through bilateral trade and intermediate-input demand. In each country, production in every sector combines primary factors and intermediate inputs sourced domestically and internationally. Input-output linkages are central: policy shocks that affect costs or prices in one sector alter the price of intermediates used elsewhere, generating amplification and cross-sector spill-overs.

International trade is modelled with sector-specific trade elasticities, allowing responsiveness to trade-cost changes to differ systematically across industries. This heterogeneity matters quantitatively: sectors with higher trade elasticities display larger trade reallocation for a given change in bilateral trade costs, while low-elasticity sectors adjust more through prices and expenditure patterns.

General-equilibrium adjustments occur through several channels:

- Relative-price and wage adjustment: Trade-cost or technology shocks shift sectoral competitiveness, inducing changes in sectoral prices and country wages consistent with market clearing.
- Network propagation: Because sectors use each other's output as intermediates, shocks transmit through production networks, affecting downstream costs and final-goods prices.
- Resource reallocation: In the long run, factors and expenditure patterns reallocate across sectors in response to changed profitability and relative prices.

Model outcomes are reported as changes in real income (welfare / 'real GDP' in model terminology), bilateral and aggregate trade flows, sectoral production and price indices.

Calibration and database

KITE is calibrated to the Global Trade Analysis Project (GTAP) Database v11, using 2017 as the baseline year and incorporating updated trade-flow and value-added information available as of November 2024. The calibration covers 141 countries/regions and 65 sectors spanning agriculture, manufacturing and services. The underlying data discipline the model's bilateral trade shares, production and value-added levels, and the input-output structure that governs intermediate demand across sectors.

Long-run closure

All counterfactual experiments are conducted in a long-run setting. Long-run adjustment implies that trade patterns, sectoral output composition and consumption bundles can fully respond to altered trade costs or productivity, consistent with the higher trade responsiveness typically associated with longer horizons (e.g. relationship formation, supply-chain reorganisation and factor reallocation).

Implementing policy and productivity scenarios

Trade-cost shocks (sanctions removal / NTB changes): In the sanctions-lifting scenario, estimated gravity coefficients are mapped into ad valorem trade-cost changes that enter the model as reductions in bilateral non-tariff barriers affecting both imports and exports involving the sanctioned economy.

Productivity shocks (reconstruction / catch-up): Productivity catch-up is introduced as Hicks-neutral technology improvements implemented as a uniform productivity shifter applied across sectors of the affected economy. This lowers unit costs, changes comparative advantage, and induces general-equilibrium adjustments in wages, prices and trade patterns – subject to the prevailing trade-cost environment (e.g. with or without sanctions).

Interpretation of results

Because KITE is a fully specified general-equilibrium trade model with production networks, its counterfactual results capture both direct effects (e.g. cheaper bilateral trade raising imports/exports) and indirect effects (e.g. cheaper intermediates raising downstream competitiveness, wage adjustments shifting expenditure and production, and global reallocation of market shares). This makes the framework well suited for assessing policy packages where changes in trade frictions and productivity interact, including combined scenarios in which trade normalisation and technology catch-up are mutually reinforcing.

Appendix C - First-order approximation of the oil price response to a supply shock

Start from log-linear (small-change) supply and demand around equilibrium

Let demand and supply depend on price P:

$$Q^d = Q^d(P), Q^s = Q^s(P).$$

Define the **short-run price elasticities** at the initial equilibrium (P, Q):

$$\varepsilon_d \equiv \frac{\partial Q^d}{\partial P}\frac{P}{Q}, \varepsilon_s \equiv \frac{\partial Q^s}{\partial P}\frac{P}{Q}.$$

For *small* changes, the first-order log approximation implies:

$$\frac{dQ^d}{Q} = \varepsilon_d \frac{dP}{P}, \frac{dQ^s}{Q} = \varepsilon_s \frac{dP}{P}.$$

These are just the elasticity definitions rewritten in 'percentage-change' form.

Introducing an exogenous supply shift

Now suppose there is a **positive exogenous shift in supply** (e.g. extra Iranian production capacity) that adds an amount ΔQ to supply, *independent of price*. Then the total percentage change in supply is:

$$\frac{dQ^s}{Q} = \varepsilon_s \frac{dP}{P} + \frac{\Delta Q}{Q}.$$

Demand still changes only via the price:

$$\frac{dQ^d}{Q} = \varepsilon_d \frac{dP}{P}.$$

Impose market clearing

In equilibrium after the shock, quantity supplied equals quantity demanded, so the changes must satisfy:

$$\frac{dQ^d}{Q} = \frac{dQ^s}{Q}.$$

Substitute the two expressions:

$$\varepsilon_d \frac{dP}{P} = \varepsilon_s \frac{dP}{P} + \frac{\Delta Q}{Q}.$$

Solving for the percentage change in price

Bring the price terms to one side:

$$(\varepsilon_d - \varepsilon_s)\frac{dP}{P} = \frac{\Delta Q}{Q}.$$

Therefore,

$$\frac{dP}{P} = \frac{\Delta Q/Q}{\varepsilon_d - \varepsilon_s}.$$

Finally, using $\%\Delta P \approx dP/P$and $\%\Delta Q \approx \Delta Q/Q$for small changes:

$$\%\Delta P = \frac{\%\Delta Q}{\varepsilon_d - \varepsilon_s}$$

Sign intuition (why price falls when supply rises)

Because typically $\varepsilon_d < 0$ and $\varepsilon_s > 0$, the denominator $(\varepsilon_d - \varepsilon_s)$ is **negative**. So if $\%\Delta Q > 0$ (a positive supply shock), then $\%\Delta P < 0$: **price falls**.

IMPRESSUM

Herausgeber, Verleger, Eigentümer und Hersteller:
Verein „Wiener Institut für Internationale Wirtschaftsvergleiche“ (wiiw),
Wien 6, Rahlgasse 3

ZVR-Zahl: 329995655

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Offenlegung nach § 25 Mediengesetz: Medieninhaber (Verleger): Verein "Wiener Institut für Internationale Wirtschaftsvergleiche", A 1060 Wien, Rahlgasse 3. Vereinszweck: Analyse der wirtschaftlichen Entwicklung der zentral- und osteuropäischen Länder sowie anderer Transformationswirtschaften sowohl mittels empirischer als auch theoretischer Studien und ihre Veröffentlichung; Erbringung von Beratungsleistungen für Regierungs- und Verwaltungsstellen, Firmen und Institutionen.

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