



# Stanford Iran 2040 Project

An Academic Platform for Research on Iran's Long-Term Sustainable Development

## Migration and Brain Drain from Iran

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## **About the Stanford Iran 2040 Project**

The Stanford Iran 2040 Project is an academic initiative that serves as a hub for researchers all around the world—particularly scholars of the Iranian diaspora—to conduct research on economic and technical matters related to the long-term development of Iran and to evaluate their possible implications in a global context.

The project encourages quantitative and forward-looking research on a broad array of areas relating to Iran's economic development. It seeks to envision the future of the country under plausible scenarios. The project has been co-sponsored by the Hamid and Christina Moghadam Program in Iranian Studies and the Freeman Spogli Institute for International Studies at Stanford.

## **Stanford Iran 2040 Project**

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## About the Author



**Pooya Azadi** is the manager of the Stanford Iran 2040 Project. He has written widely on issues relating to various aspects of development in Iran including governance, demographics, economic policy, oil and gas, renewable energy, land and water resources, food security, and scientific research policy. The overarching goal of his research is to shed light on the fundamental forces and trends pertinent to development and economic growth in Iran. He studied chemical engineering at the University of Tehran (B.Eng) and the University of Toronto (M.A.Sc. and PhD).



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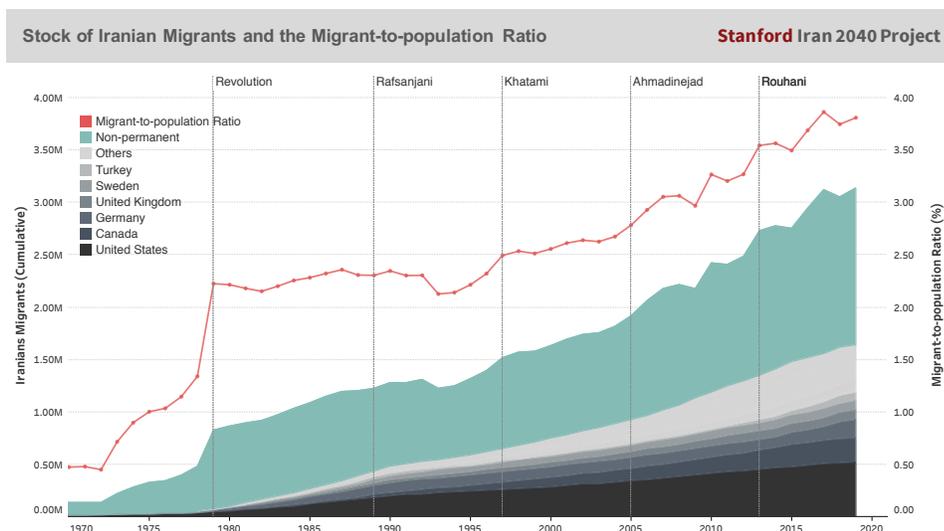


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## Executive Summary

In this paper, we present trends in the international migration of Iranians and discuss their underlying causes and ramifications for the future of Iran. Our analysis is based on a dataset compiled from statistics published by the national governments and international agencies. Additionally, we developed a classification algorithm to identify scholars of Iranian descent working in foreign countries through analyzing global publication records of the past decades.

The compiled data indicate that the total number of Iranian-born emigrants increased from about half a million people prior to the 1979 revolution to 3.1 million in 2019, corresponding to 1.3% and 3.8% of the country's population, respectively. Overall, top destination countries for Iranian migrants include the United States, Canada, Germany, and the United Kingdom. We also estimate that a total of about 700,000 Iranian-born individuals have attended foreign universities. The trend in the number of Iranian-born students enrolled in foreign universities has shown three distinct phases: the number sharply increased in the decade leading to the 1979 revolution, then significantly declined in the two decades ensuing the revolution, and again has been on an upward trend thereafter. With 130,000 Iranian-born students enrolled in foreign universities, the figure is at its highest record today. Over the past several decades, there has been an increase in the ratio of graduate to undergraduate students as well as in students who were already residing abroad prior to enrollment (children migrated with their families) while the tendency of students for returning to Iran has declined from upward of 90% in 1979 to less than 10% today. We also identified around 110,000 scholars of Iranian descent affiliated with universities and research institutes outside of Iran. In rough terms, this figure corresponds to *one-third* of Iran's total human resources in research as measured by headcount and, arguably, a far greater share based on productivity and impact. As a proxy for the brain drain issue at large, the total number of active scholars among the Iranian diaspora has undergone a ten-fold increase since 2000.



**Figure ES1.** Trends in the stock of Iranian migrants (left axis) and the ratio of migrants to population (right axis).

Iran’s ongoing brain drain crisis can be attributed to the compounding effects of multiple factors, most notably: decades of poor governance, political repression, human rights abuses, bleak economic outlook, corruption, and socio-demographic factors. Here, we discuss major factors that collectively shape the environment in which Iranians make their migration decisions. These factors are classified into four broad categories (predisposing, proximate, precipitating, and mediating) depending on how they impact people’s migration decisions—spanning from root causes to triggers to catalysts—and the timeline over which they are acting.

**Table ES1.** Major drivers of migration from Iran.

<b>Category</b>	<b>Drivers of Migration</b>
<b>Predisposing</b> (evolve over very long term)	<p>Lower per capita income compared to advanced economies</p> <p>Social and political repression, violation of human rights, and religious persecution</p> <p>Low quality of education compared to the developed countries</p> <p>Rise of labor mobility, urbanization, individualism, and secularism</p>
<b>Proximate</b> (evolve over long term)	<p>Economic stagnation, chronic unemployment, and bleak economic outlook</p> <p>Decay of the government institutions (state, the rule of law, and accountability)</p> <p>Loss of social capital, prevalence of endemic corruption and crime</p> <p>Environmental challenges in large cities, particularly air pollution</p>
<b>Precipitating</b> (events)	<p>Iran-Iraq war, 1980–1988</p> <p>Academic cleansing program (officially cultural revolution) of 1980–1983</p> <p>Government crackdown on dissent in protests of 1999, 2009, 2017–2018, and 2019</p> <p>Major economic sanctions imposed in 2012 and 2018</p> <p>State’s poor response to natural disasters in recent years</p> <p>Monetary shocks (bouts of currency devaluation, very high inflation)</p>
<b>Mediating</b> (catalysts)	<p>Increase in internet penetration</p> <p>Increase in number of friends and family abroad for potential migrants</p>

Iran’s brain drain crisis along with decades of detachment from the global economy, insufficient investment, entrenched corruption, closure of demographic window of opportunity, and the foreseeable decline in the relative value of the country’s fossil resources, collectively, suggest that Iran could possibly lose generations of economic growth. In principle, the elite members of the Iranian diaspora could significantly help alleviate these challenges through various forms of contributions including: virtual and actual return to Iran, direct investment, philanthropic contributions, tourism, and remittances. However, no such developments will occur without major breakthroughs in Iran’s current political landscape.

## Introduction

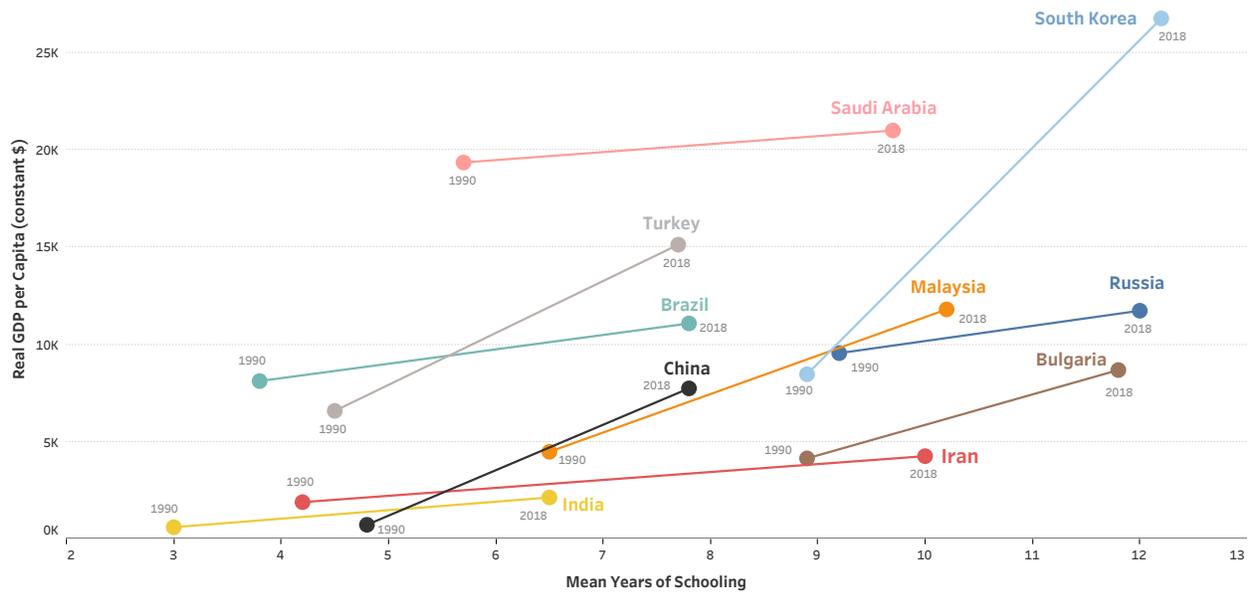
Based on quantitative measures, the development of Iran's human capital resources over the past few decades has been nothing short of remarkable. Iran tops global trends both in enhancing its mean years of schooling and in boosting the scientific output of its researchers: the mean years of schooling increased from 4.2 in 1990 to 10.0 years in 2018 and the number of scientific papers published by Iranian scholars rose by about fifty fold merely over the past two decades [1,2]. Moreover, since the early 2000s, the country has entered its one-time demographic window of opportunity during which the ratio of the working-age population to the children and elderly remains high for about half a century—a condition conducive to financial capital formation, hence economic growth [3]. However, the country's output per capita has hovered around an unimpressive level of \$4000 per year for a prolonged period of time [4,5]—placing Iran among countries whose higher educational attainments have failed to boost economic output.

The relationship between education and economic growth has been studied for many decades, with several cross-country analyses finding a strong positive association between the cognitive skills of the nations and their rates of development in the very long run [6,7,8,9]. At the macro level, education can improve the productivity of a nation as a whole and boost innovation and technology adoption. When controlled for other factors, both the quantity of education (commonly measured by mean years of schooling) and the quality of education were found to be associated with economic growth—although the quality of education was shown to be much more important than the quantity [6,7]. **Figure 1** compares the changes in educational attainment (expressed in mean years of schooling) and the real GDP per capita of Iran and selected countries between 1990 and 2018. As illustrated, the marked improvement in the educational attainment of Iranians has not been accompanied with a parallel progress in economic output. At the individual level, the intense desire for higher education is attributable to cultural factors (e.g., parents expectations and role of a university *degree* in the marriage market), over-education wage premium for jobs in the government and state-owned enterprises [10] which essentially dominate the economy, and migration aspirations of the youth which increase the expected return on higher education for them.

Besides other institutional impediments, the low economic growth of Iran is, in part, due to poor quality of the education system which is ineffective in fostering critical thinking and fails to provide students with the practical knowledge required to solve real world problems. While an in-depth analysis of this issue falls beyond the scope of this study, one can broadly attribute the poor outcome of the education system in Iran to the bold presence of ideology in educational materials (which is aimed at producing the *ideal* man of the Islamic Republic), overemphasis on performance in national contests (*concours*) and dominance of the teach-to-the-test approach, ineffective curriculum design and top-down capacity planning for universities with no regard to

## Mean Years of Schooling and Real GDP per Capita (1990 &amp; 2018)

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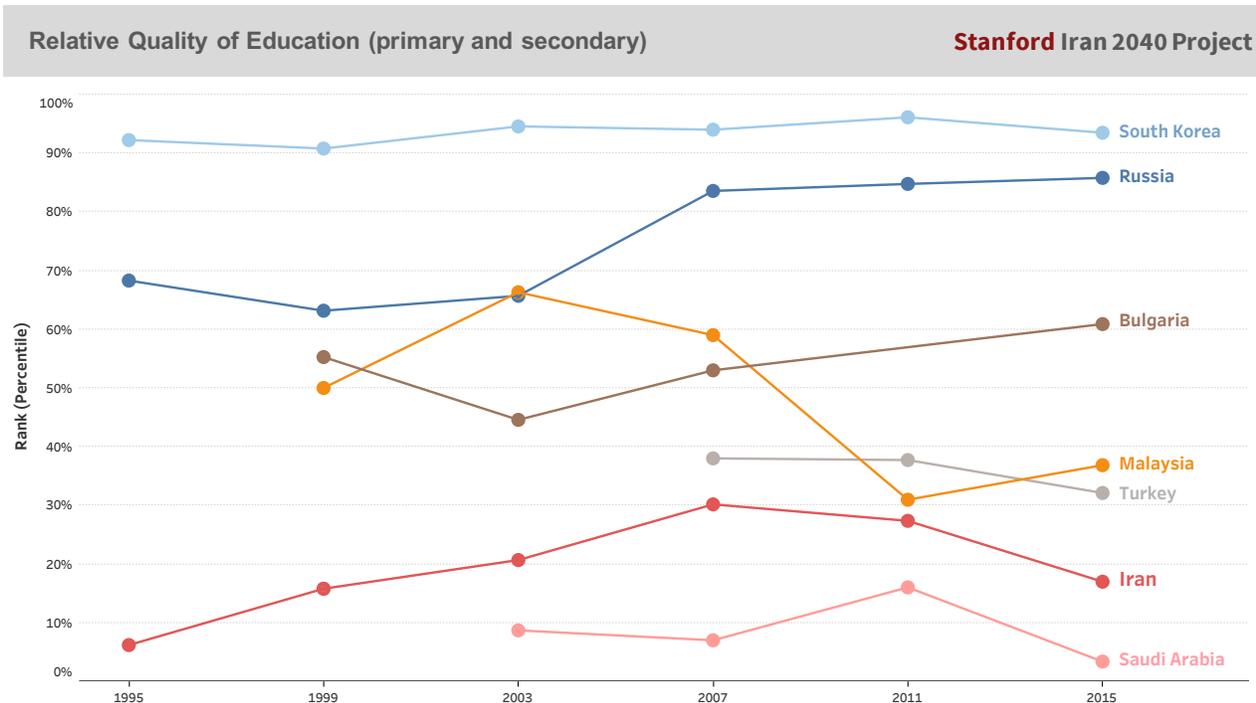


**Figure 1.** Changes in the mean years of schooling and real GDP per capita for selected countries between 1990 and 2018 [1].

the needs of the market, and setting aside a sizeable portion of university seats for the regime's elites and their relatives. Formal and cultural discriminatory rules in the labor market against Iranian women—who have contributed to the overall enhancement of mean years of schooling more than men—is another cause of divergence between trends in educational attainments and economic productivity.

Concerning the quality of primary and secondary education, according to the results of major international student achievement tests in mathematics and science [11,12], Iran has constantly ranked at the bottom third among countries participating in these tests (**Figure 2**). Compared to Iran, the fast-developing nations of East Asia have underperformed in terms of improving mean years of schooling, but nevertheless have benefited substantially from their investments in the quality of education [7].

One of the main drivers of Iran's leap in the quantitative measures of educational attainments and scientific output has been the state's expansionist policy in higher education, implemented for the aim of deferring the problem of youth unemployment [2]. The number of university students increased from about 1 million to 4 million in a mere two decades (**Figure A1, Appendix A**). Absent the required human and physical resources, the rapid expansion of university seats materialized at the cost of educational quality: existing universities were deprived of much-needed resources to improve quality, while the newly established universities often lacked minimum standards for education and research. As an important determinant of education and research quality, the faculty-to-graduate student ratio has dropped from 18% in 2005 to less



**Figure 2.** Ranks of Iran and select countries in quality of primary and secondary education based on average international test scores [11,12].

than 8% today (**Figure A2, Appendix A**).

Moreover, the state has imposed deeply short-sighted research policies on universities with the sole objective of increasing the number of publications, which is in turn used in its propaganda to demonstrate progress in technological self-sufficiency and mask significant shortcomings caused by decades of isolation due to the regime's international policy. In reality, however, regardless of their scholarly quality, an overwhelming majority of the papers published by Iranian researchers do not contribute to the nation's prosperity. A top-down incentive for publication along with lack of real demand from the economy, which is not based on new technology development, have pushed Iranian researchers to focus on the publishability of their works rather than their relevance and practical impact. The ramifications of the state's productionist approach to research has manifested itself in the country's highly scattered and mostly purposeless research activities, waste of human and material resources, as well as various forms of academic corruption now ubiquitous throughout the higher education system (see reference [2] for a more detailed discussion).

Despite the poor outcome of the educational system as a whole, there is a small group of hard-working and talented students who are admitted to the country's top universities each year and receive a higher quality education compared to their peers. Overall, the opportunity cost of migration for this group, which mainly takes place through admission to graduate schools abroad, is low due to an unwelcoming job market. Moreover, admission to foreign universities not only provides them with a legal and predictable path for migration but also prepares them

for more advanced jobs and a faster adaptation. Availability of scholarships at the graduate level, particularly for the STEM<sup>1</sup> fields which are very popular among top Iranian students, alleviates the financial barriers for the migration of university graduates. The above factors along with the availability of information (e.g., from friends who have already left for foreign universities) have institutionalized migration among the students in top universities. These issues will be discussed in more detail in the subsequent sections.

While some of the underlying causes of Iran's brain drain are shared among most developing countries (e.g., lower wages compared to more developed economies), many of the main drivers of migration from Iran have roots in the unique socio-political landscape of the country. The regime's formal stance on the issue of elite migration has been in stark contrast with its *de facto* policies and actions. On the one hand, given the large number of dissidents among those who decide to leave the country, the regime considers migration as a blessing which purges *problematic citizens* and improves its political stability in the long run. On the other hand, in authoritarian regimes, such as the Islamic Republic, where elections and polls are devoid of true meanings, the tendency of migration is commonly interpreted as an indicator of the level of dissatisfaction and hopelessness across different segments of the society; therefore, while the regime does not consider brain drain *per se* as an important threat, it is nevertheless sensitive to public perception of the issue and, as such, downplays the magnitude and consequences of the ongoing brain drain crisis.

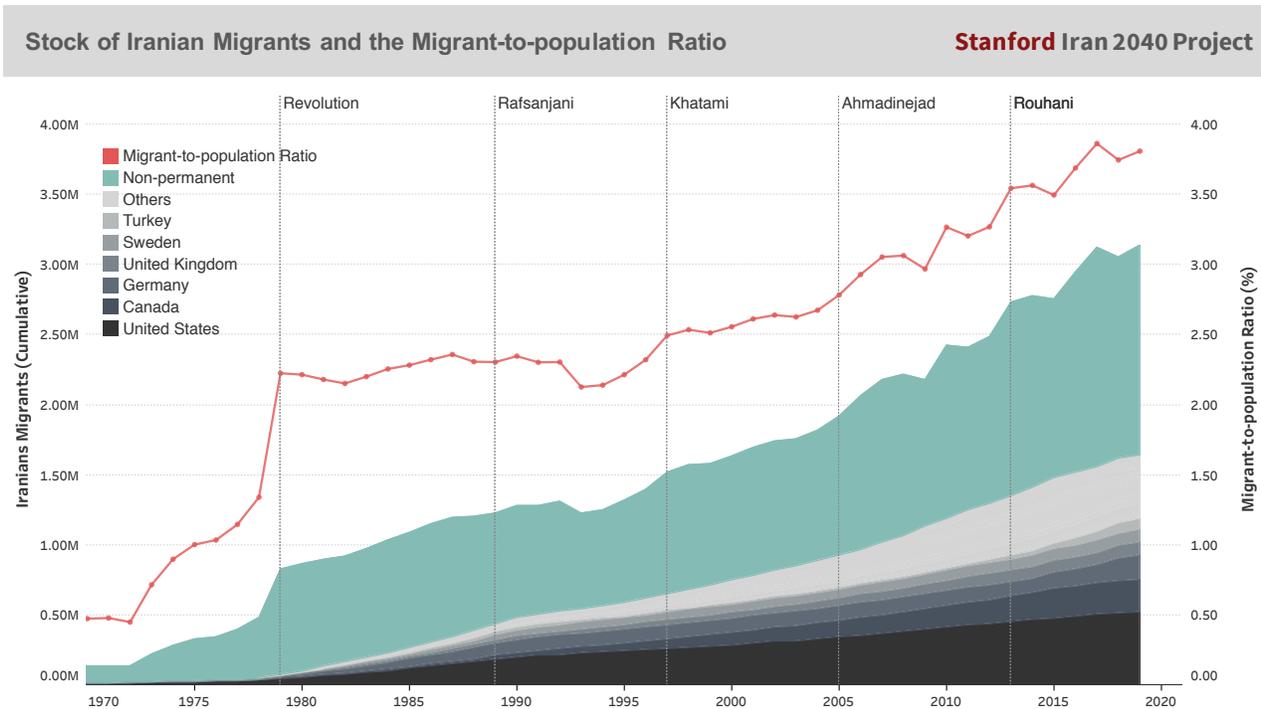
Herein, we seek to shed light on the extent, causes, and implications of migration and brain drain from Iran. To this end, we first present trends in the flow and stock of Iranian migrants with an emphasis on trends in the number of Iranian students and scholars abroad. We then explain the structural forces that collectively shape the decisions of Iranians to migrate. Finally, we discuss the extent to which the migration of highly-educated people can affect the stock of human capital and the future outlook of the country.

## Trends in Migration from Iran

The trend in the total stock of migrants and the migrant-to-population ratio of Iran over the past half-century are shown in **Figure 3**. According to the compiled data, the total number of Iranian migrants (including non-permanent) increased from about 130,000 in 1970 to 480,000 in 1978, spiked to 830,000 in 1979, then continuously increased to reach 3.1 million today. In the meantime, the migrant-to-population ratio of Iran has also steadily increased from approximately 0.5% in 1970, to 1.3% in 1978, to 2.2% in 1979, and finally to 3.8% in 2019. Since 1979, the annual flow of migrants from Iran averaged at about 63,000 people, with the largest spikes occurring in 1979, 2010, and 2016; see **Appendix B** for more detailed information about

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<sup>1</sup> Science, technology, engineering, and mathematics



**Figure 3.** Trends in the stock of Iranian migrants (left axis) and the migrant-to-population ratio (right axis).

the annual number of migrants from Iran.

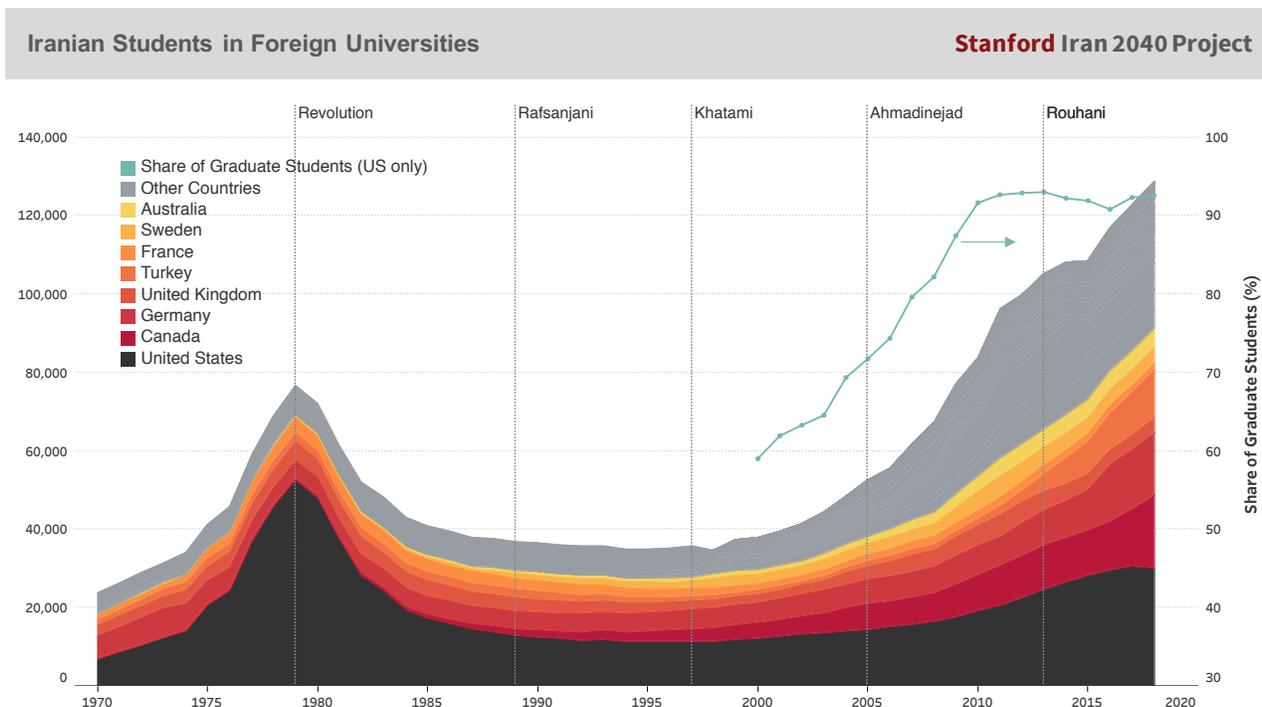
The countries hosting the largest number of Iranian migrants today include the United States (32%), Canada (14%), Germany (11%), United Kingdom (6%), Sweden (5%), and Turkey (5%). The data also reveals that, in rough terms, for every five Iranian migrants, three have left the country after obtaining permanent residency status or a work permit abroad, one through university admission, and one by being granted asylum. We also found that, since 1979, about 90% of Iranian migrants in the US who meet eligibility requirements for naturalization have already become US citizens (see **Appendix C** for more detailed data on migration of Iranians to the US).

**Figure 4** depicts trends in the number of Iranian-born university students enrolled in foreign universities between 1970 and 2018. These values include both Iranian international students (who were on a student visa) and the Iranian-born students who had already emigrated prior to enrollment at a university (hence were not considered as international students in their host countries). Assuming an average duration of study of four years to obtain a degree (see **Data and Methodology**) which in turn can be used to calculate the number of unique students from the enrollment data shown in **Figure 4**, we estimate that a total of about 700,000 Iranian-born individuals have attended foreign universities. The trend in the number of these students has shown three distinct phases: (i) the decade prior to the 1979 revolution, in which the number of enrolled students rose rapidly, reaching a peak of about 75,000 (ii) the first two decades after the revolution, in which the number of enrolled students dropped sharply, ultimately stabilizing at around 40,000, and (iii) the early 2000s until today, in which the number of students increased

steadily to reach an unprecedented level of about 130,000. Along with these variations in the number of students, some important characteristics have also significantly changed over time:

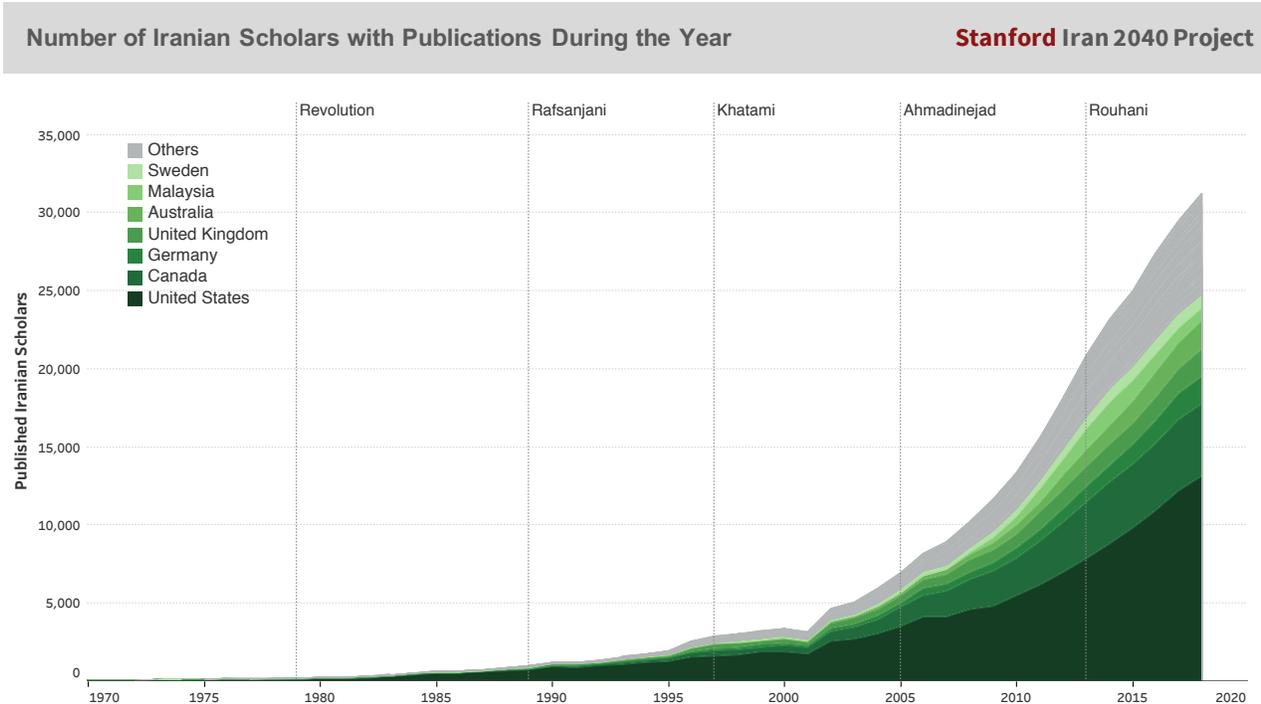
- ❖ During the 1970s, due to the rapid development and industrialization of Iran and the limited capacity of higher education in the country, the graduates of foreign universities were in high demand and hence motivated to return home [13]. In contrast, an overwhelming majority of graduates from foreign universities remain abroad today. For example, among the Iranian students in the US, the tendency to return to Iran after graduation has declined from upward of 90% in 1979 to less than 10% today [13,14], which corresponds to the lowest rate of return among the students of all other nationalities in the US;
- ❖ The share of students at the graduate level has dramatically surged over the past decades. For example, the share of graduate students among the Iranian international students<sup>2</sup> in the US increased from 55% in 1979 to 92% today [13,15];
- ❖ As more Iranian families migrated over time, the number of Iranian-born students who were residing abroad prior to university has increased accordingly. This group is typically more assimilated to their host countries compared to their parents or peers who migrate after admission to a foreign university at the postgraduate level.

**Figure 5** illustrates trends in the number of Iranian diaspora scholars who published one or more



**Figure 4.** Number of Iranian-born students (excluding second generation Iranians) in foreign countries (left axis) and share of graduate students among Iranian international students in the US (right axis).

<sup>2</sup> Data does not include students who are permanent residents or citizens.

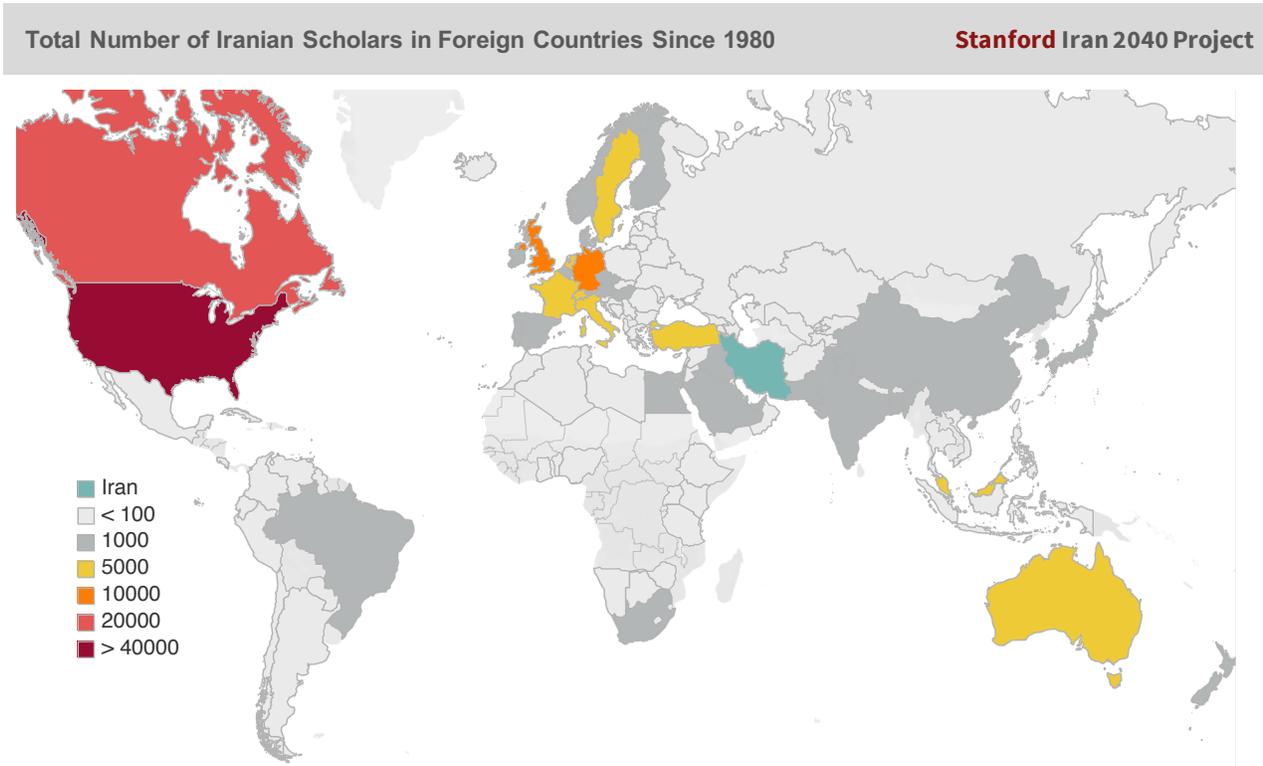


**Figure 5.** Number of Iranian diaspora scholars who published at least one article between 1970 and 2019. The total number of unique researchers is approximately 110,000. Based on data from Scopus [18].

papers in any given year between 1970 and 2019. As shown, in the decades leading to 2000, there was a steady but slow growth in the number of Iranian scholars abroad. However, since the early 2000s, this number has risen dramatically, corresponding with the substantial increase in the number of Iranian students in foreign countries as described above. A similar trend has been reported for the number of patents published by Iranian-Americans [16], which reinforces the same conclusion regarding the rate of acceleration of brain drain from Iran.

To date, the cumulative number of Iranian scholars with an affiliation outside Iran exceeds 110,000. Based on the authors' latest affiliations, we estimate that only about two percent of these researchers have returned to Iran which is consistent with the official statistics of faculty recruitments in Iran [17] (see **Appendix D** for more information about the shares of foreign-educated individuals in Iran's academia and high-level government positions). In rough terms, this figure corresponds to *one-third* of Iran's total human resources in research based on headcount and, arguably, a far greater share based on productivity and influence. The top countries that host Iranian scholars are the United States, Canada, Germany, and the United Kingdom which are also the same countries hosting the largest numbers of Iranian students today. **Figure 6** illustrates the geographical distribution of all scholars of Iranian descent affiliated with universities and research institutions in foreign countries since 1980.

Since the 1979 revolution, nearly one million Iranians have fled the country and sought asylum elsewhere, with the largest number of claims filed in Germany, the United States, Turkey, and



**Figure 6.** The estimated number of scholars of Iranian descent affiliated with universities and research institutions in foreign countries since 1980. Based on data from Scopus [18].

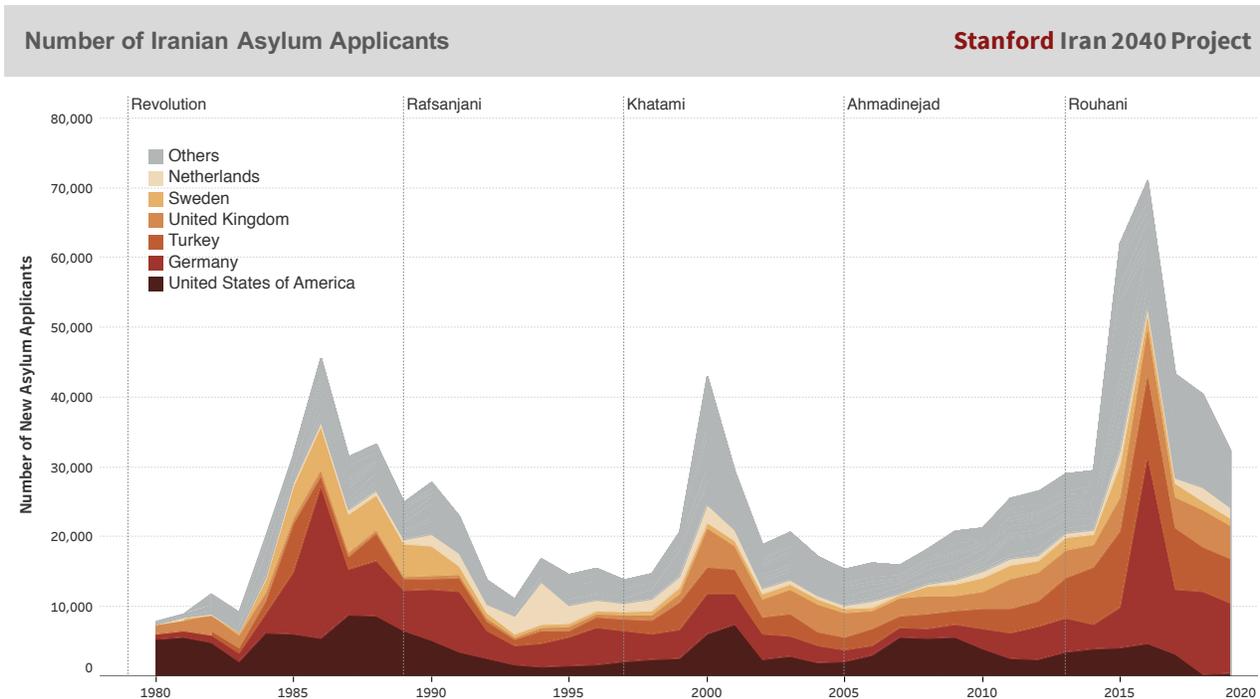
the United Kingdom (**Figure 7**). The Iranian refugees are made up of a wide range of individuals, including political dissidents, social activists, artists, ethnic and religious minorities, and LGBTQ<sup>3</sup> individuals. What persuades all these diverse groups of people to embark on uncertain and possibly irreversible and dangerous journeys to seek asylum elsewhere is the government's violation of human rights and various forms of discrimination and repression which can be in the form of brutal or even life-threatening violence.

The trend in the number of Iranian asylum-seekers after the revolution shows three distinct peaks. The first peak—occurring between 1984 and 1991, climaxing in 1986—was primarily due to the impact of the Iran-Iraq war and the consolidation of power in the Islamic Republic which was achieved with harsh crackdowns on political opposition. About a decade later, there was a second surge in the number of asylum seekers, which lasted for two years from 1999 to 2001<sup>4</sup>.

The student protests of 1999 (known as *Kouye-e-Daneshgah* protests), which were the first widespread and violent uprising in nearly two decades, could be one of the reasons behind the increase in the number of asylum-seekers in its ensuing years. The third large wave of asylum seekers from Iran began in the aftermath of the 2009 presidential election which turned into an

<sup>3</sup> Lesbian, gay, bisexual, transgender, and queer individuals

<sup>4</sup> The surge in the number of Iranians asylum seekers in 1999–2001 was partly due to ease of travel to Bosnia which did not require a visa at the time [19].



**Figure 7.** Number of new Iranian asylum applications filed between 1980 and 2019.

even more bloody protest compared to the student protest a decade earlier. The early 2010s also marked the beginning of a long period of economic stagnation which has lasted to date. The current wave culminated in 2016 when upwards of 70,000 Iranians applied for asylum status. Of about a million Iranians who have applied for asylum since 1980, about one-third have been granted asylum while the remainder have been denied for failing to demonstrate that their fear of persecution is well-founded.

## Drivers of Migration

In this section, we provide an overview of the multitude of factors that collectively shape the environment in which Iranians make their migration decisions and discuss how these structural forces may evolve in the future. The push-pull theory of migration explains the start and continuation of migration flows over time based on the disparities between the place of origin and the destination, which could encompass a wide range of economic, environmental, demographic, social, and political factors. Depending on how they impact people's migration decisions, the drivers of migration can be categorized into four broad groups, namely *predisposing*, *proximate*, *precipitate*, and *mediating* [20]. As we will explain shortly, these drivers vary not only in terms of their ability to trigger and actualize migration—spanning from root causes to triggers to catalysts—but also in terms of how long their influence lasts.

Predisposing drivers, such as income disparities between developing and developed countries,

are slow-moving factors which typically form the context for migration over multiple decades. Proximate drivers are those that, compared with predisposing factors, evolve over relatively shorter periods of time and more directly affect migration decisions. Examples of proximate factors include periods of economic stagnation, chronic environmental issues such as water shortage and air pollution, and intensification of social and political repression over a time period of several years. Precipitating drivers are those that are linked to specific events that could trigger migration, such as natural disasters, war, financial crises, and government crackdowns. Finally, mediating factors are those that facilitate or restrict migration, such as means of transportation, consular services, the availability of information about the benefits and drawbacks of migration from family or community networks. We note that these structural forces should not be viewed as deterministic factors that lead people to a certain decision about migration. Instead, they should be considered as an array of factors whose dynamic interplay increases the likelihood of a given decision over another. **Table 1** provides a list of the drivers of migration in Iran for each of the four classes discussed above.

**Table 1.** Major drivers of migration from Iran.

Category	Drivers of Migration
<b>Predisposing</b> (evolve over very long term)	Lower per capita income compared to advanced economies
	Social and political repression, violation of human rights, and religious persecution
	Low quality of education compared to the developed countries
	Rise of labor mobility, urbanization, individualism, and secularism
<b>Proximate</b> (evolve over long term)	Economic stagnation, chronic unemployment, and bleak economic outlook
	Decay of the government institutions (state, the rule of law, and accountability)
	Loss of social capital, prevalence of endemic corruption and crime
	Environmental challenges in large cities, particularly air pollution
<b>Precipitating</b> (events)	Iran-Iraq war, 1980–1988
	Academic cleansing program (officially cultural revolution) of 1980–1983
	Government crackdown on dissent in protests of 1999, 2009, 2017–2018, and 2019
	Major economic sanctions imposed in 2012 and 2018
	State’s poor responses to natural disasters in recent years
	Monetary shocks (bouts of currency devaluation, very high inflation)
<b>Mediating</b> (catalysts)	Increase in internet penetration
	Increase in number of friends and family abroad

### ***Predisposing Factors***

The term predisposing factors is used to refer to the structural forces that affect migration decisions but are static or change very slowly over time. The income disparity between Iran and the destination countries is, arguably, the most important among these factors. Over the past decades, the per capita income in the advanced economies (e.g., the US and Canada) and

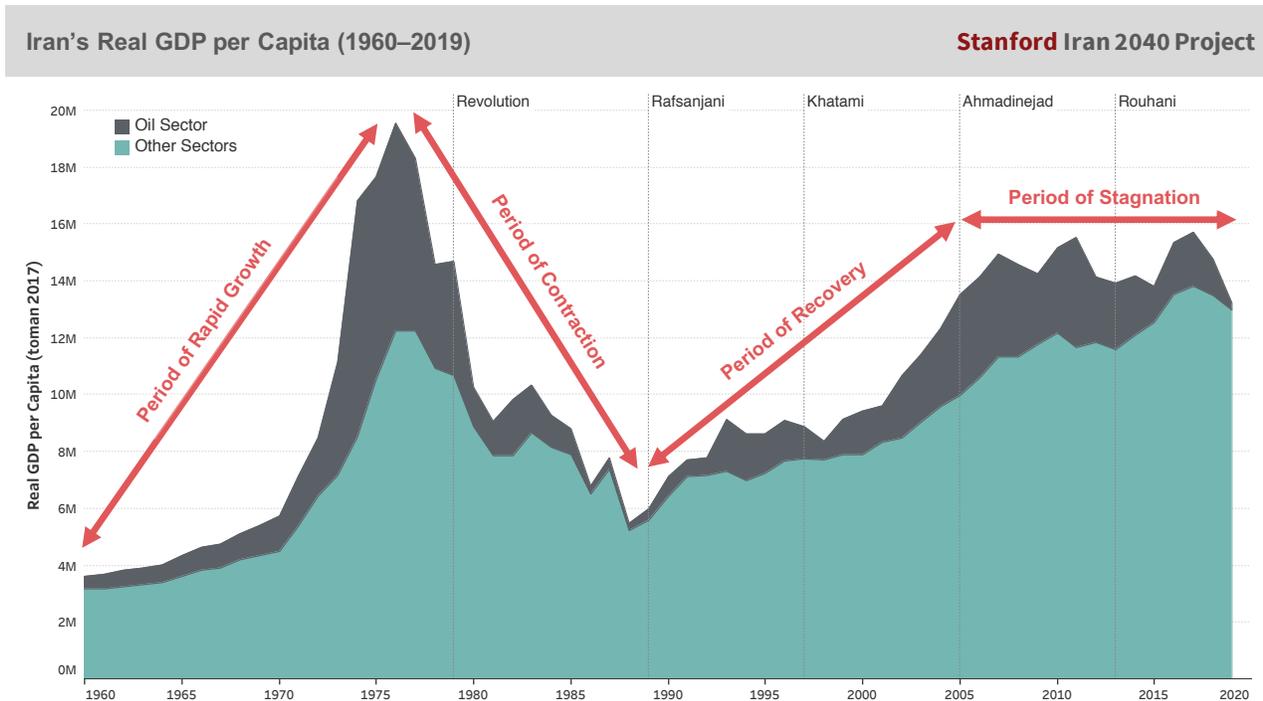
popular destinations in the developing world for Iranian migrants (e.g., Turkey and Malaysia) have been a factor of ten and three larger than that of Iran, respectively. Similar gap exists in the quality of education, particularly at the postgraduate level.

The Iranian government's social and political repression and human rights violations constitute other important predisposing factors that motivate migration across different social classes. Lack of democratic institutions (e.g., free and multiparty elections), crackdowns on civil society, the mandatory hijab, pressure on religious minorities, draconian interventions in various aspects of relationships between men and women, and homophobia are some embodiments of this issue.

Another important predisposing factor that has slowly, but fundamentally, changed the migration landscape in Iran is social mobilization, a term that refers to a cluster of changes in the reproductive behavior, education, urbanization, and mobility of labor which typically occur around the same time for each nation [21]. A sharp decline in the fertility rate in Iran, which started in the mid-1980s [3], ushered in a new era of parenting where the amount of time and money that parents could spend per child increased significantly. Analogous to the concept of capital investment, the increased level of per child expenditures on education and training, as the most important investments in human capital, has pushed the current generation of the Iranian youth for higher educational attainments compared to their previous counterparts, and, the higher the educational attainments, the higher the international transferability. The increase in the effective costs of raising a child, as a positive feedback, accelerated the fertility decline in the country. Another predisposing factor which paved the way for larger migration flows from (and within) Iran is related to the country's move over the past century from a Malthusian equilibrium and agrarian economy to an urbanized population where the majority of the labor is in industry or service sectors and more mobile compared to the past, hence more susceptible to migration if warranted by other factors.

### ***Proximate Factors***

Compared to the wage gap that exists between Iran and the developed world (which was discussed under predisposing factors), changes in the income level of each individual during cycles of economic expansion and contraction more directly affect migration decisions, hence classified as a proximate factor. Four distinct trends can be identified in historical per capita income in Iran (**Figure 8**): a sharp increase in the 1970s which was, to a large extent, due to massive oil windfalls; a sharp decline during the 1980s; a slow recovery through the mid 2000s; and stagnation since around 2005. Given major macroeconomic imbalances and deviations from normal conditions such as the country's low investment, large public debt, and banking crisis [22] along with policy and political uncertainties depict a bleak outlook for output growth in the coming years. Today, an overwhelming majority of Iranians believe that their standard of living



**Figure 8.** Iran's real GDP per capita (in constant 2017 toman) between 1960 and 2019 [27].

will not improve under the business-as-usual scenario in the Islamic Republic. A prolonged period of sluggish economic growth and poor economic prospects are among the most important drivers of migration in the past decade, especially for the highly-educated elites who have a longer planning horizon and have more resources to cope with the uncertainties of migration.

In addition to economic factors, decay of the rule of law and democratic accountability (i.e., the political institutions that limit and check power) since the early 2000s has gradually led to a loss of state capacity and legitimacy, the spread of corruption, and the erosion of social capital, resulting in a state of hopelessness prevalent amongst Iranian society today.

By deteriorating the quality of life, critical and persistent environmental issues can potentially be part of the calculus when people evaluate potential risks and benefits of migration. Among the most significant of these issues for Iran are the extreme air pollution in metropolitan areas and water scarcity which is facing most parts of the country. While the effect of air pollution in pushing people to migrate is not as significant as other economic and socio-political factors, it could be an impediment to the return of the migrants [23]. Iran's water scarcity, which is gradually becoming a full-fledged environmental crisis, has thus far only caused internal displacement of the population from the water-stressed villages to nearby cities and other regions, but has not contributed significantly to international migration from the country. However, if the problem persists, the water crisis can potentially generate a flow of environmental refugees in the future.

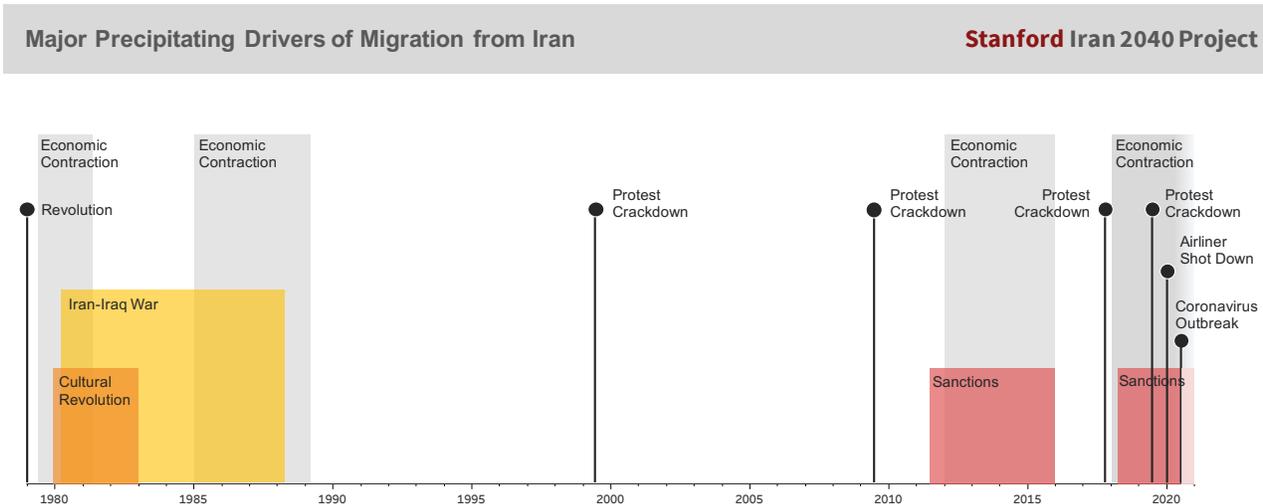
## ***Precipitating Factors***

In contrast to predisposing and proximate factors that are embedded in the economic, social, and political landscapes, precipitating factors are linked to identifiable events that directly influence the migration decisions of individuals and households. **Figure 9** displays a timeline of these events which begins with the volatile and hostile political atmosphere after the 1979 revolution and the eight-year war with Iraq. These events not only led to a flux of migrants and asylum-seekers towards Europe and North America, but also caused massive internal displacement (from western to central provinces in the case of war).

Another important event which gave rise to the migration of university professors and their families from Iran was the regime's *cultural revolution* (1980–1983), which was an effort towards Islamification of universities through academic cleansing and modification of curriculum [24]. In addition to the dire consequences of expelling some of the most qualified professors (which was followed by the recruitment of new faculty members based on commitment to the ideology of the revolution rather than merits), the ability of Iranian universities to contribute to the development of the country has been undermined by the short-sightedness of state's research policies [2], outdated and ineffective curricula, and a hostile environment for those who criticize the status quo. These issues play an important role in persuading many academics to pursue their career goals in a foreign country.

Other precipitating events that are among the causes of large flows of migrants from Iran were the government's crackdown on major protests during the past two decades. These events include the crackdowns on the student protests in 1999 (*Kouy-e-Daneshgah*), the presidential election Green Movement protests in 2009, the protests in 2017–18, and the protests in 2019 which were triggered by a spike in gasoline prices. The government's reactions to these four events became successively more violent, causing higher rates of post-traumatic stress in the society.

The economic sanctions imposed on Iran in 2012 and 2018 in response to its nuclear program were among the most significant events of the past decade affecting the decisions of Iranians to migrate in a number of different ways. First, they exacerbated Iran's economic challenges by reducing government revenue, increasing international transaction costs, and, in some cases, disrupting industrial production by interrupting the supply of imported intermediate goods. Sanctions also intensify the sense of hopelessness in the society as no democratic path exists for the Iranian people to influence policies that led to the imposition of them in the first place, and the regime's subsequent reaction to resolve the issue. Finally, by creating an uncertain atmosphere, the sanctions changed people's financial behavior by disincentivizing investment in the real economy and incentivizing conversion of savings to foreign currencies or other liquid stores of value, which over time loosens economic ties of people to the country and increases



**Figure 9.** Major precipitating drivers of migration from Iran since 1979.

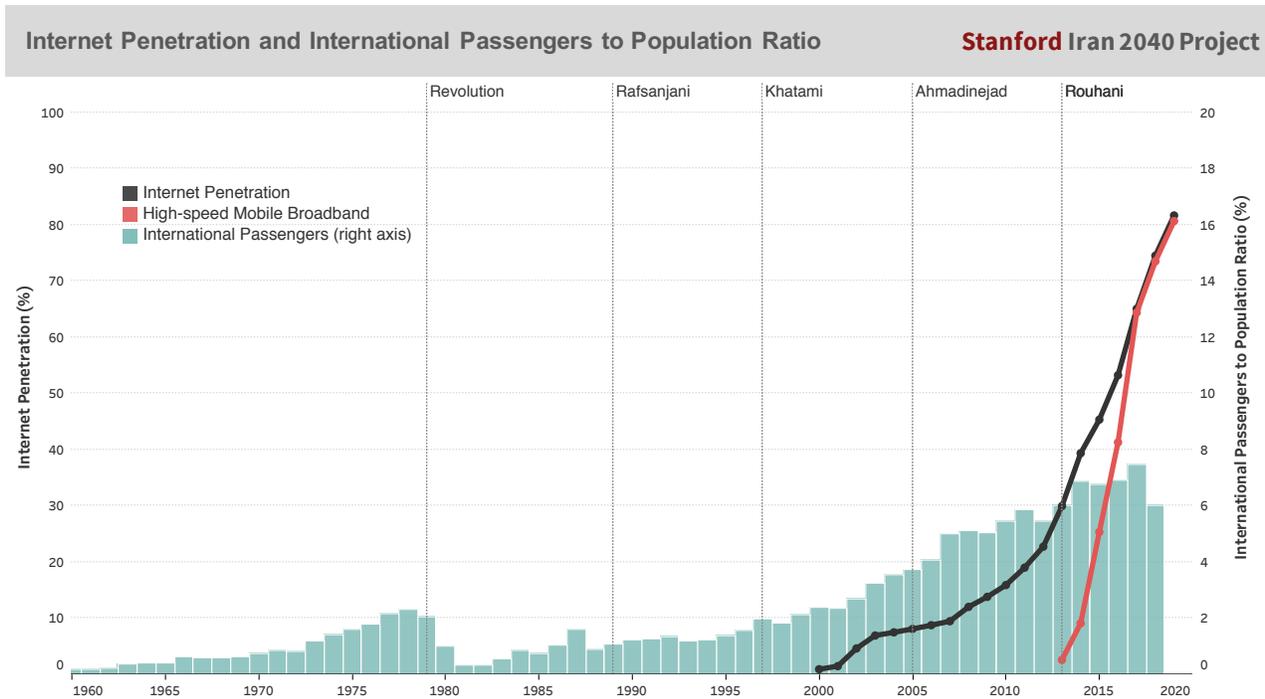
their international mobility. However, the impacts of sanctions on migration should be evaluated by taking into account not just what has materialized under these sanctions but also what could have happened under alternative scenarios.

Besides the impact of sanctions and the sluggishness of the real sector of the economy, sporadic financial shocks—manifesting in high inflation and periods of steep currency devaluation—can also be classified as precipitating events that trigger migration. These shocks primarily stem from the state’s politically-driven and dysfunctional monetary policy and cause widespread social frustration by shrinking the real value of savings and disrupting the financial plans of individuals and firms.

### **Mediating Factors**

We have thus far laid out the structural forces and precipitating events that have shaped the atmosphere for migration in Iran over the past half century. However, in addition to the migration drivers discussed above, there are other intervening factors that function as the *infrastructure* for migration, both figuratively and literally. They play an important role in creating aspirations for, and actualization of, migration. Financial resources to cover the costs of migration, the presence and quality of means of transportation, and access to information about the migration process and the country of destination are among the most important mediating factors affecting migration decisions. Lack of such resources are one of the key reasons that the poor, particularly the poorest of the poor, constitute a very small share of migrants, despite having more economic incentives for migration than the middle class and wealthy individuals [25].

The improvements in the availability, specificity, and reliability of information regarding the various steps of migration and its potential outcomes for the would-be migrants are profoundly transforming the migration landscape and culture in Iran. This is due to the increasing trends in



**Figure 10.** Iran’s internet penetration and high-speed mobile broadband (left axis) and ratio of international passengers on outbound flights to population (right axis) [27,28].

the stock of current migrants (the cascade effect) and improved access to means of communication, particularly the internet. The rise in the share of the population living abroad (**Figure 3**) means that the current generation of would-be migrants in Iran have significantly larger networks of friends and family abroad while the drastic rise in the penetration of internet and social media over the past few years has boosted routine interactions between migrants and their friends and family in the country. These first-hand routine interactions with familiar persons help eliminate some of the uncertainties surrounding different facets of migration, hence increasing the likelihood of future migrations from the country.

**Figure 10** illustrates trends in the passengers on international flights leaving Iran (as a share of population) and the mobile internet penetration in the country as proxies for degree of direct exposure to information about other countries. As shown in this figure, the relative size of the outbound passengers from Iran increased from 0.3% of the population in 1980 to 6.0% in 2018. These passengers typically include Iranian tourists to other countries, foreign tourists to Iran, Iranian migrants returning abroad after visiting Iran, and new migrants leaving the country (i.e., only a small percentage of the outbound passengers). In the meantime, the rise in internet penetration, which occurred slowly during the 2000s before accelerating in the 2010s, helped break the state’s de facto monopoly on the media and enabled people to learn about life and opportunities in other countries. The more frequent communications of recent years between Iranians inside the country and their growing networks of friends and family abroad has played an important role in shaping the culture of migration in Iran.

## Implications and Future Outlook

Having explained the main trends and underlying drivers of migration, particularly those pertinent to the migration of highly-educated and skilled persons, we now discuss the implications of brain drain and the potential role that the Iranian diaspora community could play in shaping the future of Iran. As mentioned earlier, while the government of Iran perceives migration of elites as a phenomenon which contributes positively to its political stability, due to public sensitivity surrounding the issue, it downplays the adverse effects of brain drain in its formal stance and rhetoric. The data presented in the previous sections indicate that, contrary to the regime's depiction, the current and forecasted trends of brain-drain from Iran are, in fact, formidable. Over the past few decades, the governance deadlock and the decay of political and economic institutions have overshadowed Iran's brain drain crisis. The state's dominance in the economy and the prevalence of corruption and lucrative opportunities for rent-seeking activities have, for decades, kept the return on education and entrepreneurship in Iran low. In turn, this low return on education and entrepreneurship, combined with the massive flux of graduates from low-quality higher education institutions (which were hastily created to temporarily curb unemployment), and the unmeritocratic practice of recruitment and promotion in the government and state-owned enterprises, have significantly reduced the opportunity costs associated with migration, especially for the highly-educated.

Over the past decade, Iran has struggled with the compounding effects of multiple profound crises that can only be addressed by the type and depth of reforms that are politically infeasible for the regime [26]. It is therefore likely that all predisposing and proximate factors listed in **Table 1** will remain in place or intensify in the foreseeable future. These structural issues will likely be augmented by various forms of shock (i.e. precipitating factors) which will in turn create even larger desires for migration. However, if and when future political breakthroughs stop Iran's current downward spiral and pave the way for fundamental changes in governance, the diaspora will be able to help with the development of Iran through the following mechanisms:

- ❖ **Virtual and actual return of talent:** Professionals and highly-skilled Iranian migrants can help fill the gap in knowledge and managerial skills by permanent, temporary, or virtual return to Iran. They can also facilitate the adoption of new technologies in Iran and help bring Iranian-produced goods and services into the global market. Academics among the Iranian diaspora can teach at Iranian universities and collaborate with their counterparts in the country to find solutions for Iran's challenges. However, the return of the talent to Iran, actual or virtual, not only requires a welcoming atmosphere—free of hostility and ideological and gender discrimination—but also significant material and nonmaterial incentives, which will only become available when the economy begins to grow again. Despite the lack of economic opportunity in the private sector to motivate Iranian migrants to return home, in principle, the public sector could have still benefitted

from the experience and knowledge of the country's prominent migrants. However, the Islamic Republic's paranoid mindset about the intentions of the diaspora for contributing to causes inside Iran has deprived the country of reaping such benefits. From the other end, prominent migrants are also hesitant to collaborate with the Iranian government not only because of the regime's bad reputation and lack of legitimacy but also due to potential personal threats caused by internal conflicts in the regime. Under such circumstances, majority of the rare cases of direct recruitment for the public sector from the diaspora were limited to those who have not been seriously critical about the regime's policies and simultaneously have an appetite for a political career within the present political structure of the country.

- ❖ **Financial investment:** Considering the decades of woefully insufficient and misallocated investment, Iran's market may become an excellent investment opportunity for wealthy individuals and financial managers among the diaspora. The inflow of capital from the diaspora can be in the form of foreign direct investment (FDI), venture capital, and equity. Such development will be contingent upon improvements in the rule of law, corruption, and the openness and transparency of the country's capital account and exchange rate policy;
- ❖ **Philanthropic contributions:** Given the financial success of many Iranian entrepreneurs and professionals among the diaspora community and their proven record of supporting Iranians causes (which has been mostly limited to their country of residence so far), it is likely that their philanthropic contributions to Iran will expand dramatically once the current legal and political barriers are removed. In addition to the legal barriers in the US and other countries in transferring money to Iran, many wealthy Iranians, even those who did not engage in political activities against the regime, do not risk visiting their home country due to the fear of being targeted for extortion by officials. Until such behavior by the regime changes, the philanthropic engagement of the diaspora will likely remain insignificant for the foreseeable future, despite the growing capacity and willingness of Iranian migrants to support causes in their home country;
- ❖ **Tourism:** In addition to short-term visits to Iran, the Iranian diaspora can help promote tourism to Iran and market goods associated with Iranian culture in their country of residence. As the real price of oil will likely decrease in the coming decades, tourism could potentially become one of Iran's most viable sources for earning foreign currency revenue needed for imports from other countries;
- ❖ **Remittances:** This type of contribution is primarily used for provision of basic needs for families of migrants, and thus is largely independent of the political situation. Historically, remittances sent by Iranian migrants have been small compared to those in other developing countries. For example, in recent years, migrants from India, China,

Mexico, Nigeria, Philippines, Egypt, Pakistan, Bangladesh, and even Morocco, Lebanon, Kyrgyzstan, Ghana, Kenya, Haiti and dozens of other countries have sent significantly larger sums of remittances back to their home countries than the Iranian migrants [4]. In fact, the amount of capital that Iranian migrants transfer out from the country has been consistently larger than the amount of remittances they send back.

As mentioned earlier, none of the above contributions from the Iranian diaspora will materialize without a major breakthrough in the political landscape of Iran to normalize and improve Iran's position in terms of international relations, the rule of law, corruption, macroeconomic stability, social policies, and human rights.

## Concluding Remarks

In this paper, we used data from various sources to shed light on different aspects of the migration landscape in contemporary Iran. The main quantitative findings of the paper are as follows:

- ❖ Over 3.1 million Iranian-born people have emigrated from Iran, out of whom over 2.6 million (83%) have left the country since 1979;
- ❖ Nearly 1.0 million Iranians have applied for asylum since 1980 and about one-third of those requests have been granted;
- ❖ Around 700,000 individuals born in Iran have attended foreign universities. The number of Iranian students enrolled in foreign universities has steadily increased since the early 2000s and has reached about 130,000 today;
- ❖ Based on global publication records, over 100,000 researchers of Iranian descent have worked in foreign universities and research institutions. Based on the headcount, this figure corresponds to one-third of Iran's human capital in research.

Although the number of highly-educated and skilled individuals who have already left Iran is high, the rate of brain drain from Iran will likely accelerate in the future given the increasing political uncertainties amid a downward-spiraling economy. In addition to their expansion in numbers, the achievements of Iranian migrants, both intellectually and materially, have made the Iranian diaspora into an emerging resource that can potentially help Iran break its low-growth logjam. In principle, this can take place through virtual and actual return, financial investments, philanthropy, tourism, and remittances. However, without fundamental changes in the political landscape, the prospect for significant contributions from the diaspora will remain bleak, while, in the meantime, the likely intensification of human capital flight from Iran will continue to deprive the country of one of its most valuable resources for future development.

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## Data and Methodology

The migration and asylum statistics presented in this study were compiled from international agencies (e.g., United Nations Population Division [29], United Nations High Commissioner for Refugees [30,31,32], Eurostat [33], OECD Statistics [34]) and national organizations (e.g., Iran [27], the United States [35,36], Canada [37,38], Germany [39], Australia [40], the United Kingdom [41], Denmark [42]). In rare cases where sufficient data were not available, we used figures reflected in the news or estimated by interpolation.

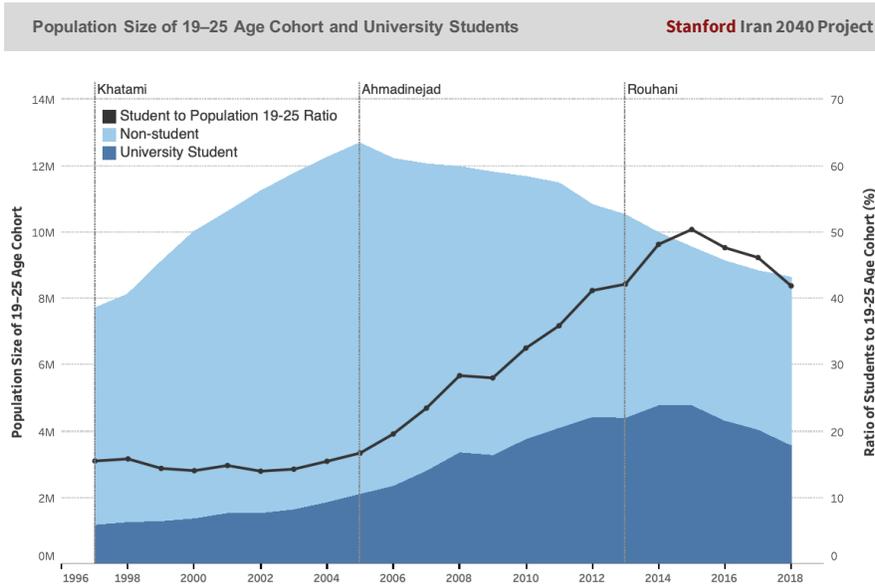
The statistics on Iranian international students were compiled using data from the Institute of International Education [15,43] and national organizations listed above. To estimate the number of Iranian students who already reside in foreign countries prior to enrollment at universities (e.g., Iranian-born children who emigrated with their families), we used data on population age structure and educational attainments of Iranians as reported in the US census results [44]. This estimate was found using the share of Iranians in the United States with a bachelor's degree or higher, as reported in the American Community Survey, and applied to the stock of Iranian migrants over time. We also found the ratio of graduate to undergraduate students using the data from the Institute of International Education and reference [13].

To count the number of Iranian scholars inside the country and abroad, we first extracted all papers in the Scopus database [18] with at least one author affiliated with an Iranian institution (nearly 600,000 papers). We then compiled separate lists of unique first and last names from all authors whose affiliation were from Iran and ranked them based on the number of times each name appeared in the list (nearly 150,000 unique last names). After excluding obvious non-Iranian names, we obtained a final list of common Persian last names and their spelling variations (about 120,000). Subsequently, we searched each of these last names on the Scopus platform without restricting the affiliation country to Iran (about 830,000 unique individuals). We then searched the publication records of each of these authors using their unique author-ID. Finally, for each country and year, we created a list of papers published by authors who are potentially Iranian (who can also be second generation Iranians). In order to correct for overestimation caused by the existence of shared surnames between Iranians and other nations (mostly the Muslim countries), we compiled a list of one thousand Persian first and last names that are almost exclusively used by Iranians. We then estimated the number of Iranian diaspora scholars in each country by comparing the share of these Iranian names among the authors identified in the previous step with an expected value calculated based on the prevalence of these names among the authors in Iran.

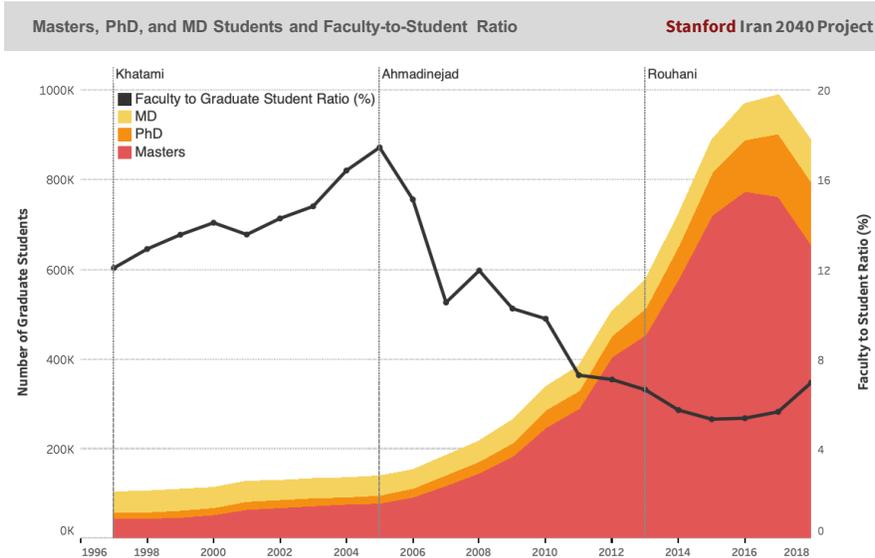
It is also worth noting that these figures underestimate the total number of *active* scholars since not every scholar would publish a paper in a given year (since the frequency of publication has increased over time, we expect that the degree of underestimation to be more pronounced in the earlier years).

We also note that the number of asylum seekers for the United States includes both asylum-seekers (who filed their claims inside the US) and refugees (those who applied abroad). Data on foreign-educated were obtained from reference [45] for the cabinet members (except for Rouhani's second term) and from a mix of public listings, government websites, and news searches (i.e., university professors, current university presidents, parliament representatives, current ambassadors, and current CEOs of twenty of the largest firms).

## Appendix A: Iran's Higher Education Statistics



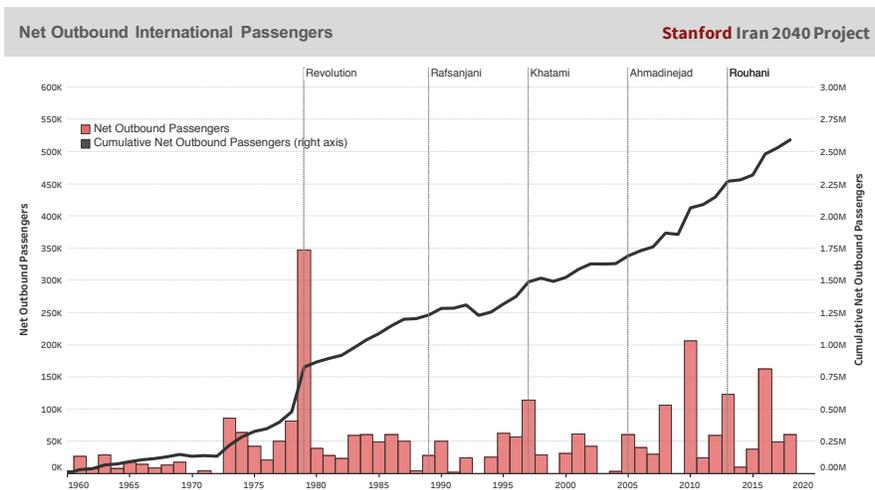
**Figure A1.** Changes in nineteen-to-twenty-five age cohort and number of university students (left axis) along with the ratio of university students to this cohort (right axis). Note that at any given time, part of the non-student population age nineteen to twenty-five may already have a university degree. The figure was originally published in reference [2].



**Figure A2.** Number of graduate students (left axis) and ratio of faculty members (assistant, associate, and full professors) to graduate students. The figure was originally published in reference [2].

## Appendix B: Estimation of Net Annual Flow of Migrants

The net flux of migrants in a given year can be estimated from the difference between the inflow and outflow of the international passengers. **Figure B1** shows Iran's net outbound passengers on international flights since 1960 and their running total. The net outflow of Iranian citizens who cross the borders by road has been about 470,000 since 1996 (**Table B1**) which is much smaller compared with those who travelled by air. Using this method to estimate the annual flow and total stock of migrants offers a number of important benefits. First, contrary to immigration statistics reported by the host countries, the passenger traffic data has no time lag and almost immediately tracks the actual migration flows. For example, it typically takes five to ten years for an Iranian student who enters a foreign country as a student to obtain permanent residency or citizenship, and thus be counted in official immigrant statistics. Second, it makes up for missing or underreported data on the number of Iranian immigrants in developing countries. Third, it allows for the exclusion of those Iranians who have been granted permanent residency permits or citizenship of a foreign country but primarily live in Iran (e.g. this situation is common among the parents of the first-generation migrants).



**Figure B1.** Net outbound international passengers calculated as the number of air passengers on flights leaving Iran minus the air passengers entering Iran (left axis) and its running total since 1960 (right axis) [27].

**Table B1.** Number of passengers entering and leaving the country by road (million) [46].

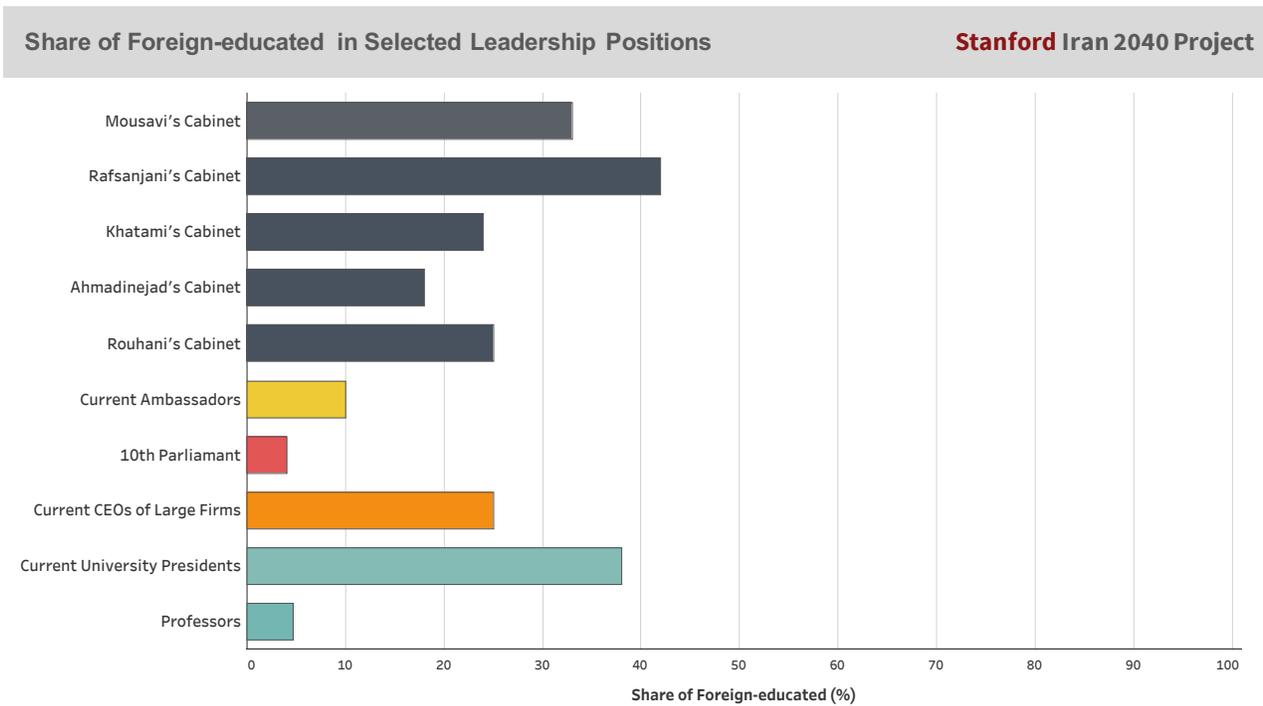
Year	Inflow	Outflow	Net Outflow	Year	Inflow	Outflow	Net Outflow
1996	0.21	0.23	0.019	2008	2.33	2.26	-0.07
1997	0.18	0.19	0.013	2009	2.87	2.84	-0.03
1998	0.18	0.20	0.020	2010	3.84	3.89	0.04
1999	0.26	0.29	0.036	2011	3.47	3.43	-0.04
2000	0.27	0.29	0.022	2012	2.65	2.68	0.02
2001	0.21	0.21	0.001	2013	3.18	3.30	0.12
2002	0.26	0.26	0.002	2014	2.98	3.32	0.34
2003	0.24	0.26	0.019	2015	3.63	3.27	-0.36
2004	0.32	0.37	0.056	2016	4.42	4.44	0.03
2005	0.39	0.43	0.042	2017	5.04	5.16	0.12
2006	1.52	1.62	0.11	2018	3.93	3.80	-0.12
2007	1.90	1.99	0.09	<b>Total</b>	<b>44.29</b>	<b>44.75</b>	<b>0.47</b>

## Appendix C: Migration of Iranians to the United States

**Table C1.** Statistics on the number of Iranian migrants and students in the US [35,36].

Year	Permanent Residence		Persons Naturalized	International Students	
	Total	Refugee/ Asylees		Total Enrolled	New Student Visas
1970	1825		416	6896	
1971	2411		501	8617	
1972	3059		569	10338	
1973	2998		578	12059	
1974	2608		562	13780	
1975	2337	36	601	20000	
1976	2700	52	567	23700	
1977	4261	78	838	36200	
1978	5861	15	1132	44800	
1979	8476	13	1217	51310	
1980	10410	124	1591	46500	
1981	11105	366	1677	35800	
1982	10314	701	1636	26200	3880
1983	11169	1450	1868	22000	4109
1984	13807	3544	2268	16640	3748
1985	16071	5420	3431	14000	4173
1986	16505	6022	4569	12100	3087
1987	14426	5559	4277	10200	1542
1988	15246	6895	4970	9000	997
1989	21243	8167	4485	7440	1027
1990	14905	8649	5973	6100	828
1991	9927	8515	10595	5000	709
1992	6995	3093	6787	4100	624
1993	8908	3875	7033	3800	534
1994	6998	2186	10041	2896	600
1995	9201	1245	11761	2587	522
1996	11084	1212	19278	2100	405
1997	9642	1447	11434	1969	370
1998	7883	754	10739	1660	372
1999	7203	1030	18268	1885	456
2000	8519	956	19251	1844	662
2001	10425	1364	13834	2216	861
2002	12960	4806	11773	2216	295
2003	7230	2023	10782	2258	272
2004	10434	3966	11781	2321	350
2005	13887	6480	11031	2251	470
2006	13947	6316	11363	2420	647
2007	10460	2570	10557	2795	801
2008	13852	3465	11813	3060	1048
2009	18553	9804	12069	3533	1787
2010	14182	4735	9337	4731	1764
2011	14822	5386	9286	5626	2490
2012	12916	3430	9627	6982	3051
2013	12863	2481	11623	8744	3044
2014	11615	2521	9620	10194	3294
2015	13114	3756	10344	11338	3250
2016	13298	3111	9507	12269	2659
2017	13791	3656	8324	12783	2201
2018	10116	4441	8409	12142	1434
2019	5789		10232		1970

## Appendix D: Foreign-educated Officials, academics, and Business Leaders in Iran



**Figure D1.** The share of foreign-educated high-level officials and business leaders (see **Data and Methodology** for the sources of data).