

Iran Economic Monitor

Towards Reintegration



Fall 2016

Global Practice for Macroeconomics & Fiscal Management
Middle East and North Africa Region



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PREFACE

The Iran Economic Monitor provides an update on key economic developments and policies over the past six months. It examines these economic developments and policies in a longer-term and global context, and assesses their implications for the outlook for the country. Its coverage ranges from the macro-economy to financial markets to indicators of human welfare and development. It is intended for a wide audience, including policy makers, business leaders, financial market participants, and the community of analysts and professionals engaged in Iran.

The Iran Economic Monitor is a product of the World Bank's Global Practice for Macroeconomics & Fiscal Management team. It was prepared by Eric Le Borgne (Lead Economist), Kamer Karakurum-Ozdemir (Senior Economist, Task Team Leader), Shahrazad Mobasher Fard (Economist), Fayavar Hayati (Economist), Samer Matta (Economic Analyst) and Majid Kazemi (Economist) under the general guidance of Auguste Tano Kouame (Global Practice Manager). The Special Focus on poverty was prepared by Tara Viswanath (Lead Economist), Aziz Atamanov (Economist), Djavad Salehi-Isfahani (Consultant) and Mohammad-Hadi Mostafavi (Consultant). The

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The findings, interpretations, and conclusions expressed in this Monitor are those of World Bank staff and do not necessarily reflect the views of the Executive Board of The World Bank or the governments they represent. For information about the World Bank and its activities in Iran, including e-copies of this publication, please visit <http://www.worldbank.org/en/country/iran>

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EXECUTIVE SUMMARY

The economy-wide positive impact of the JCPOA since January 2016 is proving to be slower than expected. Iran's economy moderated to an estimated annual growth rate of 0.6 percent in 2015 ahead of the implementation of the Joint Comprehensive Plan of Action (JCPOA). Early signs of increased economic activity in 2016 suggest it is primarily based on the oil sector's quick rebound. Inflationary pressures continued to abate, with the Consumer Price Index falling to an annual pace of 11.9 percent in 2015 and further to 9 percent in September 2016. The pace of job creation has remained insufficient to absorb new entrants to the labor force and unemployment rate worsened, by 0.4pp to 11 percent in 2015. The fiscal deficit of the central government widened marginally (by 0.4 pp) to 1.6 percent of GDP in 2015, with the rise in current expenditures being only partially offset by the decline in capital expenditures and the rise in government revenues. The latter was driven by increases in non-oil revenues. At the same time, Iran's current account surplus is estimated to have shrunk from 3.8 percent of GDP in 2014 to 2.3 percent of GDP in 2015, as the decline in oil exports was only partially offset by the fall in imports.

Following the removal of nuclear-related sanctions in January 2016, the growth rate is projected to average 4.5 percent in 2016–2018, up from a 0.5 percent average in 2013–2015. This projected recovery which will rely on favorable external factors, is expected to be driven by (i) a significant

increase in energy sector activity thanks to the removal of sanctions; (ii) increased inflows of foreign investment; and (iii) lower trade and financing costs that will help the non-oil sector contribute significantly to overall growth and job creation. The expected pick-up in economic activity is likely to translate into better fiscal and external balances despite lower oil prices. In line with the recent published data from the CBI, 2016 inflation is expected to be 8.6 percent, its lowest reading for a quarter of a century.

However, there are significant downside risks to Iran's medium-term outlook. The primary risks are an extended delay in the reintegration of the Iranian banking sector with the rest of the world due to (1) continued uncertainty about practical implementation of the JCPOA; and (2) overarching snap-back risk and remaining non-nuclear related sanctions, as well as the weaknesses in the banking sector's ability to fund productive firms. The ability of new investments to obtain adequate sources of financing will therefore remain challenging, both for domestic and foreign investments, and especially for those in the non-oil sectors. Weaknesses in external demand conditions as well as a downward movement in oil prices also pose a risk to the baseline scenario.

While the January 2016 lifting of the nuclear-related sanctions is expected to reveal the dynamism of the Iranian economy, a large structural reform agenda remains key in moving towards the ambitious growth target under the 6th

five year development plan. Iranian authorities have adopted a comprehensive strategy encompassing market-based reforms as reflected in the government's 20-year vision document, but implementation suffered from the intensified sanctions. Most recent impetus to the structural reform agenda is engrained in the sixth five-year development plan covering the 2017–2021 period, which is yet to be ratified by the Parliament. The sixth plan aims for an annual growth rate of 8 percent and a reform agenda built on a gradual but

sustained transformation of the economy towards a resilient, stable, productive, open, knowledge-based and just economy. The plan envisages the implementation of reforms of state-owned enterprises, the financial and banking sector, and a greater emphasis on the allocation and management of oil revenues to productive investments among the main priorities of the government during the five-year period. The implementation of these reforms will be key in generating private sector led growth and creating jobs.

RECENT ECONOMIC AND POLICY DEVELOPMENTS

Output and Demand

Expected benefits from the implementation of the JCPOA have not yet materialized with the exception of the oil sector's ability to increase production and exports. This delay is primarily due to the global banks' concerns regarding residual risks related to the removal of sanctions. These risks take several forms: (i) lack of clarity on the practical implementation of the JCPOA; (ii) concerns about possible triggering of the snap-back clause; and (iii) complications arising from the existence of non-nuclear related sanctions.

Preliminary Figures for Spring 2016 suggest the Iranian economy has recovered from last year's weak growth, albeit narrowly based on the oil sector's quick rebound. Following the contraction in 2012–13 period, by 6.8 percent and 1.9 percent, respectively, and a bounce back in 2014 (Figure 1), Iran's economy moderated to an estimated annual growth rate of 0.6 percent in 2015 ahead of the implementation of the Joint Comprehensive Plan of Action (JCPOA). Economic indicators are pointing to early signs of economic rebound, with the first quarter of 1395 (corresponding to April–Jun 2016) growth at 5.4 percent.¹ This strong performance was largely due to the pick-up in oil production and accompanying oil exports, with the oil sector constituting about 19 percent of GDP in 2011–15.

Oil production and exports recovered in 2015 and in the first half of 2016, counteracting the pull effect from investment and government

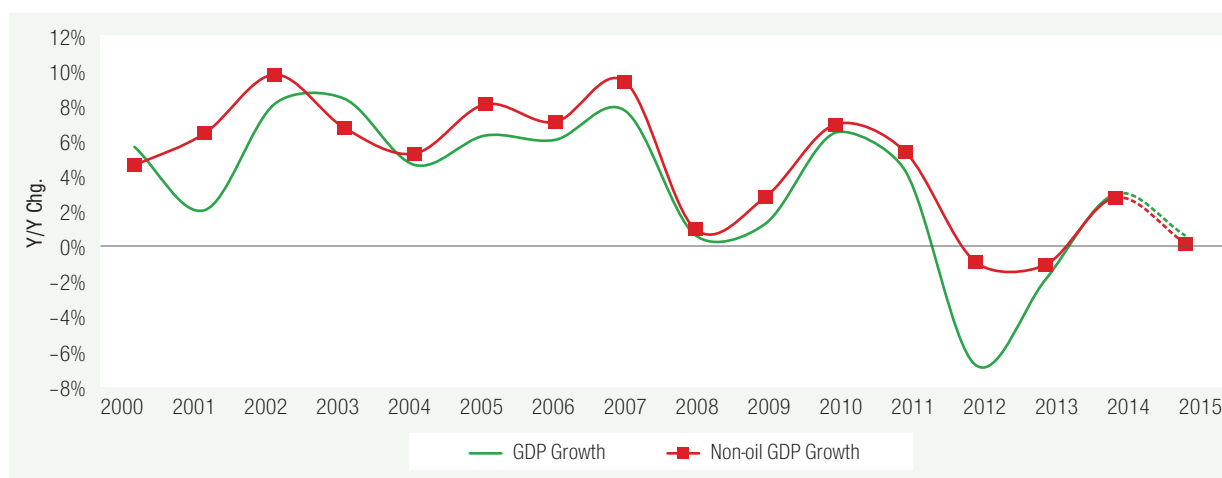
consumption. Against the 1 percent drop in investment and close to 9 percent reduction in government consumption with falling oil revenues, exports growth was the main contributor to growth in 2015 (Table 1). Following an increase in daily oil production from 3.1 mbpd in 2014 to 3.2 mbpd in 2015, production neared pre-sanctions level and reached 3.63 mbpd in August 2016. Exports of oil increased at an even faster rate and increased from 1.34 mbpd in 2014 to 1.43 mbpd in 2015 and reached 1.8 mbpd in August 2016 but is yet to reach pre-sanctions level of daily exports volume. As a result, according to the preliminary Figures for 2016, oil production and exports continued to drive a robust growth rate in the first half of 2016, estimated at 3.1 percent based on the data available from the Statistical Center of Iran.

Iran's non-oil sector could help unlock its growth potential and create jobs; the automotive sector is well positioned to be one of the frontrunners. The automobile industry in Iran accounts for 10 percent of its GDP; and with total annual sales of USD12 billion, it makes up for 14 percent of the industry value added and 4 percent of its workforce.² At the same time, Iran's car production

¹ 5.4 percent is the first quarter 1395 estimate by the Central Bank of Iran while details of this growth performance is not available at the time of finalizing this report.

² <http://www.howtoinvestiniran.com/iran-automotive-industry-is-the-second-biggest-sector-in-country>

FIGURE 1 • GDP Growth



Source: Iranian authorities, and World Bank staff calculations.

Note: Iranian calendar years, running from March 21st to March 20th of the following year.

accounts for 1.2 percent of the world's production.³ Iran's highly state-dominated automobile industry has suffered substantially from the adverse effects of international sanctions since 2007. The sharp decline

in output during 2012–2014, accompanied by a substantial fall in exports share from 6.7 percent in 2012 to 2.5 percent in 2015, reflects the quandary of the car industry in Iran and is illustrative of the challenges the productive sectors face in the post-sanctions period. Yet, the vibrant sector is well poised to benefit from the removal of sanctions and for becoming internationally competitive. Box 1 describes Iran's post-sanctions automobile industry and challenges associated with bringing the sector back to its pre-sanctions performance and beyond.

TABLE 1 • Islamic Republic of Iran: Selected Macroeconomic Indicators (2012-15)

	2012	2013	2014	2015E
Real GDP growth, at factor cost	-6.8	-1.9	3.0	0.6
Agriculture	3.7	4.7	3.8	3.0
Industry*	-18.3	-4.7	4.9	4.2
Services	1.1	-1.5	2.4	-2.0
Real GDP growth, at market prices	-6.6	-1.9	4.3	1.7
Private Consumption	-1.7	1.0	3.1	3.9
Government Consumption	-7.2	1.6	2.7	-8.9
Gross Fixed Capital Investment	-23.8	-6.9	3.5	-1.0
Exports, Goods and Services	-20.5	0.0	12.0	6.3
Imports, Goods and Services	-23.1	-18.7	-5.7	-5.6
Prices				
Inflation (Consumer Price Index)	30.5	34.7	15.6	11.9
Current Account Balance (% of GDP)	4.0	5.7	3.8	2.3
Fiscal Balance (% of GDP)	-0.6	-0.9	-1.2	-1.6

Sources: Government data and World Bank staff calculations.

*Industry includes the oil and gas sector.

A number of agreements have been signed between Iran and international partners, pointing to a positive outlook and increased future economic activity, particularly through new FDI. There are three recent agreements towards attracting new foreign investments. First, a Memorandum of Understanding (MoU) has been signed by Sam Woo Engineering and Construction (E&C), a South Korean conglomerate, to build a new refinery at the Zilae economic zone in Khuzestan province, which could potentially be worth USD 5.5 billion. The project intends to raise Iran's refining capacity for both crude and condensates from the

³ http://www.iberglobal.com/files/2016/iran_automotive.pdf

BOX 1 • Iran's Post Sanctions Automobile Industry

The total domestic automobile production in Iran is dominated by two major producers; Iran Khodro (IKCO) and SAIPA, which account for more than 90 percent of the total domestic production. These two firms are subsidiaries of the state-owned Industrial Development and Renovation Organization. Both companies assemble European and Asian cars under the license, as well as their own brands. IKCO and SAIPA account for 44 percent and 43 percent of market share, respectively. Traditional export destinations for Iranian automobiles include Algeria, Azerbaijan, Cameroon, Ghana, Egypt, Iraq, Pakistan, Senegal, Syria, Sudan and Venezuela.

Iran's automobile industry has suffered substantially from the adverse effects of international sanctions since 2007; production in the industry fell by approximately 50 percent from USD 1.4 million in 2011 to USD 0.7 million in 2012.^a The sharp decline in output accompanied by a substantial fall in exports share from 6.7 percent in 2012 to 2.5 percent in 2015, demonstrates the challenge faced by the car industry in Iran.

TABLE 1.1 • Production and Export (in thousands units) and Share of Exports (%)

	2007	2008	2009	2010	2011	2012	2013	2014	2015
Production	948	1058	1188	1351	1417	786	583,7	867,2	976.8
Exports	52.8	51.6	47.5	81,5	38,2	52,9	10	28	24.7
Export share (%)	5.6	4.9	4	6	2.7	6.7	1.7	3.1	2.5

Sources: <http://donya-e-eqtesad.com/news/889508>, and <http://bruegel.org/wp-content/uploads/2016/06/Mohsen-Pakparvar-Iran-Automotive-Industry-Bruegel-Presentation.pdf>.

With the intensified sanctions on Iran's economy since June 2013, the global ranking of the automobile industry in Iran fell from 17th in 2008 to 21st in 2015; however, Iran's auto industry still produces more cars than countries such as Italy, Austria, Australia, and the Netherlands due to its large capacity. Iran's auto industry ranked 13th in world sales of passenger cars in 2015.

The massive currency depreciation in 2012–2013 adversely affected the competitiveness of the car industry because most intermediate inputs and technology are imported from abroad. The replacement of Chinese manufacturers for the western partners such as Peugeot and Renault under the sanctions could not reverse the sharp decline in the production. As a result, domestic production fell from 1.4 million in 2011 to 0.78 million in 2012, dropping below 1 million units for the first time in 2007.

After the initial shock in 2012–13, the sector bounced back rapidly, with its 2014–15 growth at five times that of the industry average, explained partly by the reforms introduced in the sector. Currently, the industry substantially contributes to government's revenues; almost 25 percent of the sales revenue of the industry is allocated to government-sponsored enterprises and organizations, mostly in the form of tax revenue.

Against this background, with the lifting of sanctions in January 2016 and the opening up the markets to foreign investors, it is expected that car production and imports will rebound gradually and reach 1.6 million in 2016, leading to increased employment in the sector. The considerable layoff of 30–50 percent that had started in 2013 as a result of sanctions is expected to reverse with the lifting of sanctions. In fact, almost a week after the agreement with P5+1, PSA (French car manufacturer) signed a EUR 400 million (50:50) joint venture with IKCO, which allows Iran to produce 100,000 vehicles per year in 2017, and is expected to double within a year, while for Peugeot it could mean more than 450,000 vehicles.^b Furthermore, Renault-Nissan is expected to restart its operations in the country and Fiat Chrysler Automobiles' (FCA) Fiat division will set up a joint venture with IKCO.

Currently, major producers in Iran suffer from lack of liquidity and need financing to expand and update their facilities. In response to this problem, measures have been taken to ease access of producers to trade finance through domestic commercial banks and the capital market. Access to international bank loans after the removal of sanctions will likely give a major boost to the industry too. In March 2016, President Rouhani announced plans to privatize the car industry and encourage joint ventures in order to make the Iranian automotive industry more technologically-advanced and internationally competitive. More importantly, Iran aims to remove government protection for domestic car producers. In addition, addressing complicated regulations, and fragmented supply networks would help attract foreign investment to the industry.

^a http://www.iberglobal.com/files/2016/iran_automotive.pdf

^b <http://www.bloomberg.com/news/articles/2013-11-24/peugeot-likely-to-benefit-most-of-peers-from-iran-accord>

current level of 1.85 mbpd to 3.2 mbpd by 2020. Second, the Iranian-Guinean Société de bauxites de Dabola–Tougué (SBDT) signed an agreement to begin the construction of a bauxite mine in Iran by end 2016. Third, the Government of India announced

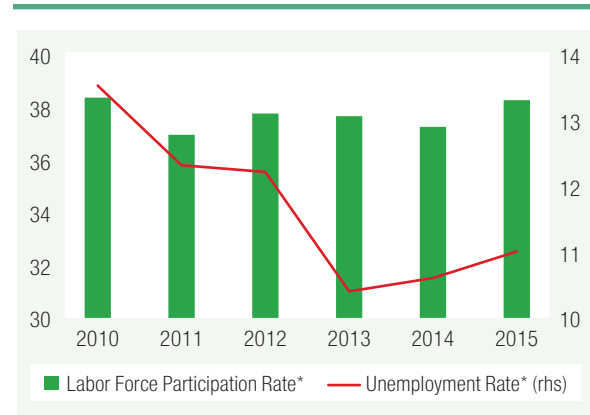
that it would invest USD 500 million to develop the strategically significant Chabahar Port, which represents an important transit route to Afghanistan and to Central Asia for Indian goods and which would avoid the land route through Pakistan. In addition,

a potentially USD 50 billion agreement to purchase 200 aircrafts from Boeing and Airbus has also been signed. Both companies announced that they received the first licenses from the U.S. Treasury's Office of Foreign Assets Control.⁴ Moreover, the revised terms of the new Iran Petroleum Contract (IPC) were approved by Iran's Resilient Economy Headquarters in mid-July, which will help attract investments from International Oil Companies (IOCs) to Iran. The new contract replaces the existing "buy-back" model, whereby the contractor funded the development of the project for an agreed amount of production share and for an agreed period of time—of five years in many instances—and transferred the operation of the fields to the government at the end of the contract. In contrast, the new IPC is structured as a joint venture, giving IOCs up to 49 percent of oil output and with a term of up to 25 years. In addition, the Foreign Investment Board, the official body responsible for making decisions on FDI applications under the Foreign Investment Promotion and Protection Act (FIPPA), approved about USD 7 billion in investments between March 2015 and March 2016 and more than USD 2 billion in investments between March 2016 and September 2016.⁵

Labor and Unemployment

Iran's unemployment rate rose in 2015, with the pace of job creation remaining insufficient to absorb new entrants to the labor market (Figure 2). The unemployment rate slightly deteriorated from 10.6 percent in 2014 to 11.0 percent in 2015, marked by stark gender differences (19.4 percent for women vs. 9.3 percent for men). Significant differences are also evident along the age dimension, with the youth particularly affected (with the unemployment rate at 26.1 percent for the 15–24 age group). The high incidence of underemployment⁶ continued to prevail, with an estimated 9.8 percent of workers being underemployed (10.8 percent for men and 4.5 percent for women) in 2015, up from 9.6 percent in 2014 (10.5 percent for men and 4.2 percent for women). Underemployment, estimated at 2.1 million in 2015, is largely concentrated among the youth population and in rural areas.

FIGURE 2 • Labor Market Conditions



Source: Iranian authorities.

Note: *Population 10 years of age and over.

The rise in unemployment was partly driven by the increase in labor force participation rate, which reached 38.2 percent in 2015 (up from 37.2 percent in 2014). This average participation rate masks sharp gender differences with men's participation rate at 63.2 percent, in comparison with women's participation rate of 13.2 percent.⁷ The pace of job creation, which was estimated at 667,800 jobs in 2014, remains well below the government's annual target of 955,000. A stronger pace of economic growth, supported in part by FDI, will be critical to achieve such a target if the relatively prudent fiscal and monetary policies are to be maintained.

Public Finances

The central government fiscal deficit is estimated to have deteriorated in 2015, with the rise in revenue being more than offset by the

⁴ <https://www.bloomberg.com/news/articles/2016-09-21/urgent-airbus-says-us-grants-license-for-planes-in-iran-deal>, Sep [11], 2016.

⁵ Information provided by OIETAI in November 2016.

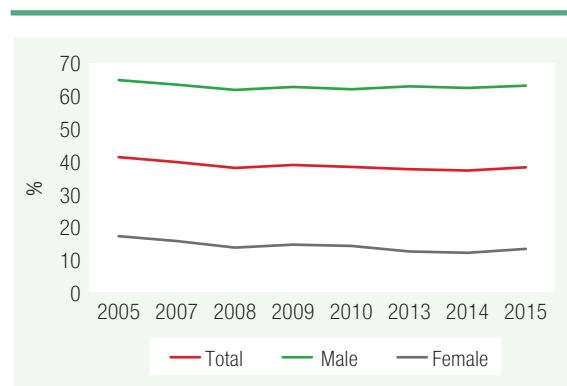
⁶ The Statistical Center of Iran defines underemployment as the situation in which labor market participants are involuntarily performing less than 44 hours of work during the reference week.

⁷ The labor force in Iran is the population 10 years of age or above.

BOX 2 • Gender Paradox of Iranian Women’s Labor Force Participation Rate

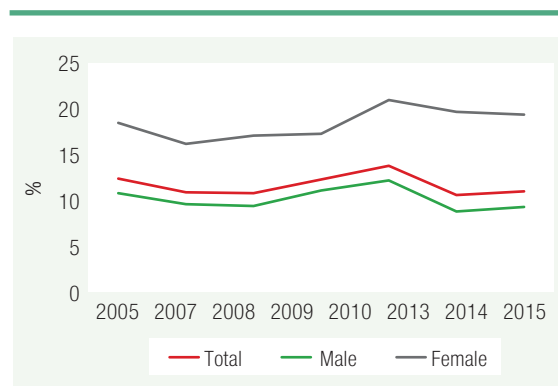
Iran constitutes a prime example for the “MENA gender paradox”, a term coined by the World Bank, which refers to the puzzle of the female labor force participation rate remaining very low in spite of the significant decline in fertility. Indeed, while Iran’s fertility rate has fallen sharply and the average number of years of schooling for women has expanded by 40 percent in only one generation, the female labor force participation rate remains at a quarter of the male labor force participation rate (Figure 2.1). This comes in spite of the emergence of labor saving home appliances, which are known to have been widely adopted in Iran. The relatively high return to women providing child care and child education appears to be the most plausible reason for this outcome.

FIGURE 2.1 • Labor Force Participation Rate by Gender



Source: ILO.

FIGURE 2.2 • Unemployment Rate by Gender



Source: ILO.

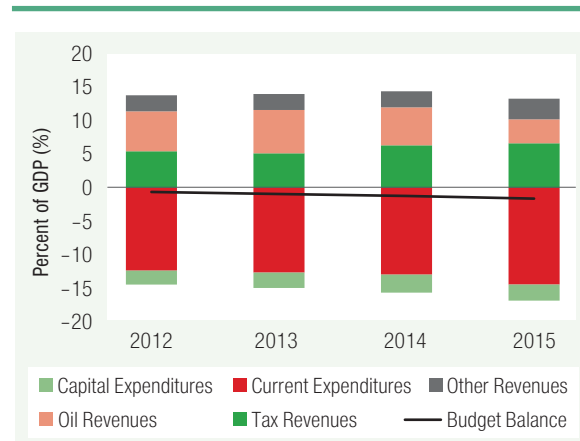
This has triggered a public debate in Iran about whether or not public spending on women’s education bears positive economic returns. A study by Salehi and Taghvatalab (2016) finds compelling evidence of positive economic returns.³ The study finds that, while women’s education has no effect in the time use of their husbands, more educated women have a higher propensity to stay longer in the labor market as well as spending more time on child care and child education, than their less educated counterparts. This is complemented by the finding that domestic work declines by the level of education of women. As such, the evidence indicates strong positive returns for society.

A stronger pace of job creation could also support a rise in the female labor force participation rate. The female unemployment rate is twice as high as their male counterpart (Figure 2.2). A steadier pace of job creation could effectively induce a higher female participation rate as women who have given up their employment search efforts and have become inactive re-enter the labor force.

³ Salehi and Taghvatalab (2016). “Education and the time allocation of Iranian women” <http://www.iraneconomics.org>

concomitant increase in expenditures. The fiscal deficit is estimated at 1.6 percent of GDP in 2015, up from a deficit of 1.2 percent of GDP in 2014 (Figure 3). Government revenue is estimated to have risen to 15.3 percent of GDP in 2015, up from 14.6 percent of GDP in 2014, in line with the continued rise in tax revenues and in the disposal of non-financial assets, while oil revenues remained stagnant at 5.7 percent of GDP, with the rise in export volume being offset by the oil price decline. Direct taxes rose from 3.3 percent of GDP in 2014 to 3.6 percent of GDP in 2015, while indirect taxes fell slightly from 3.2 percent of GDP in 2014 to 3.1 percent of GDP. The latter was attributable to the fall in import duties driven by the fall in imports, which was partially compensated by the VAT rate increase

FIGURE 3 • Central Government Expenditures, Revenues and Budget Balance, 2012-15



Source: Iranian authorities and World Bank estimates.

from 8 percent to 9 percent in March 2015. Meanwhile, government expenditure is estimated to have expanded from 15.8 percent of GDP in 2014 to 16.9 percent of GDP in 2015, led by the rise in current expenditures. Transfers through the Cash Subsidy Program declined from 3.8 percent of GDP in 2014 to an estimated 3.5 percent of GDP in 2015, due to exclusion of high-income households and the elimination of the earlier indexation of cash transfers to inflation (Figure 4).

The 2016 Budget was ratified by the Iranian Parliament in April 2016. The underlying assumptions of the 2016 Budget are that sanctions on Iran will be lifted, oil exports will rise from 1.4 mbpd at end-2015 to 2.25 mbpd in 2016, and that oil exports will be at an average of USD 40 per barrel in 2016. President Rouhani reiterated the government's interest to reduce its reliance on oil revenues ahead of the structural decline in oil prices.

The budget deficit widened in the first half of 2016. The revenues increased to 589.6 trillion Rials in the first six months of the year from 464.8 trillion Rials in the same period of last year, while expenditures grew by close to Rials 200 trillion during this period. As a result, the operating balance of the government increased by 17 percent in the first six months compared to the same period of 2015.

The government's financing needs continue to be met by banks and a more market-oriented structure of financing through the

issuance of bonds is needed. Money markets financed 89.2 percent of the overall financing needs of the economy in 2015, while the bond market and the stock market only financed 3.2 percent and 7.6 percent of total financing needs, respectively.⁸ Developing Iran's bond market remains a priority as it would significantly help support private sector development.

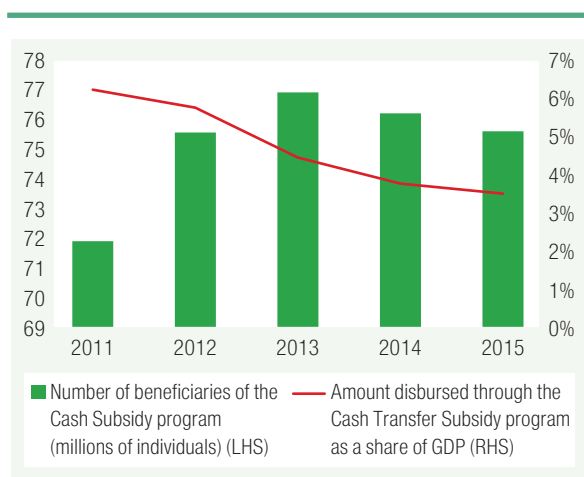
Amendments to the budget law, drafted in September 2016, aim to address the structural problems in the banking system as well as the legacy of the sanctions in the aftermath of the implementation of the JCPOA. The banking sector has been constrained by high NPL ratios, outstanding government debt and low capital adequacy. These challenges have been aggravated by the continued lack of integration with the global banking system, a major impediment to foreign investment. In order to improve the efficiency of the banking system, the government has undertaken a series of initiatives through the CBI and MoEF.

Monetary Policy and the Financial Sector

Inflationary pressures on the economy continued to abate within the context of curbing inflationary expectations, a less accommodative monetary policy stance and the lifting of sanctions. After 5 years of double digit inflation, policy makers successfully reigned in price growth in 2016 to single digits, reaching a low of 7.3 percent in March 2016, half the rate it was one year ago, driven by a stable exchange rate and favorable food prices. Since then, inflation has moved up to 9.5 percent in September 2016.

Half the decline in headline inflation was driven by falling food inflation, which fell from 21 percent in June 2015 to 9 percent in September 2016. The slowdown in food inflation was a result of the unwinding in fruit prices that soared to 50 percent year on year growth in mid 2015, before falling to negative 20 percent in March 2016 and picking up again to reach 7 percent in September 2016.

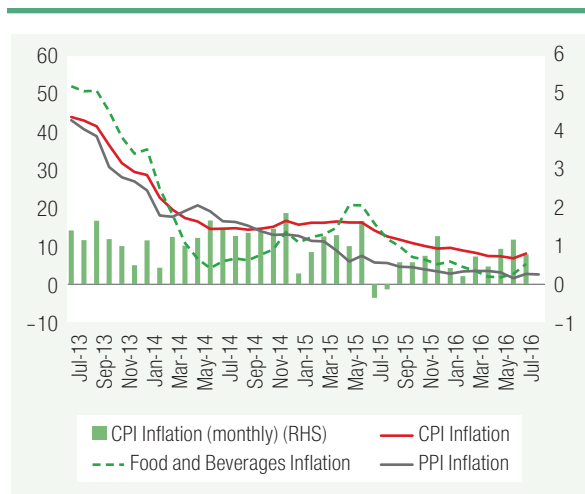
FIGURE 4 • Beneficiaries and Cost of Cash Transfer Subsidy Program 2011-15



Source: Iranian authorities.

⁸ Statement by the Governor of the CBI.

FIGURE 5 • Inflation (percent, Yoy)

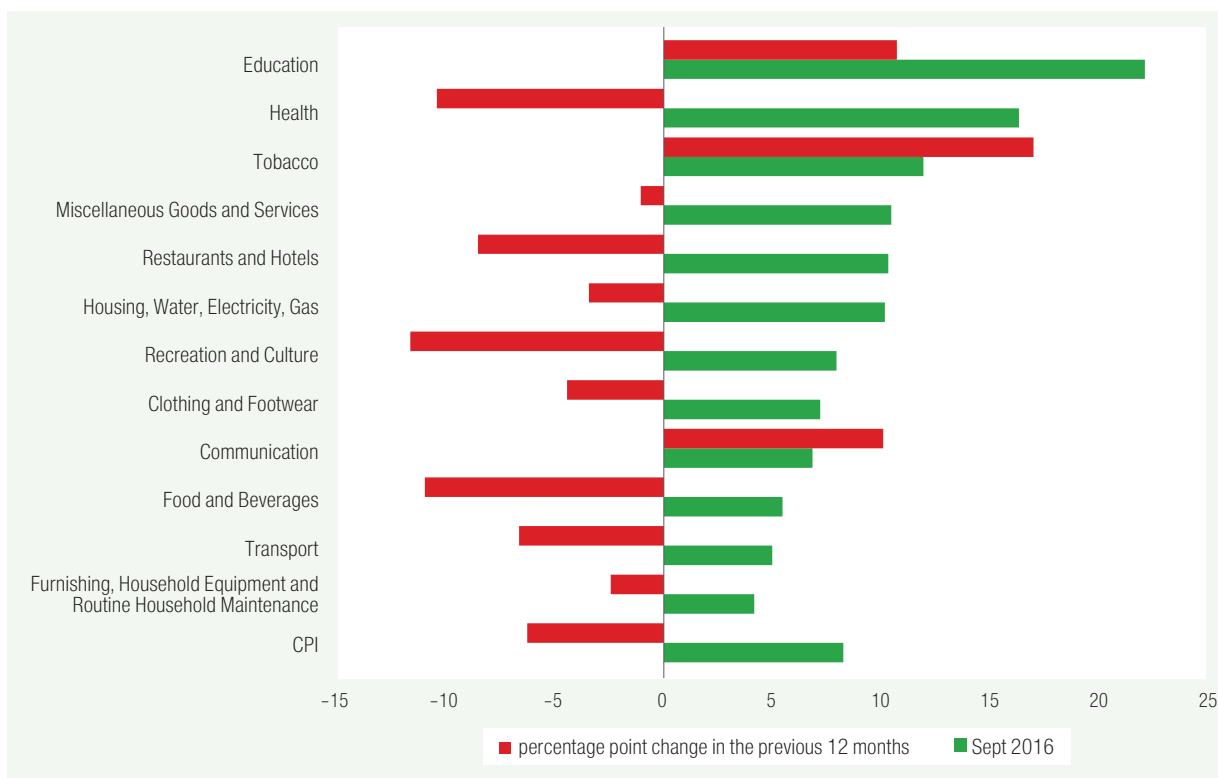


Consumer prices were subdued largely because producer price inflation fell to 2 percent in June 2016—the lowest growth rate since the series began 14 years ago. In addition to food

prices for producers, manufacturing prices recorded a negative growth of around 1 percent in year-on-year terms through January-August 2016 with declines in the producer prices of textiles, chemicals and metals. September saw the first increase in manufacturing producer inflation with growth of 1 percent. An important exception to the rapidly declining inflation rate was services, particularly health and education, for both producers and consumers. Education prices for consumers grew by 22 percent year on year in September 2016, twice the rate from a year ago. The cost of health services continued to grow at a high rate of 18 percent, but this is still a significant easing from above 30 percent a year ago.

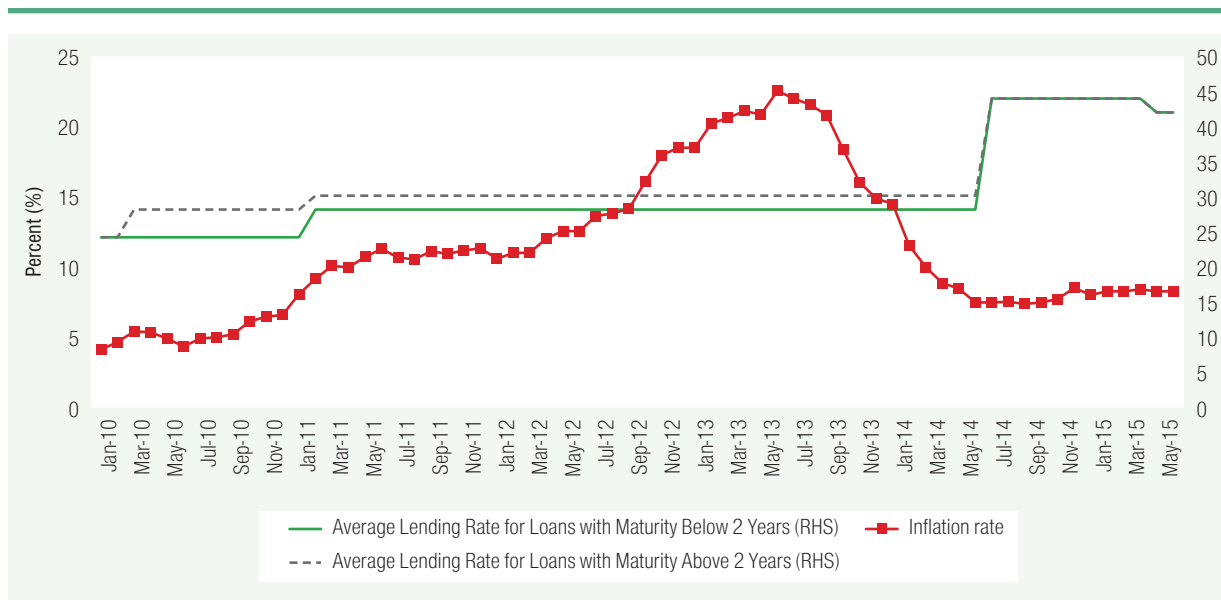
Notwithstanding this improvement, the Central Bank of Iran (CBI) remains wary of easing its monetary policy. The CBI's lending rates remained almost unchanged following the maximum deposit rate cut from 20 percent to 18 percent in February 2015 (Figure 7). This induced the Money and Credit Council (MCC)—which is composed of

FIGURE 6 • Inflation Subcomponents (percent, Yoy)



Source: Central Bank of Iran and WB staff.

FIGURE 7 • Lending Rates and Inflation



Source: Iranian authorities.

representatives from the CBI, the Ministry of Economy and Finance, and the Chamber of Commerce, among others—to exert pressure on the commercial banks to ease their lending rates in line with the reduction in inflation. In June, the heads of several private banks decided to reduce their rates on one-year deposits to 15 percent, down from 18. Due to more active role of the CBI, partially through its communication policy, the interbank market interest rate has fallen sharply over the past year from a peak of 27.3 percent in Q2 2015 to 17.9 percent in Q2 2016. The reduction in deposit and interbank rates should spur businesses to move their savings to increased production, however real rates have remained high since mid-2014.

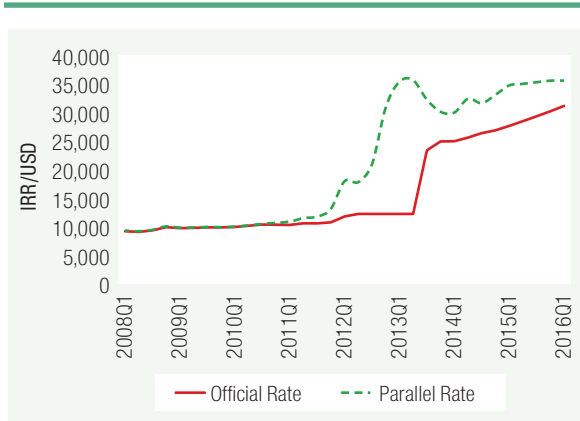
On the structural side, the government has taken a number of steps to improve the performance of the financial sector. To support the mobilization of national savings in anticipation of the lifting of sanctions, the government conducted a financial health review of the banking system. Furthermore, measures to reform this sector and enhance the supervisory role of the CBI, as well as measures to address the linkages between government arrears, NPLs and public debt to banks are being taken. Directed lending is another constraint to improving the health of the financial system

and effectively channeling savings to productive investment. Two new bills on the Central Bank and commercial banking have been drafted and are expected to be submitted shortly to the Parliament to enhance CBI's mandate and strengthen banking sector governance and supervision.⁹

The official exchange rate continued to depreciate through 2016 but at a much slower rate than in previous years, likely due to a pick-up in demand for Iran's exports. As of October 2016, the Rial was 6 percent weaker against the USD and this is likely to flow through to higher producer and consumer prices. A heavier reliance on imports is expected following the JCPOA. The greater sentiment in the local currency has led to a closing of the gap between the official and parallel

⁹ On June 2016, the Financial Action Task Force welcomed Iran's adoption of, and high-level political commitment to, an Action Plan to address its AML/CFT deficiencies, and its decision to seek technical assistance in the implementation of the Plan. The FATF, therefore, has suspended counter-measures in order to monitor Iran's progress in implementing the Plan. If Iran meets its commitments under the Action Plan in the course of twelve months, the FATF will consider next steps in this regard.

FIGURE 8 • The Iranian Rial/US\$: Parallel and Official Exchange Rates



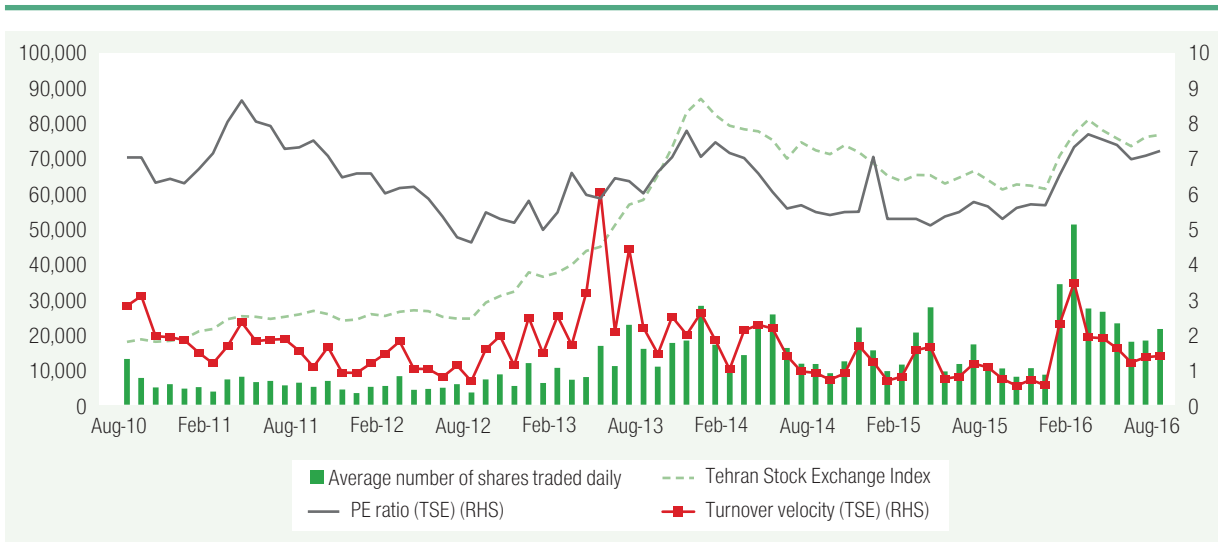
Source: Iranian authorities.

exchange market rates, facilitating the government's plan to unify the two rates. In September 2016, the value of the Iranian Rial in the official market stood at 31,274 Iranian Rial per USD, while the value of the Iranian Rial in the parallel market stood at 35,571 Iranian Rials per USD (Figure 8). The gap of roughly 14 percent between the official and parallel exchange market rates represents a marked improvement relative to the spread of 187 percent observed in the second quarter of 2012. These developments largely come as a result of the signing of the JCPOA, which

has buffeted the sentiment for the local currency. The CBI aims to unify the official and parallel exchange markets by March 2017 and towards this goal, it allows a greater number of transactions to take place at the parallel market rate, including in the banking system. This is likely to improve the predictability of the foreign exchange rate for local traders and international investors alike. However, the lack of access to major correspondent banks and difficulties in accessing foreign exchange reserves remain as challenges towards reaching this goal.

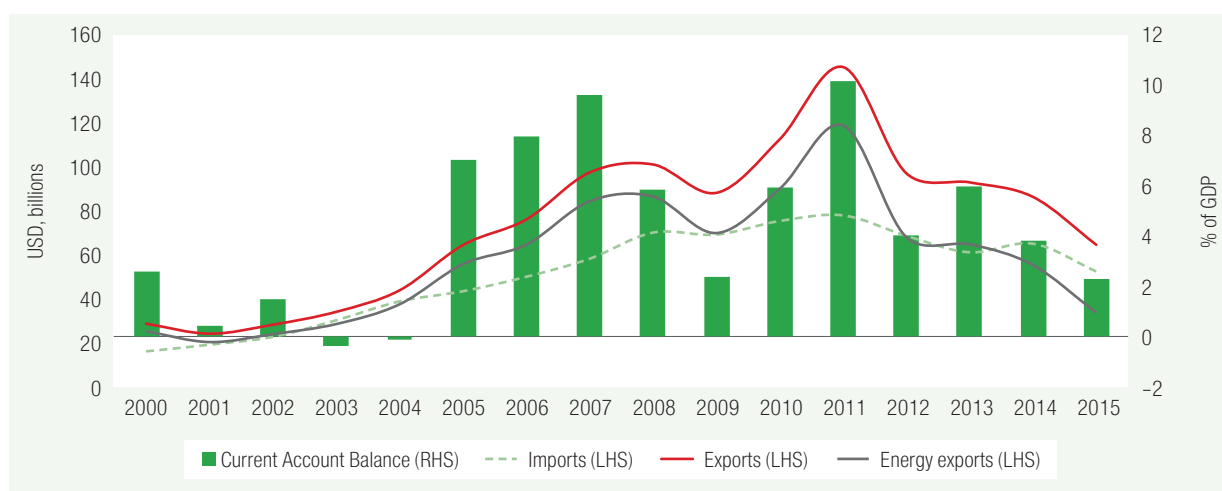
The Tehran Stock Exchange (TSE) index has generally been on an upward trend since January 2016 (Figure 9). As of September 2016, the TSE index rose by 24 percent since the beginning of 2016. There was a correction in the TSE index following skepticism over the effective implementation of the JCPOA, much of the correction has since been recovered. The TSE also saw significantly more activity following the JCPOA, with four times more shares traded per month on average in 2016 than the long-term average. This has led to higher turnover velocity in the TSE and coupled with rising stock market P/E ratio and falling deposit rates, the stock market is firming to become a more vibrant and investor friendly alternative for savers and investors.

FIGURE 9 • Tehran Stock Exchange



Source: Tehran stock exchange and WB staff.

FIGURE 10 • The Current Account Surplus Has Declined in Recent Years



Source: Iranian authorities.

External Position

Iran's current account surplus continued to decline. The surplus is estimated to have shrunk from 3.8 percent of GDP in 2014 to 2.3 percent of GDP in 2015, with the decline in oil exports being only partially offset by the fall in imports (Figure 10). Net exports declined from 3.5 percent of GDP in 2014 to 1.9 percent of GDP in 2015. The current account surplus remains markedly lower than in the year preceding the imposition of sanctions (a surplus of 10.2 percent of GDP in 2011). This predominantly reflects lower oil receipts in 2015, only at half of the 2011 levels, due to both lower oil prices and lower volume of exports. According to government sources, oil exports edged up to 2.1 mbpd and 2.2 mbpd in April and May 2016.

Structurally, Iran's current account balance is primarily driven by oil production and oil prices, although it is less volatile than its peers. Over the past 20 years, Iran's current account (CA) was primarily in surplus¹⁰ and volatile. Despite Iran's high dependence on oil exports, its CA is less volatile than its MENA peers.¹¹ This suggests that factors other than oil exports may have a stronger influence on the current account dynamics compared to the standard oil exporting country. Box 3 presents the results of an analysis of the long-term structural determinants of Iran's current account balance.

Foreign reserves, including gold reserves, were estimated at USD 128.4 billion in 2015, which was equivalent to 23 months of imports.

The liquidity and currency composition of these reserves have, however, been affected by the difficulties in accessing the international payment system and making payments in convertible currencies due to the intensification of international sanctions in 2012. The high level of import coverage is a reflection of the still relatively low level of imports of goods and services.

FDI is estimated to have remained relatively unchanged in 2015 compared to the previous year, with an uptick expected starting in 2016. The extent to which these would materialize depend on how quickly residual country risk can be mitigated and financing channels become operational and availability of greater clarity on the regulatory environment. FDI is estimated at USD 1.7 billion in 2015, significantly lower than the USD 4.5 billion recorded in 2012.

¹⁰ The exceptions are 1998 and 2003–04.

¹¹ The standard deviation of the current account balance over 1994–2015 is the lowest among MENA oil exporters, and almost three times smaller than the MENA average (3.47 versus 9.70).

BOX 3 • Determinants of Iran's Current Account Balance (CAB)

To identify the contribution of additional drivers, a model is used that explains the CA as a function of national saving and investments as well as trade competitiveness related factors.^a The parameters are estimated using 'model-averaging' methodology, which addresses the frequently overlooked problem of uncertainty with respect to the true model that best describes the determination of the current account balance. The estimated model performs well on average—the difference between the three year averages of the CAB predicted by the model and the observed CA is small throughout the period (Figure 3.1). The model also fits well the most recent CA deterioration. The key drivers of the CA balance are shown in Figure 3.1 and are summarized below:

1. As expected, **oil production** has the largest *absolute* contribution. However, aside from oil production growth over 2003–05, the *relative* changes in its contribution across the three-year period before economic sanctions are small; at around 0.15 percent of GDP (Figure 3.1). Economic sanctions resulted in a significant drop in oil production, which had a strong negative effect on the CA over 2012–14.
2. The volatility of **oil prices** significantly contributed to the volatility of the CAB. Rising oil prices led to a surplus in the CA by more than 1.5 percent of GDP in the mid-2000s and again over 2010–12. The 2015 fall in oil prices had the largest negative impact (–3 percent of GDP) on the decline in the CAB over 2013–15.
3. A relatively persistent real effective exchange rate (REER) appreciation over the second half of 1990s and 2000s (with the exception of 1999 and 2003) had a negative impact on the CA. The most recent depreciation of the nominal and real exchange rate in contrast had a positive impact on the CAB that partially compensated the fall in oil exports over 2012–14.
4. The reduction in both current and capital expenditure of the government after 2008 contributed to the CA surplus and the impact is stronger in case of the current expenditure.

Looking ahead, the volatility of the CA is expected to remain given the dependence of the economy on oil exports. In terms of the CA drivers, removal of economic sanctions should lead to a higher volume of oil production and oil exports; however the total effect of oil exports in the CA is conditional on the dynamics of oil prices. Assuming the average price of crude oil of 43 USD and 53.2 USD in 2016 and 2017 respectively, and expected increase in average oil production to 3.7 and 4.2 mbpd, the model estimates suggest improvements in the CA to around 3 percent of GDP and 4 percent of GDP, respectively.

Strong fiscal and monetary policies and policies to ramp up FDI will be instrumental in improving the CAB. Lifting of sanctions and higher growth may open the room for future increase in the government expenditures whose contraction over the sanctions period counteracted the fall in oil exports in the CAB. In particular, an increase in capital expenditures would have a smaller negative impact on the CA and would not offset improvements in the CA driven by the oil sector. Recent nominal and real depreciation contributed positively to the CA. An expected increase in oil exports may alleviate the need for stronger nominal depreciation from the current account sustainability perspective. Inflation stabilization and a successful disinflation strategy should also reduce the pressures on the foreign exchange market. The limited positive impact of FDI inflows on the CAB implies that increased efforts are needed to promote foreign investment in Iran in sectors that contribute directly or indirectly to exports. This includes policies towards stimulating FDI inflows in tradable, export oriented sectors, including oil, as well as a better understanding of the linkages between FDI in upstream, non-tradable sectors, and the performance of exporting firms.

FIGURE 3.1 • Contributions of Key Variables to the CA Balance (as a percent of GDP)

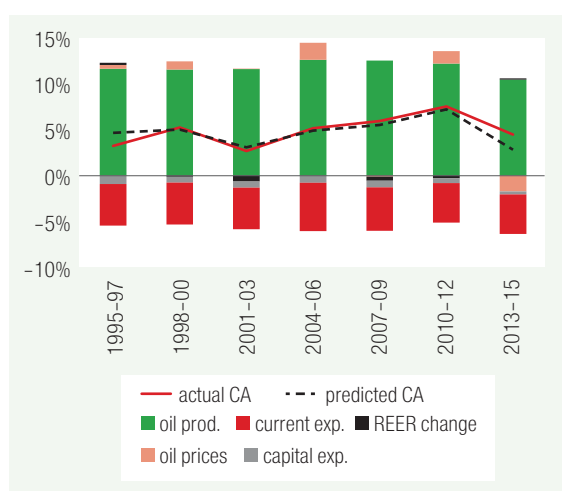
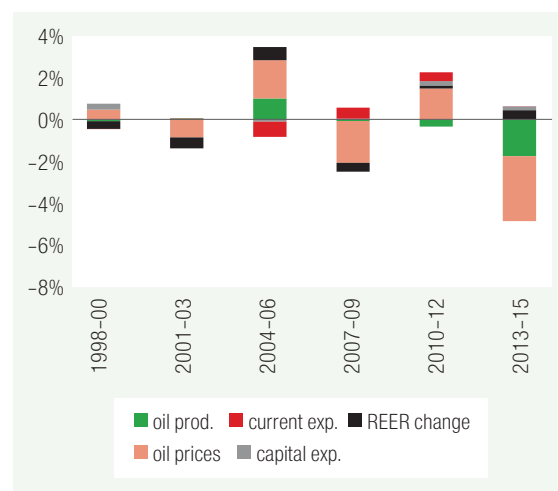


FIGURE 3.2 • Change in Contributions to the CA Balance in Different Periods (as a percent of GDP)



^a The approach follows the Toolkit for the Analysis of Current Account Imbalances developed by the World Bank's Trade and Competitiveness Global Practice.

OUTLOOK AND RISKS

Our baseline forecast hinges on the following set of international economic assumptions. According to the World Bank's Global Economic Prospects (2016), the global economy is projected to grow modestly at 2.4, 2.8 and 3 percent in 2016, 2017 and 2018, respectively (Table 2). In line with the Federal Reserve's monetary policy normalization, a gradual increase in international interest rates can be expected over the short to medium run, albeit at a slower pace than earlier expected, following the Brexit outcome. Oil prices are projected to average USD 43, USD 53.2 and USD 59.9 in 2016, 2017 and 2018, respectively.¹²

Iran's economy is expected to grow at an annual average rate of 4.5 percent in 2016–18. Relative to the Spring 2016 issue of the Iran Economic Monitor (IEM), real GDP growth for 2016 is projected to be 0.1 pp higher at 4.3 percent, reflecting a larger increase in oil and gas production (Table 3). In particular, the oil and gas sector is projected to grow by 14.5 percent in 2016 up from 12.9 percent in the previous IEM. Over the medium term (2017–2018), investment is likely to play a much larger role in generating growth on the assumption that new investment deals that are currently being negotiated will materialize in 2017 and 2018, and financial linkages with the rest of the world will be restored. In particular, the 4.7 percent average growth projected for 2017 and 2018 is expected to be driven by a 7.9 percent average increase in total investment. With renewed confidence in the economy and a lower inflationary environment, consumption is expected to grow at an average of 3.5 percent over the 2016–2018 period.

Meanwhile, inflation is expected to ease into single digits in 2016 for the first time since 1990. Consumer price inflation is forecast to register 8.6 percent in 2016, down from 34.7 percent in 2013, as a result of curbing inflationary expectations, fiscal discipline, lower commodity prices and easing import costs in the wake of partial lifting of the sanctions. This might create room for the central bank to ease its monetary policy by lowering interest rates with the objective of reducing borrowing cost and boosting growth. However, as reflected in the recently rising monthly rates there are increasing pressures on the disinflationary trend and continued tight fiscal and monetary policies will be important to keep inflation in check.

The fiscal position is expected to improve for the first time since 2012. After an estimated deficit of 1.6 percent of GDP in 2015, the fiscal balance is projected to improve by 1.2 pp of GDP in 2016 as a result of an expected surge in the volume of oil exports, which will outweigh the projected drop in prices. In parallel, non-oil revenues are likely to increase due to: (i) the recovery in economic activity, (ii) continued expansion of coverage of value added tax, and (iii) an estimated USD 3 billion windfall in frozen assets.¹³ On the expenditure side, the projected rise in capital spending is expected to be

¹² Information on the latest World Bank commodities price forecast can be accessed at: <http://pubdocs.worldbank.org/en/764161469470731154/CMO-2016-July-forecasts.pdf>.

¹³ See EIU (2016) "Iran Country Forecast: July 2016", London.

TABLE 2 • Global Growth Rates

	2013	2014	2015e	2016p	2017p	2018p
World	2.4	2.6	2.4	2.4	2.8	3.0
High-income countries	1.2	1.7	1.6	1.5	1.9	1.9
Developing countries	5.3	4.9	4.3	4.3	4.9	5.1
Commodity exporting EMDEs*	3.2	2.1	0.2	0.4	2.4	3.0
Middle East and North Africa	2.0	2.9	2.6	2.9	3.5	3.6
Islamic Republic of Iran	-1.9	3.0	0.6	4.3	4.8	4.5

Source: World Bank Global Economic Prospects (June 2016) and World Bank Iran team. e: expected; p: projected. * EMDEs stands for Emerging and Developing Economies.

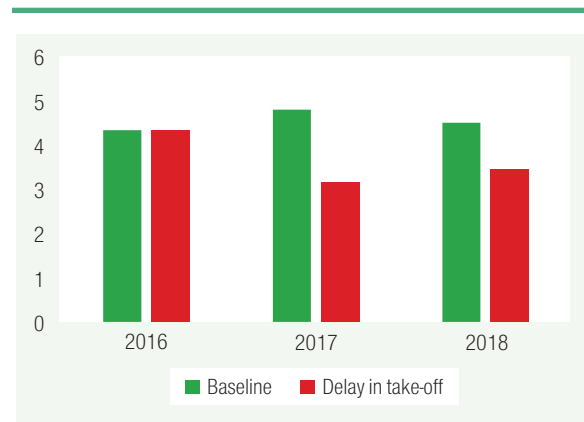
counterbalanced by a drop in current spending as a result of the parliament’s decision in April 2016 to remove cash subsidies (introduced in 2010) for high income households. Notwithstanding the expected pick-up in capital spending in 2017 and 2018, the fiscal balance is projected to record surpluses of 0.5 and 1.1 percent of GDP in 2017 and 2018, respectively. This projected improvement over the medium term, assumes a higher efficiency in terms of tax collection combined with a continued increase in oil inflows, as well as implementation of fiscal measures that may be needed to manage the impact of the ongoing securitization of government arrears and recapitalization of public banks.

The current account balance is projected to follow a monotonically increasing path over the next three years. The current account balance in 2016–2018 is revised upwards, in line with the recent data published by the CBI showing that oil exports actually rose in 2015, despite falling oil prices. In particular, after decreasing from 6.3 percent of GDP in 2013 to an estimated 2.3 percent of GDP in 2015, the current account surplus is expected to reach 2.6, 3.4 and 4.1 percent in 2016, 2017 and 2018, respectively. This improvement reflects a projected increase in energy exports, which is expected to fully offset the rise in imports stemming from lower trade costs and increased domestic consumption. Moreover, tourism inflows are expected to provide an additional boost.

Iran’s growth prospects may be at risk if investment inflows do not materialize and

oil prices do not pick up over the medium term. Achieving sustained growth rates of 4.5–5 percent a year or closer to the government’s target of 8 percent will critically depend on accelerating pace of structural reforms undertaken by current administration, reintegration with the global economy in international trade and finance and reviving foreign investors’ activity in the country. Meanwhile, Iran’s dependence on the energy sector leaves it highly exposed to swings in gas and oil prices. In particular, any drop in international oil prices, due to increased supply or a lower global growth, will exert downward pressure on the fiscal and current account balances assuming that Iran’s oil receipts are continued to be pro-cyclical—as the budget receives a fixed percentage of oil proceeds.

FIGURE 11 • Growth Under Two Different Scenarios



Source: WB staff calculations.

Simulations of a scenario where investment activity falters as a result of failure in restoring confidence suggests a significant reduction in growth in 2017–18 (Figure 11).

This downside scenario is illustrative of the impact of a weak investment outturn that may either result from the delays in the reintegration of the Iranian banking sector with the global system or lack of sufficient progress in key structural reforms, which would both hurt investors' confidence and deter

long-term investment activity. While in the baseline scenario investments are projected to grow by an average of over 7 percent, this rate will marginally be above 4 percent in a scenario where investor confidence cannot be restored, and macroeconomic policies falter. Potential investment activity will be greatly supported by reforms that will improve the investment climate including reforms in factor and product markets and reducing state's role in the economy to create room for the private sector.

TABLE 3 • Iran: Selected Economic Indicators (2013-2018)*

	2013	2014	2015	2016	2017	2018
	Act.	Act.	Est.	Proj.	Proj.	Proj.
Real sector	(annual percentage change, unless otherwise specified)					
Real GDP at factor cost	-1.9	3.0	0.6	4.3	4.8	4.5
Real GDP at factor cost (without Oil & Gas)	-1.1	2.8	0.1	3.4	3.9	4.3
Real Oil & Gas GDP	-8.9	4.8	4.6	14.5	13.1	5.9
Total oil production (million barrels/day)	3.5	3.1	3.2	3.7	4.2	4.4
Crude oil, average price (US\$)	104.1	96.2	50.8	43.0	53.2	59.9
Money and prices	(annual percentage change, unless otherwise specified)					
CPI Inflation (p.a)	34.7	15.6	11.9	8.6	10.4	9.1
Money and Quasi-Money	38.8	22.3	30.0	36.5	31.6	24.4
Investment & saving	(percent of GDP, unless otherwise specified)					
Gross Capital Formation	32.1	33.4	32.4	31.5	32.1	32.7
Gross National Savings	32.8	37.2	34.7	34.0	35.6	36.8
Government finance	(percent of GDP, unless otherwise specified)					
Total revenues	14.1	14.6	15.3	16.5	18.2	19.1
Tax Revenues	5.2	6.4	6.7	7.3	8.0	8.6
Direct Taxes	2.9	3.3	3.6	4.0	4.3	4.6
Indirect Taxes	2.3	3.2	3.1	3.3	3.7	4.0
Oil Revenues	6.5	5.7	5.7	6.1	6.7	7.0
Others disposal of non-financial assets	2.4	2.4	2.8	3.1	3.4	3.5
Total expenditures	15.0	15.8	16.9	16.9	17.6	18.0
Current	12.7	13.0	14.5	14.2	14.5	14.7
Acquisition of non-financial assets	2.3	2.7	2.4	2.8	3.2	3.3
Net lending/borrowing (overall balance)	-0.9	-1.2	-1.6	-0.4	0.5	1.1

(continues to next page)

TABLE 3 • Iran: Selected Economic Indicators (2013-2018)* (continued)

	2013	2014	2015	2016	2017	2018
	Act.	Act.	Est.	Proj.	Proj.	Proj.
External sector	(percent of GDP, unless otherwise specified)					
Current Account	5.7	3.8	2.3	2.6	3.4	4.1
Net Exports	5.1	3.5	1.9	2.2	3.0	3.6
Export of Goods and Services	23.1	23.1	18.7	19.2	20.7	21.8
Export of Goods	21.0	20.8	16.2	16.5	17.9	18.8
Export of Services	2.1	2.3	2.5	2.7	2.9	3.0
Import of Goods and Services	18.0	19.6	16.8	17.0	17.8	18.2
Imports of Goods	14.3	15.6	13.2	13.3	13.9	14.2
Imports of Services	3.7	4.0	3.6	3.7	3.9	4.0
Net Income Receipts	0.5	0.2	0.2	0.3	0.4	0.4
Income Receipts	0.7	0.6	0.6	0.6	0.7	0.7
Income Payments	0.3	0.3	0.4	0.4	0.3	0.3
Net total current transfers	0.1	0.1	0.1	0.1	0.1	0.1
Total International Reserves (Billion US\$)	117.6	126.2	128.4	134.3	147.2	166.1
as Months of Imports (number of months)	18.2	18.5	23.0	20.6	17.8	17.1
Total Gross External Debt Stock (US\$ bln)	6.7	5.1	7.5	3.3	2.8	2.7
Total Gross External Debt Stock (% of GDP)	1.5	1.2	1.9	0.7	0.5	0.4
Memorandum Items:						
Nominal GDP (Billion IRR**)	9,421,215	11,033,666	11,771,532	12,842,483	15,204,880	17,607,859

Source: Government Data and World Bank Staff Calculation.

* Fiscal year ends March 20. For example, 2015 corresponds to the fiscal year of 2015/2016.

** IRR: Iranian Rials

SPECIAL FOCUS 1: CONSTRUCTING AND UNDERSTANDING POVERTY TRENDS IN IRAN¹⁴

Accurate, credible, and timely measurement of poverty and inequality is important for many reasons: it helps to focus attention of policymakers on the poor and vulnerable in their population; it also helps to benchmark and assess the impact of policies on the poorer segments of society and design interventions that are targeted towards improving their wellbeing.

The Islamic Republic of Iran has a long and rich tradition of conducting household budget surveys and making the data publicly available. This section examines poverty and inequality trends in Iran using these surveys, covering the period from 2008 to 2014. Poverty is measured using international poverty lines based on U.S. dollars at 2011 purchasing power parity (PPP). In addition to measuring inequality, the note also examines “shared prosperity,” which is essentially the consumption growth of the bottom 40 percent and aimed at capturing whether economic

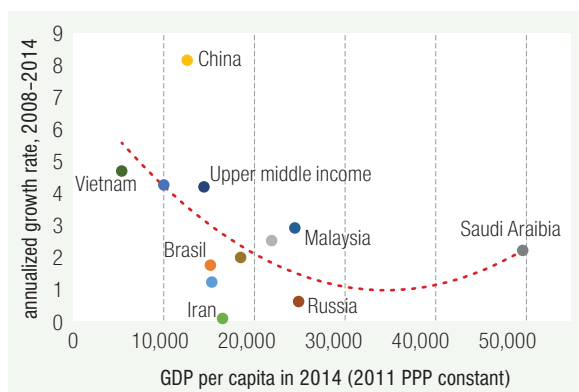
growth has been inclusive of the less well-off in the population. Finally, different econometric and statistical techniques are used to identify the drivers behind changes in poverty and shared prosperity.

Introduction

Iran entered a turbulent period after 2008 which had adverse effects on its macroeconomic performance. As shown in Figure 12, annualized

¹⁴ This section is a product of the Global Poverty Practice. It has been written by Aziz Atamanov, Mohammad-Hadi Mostafavi, Djavad Salehi-Isfahani, and Tara Vishwanath. Measurement section draws heavily on the World Bank policy research working paper 7836 “Constructing robust poverty trends in the Islamic Republic of Iran: 2008–14”.

FIGURE 12 • Average Annualized GDP Per Capita Growth Rates During 2008-2014 and GDP Per Capita in 2014

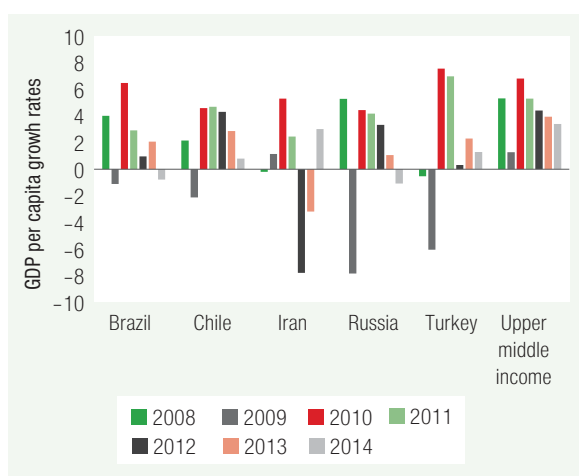


Source: WDI, May 2, 2016. Authors' calculation.
Notes: Annualized growth rates are calculated using geometric mean.

GDP per capita growth was close to zero in Iran during 2008–2014, which is lower than growth rates observed among selected peers. Iran's GDP per capita growth rate varied substantially during this period (Figure 13): a period of economic growth in 2009–2011 was followed by sharp decline in 2012 and 2013 and positive growth in 2014, reflecting the shocks the country was experiencing, including sanctions.

There is limited knowledge of the most recent trends in socio-economic wellbeing of the population in Iran. Even though there are no publicly

FIGURE 13 • Annualized GDP Per Capita Growth Rates in Iran and Selected Comparators, 2008-2014



Source: WDI, May 2, 2016. Authors' calculation.

available “official” poverty estimates in Iran, estimates of poverty trends exist in the academic literature. These are calculated either based on authors’ own assessment of an appropriate national line or according to international poverty lines based on U.S. dollars. Examples of such estimates in English cover different periods between 1984 and 2009 and are available in Assadzadeh and Paul (2004), Salehi-Isfahani (2009), Mahmoudi (2011), Nili and Poursadeghi (2011) and Maasoumi and Mahmoudi (2013). There is, however, little knowledge about trends in indicators of welfare in Iran in the most recent past, in particular after the second half of 2000s. The most recent international poverty rates reported in the World Bank Development Indicators are available only for two years (2009 and 2013) and mask significant volatility of poverty rates after 2008 due to the adverse economic conditions. Furthermore, the factors behind changes in poverty and inequality also need to be explored.

This section fills the existing knowledge gap by exploring poverty and inequality trends in the Islamic Republic of Iran during 2008–2014.

Given the absence of an official poverty line, poverty is measured using international poverty lines expressed in U.S. dollars at 2011 PPP. Using an international line helps to avoid arbitrariness and sensitivity of establishing a line in local currency units—a long process which is usually led by national authorities and requires access to auxiliary data unavailable to us. Finally, using international poverty lines brings additional flexibility through the possibility of choosing different illustrative values for the line and testing the robustness of the constructed trends.

Stylized Facts on Poverty, Inequality, and Shared Prosperity in Iran for 2008-2014¹⁵

Poverty and inequality

Iran is one of very few countries in the Middle East and North Africa region (MENA) that collects

¹⁵ Detailed explanation of methodological choices made as well as all robustness tests are discussed in Atamanov et al. (2016).

high quality household budget survey data on an annual basis. The Household Expenditure and Income Survey (HEIS) data collection started in 1963 in rural areas and in urban areas since 1968. The HEIS series is used to construct poverty estimates for this section, covering seven years from 2008 to 2014.¹⁶ Besides filling a knowledge gap, this particular time period is chosen to minimize the risk of comparability between surveys due to changes in instruments and process of data collection.

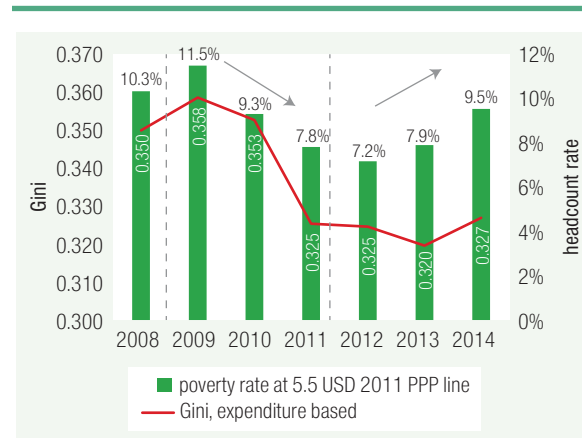
The poverty measurement methodology applied in this section follows a well-established and widely accepted tradition. Measuring poverty requires two broad steps. The first step is to define an indicator to measure welfare or living standards. The second step requires setting a poverty line—the minimum welfare level below which a person is considered to be poor. Standard procedures were followed in order to construct the components of the welfare aggregate as well as price adjustments to ensure comparability within survey years and across them (Deaton and Zaidi 2012; Haughton and Khandker 2014).

Poverty lines in this section are expressed in U.S. dollars at 2011 PPP. The most widely used international poverty line is \$1.90 (Ferreira et al. 2015). It was established by the World Bank as an average of the national poverty lines of the 15 poorest developing countries expressed in PPP terms to monitor global extreme poverty (Chen and Ravallion 2010). Given that the extreme poverty line is not relevant for Iran, several other lines with higher values are used in this section for illustrative purposes.

Three distinct trends in poverty and inequality are observed during 2008–2014. Figure 14 shows estimated poverty rates at \$5.50 2011 PPP daily poverty line (selected for illustrative purpose) and the Gini coefficient for 2008–2014. There are clearly three distinct periods: Increase in poverty and inequality during 2008–2009, a sharp fall in poverty and inequality during 2009–2012, and gradual increase in poverty and inequality again after 2012.

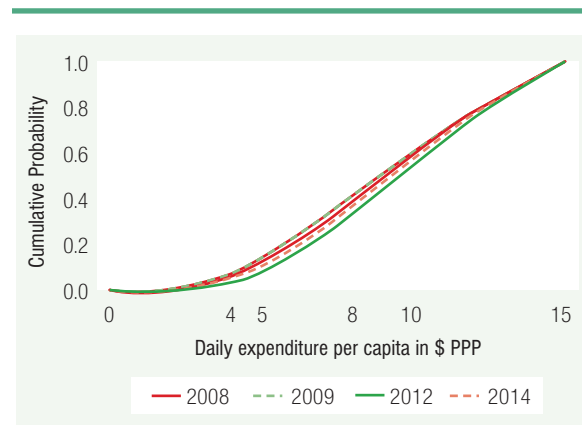
Remarkably, these trends do not change with the choice of poverty line. This is clearly seen from constructed cumulative distribution functions in Figure 15 (CDF). The CDF, for any selected level of expenditure per capita, gives the proportion of people who have expenditure per capita below that level.

FIGURE 14 • Poverty Rate (\$5.50 2011 PPP Line) and Gini Coefficient in Iran, 2008–2012



Source: HEIS 2008–2014. Authors' calculations.

FIGURE 15 • CDF of Welfare Aggregate and Different Daily Poverty Lines in 2011 PPPs, %



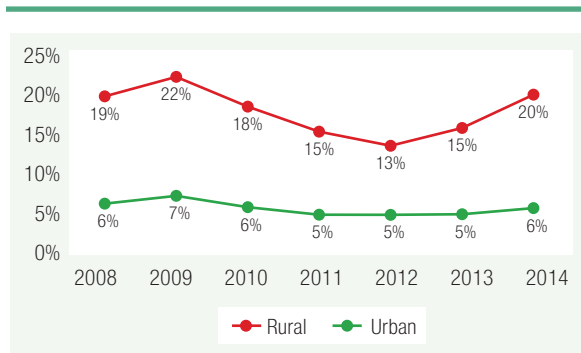
Source: HEIS 2008–2014. Authors' calculations.

Evidently, there is no overlap between CDFs between \$4 and \$10 2011 PPP indicating that all population in this range had higher expenditure per capita in 2008 versus 2009, higher expenditure in 2012 versus 2009, and lower expenditure in 2014 versus 2012.¹⁷ In other words, the precise choice of poverty line is unimportant and does not affect the trend for this

¹⁶ Data points were downloaded in January 2016.

¹⁷ No crossing between CDFs indicates first-order stochastic dominance.

FIGURE 16 • Headcount Poverty Rates at \$5.50 2011 PPP by Residence, 2008-2014



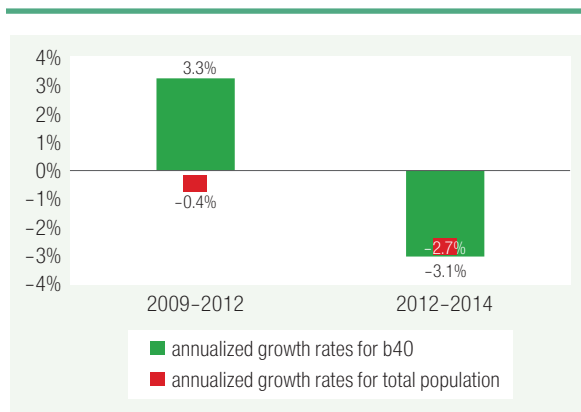
Source: Authors' calculation using HEIS 2008-2014.

part of the distribution covering almost 60 percent of the population in Iran. Hence trends in poverty are unaffected by the choice of the poverty line.

National level numbers hide stark urban/rural differences in poverty levels, with much larger rural poverty headcount rates. Figure 16 shows poverty rates in urban and rural areas of Iran. On average, poverty in rural areas is three times higher than poverty in urban areas. Over time, this gap slightly narrowed between 2009 and 2012, but increased again in 2014. In spite of such a large disparity in poverty rates, the distribution of the poor population between rural and urban areas is more equal due to the much larger population residing in urban areas.

There is not much variation in poverty rates in Iran across regions with one noticeable

FIGURE 18 • Annualized Expenditure Per Capita Growth Rates for the Bottom 40 Percent and Total Population in 2009-2012 and 2012-2014, %



Source: HEIS 2008-2014. Authors' calculations.

FIGURE 17 • Poverty Rates at \$5.50 2011 PPP Poverty Line by Regions* in 2014



Source: Authors' calculation using HEIS 2008-2014.

Note: * Regions are defined as follows: metropolitan Tehran included only urban areas of Tehran and Alborz province since 2012. Northwest includes East Azarbaijan, West Azarbaijan, Zanjan, and Ardebil. Northeast includes Khorasan Razavi, Semnan, and North and South Khorasan. Central includes Markazi, Fars, Isfahan, Tehran, Qom, Qazvin, and rural areas of Alborz. Southeast includes Kerman, Sistan, and Yazd. Persian Gulf includes Khuzestan, Bushehr, and Hormozgan. Zagros includes Kermanshah, Kurdistan, Hamadan, Bakhtiari, Lorestan, Ilam, and Kohkiluyeh.

exception—the southeast region suffers the highest poverty incidence. Figure 17 shows poverty headcount rates by regions in 2014. The poverty rate in the southeast is noticeably higher than in other regions, reaching 37 percent in 2014 using the \$5.50 2011 PPP poverty line. In contrast, in the Tehran metropolitan area, poverty is close to zero.

Shared prosperity

Iran managed to sustain positive growth in per capita expenditure for the bottom 40 percent of the population during 2009-2012 in spite of an overall average negative growth rate. One of the ways to check whether benefits of economic growth are shared widely among the population, especially among the least well-off, is to calculate the shared prosperity indicator—a measure established by the World Bank to monitor one of the twin goals. Shared prosperity aims at increasing the real per capita income or consumption of the bottom 40 percent of population.

Figure 18 shows annualized expenditure per capita growth rates of the bottom 40 percent of the population versus growth rates for the total population. Consistent with sharply falling poverty and inequality rates, the most vulnerable

population from the bottom 40 percent experienced a positive growth rate of 3.3 percent during 2009–2012. This good outcome was achieved despite the fact that growth for the population overall was negative during this period. However in the second period (2012–2014), the bottom 40 percent were slightly worse off relative to the overall population, consistent with increasing inequality over this period.

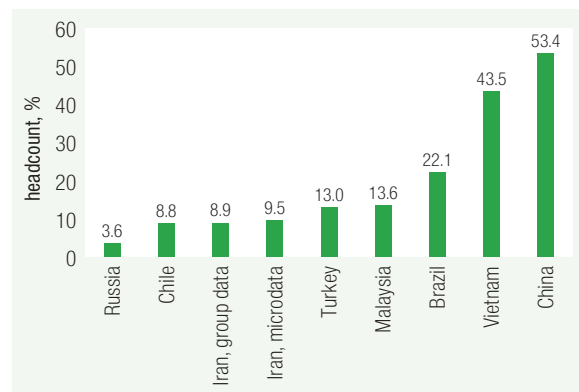
Individuals from the bottom 40 percent of the distribution are more likely to work in agriculture, in low-skilled occupations, and live in rural areas. Unsurprisingly, comparing the characteristics of the population from the bottom 40 percent with the characteristics of the population from the top 60 percent reveals substantial differences. Adults (15+) in the bottom 40 percent lag behind those in the top 60 percent in terms of education. For example, only 8 percent of the bottom 40 percent have at least a college degree compared to 25 percent among the top 60 percent in 2014. The share of illiterate people is also higher among the bottom 40 percent of population. Consistently with this finding, individuals in the bottom 40 percent of the distribution are more likely to live in rural areas, be employed in the agricultural sector, and have unskilled occupations.

How does Iran compare with its peers?

The level of poverty in Iran is comparable to what is observed in countries with a similar level of economic development. Figure 19 shows poverty rates in Iran and selected peers circa 2012. While welfare aggregates among different countries are not strictly comparable, this comparison reveals that for the most recent years, Iran’s poverty rate is broadly within a range of poverty rates observed in countries with similar economic wellbeing: Turkey, Chile, and Malaysia (using an international poverty line of \$5.50 2011 PPP per day). Vietnam, Indonesia, and China have much higher poverty rates, but also much lower GDP per capita in 2011 PPP.

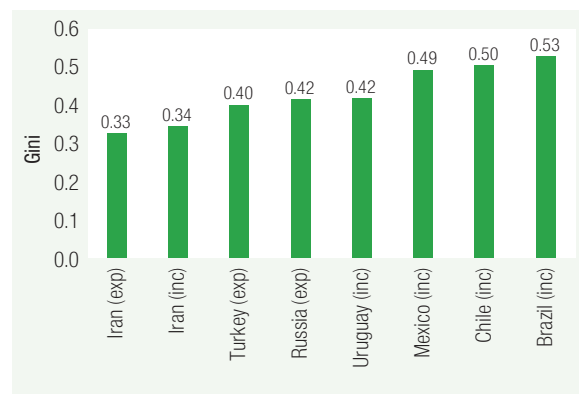
The level of inequality is also quite low in Iran compared to its peers. Comparing the level of inequality across countries is usually full of caveats for many reasons including the use of “income” by some countries and “consumption” by others. Keeping this in mind, inequality in Iran is lower than

FIGURE 19 • Poverty Rates in Iran and Selected Comparators at \$5.50 2011 PPP Daily Poverty Line Circa 2012, %



Source: HEIS 2008–2014 and PovcalNet as of October 6, 2015. Authors’ calculations. Note: Poverty for Iran is for 2014.

FIGURE 20 • The Gini Coefficient in Iran and Selected Comparators Circa 2012

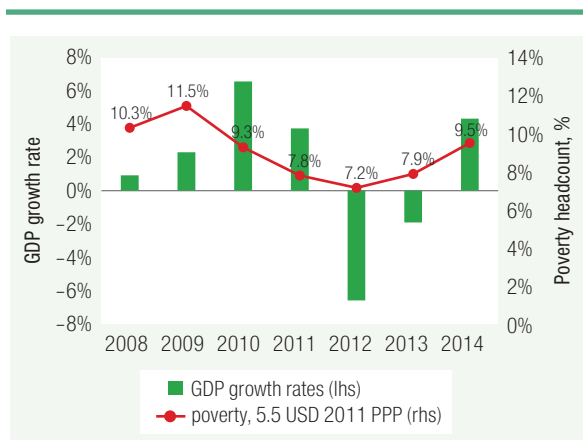


Source: HEIS 2008–2014 and PovcalNet as of October 6, 2015. Authors’ calculations. Note: The Gini index for Iran is for 2014.

what is observed in countries with similar level of economic development regardless of the type of welfare aggregate used (income or consumption per capita). Thus, the Gini index based on spatially adjusted income per capita is around 34 and not spatially adjusted around 36,¹⁸ while in Turkey, which has the second-lowest Gini among selected countries, it reaches 40 (Figure 20).

¹⁸ Gini of 37.4 reported in WDI for 2013 is based on group expenditure data and not spatially deflated welfare aggregate. It is still lower than what is observed in Turkey.

FIGURE 21 • GDP Growth Rates and Poverty Rates in Iran, 2008-2014

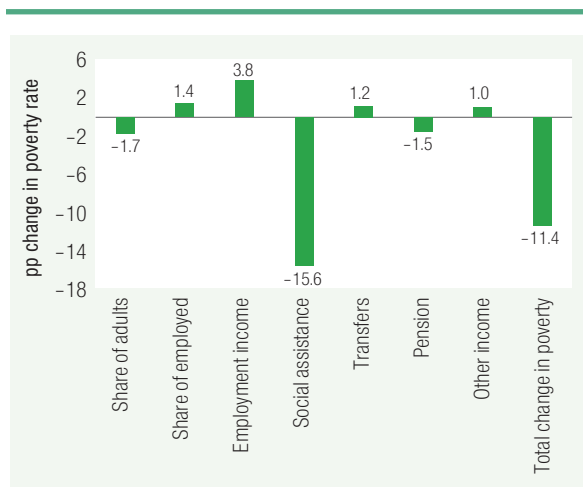


Source: Authors' calculation using HEIS 2008–2014.

Explaining Welfare Changes in 2008-2014

Trends in poverty in Iran broadly follow observed trends in macroeconomic performance during 2008–2014 with noticeable exceptions in 2012 and 2014. Figure 21 combines real growth rates of GDP in Iran with poverty rates at the \$5.50 2011 PPP poverty line. Fall in poverty during 2009–2011 is accompanied by positive economic growth, however a negative shock in 2012–13 led to an increase in poverty only in 2013. Poverty continued to grow in

FIGURE 22 • Sources of Income Poverty Changes, 2009-2012, Percentage Points



Source: Authors' calculation using HEIS 2008–2014.

Note: The levels of income poverty are different from the level of poverty based on expenditure per capita, nevertheless their trends are qualitatively similar.

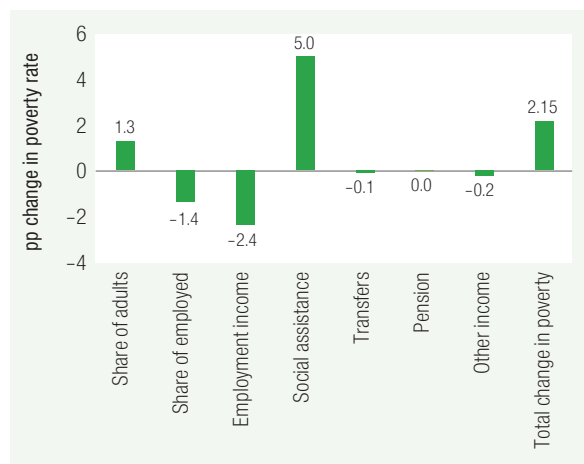
2014 even with a positive economic growth. This indicates that negative growth in 2012 did not affect the bottom poor distribution during 2012, while the same population could not fully benefit from economic growth in 2014. In the previous section it was also shown that the vulnerable population from the bottom 40 percent of the distribution seem to be insulated from the negative shock in 2009–2012, but could not benefit from economic growth in 2012–2014.

The apparent disconnect between economic growth and welfare changes can happen for many reasons. It may be related to the lagged impact of economic growth or lack of a trickle-down effect. In addition, redistributive government policies could play a protective role. A definite answer requires identifying and quantifying the sources of poverty changes during the period considered. One way of doing this is to decompose changes in income poverty by income sources (Azevedo, Minh, and Sanfelice 2012). This will help to identify the key drivers underlying the increase or decline in income poverty and inequality.¹⁹ Two periods are selected for the analysis: the first is 2009–2012 when there was a sharp poverty reduction, and the second is 2012–2014 when welfare indicators deteriorated.

Social benefits were the key contributors to the fall in poverty during 2009–2012, counterbalancing the negative impact coming from the labor market. Figure 22 shows contributors to income poverty changes in 2009–2012. In total, income poverty dropped by 11.4 percentage points. The key driving force behind this remarkable fall was social assistance in the form of universal cash transfers the government distributed to compensate for increasing energy prices after subsidies reform.²⁰ In particular, the income poverty fell by 15.6 percentage points due to cash transfers. Generous universal social benefits

¹⁹ One may also use Datt-Ravallion (1992) decomposition, which splits the change in poverty into distribution-neutral growth and redistribution effects. According to it, decline in poverty between 2009 and 2012 was fully driven by redistribution, while growth effect contributed to higher poverty. During 2012 and 2014 both growth and redistribution effects were increasing poverty. Income poverty decomposition goes beyond this and has an advantage of being able to quantify contributions of different income sources to changes in poverty and inequality.

FIGURE 23 • Sources of Income Poverty Changes, 2012-2014, Percentage Points



Source: Authors' calculation using HEIS 2008-2014.

Note: The levels of income poverty are different from the level of poverty based on expenditure per capita, nevertheless their trends are qualitatively similar.

counterbalanced the negative impact of labor market deterioration where decrease in both employment and employment income contributed to increase in poverty. It is worth noting that the labor market did not positively contribute to poverty reduction, given positive economic growth in 2009-2011.²¹

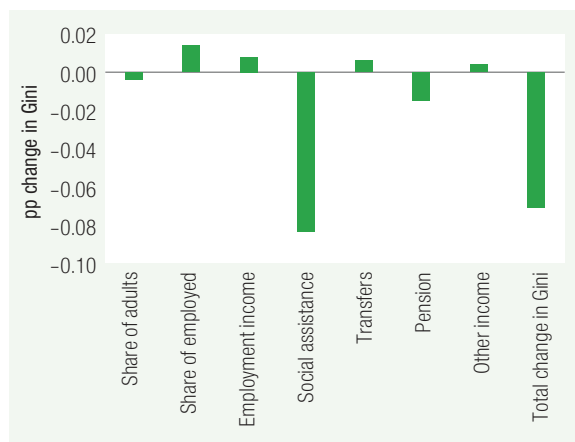
The erosion of social benefits contributed to the increase in poverty in 2012-2014 with a counteracting impact from the labor market.

Figure 23 shows the main contributors to poverty changes in 2012-2014. In contrast to 2009-2012, the role of benefits completely reversed. It seems that due to high inflation the real value of benefits diminished and that was the key factor behind increase in poverty. Thus, the size of social assistance per capita dropped by 38 percent in real terms between 2012 and 2014. At the same time, there was a positive contribution to poverty reduction coming from the labor market, but it was not enough to offset the negative impact of diminishing social assistance.

Cash transfers were also the key factor behind the decline and increase in inequality.

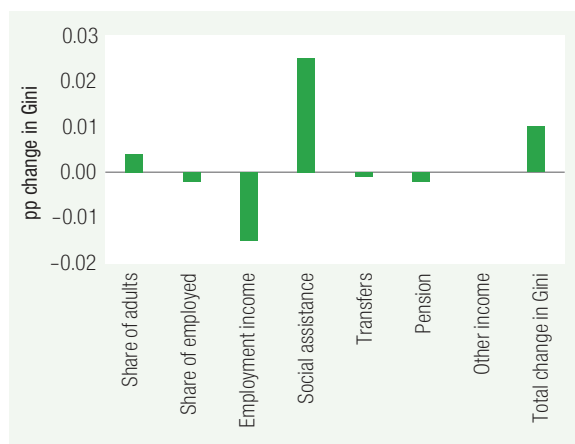
Figures 24 and 25 show that social assistance was the most equalizing source of income during 2009-2012 reducing income per capita Gini, but being the most un-equalizing source in 2012-2014. Employment income started playing a significant equalizing role in 2012-2014, which may signal that population from

FIGURE 24 • Sources of Income Inequality Changes Measured by Gini, 2009-2012



Source: Authors' calculation using HEIS 2008-2014.

FIGURE 25 • Sources of Income Inequality Changes Measured by Gini, 2012-2014



Source: Authors' calculation using HEIS 2008-2014.

the bottom of the distribution was mostly benefiting from the positive changes in the labor market.

Improving labor market conditions will be key in having sustainable poverty reduction. Iran's performance in poverty and inequality reduction was remarkable until 2012. However, it was primarily driven

²⁰ This is consistent with early findings from Salehi-Isfahani, Stucki and Deutschmann (2015).

²¹ If 2009-2011 period is chosen for decomposition, there is still lack of positive impact of the labor market on poverty indicating absence of trickling down impact from economic growth on the poor.

by the universal cash transfer program, which was launched to protect the population from the negative impact of higher energy prices. While the program appears to have been very effective in mitigating the adverse impacts of the energy tariff reform, it cannot be the panacea for sustaining poverty reduction and boosting shared prosperity in the long-term. To the extent that improvements in labor market outcomes

offers a more durable path to welfare improvement, the very meager contribution of the labor market to explaining poverty reduction in Iran is indicative of a strong need to improve labor market outcomes and access to productive job opportunities. Better understanding of the constraints to job creation, labor productivity, and private sector participation is needed and requires further research.

REFERENCES

- Assadzadeh, A., and S. Paul, S. 2004. Poverty, growth, and redistribution: a study of Iran. *Review of Development Economics*, 8(4): 640–53.
- Atamanov, A., M. Mostafavi, D. Salehi-Isfahani, and T. Vishwanath. 2016. “Constructing robust poverty trends in the Islamic Republic of Iran: 2008–2014.” Policy Research working paper No. WPS 7836. Washington, D.C.: World Bank Group.
- Azevedo, Joao Pedro, Minh Cong Nguyen, and Viviane Sanfelice. 2012. “ADECOMP: Stata module to estimate Shapley Decomposition by Components of a Welfare Measure.” Statistical Software Components S457562. Boston, MA: Boston College Department of Economics.
- Chen, Shaohua and Martin Ravallion. 2008. The developing world is poorer than we thought, but no less successful in the fight against poverty. Policy research working paper 4703. World Bank: Washington, D.C.
- Datt, Gaurav. 1998. “Computational Tools for Poverty Measurement and Analysis,” Discussion Paper No. 50. Food Consumption and Nutrition Division; International Food Policy Research Institute: Washington, D.C.
- Datt, Gaurav and Martin Ravallion. 1992. Growth and Redistribution Components of Changes in Poverty Measures: A Decomposition with Applications to Brazil and India in the 1980s. *Journal of Development Economics*, 38: 275–296.
- Deaton, A. and Zaidi, S. 2002. “Guidelines for Constructing Consumption Aggregates for Welfare Analysis.” LSMS Working Paper No. 135. World Bank: Washington, DC.
- Ferreira, F., S. Chen, A. Dabalén, Y. Dikhanov, N. Hamadeh, D. Jolliffe, A. Narayan, E. Prydz, A. Revenga, P. Sangraula, U. Serajuddin, and N. Yoshida, 2015. *A global count of the extreme poor in 2012: data issues, methodology, and initial results*. Policy Research working paper; No. WPS 7432. World Bank Group: Washington, D.C.
- Haughton, Jonathan and Shahidur Khandker. 2009. *Handbook on poverty and inequality*. World Bank: Washington D.C.
- Maasoumi, Esfandiar and Vahid Mahmoudi. 2013. Robust growth-equity decomposition of change in poverty: The case of Iran (2000–2009). *The Quarterly Review of Economics and Finance*, 53(3): 268–276.
- Mahmoudi, V. 2011. Poverty Changes during the Three Recent Development Plans in Iran (1995–2007). *African and Asian Studies*, 10 (2–3): 157–179. DOI: 10.1163/156921011X587013
- Nili F. and Poursadeghi H. S. 2011. Poverty Decomposition Based on Iranian Households’ Socioeconomic Characteristics: Integrated Micro and Macro Approach. *Journal of Money and Economy*, 6 (1):75–106
- Salehi-Isfahani, Djavad. 2009. Poverty, inequality, and populist politics in Iran. *Journal of Economic Inequality*, 7 (1): 5–28.
- Salehi-Isfahani, Djavad, Bryce Wilson Stucki, and Joshua Deutschmann. 2015. The Reform of Energy Subsidies in Iran: The Role of Cash Transfers. *Emerging Markets Finance and Trade*, 51(6): 1144–1162.
- World Bank. 2008. Islamic Republic of Iran. Spatial Patterns of Poverty and Economic Activity. Report No. 46603. Washington, D.C: World Bank.

SPECIAL FOCUS 2: AMBIENT AIR POLLUTION IN IRAN²²

The air above Iran is amongst the most polluted in the world and it is getting worse. In 2013, the latest year for which the World Bank together with the Institute for Health Metrics and Evaluation (IHME) produced estimates for Iran, 19,644 deaths were attributable to air pollution, translating roughly to 28 in 100,000 persons (World Bank and IHME, 2016). The economic cost of air pollution was estimated at roughly 2.2 percent of Iran's GDP or USD 13 billion per year, indicating that air pollution reduction is beneficial from not only a human health perspective, but also from an economic perspective. In a cost-benefit framework, out of every USD 100 the Iranian economy produces, USD 2.6 accrue as negative environmental externalities (i.e. costs) from air pollution. At the margin, there are several industrial, transport, energy, and agricultural activities, that if altered, maybe even halted, would yield more benefits in terms of avoided costs from pollution than gains from such activities, if undertaken.

Urban Ambient Air Pollution in Iran is Severe and Getting Worse

Iran is one of the most air polluted countries in the world. Some of Iran's cities rank amongst the

top most polluted cities in the world, as measured by PM2.5 concentrations (see Figure 26). PM2.5 is the air pollutant with the most substantial health effects.²³ As shown by Figure 27, three of the forty most PM2.5 polluted countries are in Iran. Overall,

²² This special focus section has been written by Martin Heger, Maria Sarraf and Jia Jun Lee. Massoud Estiri (Air Quality Specialist, Municipality of Tehran) also contributed to this section.

²³ The WHO air quality guidelines (AQGs) are intended for worldwide use and were developed to support actions to achieve air quality that protects public health. 10 micrograms/m³ is the guideline level, and the lowest concentration level at which premature mortality has been shown to increase with more than 95% confidence in response to long-term exposure to PM2.5. For countries that have much worse air quality, beyond 35 micrograms/m³, like Iran, WHO has set interim targets to guide the route to better air quality. Interim target-1 aims at curtailing concentrations below 35 micrograms/m³, a level which corresponds to a 15% higher long-term mortality risk relative to the guideline level. Interim target-2 aims at curtailing concentrations below 25 micrograms/m³, which corresponds to a lower risk of premature mortality relative to the interim target-1 level

FIGURE 26 • PM2.5 Concentration Levels (Annual Mean of $\mu\text{g}/\text{m}^3$) of the Forty Most Polluted Cities



Source: WB staff calculations based on WHO (2016).

Note: The cities displayed in this map are based on the list of cities for which there were values in the WHO Air Quality dataset. The number of monitoring stations and their sitting criteria may vary across cities.

14 of the 24 Iranian cities in the WHO Air Quality dataset are in the top 10 percent of the most polluted cities. Zabol is the single most PM2.5 polluted city in the world and the 3rd most PM10 polluted city. Bushehr and Ahvaz are among the top 25 most air polluted cities.²⁴ Figure 27 shows the geographical variation of PM2.5 pollution in Iran. Despite some efforts, nearly the entire Iranian urban population is still exposed to concentration levels that exceed the WHO guidelines.

Tehran exceeds the guideline measure of PM10 air pollution several fold. Tehran is far less PM10 polluted than for example Karachi or Delhi are (see Figure 28). Amongst the megacities for which we have PM10 pollution data (which allows for easier global comparison of megacities than PM2.5), Tehran is in the midfield. That said, the city still has four times the pollution concentration, which would conventionally be considered as healthy by the WHO ($20 \mu\text{g}/\text{m}^3$)

Sources of ambient air pollution:

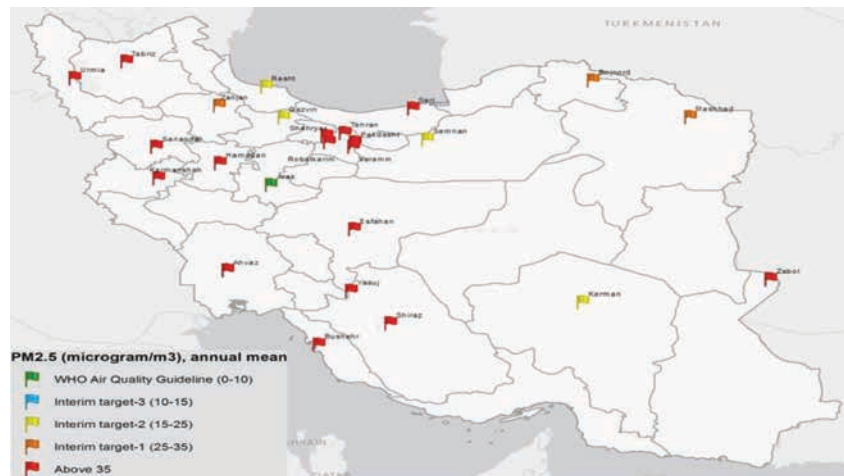
Air pollution in Iran is originating from both anthropogenic sources (such as transportation, industry or agriculture), and natural topographic conditions, such as geological dust. Each city for which air pollution concentrations are plotted in Figure 26 has a different particulate sources mix. Source apportionment studies are required to

determine the relative contributions from each of these sources. However, source apportionment analysis is very sparse in Iran. Out of the cities, which have air pollution data, there are only a few where source apportionment was done, including Tehran and Ahvaz. In Tehran, transport and industry contribute largely to the high pollution concentration, but there are also contributions from mineral dust (see e.g. Sarkosh, 2013). In Ahvaz, for example, people suffer from both fine dust from natural sources, due to the desert climate of the location of the city, as well as particles from combustion sources (Sowlat et al, 2013). The sources of dust affecting Iranian cities originate both nationally and from other countries in the

by approximately 6% [2–11%]. Interim target-3, aims at curtailing concentrations below 15 micrograms/m³, which corresponds to a lower risk of premature mortality relative to the interim target-2 by approximately 6% [2–11%]. For a detailed discussion of these targets see WHO (2006) and OECD (2016).

²⁴ This note focusses on PM2.5 air pollution, as it is not only most frequently used as a general indicator of the air pollution mixture, but also because PM2.5 has the largest quantifiable contribution to the burden of disease from air pollution (see WHO, 2015).

FIGURE 27 • PM2.5 Concentration Levels of Selected Iranian Cities

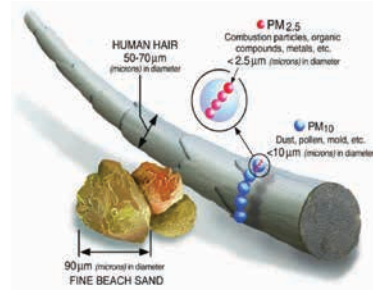


Note: The cities displayed in this map are based on the list of cities for which there were values in the WHO Air Quality dataset.

WHAT IS PM2.5 AIR POLLUTION?

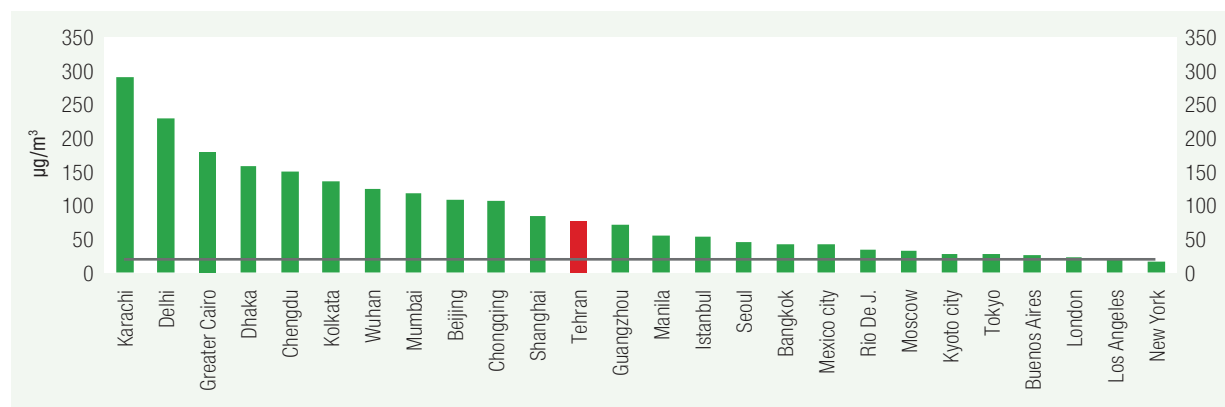
Fine particulate matter, or PM2.5 air pollution, is defined as fine inhalable air particles with diameters of 2.5 micrometers (or microns) and smaller. PM2.5 poses the most severe health impacts because they can get deep into the lungs and even into the bloodstream. The infographic below illustrates the size of PM2.5 relative to that of hair, sand and PM10.

Most PM2.5 particles form in the atmosphere as a result of complex chemical reactions in the presence of sunlight. In addition, they are often emitted directly from power plants, industries and automobiles. Fine particulate matter may also be emitted directly from a source such as construction sites, unpaved roads, fields, smokestacks or fires.



Source: US EPA.

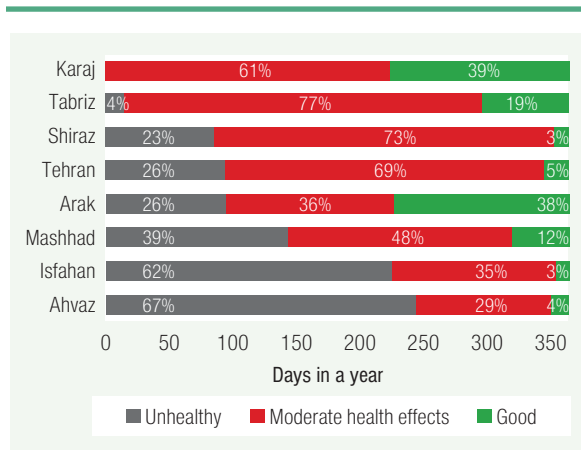
FIGURE 28 • PM10 Concentration Levels (Annual Mean of $\mu\text{g}/\text{m}^3$) of Global Megacities



Source: World Bank staff (2016) based on WHO 2016 data.

Note: The megacities displayed in this Figure are based on the list of cities for which there were values in the WHO Air Quality dataset. We defined megacity as defined by more than twelve million people living in it. The number of monitoring stations and their sitting criteria may vary across cities.

FIGURE 29 • Days in the Year 2014 by Air Quality Classification



Source: World Bank staff calculations based on data from communications with the Department of Environment, Iran.

Note: Air quality that is declared as “good” corresponds to a PM2.5 value of 0–50, “moderate health effects” corresponds to a PM2.5 value of 50–100 and “unhealthy” corresponds to a PM2.5 value of above 100 and includes the categories “unhealthy for sensitive groups”, “unhealthy” and “very unhealthy”. For Ahvaz and Tabriz, PM10 was used to classify the level of air pollution.

region (see e.g. Raheleh et al., 2013). Particulates from both geological dust and combustion sources have adverse health effects (see World Bank/IHME, 2016).²⁵ The development of successful air pollution policy will heavily depend on the distinction between the sources and therefore an accurate national air pollutants inventory based on source apportionment studies is highly desirable.

For more than 300 days a year the average Iranian city has air pollution with moderate to severe health effects. For about 100 of these days, air pollution is qualified as unhealthy and for about 200 days it can have moderate health effects (see Figure 29). Only for about 60 days is the average air quality considered to be good. Shiraz, Tehran, Isfahan and Ahvaz, all had about 350 days a year of air pollution that had adverse health effects, leaving only about 15 days during which there were actually clean air concentrations in 2014. On some days these cities have particulate matter levels that are about several times that of Beijing or Delhi, two other highly polluted major cities. Ahvaz had the worst level of air pollution with 245 days a year having been unhealthily air polluted, and 106 days having had air pollution levels that have moderate

health effects. Only 9 days a year, the city actually had clean air.

Air pollution worsened by about 0.5 percent per year between 1990 and 2013. PM2.5 concentrations increased in every period. From 1995–2005, the annual increases were just shy of half a percent, but from 2005–2013 the annual changes came closer to the 1 percent mark.

Decoupling of Air Pollution from Economic and Population Growth in Iran

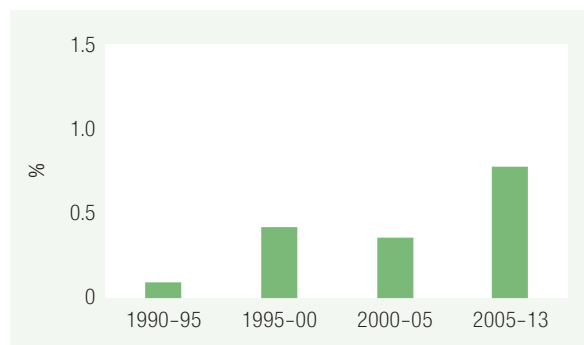
Iran’s economic growth is decoupling from air pollution. On the bright side, overall, Iran’s economic growth by far outweighs the country’s growth in air pollution, suggesting that the country’s economic activity is becoming less pollution intensive (see Figure 30).²⁶ Between 1990 and 2013, GDP grew by 116 percent whereas PM2.5 air pollution increased at a much lower rate of 11 percent, with GDP peaking in 2010.

However, decoupling in Iran happens at a slower pace compared to other countries suffering from similarly high levels of ambient air pollution. Compared to Egypt, a country from the same geographical region and similar levels of air pollution, Iran’s GDP has grown at a slower rate while PM2.5 concentrations have grown more rapidly, meaning that Iran’s GDP is decoupling at a slower rate (see Figure 31). This comparison is even starker when looking at India and China. Even though both of these countries have increased their pollution levels 3–5 times more than Iran’s from 1990 to 2013, because of long-term growth rates that

²⁵ The current position of the WHO, the US-EPA, and the International Agency of Research on Cancer (IARC) is that the evidence base at present is insufficient to support that there are different health effects associated with one or another source. For a detailed elaboration of health impacts and PM pollution sources, see World Bank/IHME (2016).

²⁶ Even more so if one assumes that some of the increases in pollution may have been driven by increase contributions from natural sources.

FIGURE 30 • Annual Changes of PM2.5 Concentration, from 1990 to 2013



Source: World Bank staff calculations based on Brauer et al (2016).
 Note: The underlying source of these trend data are satellite observations fused with ground-level observations, and interpolated using chemical transportation models. The accuracy is therefore not as high as the accuracy of the surface monitoring stations only.

surpassed Iran's by 3–8 times they have decoupled relatively faster.²⁷

Iran's pollution per capita has decreased.

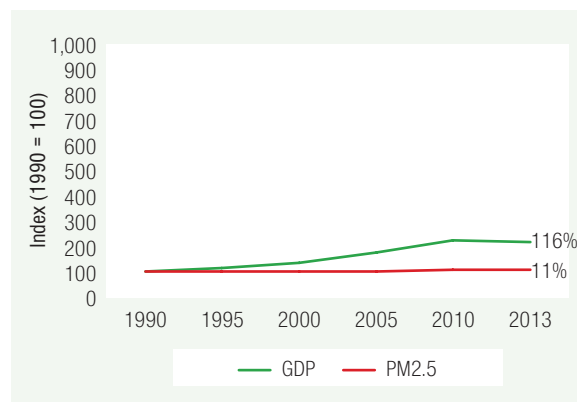
Even though pollution has increased between 1990 and 2013, as shown above, this increase was driven largely by population growth. Per capita, the pollution levels actually decreased by about 1 percent every year from 1990 onwards, with the exception of 2005–2010, where it actually slightly increased.²⁸ This indicates that per capita, less pollution is emitted, meaning that the average person is more efficient in terms of emitting pollution and causes less of the negative environmental externality.

Health Effects from Air Pollution in Iran

Globally, air pollution is the fourth most important risk factor of death. It follows metabolic risks, dietary risks and tobacco smoke according to Global Burden of Disease data from the Institute for Health Metrics and Evaluation (IHME). About 1 in 10 deaths globally is attributable to air pollution, yielding a total of 2.9 million deaths per year in 2013, a 30 percent increase since 1990.

In Iran, an estimated 19,644 deaths a year were attributable to air pollution in 2013. 28 out of 100,000 deaths was attributable to air pollution, according to The Cost of Air pollution: Strengthening

FIGURE 31 • Decoupling of Economic Growth from Air Pollution in Iran



Source: World Bank staff calculations based on Brauer et al (2016) pollution data and WDI (2016) constant GDP data.

the Economic Case for Action, a new joint publication between the World Bank and IHME.²⁹ While the deaths continuously increase over time, relative to population growth, they have actually been declining from 2000 onwards, meaning that as a share of population, fewer people have been dying from air pollution (see Figure 33).

²⁷ A deeper analysis into the driving factors of decoupling would be desirable. Such a prospective analysis would take into consideration not only the different topographical, meteorological and climatological conditions of each country, but also varying original states of development and economic structure. Furthermore, such analysis could also disentangle anthropogenic from natural sources.

²⁸ This calculation is based on Brauer et al (2016) data as well as UN-DESA (2016) data.

²⁹ The relative risks of mortality from exposure to PM2.5 was estimated using integrated exposure-response (IER) functions Burnett et al., 2014; Cohen et al., (n.d.). The IER method captures both the magnitude of PM2.5 exposure and the relative risks associated to that exposure. The relative risks are estimated from published evidence on cardiovascular disease and lung cancer burden from four types of PM2.5 exposure—ambient air pollution, second-hand tobacco smoke, active smoking, and household air pollution. By doing so, this method allows estimation of risk in places where no studies have been conducted, such as in much of Asia, Sub-Saharan Africa, and the Middle East and North Africa.

FIGURE 32 • Decoupling of Economic Growth from Air Pollution in Egypt, India, and China



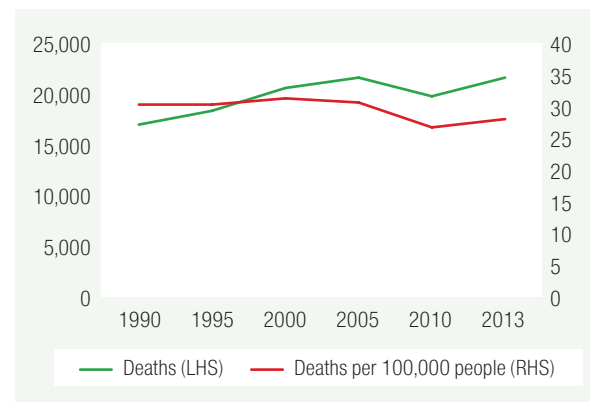
Source: World Bank staff calculations based on Brauer et al (2016) pollution data and WDI (2016) constant GDP data.

Economic Cost of Ambient Air Pollution in Iran

Iran's economic cost of air pollution has been quantified to be about 2.2 percent of the country's GDP, or USD 13 billion. In the joint World Bank and IHME report mentioned above the economic costs from ambient air pollution were computed to correspond to about 2.2 percent a year. This environmental externality cost measure quantifies the economic cost of premature mortality attributable to air pollution in Iran.

2.2 percent of Iran's GDP, while being a useful reference point, is likely to be an underestimation. Even though premature mortality makes up the largest component of the economic

FIGURE 33 • Health Impacts from Air Pollution



Source: WB staff calculations based on WB/IHME (2016) data.
 Note: LHS is an abbreviation of left-hand side, indicating that the left hand side scale on the y-axis applies. RHS is an abbreviation of right hand side.

costs arising from the health impacts of air pollution, 2.2 percent of GDP is probably an underestimation, as the report does not take into consideration the costs of morbidity, which are also substantial. For example, the reducing of labor productivity due to constrained breathing, work absenteeism and even hospitalization are thus not accounted for in the estimate. These morbidity impacts were incorporated in the World Bank's 2005 Cost of Environmental Degradation Study.

The valuation methods employed to get to an economic cost estimate from health outcome data put a price on reducing the likelihood of mortality (quantifying the welfare losses) and also by quantifying the income an individual is forgoing by dying prematurely (forgone labor output). The estimated value represents the sum of all individuals' willingness-to-pay (WTP) to reduce mortality risk values, and their foregone economic output because they have died prematurely.³⁰

Improving air quality in Iran will require a mix of technical analyses, investments, and policy reforms (which include extensions to the presented analyses in this note) on the national as well as the city level (as the sources and solutions to air pollution can vary largely from one city to the next). The good news is

that air pollution is an absolutely reversible problem, unlike many other challenges.

³⁰ The WTP method monetizes the increased fatality risk due to air pollution and how much an individual is willing to pay to avoid it. In other words, it accounts for the marginal tradeoffs that individuals are willing to make in order to reduce their probabilities of dying. Due to the limited number of studies on WTP, the Value of Statistical Life (VSL) estimated in the global World Bank report for non OECD countries are based on estimations using the benefit-transfer approach. This estimation is done by assuming that the ratio of income in country x, say Iran, over the average income in an OECD country is proportional to the ratio of VSL in Iran over average VSL in an OECD country. e denotes the income elasticity of the VSL. The value obtained is the total welfare losses incurred by Iran due to premature mortality caused by air pollution:

$$VSL_{Iran} = VSL_{OECD} \times \left(\frac{Income_{Iran}}{Income_{OECD}} \right)^e$$

That said, for Iran several WTP studies quantifying the costs of air pollution in selected cities, such as Tehran, are available, which mark a natural extension to improve the analysis further. For a detailed elaboration of the methodology, please consult the Cost of Air Pollution report (2016).

BOX 4 • Air Pollution is Reversible – Evidence from other Country Experiences

Unlike other negative environmental externalities, air pollution is reversible. London, Paris, and New York, all cities which suffered greatly from severe air pollution a couple of decades ago have cleaned up their air owing largely to decisive policy actions. On most days in recent years, these megacities remain within the WHO air pollution guidelines for what is considered healthy. There are also more recent examples of decisive policy action leading to air quality improvements, including Chile and Peru (to name but two examples):

Chile, from 2003–2010, launched an urban transportation project with the objective to improve Santiago's air quality through reducing local air pollutants by expanding the public transportation system. As part of the project, interventions included reducing the emissions from public buses, increasing the use of bicycles, implementing up-to-date emission testing, developing business schemes for operation of the public transportation system, monitoring the bus systems, and implementing overall traffic planning. In large parts due to this comprehensive transportation program, PM2.5 air pollution concentrations reduced by more than half from the early 1990s to the early 2010s.

Peru, from 2009–2011, launched an air pollution and transportation program, which included improvements in vehicle emissions, fuel quality, and air quality monitoring systems. The objective of the program was to build a constituency for air pollution control that takes an active interest in shaping air pollution control activities. In large parts due to the project, PM2.5 levels decreased by almost half from 2009–2012 in the metropolitan Lima-Callao area. The improved air quality was particularly beneficial for poor persons, as they were more severely affected by the air pollution than non-poor persons.

REFERENCES

- Boys, B.L., R. V. Martin, A. van Donkelaar, R. J. MacDonell, N. C. Hsu, M. J. Cooper, R. M. Yantosca, Z. Lu, D. G. Streets, Q. Zhang, S. W. Wang. 2014. Fifteen year global time series of satellite-derived fine particulate matter. *Environmental Science & Technology* 48 (19), 11109–11118. DOI: 10.1021/es502113p.
- Brauer, Michael, Greg Freedman, Joseph Frostad, Aaron van Donkelaar, Randall V. Martin, Frank Dentener, Rita van Dingenen, et al. 2016. Ambient Air Pollution Exposure Estimation for the Global Burden of Disease 2013. *Environmental Science & Technology* 50 (1): 79–88.
- Burnett, Richard T., C. Arden Pope III, Majid Ezzati, Casey Olives, Stephen S. Lim, Sumi Mehta, Hwashin H. Shin, et al. 2014. An Integrated Risk Function for Estimating the Global Burden of Disease Attributable to Ambient Fine Particulate Matter Exposure. *Environmental Health Perspectives* (February). DOI:10.1289/ehp.1307049.
- Cohen, Aaron et al. N.D. “The Global Burden of Disease Attributable to Ambient Air Pollution: Estimates of Current Burden and 23-Year Trends from the GBD 2013 Study.” In submission, *The Economic Consequences of Outdoor Air Pollution*, OECD Publishing Paris.
- Raheleh, Givehchi, Mohammad Arhami, and Massoud Tajrishy. 2013. Contribution of the Middle Eastern dust source areas to PM10 levels in urban receptors: Case study of Tehran, Iran. *Atmospheric Environment* 75:287–295.
- Sarkhosh, M., A.H. Mahvi, M. Yunesian, R. Nabizadeh, S. H. Borji, and A. G. Bajgirani. 2013. Source apportionment of volatile organic compounds in Tehran, Iran. *Bulletin of Environmental Contamination and Toxicology*, 90 (4): 440–445.
- Sarraf, M., M. Owaygen, G. Ruta, and L. Croitoru. 2005. “Islamic Republic of Iran: Cost Assessment of Environmental Degradation.” Sector Note No. 32043-IRN. Washington, D.C: The World Bank.
- Sowlat, M.H., K. Naddafi, M. Yunesian, P. L. Jackson, S. Lofti, A. Shamsavani. 2013. PM10 Source Apportionment in Ahvaz, Iran, Using Positive Matrix Factorization. *CLEAN – Soil, Air, Water*, 41 (12): 1143–1151.
- van Donkelaar, A., R. V. Martin, M. Brauer and B. L. Boys. 2015. Global fine particulate matter concentrations from satellite for long-term exposure assessment. *Environmental Health Perspectives*, 123, 135–143. DOI:10.1289/ehp.1408646, 2015.
- van Donkelaar, A., R. V. Martin, M. Brauer, N. C. Hsu, R. A. Kahn, R. C. Levy, A. Lyapustin, A. M. Sayer, and D. M. Winker. 2016. Global Estimates of Fine Particulate Matter using a Combined Geophysical-Statistical Method with Information from Satellites, Models, and Monitors. *Environmental Science & Technology*, 50 (7): 3762–3772. DOI: 10.1021/acs.est.5b05833.
- World Bank; Institute for Health Metrics and Evaluation. 2016. *The Cost of Air Pollution: Strengthening the Economic Case for Action*. World Bank, Washington, D.C.
- World Health Organization Regional Office for Europe, OECD. 2015. Economic cost of the health impact of air pollution in Europe: Clean air, health and wealth. Copenhagen: WHO Regional Office for Europe.
- World Health Organization. 2006. *Air quality guidelines: Global update 2005. Particulate matter, ozone, nitrogen dioxide, and sulfur dioxide*. Copenhagen: WHO Regional Office for Europe.



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