

The effect of sanctions 2011 on Labor force participation of women in Iran

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Abstract

In the recent years Iranian females' education have increased dramatically with the decrease in their fertility rate. However; their participation in the labor market have not changed considerably. So, it seems that education and children is not a barrier for women employment in Iran anymore. However, since in Iran no controlled experiment is done to measure the effect of a program on LFP of women, we used sanctions of 2011 as an exogenous shock to run a DID estimate and measure its effect on LFP. This sanction affected manufacturing sector and decreased its GDP by near 18% in two years while it had little effect (or not any) on service sector. Using a panel data of Household expenditure and Income survey (HEIS) of families in Iran for the period of 2010-2012, I made a treatment and a control group based on the sector that the husbands of a woman worked before sanctions: Manufacturing or Service. According to our findings, sanctions had a negative effect on women in treatment group (those whose husbands worked in manufacturing) and reduced their LFP by about 2.5 pp. This negative effect was mostly driven by educated women such that LFP of women who have university degree was reduced by near 12 pp during sanctions and had little effect or nothing on other women. The only positive effect that we saw during sanctions was among the neediest families who are at the bottom of income distribution for both our treatment and control group. According to our interpretation these women increased their LFP because their living expenses was increased due to the inflation during sanctions. In addition, we saw the negative effect just in rural areas and not in urban. Our finding tells us contrary to our expectations, women did not increase their participation with a bad income shock if they were not needy. Our interpretation is that women were discouraged to participate in the labor market during sanctions perhaps as a result of negative signals from the demand side of the labor market or because many of them lost their jobs. The policy implication is that for fostering women to participate in the labor market, we should also pay attention on the labor market and provide a better environment for them.

Table of Contents

Introduction	3
Literature Review	7
Evidence and Methodology	9
Data	10
Model	12
Results	17
Conclusion	24
Appendix	25

Introduction

In the recent years Iranian females' education have increased dramatically with the decrease in their fertility rate. However; their participation in the labor market have not changed considerably. The average number of children for an Iranian woman has changed from 6.9 in the year 1960 to 2.1 in the year 2018 and the average years of schooling has increased from 0.13 to 8.5 from 1960 till 2018 ¹ (figures 1 and 2). However, female's participation rate in the labor market has remained approximately around 15% during these years with a slow increase according to figure 3². This number is very low even in comparison to the similar countries like Turkey with a female labor force participation of around 30% (twice than Iran) and a relatively lower average years of schooling (figures 1 and 3).

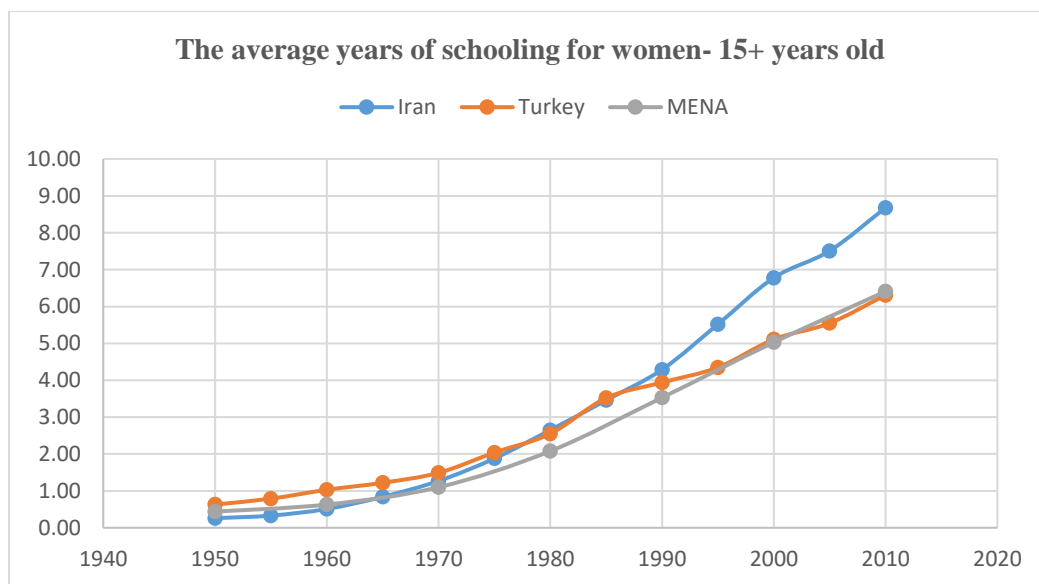


Figure 1, the average years of schooling for women 15+ years old. Iran, Turkey and MENA – 1950-2010- Data source: Barro & Lee (2013)

This phenomena does not belong to Iran itself and is common between countries in MENA regions (Middle East and North Africa). According to the above explanations and as Majbouri (2018) and many other economists stated, Human capital and children appears to be no more barriers towards female LFP in Iran and MENA. So, we might look for other factors which hinder women's employment.

¹ The average years of schooling is 9 years for men in the year 2018. These data are revealed by the [Statistical Center of Iran](#)

² According to the [GlobalEconomy.com](#) the average value of female labor force participation Iran during 1990-2020 was 14.48% with the minimum of 9.84% in 1990 and the maximum of 19.45% in 2005.

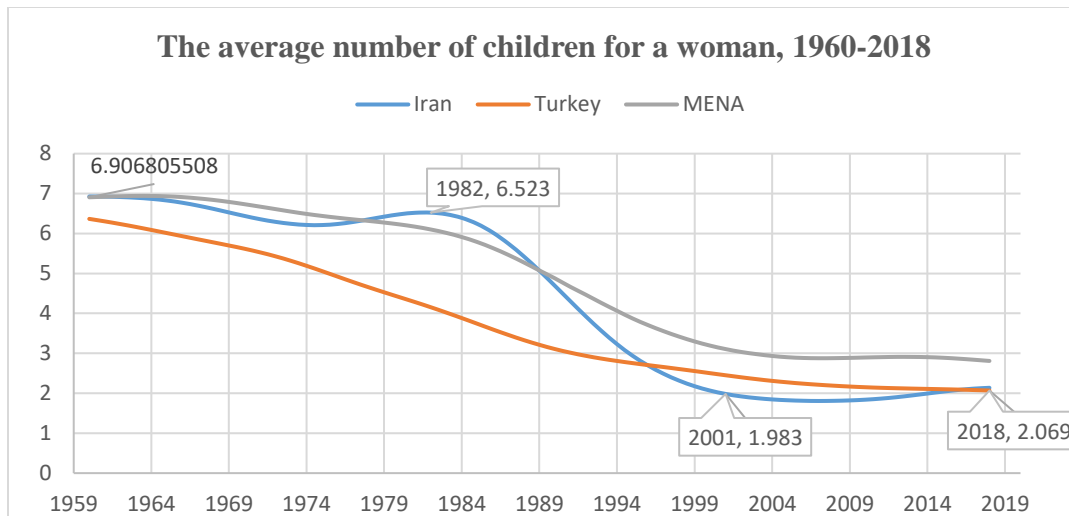


Figure 2, the average number of children for a woman. Iran, Turkey and MENA – 1960-2018- Data source: World Bank.

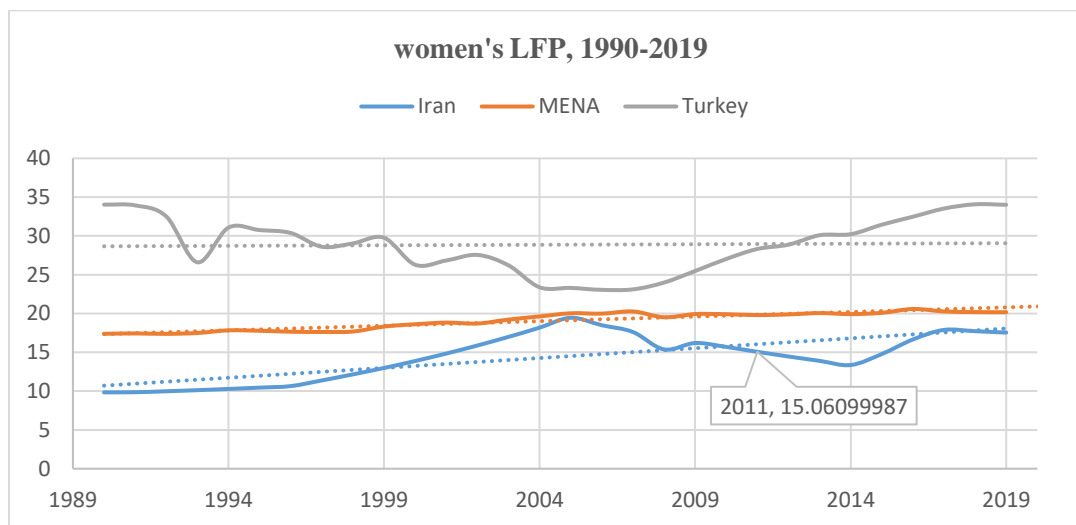


Figure 3, LFP of women in 1990-2019, Iran- Turkey and MENA
Data source: World Bank

Karshenas and Moghadam (2001) and Moghadam (2005) have blamed Islam and culture for this low participation. However, Ross (2008) argued that oil-income is the first barrier for women's employment in MENA. What we can understand from Ross's work and as it is shown by Majbouri (2016) is that social norms and patriarchal culture works as a barrier towards women employment in the Middle East and North Africa where a family can have sufficient welfare without a woman employment thanks to the unconditional earning from oil. As stated by Scott and Tilly (1975) women's employment follows a U shape pattern in the process of development and it seems that these societies have not reached to a development stage where old social norms start to change.

Some other studies have blamed the Economic weather of Iran, market inefficiencies and discrimination in the labor market for this low FLFP (Russel (2009) and Majbouri (2018)). However, other economists like Bahramitash and Esfahani (2008) argue that the main factor for the low FLFP in Iran is unemployment among educated women that has risen sharply because their entry into the labor force has significantly outpaced their ability to find jobs. Our study confirms this argue as we see a negative effect of sanctions on employment between educated women.

It seems that due to the high level of women's human capital in Iran, the increase in their participation rate in the labor market helps to increase economic development. If the factors affecting women's participation in the labor market is ascertained, we can identify the area of focus to motivate women for participating in the labor market. However, in Iran no controlled experiment is implemented to analyze the effect of a particular program for encouraging (discouraging) women to increase (decrease) their LFP like what Field et al. (2015) did in India to study the effect of strengthening women's financial control on their labor supply. In this context, the only way that remains is to employ an exogenous shock to conduct a semi- random experiment. We can use an exogenous shock that hit a particular part of the economy or a particular set of women more than the others to make a control and a treatment group and compare their behavior before and after the shock using the method of difference-in-difference. This is what we are going to do in this study. There are many shocks that hit Iran during the past decades. These shocks include a variety of aspects such as sanctions imposed by the US and EU, the water crisis and the rainfall change, natural disasters like earthquake or flood, oil and gas price fluctuations and many more.

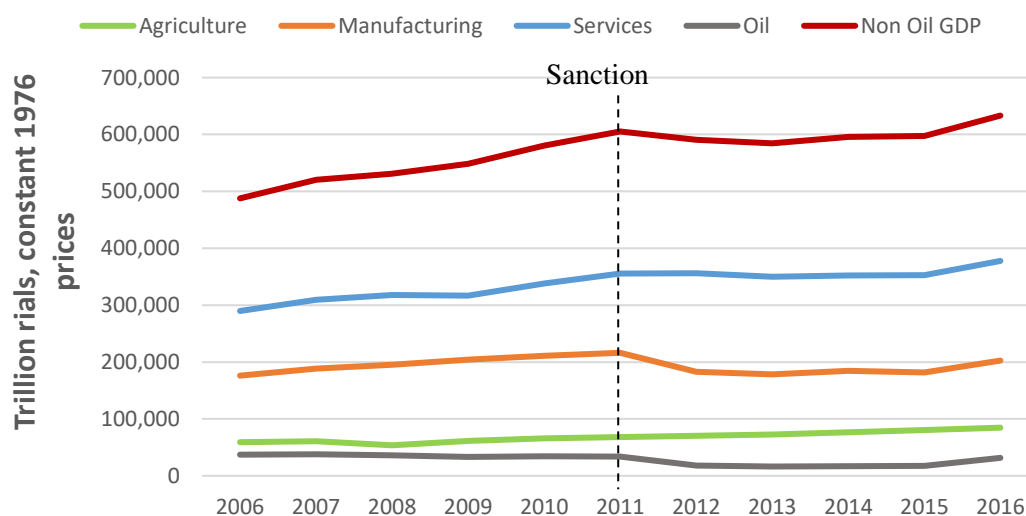


Figure 4, annually data for GDP- different sectors and oil – 2006-2016-

Data Source: Iran Central bank

For this study I am going to analyze the effect of sanctions that hit Iran economy in July 2011.

³According to figure 4 and as stated by Djavad Salehi (2015), before sanctions were imposed in 2011, Iran had enjoyed several years of oil-induced economic growth. During 2005-2010, non-oil GDP, which reflects the level of economic better than GDP with oil, grew at about 5% per year; in subsequent years its growth reached zero and then became even negative. This shock according to figure 4 not only caused oil revenue to decrease, but also hit manufacturing even more than any other sectors. It caused a rapid decrease in manufacturing GDP that even until 2016 this sector could not go back to its previous state before sanctions. As we will further explain in the method section, we use this intensity of variation in the sectors caused by sanctions to make a treatment and a control group. As most families in Iran are male headed and women's participation in the labor market is an issue that is decided inside the family and women's husbands and their bargaining power has an important role in it, we divided women based on their husband's occupations in manufacturing or service group and made a treatment and a control group for conducting a difference-in-difference regression. We expect that women react differently with different shocks to their husband's income. What we found was a negative impact of sanctions on women's LFP especially between women with tertiary education. However, during 2011, a cash transfer program was started by the government to compensate households for the increase in the prices of energy⁴. We included this shock in our estimates and found no evidence of interfering our results because the transfer did not have any actual effect on LFP align with what Djavad Salehi and Mostafavi-Dehzoeei (2017) found. Our findings are further explained in the result section.

This study is the first one that analyzes the effect of sanctions on women's LFP in Iran. Two other papers have studied the effect of some exogenous shock on labor force participation in Iran. Djavad Salehi and Mostafavi-Dehzoeei (2017) studied the effect of cash transfer program in 2010 on LFP of men and women in Iran and found no evidence that the cash transfer program reduced labor supply as it was argued by some economists. Majbouri (2016) analyzed the effect of the economic crisis of 1994-95 on labor force participation of women in Iran and found that married women in rural areas and never married women in urban areas increased their LFP during this crisis. However, what we found in this study was a negative effect on LFP of married women in rural areas due to 2011 sanctions.

For estimating the effects I used a panel data of Household expenditure and Income survey (HEIS) of families in Iran in 2010-2012. This dataset is revealed annually by the Statistical Center of Iran and contains a broad spectrum of properties relating to each members of the household. A more detailed explanation of this dataset will come in the data section.

The remaining parts is as follows: In section 2, I will review the literature in the context of women's LFP in Iran, in section 3, I will give more details about Iran sanction in July 2011 and

³ Two sanctions one in 2011 and the other in 2018 hit Iran. I used this sanction because 2018 had coincidence with the Covid-19 pandemic and separating the effects were difficult.

⁴ In December 2010, as part of an ambitious reform of bread and energy subsidies, Iran started a monthly cash transfer program to compensate households for the price increases (Guillaume et al. 2011; Salehi-Isfahani et al. 2015). In 2011, the first full year of the program, 1 transfers amounted to 6.5% of the GDP and about 29% of the median household income.

explain how I constructed our DID regression according to this evidence. In section 4, our model and the variables that we used are explained. In section 5, I will introduce the dataset that we used for this study. Section 6 analyzes the result and section 7 concludes.

Literature Review

As we stated in Introduction, women's LFP in Iran has remained quite low in spite of the increase in their education and the decrease in their number of children. So, Iran needs a separate attention and has been the subject of some studies. Due to the space limitations, in this review we just focus our attention to the studies done on FLFP (female labor force participation) in Iran and is mostly related to our work.

H. S. Esfahani (2006) found that the low FLFP in Iran is due to the oil income which is given to the families as direct or indirect subsidies. He argued that the unconditional increase in the wealth without working is an anti – motivation for women's participation. However, what Assaad and Hamidi (2008) found in Egypt was contrary to Esfahani's finding: Women's participation is higher in the families whose men have higher income. Majbouri (2016) used a long panel dataset controlling for country and year fixed-effects and showed that per capita oil and gas rents reduce FLFP rates in countries with Islamic family law more than others. He argued that when men's income increase, their bargaining power in the family increase and women's LFP decrease in Islamic societies while the higher bargaining power has no effect on LFP in non-Islamic societies and it affects other aspects like family expenditures.

Bahramitash and H.S Esfahani (2008) reexamined the evolution of women's labor force participation and employment in Iran in the light of five decades of census data from 1956 to 2006. They argue that the reduction in female employment during these decade was essentially due to declines of private sector jobs, particularly low skill ones in rural handicrafts, closely connected with the disruption of production and trade in the aftermath of Revolution and the Iran-Iraq War. While they provide broad explanations and deep analysis of the labor environment in Iran, their study lacks of statistical analysis like regressions and it is mostly based on visualizations and analytical evidences.

Majbouri (2015) used household expenditure and income survey of 2006 through 2009 in Iran and estimated elasticities of participation and hours with respect to wages. Using a structural estimation and controlling for selection, he depicted that the elasticity of women's participation in the labor force with respect to wages is quite large, especially for married urban women. He argued that the plausible implication of such large elasticities is that nonparticipating women have potential wages close to the wages of those who participate. Therefore, lower potential wages cannot be the factor that strongly dissuades women from participation and other factors, such as labor market institutions and preferences, could be the underlying force hindering women from participation.

Bahramitash and H. S Esfahani (2016) used a cross sectional of countries data to analyze the effect of different factors on women's LFP. They argued that big policies and supporting women in the labor market can affect women's participation in the labor market. Their findings is align with

what we found about the effect of negative environment shock on women's LFP. They also argued that oil income can even increase women's participation in self-employed or employer jobs if the social norms and economic environment permit.

HS Esfahani and Shajari (2012) used a probit regression with the place of birth (urban or rural) as an instrument to analyze the causal effect of education on LFP using a cross sectional data driven by national public census of Iran in 2006. They found that having tertiary education increases the chance of a woman to participate in the labor market by about 32%. While the coefficient for education is align with other studies, they have not brought enough evidences that the place of birth satisfies exclusion restriction and hence it is a good instrument for education.

Majbouri (2018) analyzed the causal effect of number of children on women's participation in the labor market and used an instrument of whether a woman has given birth to twins in her first conception using a cross sectional data of 2000 in Iran when fertility treatments has not become legal in Iran yet. He found that having an extra (unplanned) child would only reduce female participation rate for low-educated mothers and mothers with young children, thus having no causal impact on most mothers' participation. He concludes that perhaps other factors like social norms and gender discrimination apart from children are the main reasons for the low participation of women in Iran.

Our study is mostly closed to the following two papers that have measured the effect of shocks on FLFP in Iran:

Majbouri (2016) used a panel data between years 1992-1995 to analyze the effect of Iranian economic crisis of 1994-95 on women's participation. He found that the most increase in FLFP was among married women in rural areas (9.4 pp) and never-married women in urban areas (10.7 pp). He asserts that the fact that we do not see any increase in FLFP of married women in urban areas in comparison to rural is due to the different patterns of jobs in these places. Works in rural areas are more flexible, usually unpaid and have little interaction with strangers. All the properties that many men prefer for their wives' jobs. He confirms that this result is not driven by other hidden time trend factors such as rainfall in rural areas because rainfall has decreased during these years and we expect a decrease in the participation with the decrease in rainfall. While Majbouri tries to support his results by including other time variables and rainfall statistics, it is not obvious that what he has found is due to the economic crisis of that year and not any other trends or shocks. Actually what we found in this study was contrary to Majbouri and a negative effect of 2011 sanctions on FLFP. However, these crisis in 1994-95 and 2011 are not the same and may not be comparable.

Djavad Salehi and Mostafavi-Dehzoee (2017) studied the causal impact of a nation-wide unconditional cash transfer program started in 2010 on labor supply in Iran using a panel data of 2010 and 2011. They used both FE and DID methods using exogenous variation in the intensity and time of treatment. With the exception of youth, who have weak ties to the labor market, they found no evidence that cash transfers reduced labor supply, while service sector workers increased their hours of work, perhaps because some used transfers to expand their business.

Evidence and Methodology

As stated in the Introduction, sanctions hit Iran economy at July 2011 and caused a rapid reduction in the oil and manufacturing GDP. In figure 5, quarterly data is shown for the period of 2006-2016 by the main sectors including service, manufacturing (including oil and mine) and agriculture. From this figure, we see that manufacturing's GDP started to decrease from the third quarter or second half of 2011⁵. This decrease continued till the first quarter of 2013 and during this two years (from the first half of 2011 till the first half of 2013), manufacturing experienced about 19% decrease in its GDP! Service and agriculture seems to be not affected by sanctions and even a bit increase by 1% and 4% respectively. It may be due to the fact that perhaps some people switched their business from manufacturing to service during sanctions. Agriculture seems to show a seasonal pattern mostly dependent on the weather rather than anything else.

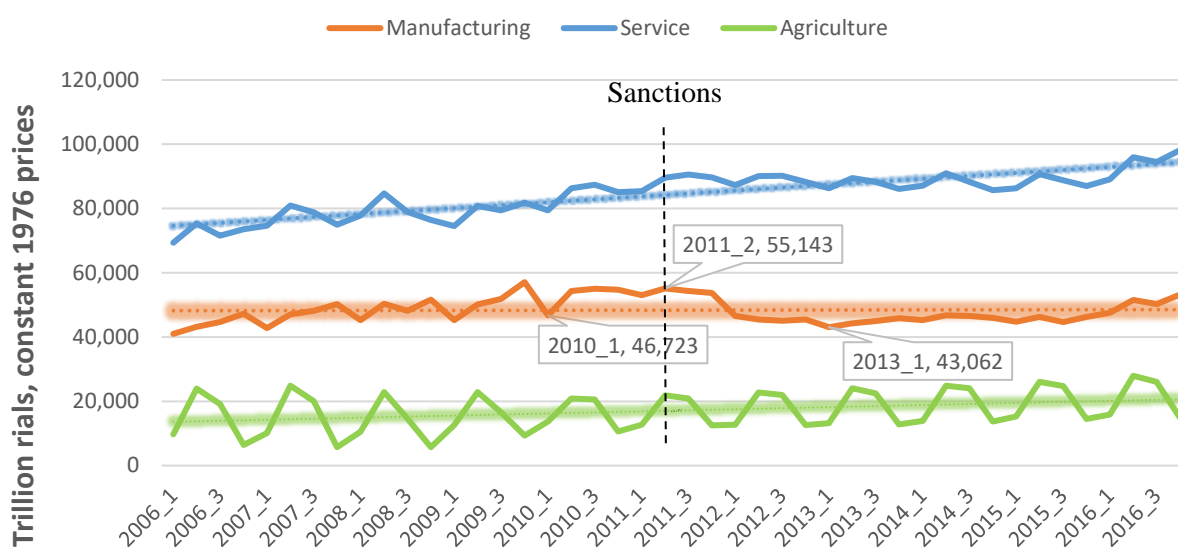


Figure 5, quarterly data for GDP by main sectors – 2006-2016

Data source: Iran Central Bank

Based on the above explanations and figure 5, we can argue that manufacturing is the only sector which is hit by sanctions and the group of people who worked in manufacturing before sanctions were affected more by sanctions. We use the word “more” because during sanctions, Iran experienced a depression and an inflation in the prices due to a negative supply shock which increased the expenses and affected all the families accordingly. However, for those working in manufacturing, the effect of sanctions were even more severe because it directly affected their income as well (not for sure by with a higher probability).

⁵ I used Gregorian years while the actual years in the data is from March 21 to March 20. For example, year 2011 refers to the period between 21 March 2011 and 20 March 2012. So, the second half of 2011 corresponds to the time from October 2011 till March 2012 in the calendar.

We want to see the effect of sanctions on labor force participation of women in Iran. Using a raw panel model is not right because what we see from the difference of the data before and after the sanctions, may not be due to the sanctions and other time trends or hidden variables might have worked as well during this time that might not be due to the sanctions. So, focusing on just one group do not seem a reasonable idea. Instead we should find some people who are hit by the sanctions more than others. If we can find at least two such groups that one is hit by the sanctions more than the other, we can compare these groups before and after the sanctions and make a difference in difference (DID) model. From the above explanations, we could find a comparison and a treatment group according to the data. This forms our basic idea. We compare manufacturing against service group. So, manufacturing is the treatment group and service is the control group. We have made our model based on some assumptions.

In Iran, most families are male headed (about 87% of the families according to 2010-2012 survey). It means that men have the main responsibility for supplying the families' living expenses. In this context, women's decision for working is affected by their husband's job, income and his preferences along with the woman's characteristics and relates to the intra household bargaining power. So, any bad income shock to the man may affect woman's decision for working. Based on this, we focused our attention to those families who are male headed and their head works in manufacturing or service sector (it consisted 53% of our data) and analyzed labor force participation of women who are the wives of these men during sanctions. We have excluded those families who are female head because most of the women in these families desire to participate in the labor market or they are dependent on some charity agencies for funding their living expenses. In addition, we excluded single women (27% of our dataset from women of age 15+) because we expect the decisions of these girls for working is independent of their families and is not affected by their fathers' (mothers) employment status (while it might depend on their family income). We also excluded those families that their head worked in agriculture sector or was out of the labor force or unemployed. This exclusions were due to the fact that as we saw in figure 5, agriculture mostly showed a seasonal pattern depending more on the weather. We also made our stratification based on the sector where the husband worked before sanctions because some people might have changed their sectors or gone out of the labor force or become unemployed after that sanctions.

So, our treatment group is those women who are married and their husbands worked in manufacturing sector before sanctions and our control group is those whose husbands worked in service sector before sanctions. It is worth mentioning that our dataset is for three years of 2010, 2011 and 2012. According to figure 5, 2010 till the first half of 2011 is the time before sanctions and the second half of 2011 till 2012 is the time after sanctions. More details about our dataset is explained in the next section.

Data

The data for this study is driven from three rounds of the Household Expenditures and Income Survey (HEIS) from 2010 through 2012. This dataset is collected annually by the Statistical Center of Iran (SCI) since 1963 in rural areas and 1968 in urban areas. The surveys contain demographic information including basic information like age, gender, marital and employment status, assets ownership, expenditure, job status including the occupation and income and many more. Over the

years, the dataset has become richer and more information is gathered. The main purpose of this survey is to measure the average expenditures and earnings of a rural or urban family in Iran.

The households in each year are randomly divided into 12 groups of approximately equal size, and interviewed in different months of the year. As stated by Majbouri (2015), sample selection follows a two-stage sampling method. In the first stage, based on the most recent census, the total number of primary sampling units (PSUs) in each geographical block (rural or urban areas in each province) is determined, which is equal to the population in the block divided by five. In the second stage, a number of PSUs in each block are chosen to be surveyed. This number depends on the population and some other variables like expenditure and income, in that block. Hence, households have different probability of selection. The inverse probability of selection is known as the household (individual) weight. For example if there are 1000 households in a block and 200 of them are chose, the probability of selection becomes $1/5$ and each household's weights becomes 5. This means that on average each household in the sample is equivalent to five households in the real data. I have considered these weights for summary statistics and regressions in this study.

As Djavad Salehi (2017) mentioned, from 2010, HEIS is collected as a rotating-panel with a base sample and households were interviewed the same month each year, so in the panel estimation we can ignore the month of interview. According to SCI definition, base sample is a big sample which is used for some subsequent years and subsamples are driven from this sample. We have three panels after 2010 including 2010-2012, 2013-2017 and 2018 till now. Each panel includes different set of households and subsamples are based on a different sample. The primary goal for using rotating panels by SCI was to reduce year to year fluctuations and to make consecutive year samples more similar. We have chosen 2010-2012 from this dataset for three reasons. First, is that this is the only panel dataset which contains observations from the time one year before the sanctions till one year after the sanctions were imposed. Second, as there is no similarity between observations from 2012 and afterwards, we cannot use the next two panel datasets and we should consent to 2010-2012 dataset. Third, there is some similarities between data from 2010 and 2009 but these observations have no similarity (or very few) to the years after the sanctions (2011 and 2012). So, using observations before 2010 does not help because they were not tracked after sanctions were imposed.

The dataset from 2010 is based on the interview from 18701 families living in urban areas and 19584 families living in rural areas. 2011 dataset is based on 18727 urban families and 19786 rural families and 2012 is based on 18535 urban and 19657 rural families. Since the primary aim of data collection by SCI was not to collect panel data, households are not followed if they relocate. Of 38,285 households in 2010, 25622 (67%) were matched with 2011 and of 38,513 households (152,291 individuals) in 2011, 25945 (67%) were matched with 2012. This form our balanced panel with an attrition rate of 33%. However, we used those households from 2010 which were matched with 2012 and those from 2011 which were matched with 2012 and were interviewed in the first half of 2011 if the observation was not available in 2010.

Besides attrition, the panel suffers from weak identification of household members between years. If an individual leaves the household, she (he) is dropped from the sample and her (his) ID is given

to the next member. To correct this mismatch, we dropped an observation whose gender has changed during years or her age has changed by more than two years for two subsequent years.

Our focus group as mentioned earlier is those women who are wives of the men who are the head of family and worked in manufacturing or service sector before sanctions. They consisted 3,857 women during three years who were available for at least two years (once before sanction and once after sanctions). They consisted 10,839 total observations.

One Caveat in our data is that there was no common observations between 2012 and afterwards. As we explained, 2013-2017 dataset was interviewed from a different set of households based on a different base sample. So, we can track individuals till the end of 2012 with what we have in hand. From figure 5, the last quarter of 2012 was just one quarter before manufacturing's GDP did not see a reduction anymore. However, according to our data limitations, we cannot track the behavior of households and women after sanctions while we are aware that the change in their behavior might remain for some time after sanctions' effect in manufacturing was diminished.

Model

Before introducing our model and analyzing the results, we should mention that our model of DID is based on some assumptions that we explain it here.

First Assumption: Parallel Trend

Our first assumption is the parallel trend assumption. We assume that LFP of women in comparison and treatment group changes parallel before the sanctions hit (or any exogenous shock that affected these two groups separately). We can check the validity of this assumption by looking at the trends for labor force participation of married women by their husbands' sector before sanctions hit. It is shown in figure 6. By looking at this figure, we can approximately argue that manufacturing and service sector were moving together until 2010 when LFP in manufacturing group reduced significantly in comparison to service group. It is obvious that agriculture was not moving in parallel to the other two groups and we should exclude it. In addition, agriculture is a kind of job which is mostly common in the villages and rural areas. Families in these areas have a different culture which affects women's decision for participating in the labor market. As Majbouri (2016) mentioned, these kind of jobs are usually unpaid family works which are more flexible and have less contact with strangers. So, men can have more control on their wives' jobs in rural areas. As we see in figure 6, women's participation is quite high in agriculture group in comparison to the other two groups. So, according to figures 5 and 6 excluding agriculture sector seems a reasonable idea.

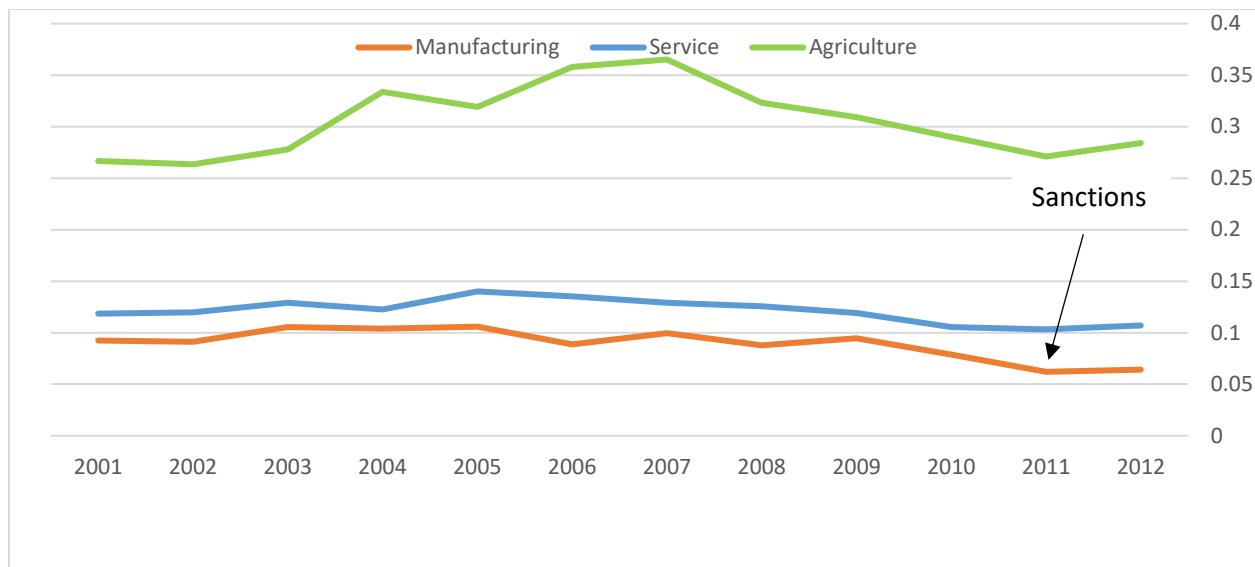


Figure 6, Annual LFP for married women by their husband's sector- 2001-2012

Source: Author's calculations from HEIS dataset

In figure 7, quarterly data is shown for a deeper view on the changes during second half of 2011 when sanctions hit. However, since the months of interview was only available after 2008 in the data, quarterly data is just shown for the period of 2008-2012.

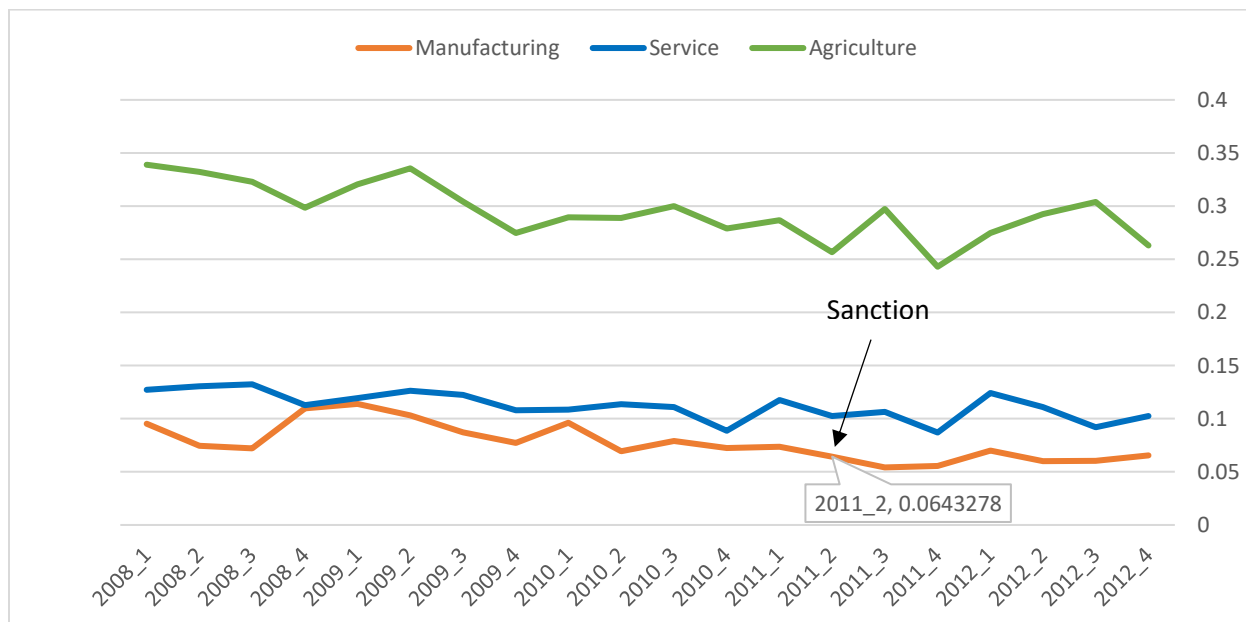


Figure 7, Seasonal LFP for married women by their husband's sector- 2008-2012

Source: Author's calculations from HEIS dataset

In figure 7, we see that from the first half of 2011, some months before manufacturing's GDP starts to decrease, LFP of women in manufacturing group reduced significantly while we do not see this reduction in service group. This reduction continued until the third quarter of 2011 when an increase happened in the next two quarters (2011_3 – 2012_1) followed by a decrease (2012_1 – 2012_2). In general, the quarterly data in manufacturing group shows a fluctuating pattern during sanctions with a total of near 7% reduction from the 2011_2 till 2012_2 (one year after sanctions hit). As we will see in the result section, the most negative effect is between women who are more educated and have university education while other women are not affected much. In service group, we will see even more fluctuations during sanctions with a total of near 8% increase from 2011_2 till 2012_2.

However, we should interpret these charts with caution for two reasons.

First, women whose husbands work in service sector are more likely to work in service sector in comparison to women whose husband work in manufacturing (table 1). So, any exogenous shock which affects one sector more than the other from the demand side causes these two charts to separate from each other. So, we can ignore some minor unparalleled trends in the figure before 2010 because in addition to the sanctions of 2011, Iran's economy experienced many other shocks from oil and gas price fluctuations, depression and booms, changes in policies and previous sanctions before 2010 which affected one sector (mostly manufacturing) more than the other. However, in figure 6 we can see that one year before sanctions (2009) the two sectors were moving together. In addition, as we will explain in the third assumption, we have considered other shocks during this time to Iran Economy in our estimates.

Second, in our data, there was no panel for at least five subsequent years before sanctions hit so, we should have consented to the statistics driven from cross sectional data each year. We cannot fully trust these charts because same people are not tracked every year for drawing these charts.

Due to these two limitations, we can ignore minor differences in the trends between manufacturing and service group and assume that the condition of parallel trend is satisfied.

Second Assumption: Random assignment

The second assumption is that conditional on observable characteristics, the allocation of people to control and treatment group is random. Table 1 shows some main characteristics of women working in manufacturing versus service group before sanctions hit in the second half of 2011. From this table we see that women in service group are a bit older, have less populated households, are more educated and have a higher LFP. In addition, their husband's income is quite higher than the other group (more than 15 million Rials annually). So, they are significantly richer. In our DID regression we control for these characteristics. So, these differences is not problematic.

<i>Husband's Sector:</i>	<i>Service</i>	<i>Manufacturing</i>	<i>Total</i>
<i>age</i>	38.58655 (10.09977)	36.62857 (9.761317)	37.8042 (10.01063)

<i>education</i>	2.835707 (1.485619)	2.396485 (1.423547)	2.660208 (1.476697)
<i>Household's size</i>	4.03 (0.0283813)	4.19 (0.0674584)	4.058011 (0.0262548)
<i>Husband's income (Rials)</i>	5.86E+07 (4.63E+07)	4.34E+07 (3.16E+07)	5.25E+07 (4.18E+07)
<i>Average cash transfer for the household (Rials)</i>	4,317,309 (32972.3)	3,047,590 (74524.49)	4,125,066 (32245.2)
<i>urban</i>	0.8335127 (0.372606)	0.731345 (0.4434057)	0.79269 (0.405436)
<i>LFP %</i>	10.46021 (30.61127)	8.51498 (27.91961)	9.683 (29.5766)
<i>Service sector if employed %</i>	79.89	45.01	67.94
<i>Manufacturing sector if employed %</i>	10.92	43.56	22.1
<i>Observations</i>	2,105	1,523	3,628

Table 1, Average and standard deviation of main variables

For treatment and control group (standard deviations in parenthesis)

The interesting aspect of this table is that those employed women whose husband work in service group, are more likely to work in service sector than in manufacturing (80% in comparison to 11%). This difference diminishes for an employed woman whose husband works in manufacturing group (45% work in service group in comparison to 44% in manufacturing). According to these explanations, we expect that sanctions, not only affects manufacturing (treatment) women through their husband's status in the labor market, but also engages them directly more than service group because employed women in this group are more probable to work in manufacturing in comparison to the women in service (control) group. So, it is worth mentioning that what we get in the final results, is the outcome of all these forces.

Third Assumption: Controlling for other shocks to the Economy

The last assumption is that sanction was the only shock that hit the economy in 2011. We should take this assumption with caution because in 2011 a cash transfer program was started in Iran. According to Salehi an Mostafavi (2017), "In December 2010, as part of an ambitious reform of bread and energy subsidies, Iran started a monthly cash transfer program to compensate households for the price increases (Guillaume et al. 2011; Salehi-Isfahani et al. 2015). In 2011, the first full year of the program, transfers amounted to 6.5% of the GDP and about 29% of the median household income". The government's initial purpose was to compensate those households who are in the bottom one-third of the income distribution but because identifying these households from the rest was practically costly and nearly impossible, it decided to pay everyone who has registered for the program. In addition, the nominal amount of transfer was the same for all

individuals. This was a positive unconditional income shock that according to the literature, it might have a negative effect on LFP. However, according to what Salehi and Mostafavi (2017) found, it did not have any significant effect on LFP in general while service sector increased their LFP perhaps because they used the transfer to expand their business. To account for this shock in our estimates, I included the average of all cash transfers that were received by all individuals in the household in my regressions (Each Individual was eligible for receiving the transfer). I also included household's head (man) income in addition to the cash transfer in my DID estimation. So, the amount of cash transfer is accounted relatively to the household's income.

In table 1, the average ratio of transfers for the household in 2011 is shown for manufacturing and service group. It is worth mentioning that the first installment of the transfer into the individual's account was the last quarter of 2011, some months after sanctions had started to show their effects on manufacturing. From table 1 we see that the amount of transfer is significantly greater for service group in comparison to manufacturing (about 1,300,000 Rials more for service group). However, as long as we control for the amount of cash transfer in our regressions, there will be no problem in making our control and comparison group.

According to the above explanations, our model of DID is according to equation 1.

$$LFP_{i,t} = \alpha + \beta treatment_i + \sigma sanction_t + \delta treatment_i * sanction_t + \theta X_{it} + e_{it}$$

Equation 1, Our DID model

In the above equation, $LFP_{i,t}$ shows LFP of woman i in time t and is a binary variable being one if a woman desires to participate in the labor market and zero otherwise. It is worth mentioning that according to our definition, someone who participates in the labor market is the one who is employed or is seeking for a job but has not found it yet.

$treatment_i$ is a dummy variable indicating whether an individual (woman) is in the treatment group (her husband worked in manufacturing before sanctions) or not. $sanction_t$ is a dummy variable indicating whether the observation is before the sanction or after the sanction.

X_{it} is the individual or household characteristics that is correlated with being in treatment or control group and affects labor force participation. It consists of husband's income and the amount of cash transfer that the family receives, education, age and age squared, rural-urban residence. We have also controlled for province effects. As we have added age to our controls, we did not include year fixed effect because high correlations of these two variables.

In this equation β measures the effect of being in treatment group before sanctions hit (the difference between control and treatment group before sanctions). σ is the effect of sanctions (the difference in time between before and after sanctions within each group) and δ is the parameter of interest which measures the difference of the difference between the control and the treatment group. According to table 2, by first differencing we eliminate the sanction effect which is σ and by second differencing we eliminate the group effect which is β and what remains is δ that is the parameter of interest.

	Control	Treatment	Difference groups
Sanction Year = 0 (2010 – First half of 2011)	α	$\alpha + \beta$	β
Sanction Year = 1 (second half of 2011 – 2012)	$\alpha + \sigma$	$\alpha + \sigma + \delta + \beta$	$\delta + \beta$
Difference in sanction year	σ	$\sigma + \delta$	δ

Table 2, the parameters of Difference- in – Difference in equation 1

Results

According to our DID model which is formulated in equation 1, I run a probit regression including the sampling weights as we described in the Data section. It is worth mentioning that standard errors were corrected to account for correlation within clusters according to the following:

Since our dataset is panel, there might be some correlation between observations especially for those working in the similar occupations (e.g shocks that appear in a particular occupation for example between teachers). So, our standard errors and t-statistics become unreliable if we do not consider this issue. To solve this problem, I used clustered standard errors with husband's occupations multiplied by the year of interview as clusters. I extracted sectors from occupations manually. ⁶So, just those occupations that include manufacturing and service sector are present in our analysis (except for those men who changed their sector after sanctions and might have changed to agriculture sector). According to our treatment and control group which are made based on the men's occupations in the period of 2010-2012, the interaction of men's occupations and year of interview seems the most plausible clusters.

The marginal effects of our regressions along with the standard errors and the significance of the coefficients is shown in table 3. In column 1, the effect is shown without including the controls, in column 2, the controls mentioned in table 1 is included in the regression. In column 3, logit regression is used instead of probit regression and in column 4, the OLS coefficients which is the same as its marginal effects is shown. Column 5 is the result of regression with keeping just two observations for each woman (one after sanctions and one before it). So, for those women who had been interviewed for three subsequent years of 2010, 2011 and 2012, the observation from 2011 was removed. It means that I removed 3,126 observations which reduced our sample to a total of 7,688 observations. I did it to balance my samples before and after the sanctions. However, the result did not change. ⁷

Our variable of interest is “treatment group* sanction year” which is δ in equation 1. It is the effect of sanctions for our treatment group which is the manufacturing sector. The coefficient is negative

⁶ For more information refer to Appendix

⁷ It is worth mentioning that marginal effects are reported at mean values of the covariates which is the default option in scientific studies.

which means that 2011 sanctions had negative effect on labor force participation of women in Iran. This coefficient is significant at 10% level. However, if we do not include other covariates, it will be significant at 1% (column 1) and if we use just two observations for each person it will be significant at 5% (column 5). The negative effect might seem surprising because we might have expected women to increase their LFP due to a bad shock to the family's income during the sanctions because those men who worked in manufacturing before sanctions had a higher chance of losing their jobs or reducing their wages due to the sanctions. However, this negative effect tells us that women were discouraged to participate in the labor market during sanctions perhaps as a result of negative signals from the labor market or as we saw earlier, those women whose husbands worked in manufacturing had a higher chance of working in manufacturing as well. So, many of them might have lost their jobs during the sanctions. This finding is align with what we saw in figure 7 about LFP of women during sanctions. However, in interviews many women prefer to provide themselves as not participating in the labor market rather than unemployed if they lost their jobs or could not find any job according to their reservation wage. So, separating between unemployed and not participating in the labor market is not practically possible.

The amount of marginal effect for our variable of interest is stable and robust to using logit, probit or OLS regression and even using different numbers of observations (column 5). So, we argue that for an average woman whose husband worked in manufacturing, sanctions reduced her LFP by about 2.5 percentage point (between 2.3-2.8 pp). This is not a small number because as we saw in table 1, LFP of women whose husbands worked in manufacturing was around 8.5% before sanctions. So, it is about 30% reduction in LFP which seems a noticeable amount!

Dependent variable: LFP Variables	(1) Probit	(2) Probit	(3) Logit	(4) OLS	(5) Probit
Treatment*	-0.0520***	-0.0237*	-0.0251*	-0.0231*	-0.0288*
Sanction year	(0.0163)	(0.0130)	(0.0135)	(0.0122)	(0.0158)
Sanction year	0.00235	-0.00270	-0.00548	-0.00768	0.0277
	(0.0133)	(0.0218)	(0.0206)	(0.0217)	(0.0249)
Treatment group	-0.0304**	0.000259	-0.00198	-0.00461	0.00968
	(0.0138)	(0.0103)	(0.0103)	(0.0105)	(0.0105)
		(0.00412)	(0.00476)	(0.00219)	(0.00452)
age2		-0.000248***	-0.000297***	-0.000174***	-0.00021***
		(5.44e-05)	(6.32e-05)	(2.69e-05)	(6.04e-05)
Cash transfer		4.41e-10	4.59e-10	4.39e-10	-4.10e-10
		(8.38e-10)	(8.11e-10)	(8.26e-10)	(9.45e-10)
Household's size		0.00471	0.00448	0.00613	0.00769
		(0.00400)	(0.00410)	(0.00393)	(0.00506)

Education

primary		0.00190 (0.0118)	-0.00221 (0.0123)	0.00728 (0.0109)	0.00597 (0.0153)
secondary		-0.00682 (0.0124)	-0.0126 (0.0129)	0.00487 (0.0108)	-0.00754 (0.0148)
Upper secondary		0.0431*** (0.0122)	0.0382*** (0.0124)	0.0449*** (0.0118)	0.0464*** (0.0145)
tertiary		0.232*** (0.0134)	0.213*** (0.0129)	0.408*** (0.0249)	0.235*** (0.0159)
Husband's income		-3.60e-10*** (7.99e-11)	-3.36e-10*** (8.20e-11)	-2.37e-10*** (8.33e-11)	-2.83e-10*** (8.76e-11)
urban		-0.0310*** (0.00811)	-0.0324*** (0.00865)	-0.0300*** (0.00841)	-0.0316*** (0.00864)
Observations	10,845	10,784	10,784	10,784	7,688
Province FE	YES	YES	YES	YES	YES
Pseudo R2	0.0070	0.2129	0.2156	0.27156	0.2132

Table 3, marginal effects for DID regression according to equation 1. For details refer to the text, Clustered Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

The effect of sanctions for control group is measured by “sanction year” in table 3 and is not significant in any of our regressions.

In addition, in table 3 we can see that “treatment group” which is the dummy variable for manufacturing is not significant after controlling for other covariates. However, according to lower LFP of women in manufacturing that we saw in table 1, treatment group is negative before including controls. This means that the difference that we saw in LFP of women in these two groups disappears when we control for women's characteristics such as education and age. In table 1, we see that women in service group are a bit more educated and older. According to table 3, education especially tertiary has the highest effect on LFP of women. So, it seems plausible that women in service group have higher LFP due to their education. In table 3, we can see that tertiary education increases a woman's chance to participate in the labor market by more than 20 percentage point, upper secondary increases it by about 4 pp and other levels seem to have no effect in comparison to illiterate which is the base group. Age has a positive effect on LFP and its second power has a negative effect according to our expectations. It means that LFP increase till a

certain point and decreases afterwards. Its turning point is around 43⁸ which is the age that a person reaches her highest performance in the life cycle. Cash transfer is not significant in our regressions. This means that the cash transfer program did not have any effect on LFP of women after controlling other variables although the amount of transfer was lower for manufacturing. This result is align with what Salehi and Mostafavi (2017) found about the cash transfer program of 2011. They also found that it did not have any effect on LFP. So, this exogenous shock to the economy that coincided sanctions is not our concern any more. The number of members in the household has also no effect on LFP (we included this variable to normalize the income related variables and also consider the family structure). Husband's income has a negative significant effect according to our expectations. Being in urban areas have a negative effect on LFP and this is according to our statistics since women's LFP is higher in rural areas in comparison to urban areas in Iran.

It is worth mentioning that apart from the variable of interest which is the effect of sanctions in treatment group, what we found and explained for other covariates is correlation and not causation.

DID Estimate by Education

In another regression, we separated women based on their education level and measured the treatment effect for each group. It is shown in table 4. According to this table we see that that the group which is mostly affected by sanctions is women with tertiary education. We will see a decrease of 11.8 pp in the LFP of treatment group in comparison to control group after sanctions according to table 4. This effect is significant at 5% level. In addition, women with university degree are the only group that "sanction year" has been significant and negative for them and the only group that treatment and control group are different from each other even after controlling other variables. So, there is about 13 pp reduction in LFP after sanctions for two groups and treatment group are 12.6 pp less employed in comparison to control group between educated women.

We also see a less but still significant decrease (3pp significant at 10% level) for women with secondary education. What we can understand from this result is that the negative effect from sanctions mostly engaged women of higher education. This result confirms the fact that the bad shock in the demand side of the labor market is responsible for this reduction in women's employment during 2010-2012.

VARIABLES	(1) Primary	(2) Secondary	(3) Upper Secondary	(4) Tertiary
Treatment group* sanction year	-0.0143 (0.0179)	-0.0349* (0.0203)	-0.00547 (0.0197)	-0.118** (0.0545)
Sanction year	0.0351	0.0302	-0.0255	-0.130*

⁸ $0.0213/(2*0.000248) = 42.9$

	(0.0248)	(0.0310)	(0.0316)	(0.0682)
Treatment group	0.0266 (0.0175)	0.0361 (0.0248)	0.0103 (0.0219)	-0.126** (0.0616)
age	0.00748 (0.00482)	0.0137* (0.00756)	0.0236*** (0.00724)	0.196*** (0.0222)
age2	-0.000114** (5.70e-05)	-0.000158 (9.63e-05)	-0.000258*** (9.21e-05)	-0.00239*** (0.000274)
Cash transfer	-2.02e-10 (8.52e-10)	7.83e-10 (1.19e-09)	1.36e-09 (1.32e-09)	2.90e-09 (3.28e-09)
Household size	0.0215*** (0.00447)	0.0153 (0.0105)	-0.00241 (0.00972)	-0.0532** (0.0221)
Husband's income	-6.40e-10*** (2.33e-10)	-7.05e-10*** (2.36e-10)	-3.43e-10** (1.56e-10)	-6.36e-10** (2.93e-10)
urban	-0.0148 (0.0105)	-0.0144 (0.0130)	-0.0401*** (0.0124)	-0.0818 (0.0626)
Observations	3,335	1,421	2,103	913
Province FE	YES	YES	YES	YES
Pseudo R2	0.1097	0.0962	0.0941	0.2457

Table 4, marginal effects for DID regression separated according to women's education,
Clustered Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

DID estimate by Urban and Rural areas

Due to the different culture and manner of works for women in rural and urban areas, we did two separate regressions for them. The result is shown in table 5. The surprising fact about this regression is that the effect of sanctions on treatment is not significant anymore for urban women while it is significant for rural women! So, we can argue that the result that we saw in table 3 were mostly driven by rural women. In addition, "sanction year" which is the effect of sanctions on LFP for service group has been significant and positive in rural areas. It means that sanctions increased LFP of rural women whose husbands worked in service sector by about 5 pp and it reduced LFP of women whose husbands worked in manufacturing sector by about 1.5 pp ($6.12 - 4.63 = 1.49$).

VARIABLES	(1) Urban	(2) Rural
Treatment *	-0.0112	-0.0612***

sanction year	(0.0157)	(0.0155)
Sanction year	-0.0161 (0.0249)	0.0463** (0.0233)
Treatment group	0.00226 (0.0133)	-0.00184 (0.0121)
Age	0.0236*** (0.00555)	0.0122*** (0.00355)
age2	-0.000271*** (7.31e-05)	-0.000155*** (4.48e-05)
subsidy	6.15e-10 (9.77e-10)	-3.23e-10 (9.33e-10)
Household's size	0.00369 (0.00519)	0.00555 (0.00551)
primary	0.0110 (0.0139)	-0.0217 (0.0175)
secondary	-0.00187 (0.0156)	-0.0312* (0.0182)
Upper secondary	0.0506*** (0.0146)	0.0136 (0.0184)
tertiary	0.237*** (0.0160)	0.213*** (0.0283)
Husband income	-3.17e-10*** (8.29e-11)	-5.46e-10** (2.36e-10)
Observations	6,232	4,467
Province FE	YES	YES

Table 5, marginal effects for DID regression separated according to women's living area: Urban or Rural, Clustered Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

One interpretation for this result is that because of the culture in Iran which accounts men responsible for providing the family necessary expenses, many may not prefer for their wives to work if they lose their jobs. We can confirm this interpretation by taking a look at the different responses in different income quintiles and for different groups of women.

DID estimate by Husband's income

In another regression, we divided women according to their husband's income quintile. It is shown in table 6. What we find here is that all groups have experienced a negative impact after sanctions. However, for just those families in the second quintile the effect was significant and the standard error was low. We can see that these women experienced a reduction in their LFP after sanctions. The interesting part about this table is that for the bottom of income distribution (first quintile) sanction years have had a positive effect on LFP for all women in comparison and treatment group (column 1). This means that what we expected from the positive effect of sanctions on LFP is just true for the neediest families and that these women increased their LFP by near 9 pp due to the shock of sanctions. We can think of it as these women decided to work because in addition to the bad income shock, all families faced a rise in their expenses due to the price inflation during sanctions. However, we might think that many of these women have started to work in service sector because the environment was more welcoming during sanctions. In addition,

We also see a negative effect from sanctions in the 4th quintile for both treatment and control group.

The result from these regressions confirms that except for the neediest families who have are at the bottom of the income distribution, sanctions have had at least negative effect on women's LFP.

VARIABLES	(1) Quintile1	(2) Quintile2	(3) Quintile3	(4) Quintile4	(5) Quintile5
Treatment group*	-0.00831	-0.0673***	-0.0118	-0.0160	-0.00920
Sanction year	(0.0288)	(0.0191)	(0.0237)	(0.0271)	(0.0289)
Sanction year	0.0893***	-0.00955	-0.0160	-0.0600***	0.00112
	(0.0266)	(0.0413)	(0.0362)	(0.0195)	(0.0234)
Treatment group	0.0389	-0.00111	-0.000762	-0.0681**	0.0267
	(0.0263)	(0.0176)	(0.0235)	(0.0278)	(0.0385)
age	0.0227***	0.0113	0.00587	0.0442***	0.0533***
	(0.00652)	(0.00929)	(0.00526)	(0.00968)	(0.0123)
age2	-0.000287***	-0.000132	-5.10e-05	-0.000538***	-0.000631***
	(8.20e-05)	(0.000119)	(6.40e-05)	(0.000120)	(0.000152)
subsidy	-2.56e-09**	1.85e-09	1.15e-09	2.02e-09**	0
	(1.02e-09)	(1.77e-09)	(1.35e-09)	(8.41e-10)	(1.16e-09)
Household size	0.0170***	0.00953	0.000199	-0.00460	-0.00348
	(0.00586)	(0.00915)	(0.00757)	(0.00725)	(0.00936)
primary	0.0103	-0.00181	0.0118	0.0185	-0.0326
	(0.0228)	(0.0189)	(0.0181)	(0.0254)	(0.0438)

secondary	-0.0465* (0.0276)	0.0265 (0.0221)	0.00820 (0.0274)	0.00145 (0.0325)	-0.0425 (0.0478)
Upper secondary	0.0336 (0.0275)	0.0198 (0.0263)	0.0522** (0.0264)	0.0469* (0.0274)	0.0566 (0.0418)
tertiary	0.268*** (0.0279)	0.146*** (0.0251)	0.237*** (0.0302)	0.217*** (0.0315)	0.240*** (0.0417)
Husband's income	-1.54e-09 (9.42e-10)	2.16e-10 (1.62e-09)	1.48e-09 (1.59e-09)	-8.77e-10 (1.20e-09)	-9.59e-11 (1.03e-10)
urban	-0.0427** (0.0179)	-0.0110 (0.0175)	-0.0383*** (0.0147)	-0.0170 (0.0169)	-0.0353 (0.0215)
Observations	2,535	1,924	2,012	1,913	1,935
Province FE	YES	YES	YES	YES	YES

Table 6, marginal effects for DID regression separated according to women's husbands' income, Clustered Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Conclusion

Labor force participation of women in Iran has remained quite low despite the increase in their education level and the rapid decrease in their number of children. This phenomena which has remained as a mystery does not belong to Iran and is common between countries in MENA region. According to this evidence, education and children seems to be no more a barrier towards women employment in Iran and we should look for the reason in other areas. However, as no controlled experiment has been implemented in Iran to analyze the causal effect of a fostering program on labor force participation of women and identify the barriers towards their employment, we decided to study the effect of an exogenous shock to the economy on FLFP⁹ in Iran. What we did in this study was to measure the effect of Iran sanctions imposed by the US and EU at July 2011 and started to show its effect on economy and especially the manufacturing sector from the second half of 2011. We found that manufacturing sector was affected by this sanctions and experienced a decrease in its GDP for about two years starting from the second half of 2011 while we did not see this decrease in service sector's GDP. According to this observation, excluding agriculture we divided our sample based on the head of families' (male) sector and made a control (service) and treatment (manufacturing) group to measure the effect of sanctions using the method of difference-in-difference. We used a panel of Household Expenditure and Income survey (HEIS) based on a total of 10,487 observations for the period of 2010-2012. Our first impression was that women will increase their labor participation due to the negative shock from sanctions to their family income. However, what we found here was contrary to the one's prediction. We found a negative effect on the treatment group which means women whose husbands worked in manufacturing reduced their labor supply by about 30% due to the sanctions. However, that this negative impact is mostly driven by women with tertiary education. Educated women in the treatment group have

⁹ Female Labor force participation

reduced their LFP by about 12 pp during sanctions while the effect was not significant for other groups with just a small impact of 3 pp for women who have secondary education. We also found that the negative effect of sanctions is only significant in rural areas. Rural women whose husbands worked in manufacturing decreased their LFP by about 1.5 pp after sanctions while in service group women even increased their participation. Our interpretation is that this negative response may be from the demand side and the bad signals from the labor market. It seems that during sanctions, the economic weather of labor market was not good and in addition to being unemployed, many women were discouraged to participate in the labor market. It is worth mentioning that women may have started to do some jobs to compensate for the bad income shock like family unpaid jobs but our data just measures the formal jobs in the labor market. Even if this may be true, what we find here is that apart from cultural issues, the labor market environment plays an important role in encouraging (discouraging) women for participation. It may be true that labor market is not welcoming to women in Iran and many employers prefer to hire a man instead of a women with similar characteristics. What we find here is that the negative signals from the labor market especially during sanctions had affected women's decision to participate in the labor market.

It is worth mentioning that our regressions was based on some assumptions. The first assumption was that after controlling the individual characteristics such as education, age and the family income, the allocation of women to the control and treatment group is random. Our second assumption was that women's LFP in control and treatment group was moving in parallel before sanctions. We confirmed this assumption by looking at the trends of female participation in each sector from one decade before sanctions. However, our data does not permit us to show time trends in each sector based on panel samples and we should consent to the cross sectional statistics constructed in each year separately. The last assumption was that sanctions was the only shock that affected families and labor force during 2010-2012. The other shock that happened during this time was the cash transfer program that we included in our regression and was not significant in our estimates which was align with what Salehi and Mosatafavi (2017) found about the insignificant effect on this program on LFP. So, this issue is not any of our concern. However, one caveat of our data was that it was just panel for three years and it did not permit us to follow women longer before or after sanctions.

Iranian women's human capital can be a bonus to the economy. What we found in this study is that for encouraging women to participate in the labor market, programs that focus on the demand side of the labor market and provide a more welcoming environment for women can be quite as important as those focusing on the culture and bargaining power of women within the family.

Appendix

In the following, the definitions of some variables are written based on the definitions provided by SCI (Statistical Center of Iran). These are the main variables used in the regressions and may have some ambiguity for the reader.

Activity status and LFP

According to the HEIS dataset's questionnaire, activity is grouped into six different categories including employed, unemployed, income earner without job, student, house keeper and others.

Employed

According to the definition provided by SCI which is based on the definition of work, an employed person is someone who has worked for at least one hour (even in another job other than her main job) in the previous week to the time of interview. Working means those economical activities done for earning money and its purpose is producing service or commodity. In addition, these people are also counted as employed:

Those who have job but not worked in the previous week

Those who work in agriculture sector but not worked in the previous week due to the season.

Those who have not gone to work because their job is periodic.

Those who are funded by their sponsors from their job to study and have not worked during the past week.

Those who have not gone to work due to leave, vacation, illness and etc.

Those who have not gone to work due to a change, repairmen or lack of customer in their company and those who have been suspended from working but their contract have not been cancelled.

Unemployed

Those who have not worked for at least one hour in the week before the interview and do not have any job are counted as unemployed if they satisfy these two conditions:

First, in the previous thirty days they have done something like searching for vacancies for finding job.

Second, they are ready to work for a period of 15 days including seven days before and seven days after the interview.

In addition these people are also counted as unemployed:

Those who are expected to start a job but not yet started working.

Those who have left or fired from their previous job but expect to return.

LFP

LFP stands for labor force participation. In our model it is our dependent binary variable indicating whether a person participates in the labor market or not. If a person is employed or unemployed, it means that she (he) has the desire for working. So, she (he) is counted as participating in the labor market and her (his) LFP becomes one. Those women (men) who are housekeepers or student are counted as not participating in the labor market and their LFP becomes zero.

Education

Education in our data has a separate code for each year of education from preprimary till doctorate. We divided the level of education into five different groups (levels) including illiterate, primary, secondary, upper secondary and tertiary with illiterate as base group. In our summary statistics in table 2, level zero to five indicates the mentioned group from illiterate to tertiary. So, when the average is 2.39 among a group, it means that on average those group have studied 0.39 of secondary or about 6.2 years (5 years primary + 0.39*3 years secondary)

Job occupations

If a person is employed (or maybe unemployed but perhaps suspended), his (her) occupation along with his (her) income is provided in the HEIS dataset. There are two separate tables one for the information regarding the person's income from salary receiving jobs divided into three different sectors of public, cooperative or private. The other for the information regarding those jobs which are self-employed, family employed or employer and no salary is defined for them. In our model, if a person had more than one job (e.g one in public and the other as working by himself), his occupation for the salary earning job is accounted. According to SCI definition, there are ten main occupations including managers, professionals, technicians and associate professionals, clerical support workers, service and sales workers, skilled agriculture, forestry and fishery workers, Craft and Related Trades Workers, Plant and Machine Operators and Assemblers, Elementary Occupations, Armed Forces Occupations. Each of these groups usually needs different levels of skills and contains four levels of subgroups.

In this study I mapped occupations to each sector manually. For example teachers lied in service sector and engineers in industry sector. Hence, some mistakes might have happened due to the mismatch (some occupations were not clear to which sector they exactly belong).

Income

In the SCI questionnaire, income is questioned along with the corresponding occupation for each person who is working (or having income without working). We used the information regarding the income in the last 12 months (one year) which was in Iranian currency (Rial).