

Female labor Impact on Industrial Value Added in Iran Autoregressive Distributed Lag Modeling Approach

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Abstract

This paper explore the women's labor force participation in industrial sector in Iran as a whole. Then will investigate the women's labor in industrial sector as a factor which affects on value added of industries which is directly related to effectiveness of women in industrial on GDP. Also this study attempts to find causes of deficient in woman's labor market in industrial sector.

KEYWORDS: value added, female labor force, Iran

Introduction

A discussion about sustainable development is not complete without a conversation on gender equality. Since women account for half of any country's talent base, empowering their participation in the workforce greatly enhances productivity and fosters economic growth. In fact, World Bank studies show that development strategies focusing on gender equality see stronger economic growth than gender-neutral strategies. The labor force has a significant effect on economic growth because of their contribution to the value added process. This concept brings up the value of female labor force as a source of factor accumulation and human capital. In present study researcher would try to explore the women labor in industrial sector as a factor which affects on value added of industries which is directly related to effectiveness of women in industrial's labor on GDP.

Structure of female labor in industrial sector of Iran

Employed women are increasingly working in the private sector and taking on managerial and entrepreneurial roles. Young women in both rural and urban areas, attend school more often than joining the carpet and cottage industry workforce, which was the main source of increase in female employment in the 1960s and 1970s.

Interestingly, the current pattern of economic development in Iran is also shifting the sources of growth towards industries and services, especially professional services, which better match the growing education and job preferences of the new generations of women. These shifts are likely to have significant consequences for Iran's economic and political developments in the coming decades.

The government's long-term objectives since the revolution have been economic independence, full employment, and a comfortable standard of living for citizens, but at the end of the 20th century, the country's economy faced many obstacles. Iran's population more than doubled between 1980 and 2000 and grew increasingly younger. Women in Iran have garnered extraordinary achievements in the last two and a half

decades. Fertility rate has fallen with a very high rate compare to the other countries in the world. Meanwhile, education levels have consistently increased, to the extent that currently, women who are in their late 20s are more educated than their male counterparts. But still, female labor force participation (FLFP) rates remain at the low levels of two decades ago (FLFP puzzle). Here will study the patterns of women's economic activity in industrial sector of Iran in last two decades in light of the country's census. As we show in this part, the mode of women's employment in industry in Iran, which before the Revolution was low-pay or unpaid family, has been shifting towards more professional service occupations for educated women aged 25-50 years.

To find a picture of whole trends of working women in industrial sector in terms of type of sector (production and non production) and type of industries which the largest female labor have been absorbed by them Table (1) & Table (2) are inserted. The women`s job distribution in industrial sector is as follow:

- 1- The trend of working women in terms of the number in duration of research 1990-2007 has been increasing. The number of women in industrial sector has been increased around 70% in duration of study.
- 2- The study of female labor in industrial sector reveals that the most of female workers are occupied by Manufacture of Food and Textile industries which both of this are low technology industries. Unskilled or uneducated women workers easily absorb by low technology industries.
- 3- In duration of study the biggest share of working women has been dedicated to production sector of industrial sector.
- 4- Although the share of working women in production sector in every single year is bigger than nonproduction sector but there is a Changing trend of female worker from production sector to non-production sector in slow rate.
- 5- The study of female labor in industrial sector reveals that the most of female workers are occupied by low technology industries. Unskilled or uneducated women workers easily absorb by low technology industries
- 6- The trend of working women in high technology industries has been increasing but in a very slow rate.
- 7- Although the share of working women in production sector in every single year is bigger than nonproduction sector but there is a Changing trend of female worker from production sector to non-production sector in slow rate.
- 8- The most of women who works in production sector are occupied in low technology industries.
- 9- Although still the biggest share of female labor in industrial sector belongs to unskilled workers but the trend of unskilled worker has been decreasing.

- 10- The industries with high technology have bigger share of female labor participation compare to medium technology.

Data and Methodology

The Autoregressive Distributed Lag Modeling Approach has been applied to find the female labors effect on value added of industrial sector in Iran. Therefore Cobb–Douglas production function has assumed and time series data on number of female workers and changing in value added in industrial sector examined through analytical methods by Micro fit software.

Model

Variable of Model:

- 1) V: Value Added by industrial sector.
- 2) K: Capital in industrial sector.
- 3) L_F : The Number of Female Workers in Industries.
- 4) L_M : The Number of Male Workers in Industries

The model provided as follow:

$$Y = f(K, L)$$

Where Y is the Value added; K is the capital; and L is the number of employee which divided two part Female labor (L_F) and Male labor (L_M). This study used Cobb–Douglas function as follow:

$$V = f(K, L_M, L_F)$$

$$V = AL^{\alpha}K^{\beta}$$

$$\ln V = \ln A + \alpha M \ln L + \alpha F \ln L + \alpha k \ln K$$

$$(\alpha M, \alpha F, \alpha k) > 0$$

The common practice for determination of variable in the model is to use ARDL method.

if $\alpha M > 0$, So; the effect of Male labor on value added is positive

if $\alpha F > 0$, So; the effect of Female labor on value added is positive

if $\alpha K > 0$, So; the effect of Capital on value added is positive.

Parametric Test:

With regard to estimated of model, increase in female labor force in industrial sector in Iran has a positive effect on value added of industrial sector. There are four variable V, L_F , L_M , K which V is dependent variable and researcher estimates effects of other

variable on V. The coefficient of determination for a regression, R^2 , is the proportion of the total of the dependent variable V that is explained by the regression:

$$0 \leq R^2 \leq 1$$

The higher R^2 , the lower is the sum of squared errors relative to the total sum of squares. In the extreme case when all residuals are zero, $R^2 = 1$, and all of the total sum of squares is explained by the regression. Thus R^2 is a measure of the explanatory power of the regression, in particular, a measure of how well the model, as estimated, fits the available data.

$$0 \leq 0.98 \leq 1$$

$R^2=0.98$ which means 98 percent of the variance of the dependent variable is explained by the regression with 2 percent left unexplained.

The **Durbin–Watson** is a test statistic used to detect the presence of autocorrelation which is always between 0 and 4.

$$0 \leq DW \leq 4$$

A value of $DW= 2$ means that there is no autocorrelation in the analyses. Values approaching $DW= 0$ indicates positive autocorrelation and values toward $DW=4$ indicates negative autocorrelation. Autocorrelation in the residuals from a statistical regression analysis, is

$$DW = 2.11$$

This indicates there is no autocorrelation in the residuals from the statistical regression analysis.

Analysis of the findings:

With regard to estimated ARDL Model in Microfit , increase of Female labor force in industrial sector has a positive effect on Economic Value-added. V is dependent variable which researcher estimated effects of other variable on V. Coefficient of L_F is 0.35 which means that 100 percent increase in Female labor force in industrial sector leads 35% increase in Economic Value Added during 1993 to 2007 and Coefficient of L_M in the same period of time is 0.51 which means that 100 percent increase in Male labor force in industrial sector leads 51% increase in Economic Value Added.

Another independent variable is Capital which its coefficient is 0.11 which represents, the 100% increase in capital in industrial sector leads to 11% increase in value added.

Then the effect of capital on value added in industrial sector at the duration of 1993 to 2007 is less than labor. It means the industrial sector in Iran is labor intensive and the productivity of labor is more than capital.

Conclusion

Although there is a growing pattern of female labor number in industrial sector in Iran during last decades but still the share of female participation in industrial sector is far behind the male labor. The observation of every single year of study's duration shows

the largest share of women are occupied in production sector of industries but the trend of working women in this duration indicates the changing trend from production sector to non production sector .

Regarding to the result of model the total efficiency of male labor is more than women labor in industrial sector. It can be related to the type of jobs and the number of men who are working in industrial sector. Also the male labor compare to female labor has much more bigger share as skilled worker. Also capital is not effective as much as labor on value added of industrial sector which indicates the industrial sector in Iran is labor intensive.

The relationship between value added and GDP is obvious. Then utilization of working women in industrial sector has positive effect on GDP.

For increasing the female labor participation in industrial sector attention to these points are useful:

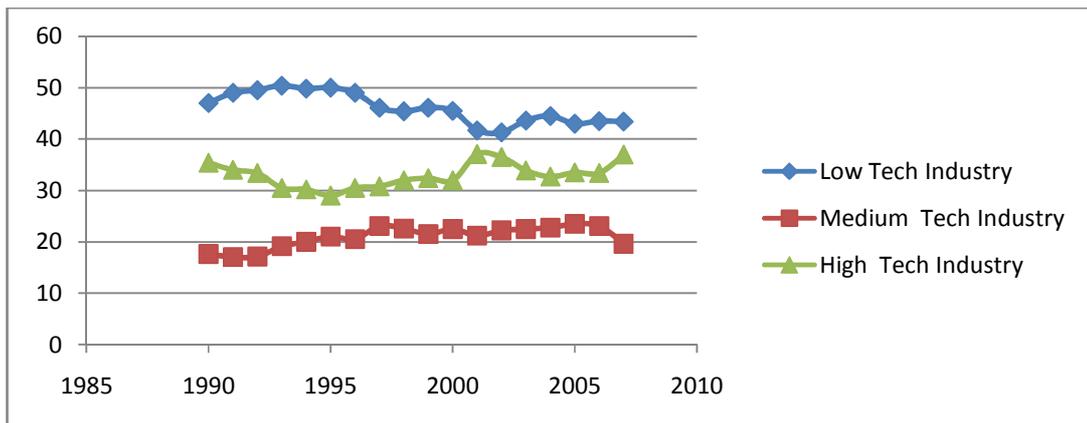
- 1) Decrease in total rate of unemployment would effect on female labor participation in all section as well as industrial sector.
- 2) Distribution equal facilities and opportunity for female and male labor in industrial sector will courage the female labor to work in industrial sector.
- 3)The elimination gender discrimination by roles whereas choosing workers have to be according to education and skill qualifications.
- 4) Government supports affects on boosting tendency of industries for absorbing educated or skilled female worker.

Female Labor in Industrial Sector by Technology Categorize (%) 1990-2007

Year	Female Labor in Low Tech Industry out of Total Female Labor %	Female Labor in Medium Tech Industry out of Total Female Labor %	Female Labor in High Tech Industry out of Total Female Labor %
1990	47	17.6	35.4
1991	49	17	34
1992	49.5	17.1	33.4
1993	50.4	19.1	30.5
1994	49.8	20	30.2
1995	50	21	29
1996	49	20.5	30.5
1997	46.1	23.1	30.8
1998	45.4	22.6	32
1999	46.1	21.5	32.4
2000	45.5	22.5	32
2001	41.7	21.2	37.1
2002	41.3	22.2	36.5
2003	43.6	22.5	33.9
2004	44.5	22.8	32.7
2005	43	23.5	33.5
2006	43.5	23.1	33.4
2007	43.4	19.6	37

Source: Researcher's Calculations by Excel software based on statistics Center of Iran data.

Distribution of female Labor in Industrial Sector by Technology Categorize (1990-2007)

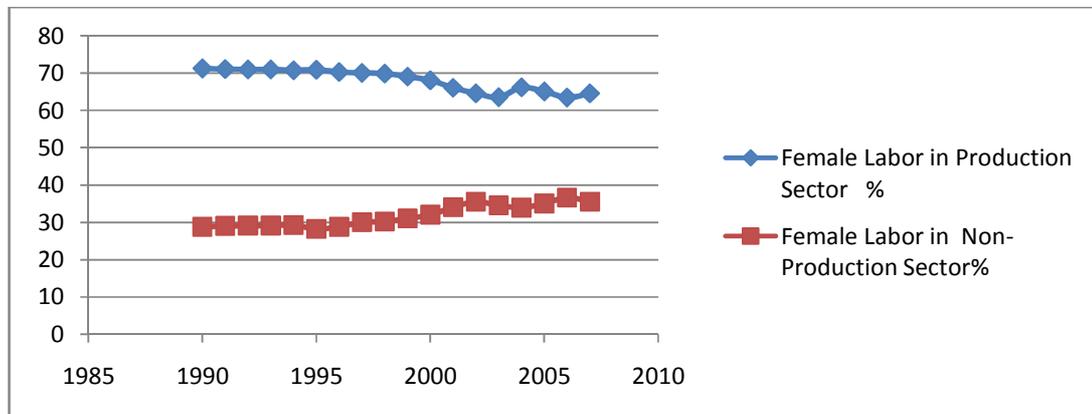


Female Labor share in Production & Non-Production Sector (1990-2007)

Year	Total number of Female labor in Industrial Sector	Female Labor in Production Sector %	Female Labor in Non-Production Sector %
1990	55,268	71.2	28.8
1991	34,490	71	29
1992	36,015	70.8	29.2
1993	34,590	70.9	29.1
1994	54,743	70.7	29.3
1995	54,050	70.8	28.2
1996	55,378	70.2	28.8
1997	57,373	70	30
1998	56,342	69.8	30.2
1999	58,581	69	31
2000	61,381	68	32
2001	68,215	66	34
2002	76,700	64.5	35.5
2003	88,756	63.5	34.5
2004	94,701	66.1	33.9
2005	94,901	65	35
2006	99,680	63.4	36.6
2007	110,602	64.5	35.5

Source: Researcher's Calculations by Excel software based on statistics Center of Iran data.

Female Labor share in Production & Non-Production sector (1990-2007)



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