How the education affects female labor force? Empirical evidence from Turkey

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Abstract

This article investigates the major issues of females in Turkey and the characteristics required of school improvement with many educational reforms they have faced from the perspectives of women. It is a brief overview of the field of human capital theory. This is followed by explaining datas used to construct Time-series with variables provided. Results indicated that increasing the education of women can be considered to related to decreasing fertility and mortality rates while has a positive effect on female employment and their literacy. Additionally, educated women were said to increase their problem solving, life skills, flexibility and openmindedness.

Keywords: Female labor force; education; literacy; human capital.

1. Introduction

Social scientists have long been interested in the problem of segregation in the labor market by gender, that is, the tendency of men and women in the employment population to be differently distributed across occupations. Many developing countries bring out gender gap in education, employment, and health which are the indicators of human capital. In addition, education is an asset. Once gained, it cannot be sold. This was based on the theory that education is an investment in human capital and as its amount increases, individual’s skills and competencies also increase. There are overwhelming distinctions in education between the sexes in some developing countries. Furthermore, employment opportunities and earnings differ greater by gender in most developing nations (World Bank, 2001). There are numbers of studies in the literature which put emphasize on the impact of gender inequality in education that affects females. Female education has a great impact on the well-being of the families and societies. It is an important issue for number of reasons. Firstly, education of females increases females’ productivity by rising output in economic activities. Secondly, it increases children’s education profile which results in better educated people. The first step in education is literacy which gives a fundamental skill to empower women to take control of their own lives. With an increasing literacy rate, they will have more access for getting a better position in the labor market. This will then enhance women’s position in the society.

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In Turkey, the level of schooling is still very low for women although progress in enrollment has been made over the past decades by UNESCO; the share of female enrollment is still low. The level of education for men is also not very high, but compared to women, their situation is better. This study examines how the determinants of adult female literacy rate, the ratio of graduated women from primary, secondary, tertiary and higher education which are excepted as the indicators of education, GDP per capita growth rate, fertility rate and female unemployment rate affect female labor force in Turkey. It is also expected to find a significant relationship between female labor force and human development goal such as school enrollment and literacy rates, total fertility rate.

2. Literature survey

Human capital theory regards participation in education as an investment in human capital because of the expected returns later in life (Becker, 1964). So it can be said that the greater the amount of educational attainment, the more skilled, well-knowledge and productive people in the society will be. Therefore, the level of education has a strong impact on social outcomes like mortality, fertility, education of children, income distribution and life expectancy at birth. Also, Schultz gives some clues about the moral issue of treating education as an investment in human and suggests treating its consequences as a form of capital. He also takes expenditure on education as an investment rather than consumption to the future. On the other hand, Denison looked at the issue of schooling and its impact on long-term economic growth. The dominant hypothesis of him is that education affects positively economic growth since it increases the level of skills possessed by the labor force and its marginal productivity.

Hosgör and Smits derived hypotheses about effects of socio-economic, cultural, demographic and geographic factors on educational participation. They looked at the effect of family background on educational participation by using bivariate cross tabulations and multivariate logistic regression analyses. Educational participation was measured with variables indicating whether the children ever entered primary or secondary education. According to these findings, they conclude that educational participation of children, and especially of girls, is found to be still a major problem in Turkey, with non-enrollment being especially high in the countryside and the eastern part of the country. Parental educations, number of siblings, household income, occupation of the father, traditionality of the mother are major factors affecting participation.

In addition to these, gender inequality in education may have contrary impacts on economic growth. It may decrease some human capital determinants such as total fertility and unemployment of female. Barro uses a panel of countries over the period from 1965 to 1995 to estimate the relationship between economic growth and inequality, and finds that increased inequality tends to retard growth in poor countries while make boost in rich countries. According to Lagerlöf promoting female education is known to reduce fertility and child mortality levels, and promote the education of the next generation.

According to Knowles, gender inequality reduces the average amount of human capital in a society and thus harms economic performance. He also estimates the impact of gender inequality in education on levels of GDP per capita in an explicit Solow framework, treating male and female education as separate factors of production. At the end, findings show that gender inequality in education significantly reduces the level of GDP per capita.

According to Tansel, Time Series is another way to examine aspects of female labor force participation rates in Turkey. He looked at econometric estimates of the determinants of female labor force participation rates across the 67 provinces for the years 1980, 1985 and 1990. He tried to explain the relationship between female labor force participation and the level of economic development, and specifically concentrate on the U-shaped hypothesis of female labor force participation. As a result of these researches, rate of economic growth and level of female education were both found to have a strong positive effect on female labor force participation.

3. Movements in education

The formal education system consists of three levels of schooling in Turkey primary, secondary and tertiary. Primary school provides five years of elementary education while junior secondary and senior secondary school (except technical high schools) takes three years. In August 1997, compulsory education is extended from five to eight years covering junior secondary school. Primary education covers the children aged 6-14 with the new compulsory education system. Before 1997, children were enrolled in primary education at age 6 to 11. From 12 to 14, they were in junior secondary school while between 15 and 17 they went to senior secondary school.

There have been considerable improvements in the rate of graduated women working in the labor force since 1980. Considering all the educational levels examined in past 24 years, it is highly significant that the ratio of higher education graduated women working in the labor force has increased enormously from 7.2 percent to 26.49 percent with showing a decreasing trend in primary, secondary and senior secondary education. The rate of primary school graduated women working in the labor force was 0.88 percent in 1980 while it has decreased to 0.36 percent in
The rate of junior secondary school graduated women working in the labor force was 8.08 percent in 1980 while it has shown an enormous decrease with 3.30 percent in 2004. The rate of senior secondary school graduated women working in the labor force was 18.84 percent in 1980, but it has decreased to 9.08 percent in 2004 (Table 1).

Literacy rates for female population have also increased in the last 24 years. It was 24 percent in 1970 while it has increased to 78.5 percent in 2004. It has shown the same trend in higher education. A higher percentage of female (43.1) population choose to continue their education in universities compared to last 24 years. On the other hand, adult female illiteracy rate declined from 61 percent in 1970 to 21.38 percent in 2004. Nevertheless, by the eight years primary education, youth female illiteracy rate is expected to decrease below 2 percent while it is 5.14 percent now. In addition to these, fertility rate which is taken as a human capital measurement has decreased from 5 percent in 1970 to 2.37 percent in 2004. In most frequent cases, male enrollment ratios are higher than female. Because most families cannot afford to educate girls and they are doing domestic work. Because girls are often needed in the home and they are unpaid family workers in agriculture. Of course cultural, religious and social factors have high impacts on low level of girls’ school enrollments and participation rates in the labor force. As figure 2 and 3 shows the gap between female and male are diminishing in the last two decade. According to the figures, the fastest growing education in twenty years is tertiary education for both men and women according to the data set. But especially women are relative to men showing an increasing trend over the years. That means the progresses that have been done by UNESCO for women are successful and it has increased the lath of education.

Sectoral employment patterns for men and women also differ between 1970 and 2001. Nearly 71 percent of women in labor force is employed in agriculture, 9.2 percent in industry and 17.3 percent in services, while men are more smoothly distributed across sectors 33.2 percent in agriculture, 24.2 percent in industry and 40.7 percent in services. Similarly, there is a marked difference in gender employment status: 68.8 percent of women in labor force in 2000 were unpaid family workers, 25.2 percent were wage earners and 6 percent were self employed compared to 13.8 percent of men who were unpaid, 58 percent were wage earners and 28.2 percent were self-employed.

4. Data

Number of regressors is included in this study that affect female labor force. The model is re-estimated by using Time-Series. The purpose of this econometric estimation is to focus on the measure of gender inequality in education and its derivatives which are accepted as human capital. Female labor force participation rate is the dependent variable while literacy rate, school enrollments, fertility rate, GDP per capita growth rate, female unemployment rate and dummy variables used to prohibit the particular effects are explanatory variables. 1980 – 2004 period data were used to construct Time-Series with the help of variables provided in Table 1. The following equations are estimated:

\[
\Delta(FLF/LF) = \alpha + \beta_1 GDPGR + \beta_2 \Delta(PE) + \beta_3 \Delta(SE) + \beta_4 \Delta(TE) + \beta_5 \Delta(H) + \beta_6 \Delta(LITR) + \beta_7 \Delta(FERR) + \beta_8 \Delta(FUR) + \delta_1 D_1 + \delta_2 D_2 + \delta_3 D_3 \\
\text{(eq-1)}
\]

\[
\Delta(FLF/LF) = \alpha + \beta_1 \Delta(PE) + \beta_2 \Delta(SE) + \beta_3 \Delta(TE) + \beta_4 \Delta(H) + \beta_5 \Delta(LITR)
\text{(eq-2)}
\]

\[
\Delta(FLF/LF) = \alpha + \beta_1 \Delta(LITR)
\text{(eq-3)}
\]

\[
\Delta(FLF/LF) = \alpha + \beta_1 \Delta(FUNR)
\text{(eq-4)}
\]

\[
\Delta(FLF/LF) = \alpha + \beta_1 \Delta(FERR)
\text{(eq-5)}
\]

\[
\Delta(FLF/LF) = \alpha + \beta_1 GDPGR + \delta_1 D_1 + \delta_2 D_2 + \delta_3 D_3
\text{(eq-6)}
\]

FLF/LF: Change in the rate of female in working population, 1980 – 2004
GDPGR: GDP/capita growth rate
PE: Change in the rate of graduated females from primary education
SE: Change in the rate of graduated females from secondary education
TE: Change in the rate of graduated females from tertiary education
HE: Change in the rate of graduated females from higher education
LITR: Change in adult female literacy rate as percentage
FERR: Change in total fertility rate (percentage of children)
FUNR: Change in female unemployment rate
D1: The war in 1991
D2: Financial crises that were occurred in 1994 and 2001
D3: The Marmara earthquake in 1999

All variables’ first differences are put into the regression. The reason of this is that there are some variables which are non-stationary. That means, they cannot influence their properties and have stochastic trends which are determined by changes that can be easily explained by the model. Therefore, to prohibit these differences between stationary and non-stationary variables, all variables’ first differences are taken. Otherwise, this model will tend to show linear relationship but it will not be real.

The first equation measures the impact of education, gdp per capita growth and human development indicators on female labor force. However, these regressors can also be taken into regression separately to measure how each of them affect female labor force one by one. In equation two, only education variables are taken as independent variables, while in equation three, the relationship between literacy and female labor force is tested. In equation four, the effect of female unemployment rate on female labor force is explored while in equation five, the relationship between fertility rate and female labor force is examined. In the last equation, it is analysed if economic growth will lead to an increase in female labor force by using the impressions of dummy variables.

Table 1: Estimation Results of Regression Analysis

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Constant</th>
<th>GdpGR</th>
<th>PE</th>
<th>SE</th>
<th>TE</th>
<th>HE</th>
<th>LITR</th>
<th>FERR</th>
<th>UNFL</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>R²</th>
<th>Adj. R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>FLFPR</td>
<td>0.09</td>
<td>0.02</td>
<td>-</td>
<td>-</td>
<td>0.012</td>
<td>0.03</td>
<td>0.004</td>
<td>0.021</td>
<td>0.014</td>
<td>3.14</td>
<td>-0.02</td>
<td>0.11</td>
<td>0.03</td>
<td>-0.04</td>
</tr>
<tr>
<td></td>
<td>0.858</td>
<td>(2.17)</td>
<td>(-0.48)</td>
<td>(-0.95)</td>
<td>(1.34)</td>
<td>(1.99)</td>
<td>(0.89)</td>
<td>(3.41)</td>
<td>(-1.98)</td>
<td>(0.52)</td>
<td>(0.16)</td>
<td>(-0.91)</td>
<td>0.767</td>
<td></td>
</tr>
<tr>
<td>FLFPR</td>
<td>0.154</td>
<td></td>
<td>1.006</td>
<td>0.03</td>
<td>0.055</td>
<td>0.144</td>
<td>0.07</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.984</td>
<td></td>
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<tr>
<td></td>
<td>2.827</td>
<td>(-0.82)</td>
<td>(-0.15)</td>
<td>(1.98)</td>
<td>(2.12)</td>
<td>(2.09)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.912</td>
<td></td>
<td></td>
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<tr>
<td>FLFPR</td>
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<td></td>
<td></td>
<td>0.06</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.417</td>
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<tr>
<td></td>
<td>(35.12)</td>
<td>(4.06)</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.392</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FLFPR</td>
<td>36.84</td>
<td></td>
<td></td>
<td></td>
<td>-0.06</td>
<td>(-1.39)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.084</td>
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<tr>
<td></td>
<td>(0.58)</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>0.041</td>
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<tr>
<td>FLFPR</td>
<td>40.94</td>
<td></td>
<td></td>
<td>-1.55</td>
<td>(-4.72)</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>0.492</td>
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<tr>
<td></td>
<td>(39.02)</td>
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<td></td>
<td></td>
<td></td>
<td>0.470</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FLFPR</td>
<td>36.05</td>
<td>0.06</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.129</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>(117.22)</td>
<td>(0.88)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.05</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-0.73</td>
<td>1.14</td>
<td>1.34</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.05</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1 shows the basic regression equations (1) through (6) as described above. Most regressions have shown the expected signs, a high explanatory power and perform well on specification tests. Equation (1) confirms a number of known findings regarding the importance of initial levels of human capital (PE, SE, TE, and HE) as well as growth in human capital (GDPGR).

There is negative impact of unemployment and literacy while there is a positive impact of fertility and higher education (based on t-values). All of the dummy variables for the various events are insignificant. More interesting thing in this equation (1) is the finding that both the ratio of graduation from tertiary school (TE) as well as higher education (HE) has a significant positive impact on female labor force participation rate while primary (PE) and secondary education (SE) has the opposite effect. Indeed, female labor force improvement is positively associated with education. The coefficients of the graduated from the different levels of educations are on the expected way. Only an increase both in the primary and secondary education will decrease the female labor force as expected. On the other hand, only t-value for graduated females from higher education is significant (1.99). That means, when the education level of females increase, they start to get more share in the labor force. Increasing school enrollment has a positive impact on female labor force participation. By the way, GDP growth rate has a high explanatory power on female labor force as it is expected. A 1% increase in the ratio of GDP growth rate will raise the female in the labor force by about 2%. 
Empirically, female labor force also appears to be related to the health. When fertility rate is included in the regressions, the direct effects of fertility rate on female labor force become bigger although it is expected to be negative and the coefficients on fertility rate is in the wrong direction, but significant. Meanwhile, the coefficient of literacy rate on female labor force has a positive impact (0.9%) and in the right direction, but it is insignificant. It means that on you increase the literacy of women, is not enough to raise their position in the labor force. Because education of women also has to be increased to get a better job or to be in the labor force and to compete with men. However, the relationship between unemployment and female labor force is negative as expected. When there is 1% increase in the unemployment rate, female labor force will decrease by 2% and it is also significant.

Equation 2 shows the reduced form estimate of the determinants of education and finds that higher education are related to higher female labor force growth and higher human capital. Comparisons between equations (1) and (2) indicate that the effects of education are indeed sizable as the significance of all coefficients. In addition, reducing gender inequality in labor force will lead to higher education levels. In particular, female labor force appears to be positively affected by education. Due to this, education is one of the most important variables for women for raising their position in the labor force. According to the regression, all the signs of the coefficients of the equation are on the expected direction and t-values of them are statistically significant with a very high R\(^2\) (98%) except primary and secondary education. That means, expenditure on human capital is very important and it will return to women as a better job, better payment and better position in prospect.

Equation 3 also shows that literacy rate has the expected impact so that it can be said that increase in literacy rate will increase female labor force participation rate. But it cannot be concluded that it has an overwhelming effect on female labor force. Because putting only literacy rate into regression is meaningless and express nothing although it has a significant impression. In equation 4, only unemployment is added to determine its effect on female labor force. Unemployed female share in the sector has a negative and insignificant impact on female labor force. This result may be expressed with some caution such as the greater access to unemployment for females, the higher the decrease in the female labor force participation rate. Equation 5 estimates a model to check the relationship between fertility rate and female labor force among 1980 and 2004. Every 1% raise in the level of female education reduces the total fertility rate by 1.55%. It shows that increase in education makes difference to the fertility rate and birth rates show a decreasing trend, while the ratio of female labor force participation is highly significant. This clearly demonstrates that increase in the level of education makes reductions in fertility rate and increase women’s share in the labor market.

In equation 6, how GDP growth rate affects female labor force in time is investigated. Dummy variables which are put into the regression are used to prohibit the particular effects of the defaults like 1991 war in Iraq, 1994 and 2001 financial crisis and 1999 Marmara earthquake. Every 1% raise in GDP growth rate decreases the female labor force participation by 6%. The size of the coefficient is large (\(\beta_1=0.06\)) but insignificant (\(|t| =0.88<1.96\)). In developing countries like Turkey with low female education, economic growth does not significantly enhance female labor force participation rate. Of course, there are other factors like: with a high growth rate in family income, they do not want to work or it can be said that they work but as an unpaid family workers. As a result, it can be concluded that rise in GDP growth rate makes improvements in female labor force participation and increase their share in the labor force. On the other hand, there is a weak relationship between dummy variables and female labor force participation. The effect of the war in 1991 on Female labor force is small (\(\delta_1=-0.73\)) and insignificant (\(|t| =0.50<1.96\)) while other dummy variables also have small shares in the effect of female labor force (\(\delta_2=1.14, \delta_3=1.34\)) and also insignificant (\(|t| =1.05<1.96\) and \(|t| =0.95<1.96\)) effects on female labor force participation rates.

### 5. Conclusion

Using Time-Series regression, this paper empirically concentrates on the effects of the level of education, GDP growth rate and other human development incidies as well as unemployment on female labor force participation. Eight indicators are used to run the regression. The results indicate that the level of education exerts a statistically significant positive effect on women in the society. There is an increasing trend in the labor force participation of females who are graduated from higher education. This means that an additional year of female schooling raises the

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\(^2\) It is also proved with the variable of higher education. As the education of women increase, they start to find jobs or better location according to their education level. The variable of literacy is not only enough to raise women’s position in the labor force.
female labor force participation rate. It is also found that the level of education among the population in Turkey has an important effect on improvement of gender equality in labor force. On the other hand, still now, so many women are not permitted to go to the school or carry on their education in the Eastern and South-eastern parts of Turkey, because they have to work in lands that their families’ use them as unpaid family workers or have to help their families in home. Due to this, for overall, the female labor force ratio is very low compared to men.

Secondly, the research shows that as the female schooling goes up to higher levels, it directly lowers fertility rate and raises female activity rates. Therefore, female labor force can be increased in the society either by reducing fertility and unemployment rates or by increasing their educational attainment.

In summary, existing evidence indicating that improving the level of education of females will lead to lower fertility and unemployment rates. In addition this, the combination of all of these variables will lead to a higher female labor force participation in the society.

References

The seminal article on (residential) segregation is Duncan and Duncan (1955). For recent contributions to gender segregation, see the special issues of the *Journal of Econometrics,* 1994, 61(1), and *Demography,* 1998, 35(4), as well as the treatise by Flückiger and Silber (1999).