

The Determinants of Female Labor Force: Empirical Evidence from Turkey

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...to increase the welfare and happiness of Turkish citizens and Turkish society, to support and facilitate economic, social and cultural development in national unity and integration and to make the Turkish nation a constructive, creative and distinguished partner in modern civilization. Hence, education system has to be having democratic, modern and coeducational characteristic.¹

I. 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.² 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 can not 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.

¹ The main purpose of the Turkish Education System, Ministry of Education, 2004.

² 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).

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 expected 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 goals (Human Development Goals, 2001) such as school enrollment and literacy rates, total fertility rate.

The main aim of this paper is to expose the possible relationships among education, inequality and economic growth on female labor force in a period from 1980 to 2004 in Turkey. This paper proceeds as follows; section two reviews the literature on the effects of education as human capital on economic growth and gender inequality in labor force. Section three looks at the movements in education using human development indices for Turkey. Also, some information is given about the structure of education and recent developments in Turkey. Section four describes the data used in this study and the estimation procedure. Estimation results are given in Section five, while the final section provides concluding remarks.

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 (1960: 571-83) 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 (1964) 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.

A more recent paper that includes results specific to OECD country samples, by Gemmill (1996: 9-28) emphasizes the problems of using enrollment rates and constructs alternative measures of human capital based on attainment at the primary, secondary and tertiary levels. He finds out a correlation between the number of people with tertiary qualifications and subsequent growth. He also finds some evidence that investment in OECD countries is positively correlated with the extent of secondary schooling in the labor force.

Mankiw, Roemer, and Weil (1992: 407-437) regress growth rates on a number of structural parameters derived from the Solow growth model (investment rate, population growth, initial income, and some other parameters), and then regresses each of those factors again on a range

of other determinants such as policy distortions, as well as political, social, and demographic variables. In addition, the regressions have shown that the subsequent investments in human capital are associated with higher economic growth; that population growth dampens economic growth; that greater openness appears to reduce economic growth; and that political instability and ethnic diversity appear to reduce economic growth.

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. Baro (2000: 5-32) 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 (1999), promoting female education is known to reduce fertility and child mortality levels, and promote the education of the next generation. Due to his analysis, each factor has a positive impact on economic growth. Thus gender inequality in education reduces a wide range of benefits that one vital for society.

According to Tansel (2002), 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.

Hoşgör and Smits (2002) 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.

Due to Knowles (2002: 118-149), 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.

Gylfason (2001) discusses the measures of education and considers their relationship to economic growth across countries. Cross-country patterns in the data shows both inequality and education has significant, independent impact on growth, even if education and inequality are closely correlated. He proves that education seems to encourage economic growth not only by increasing

and improving human capital but also social capital by reducing inequality.

Hill and King (1995) study the impact of gender differences on education in an empirical growth context. Instead of trying to account for growth of GDP, they relate levels of GDP to gender gap in education. They find that a low female-male ratio is associated with a lower level of GDP per capita.

Klasen (1999) also studies the impact of gender differences on education, but he tries to explain long-term growth of GDP per capita rather than levels of GDP per capita, in using a broader and longer data set, in using a more reliable measure of human capital, and in including other standard regressors from the empirical growth literature.

Dollar and Gatti (1999) also examine the relationship between gender inequality in education and growth. They try to explain five-year growth intervals and attempt to control for the possible endogeneity between education and growth using instrumental variable estimation. They find that female secondary education achievement is positively associated with growth, while male secondary achievement is negatively associated with growth. In the full sample, both effects are insignificant, but it turns out that in countries with low female education, furthering female education does not promote economic growth, while in countries with higher female education levels, promoting female education has a sizeable and significant positive impact on economic growth.

Finally, The International Labor Office (2000) points out higher education as one of the key indicators to the labor market. They also consider that a major preoccupation of governments worldwide is to adapt education and training to the needs of the economy. This is especially important considering the relationship between education and labor markets/employability.

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.³ 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

³ The seventh five year development plan has the goal of universal enrollments for the eight year schooling and 75 percent enrollment rate at tertiary school levels, SPO 1995.

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 2004. 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 2004⁴ (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 chooses 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 (UNDP, 1999) (Table 1).

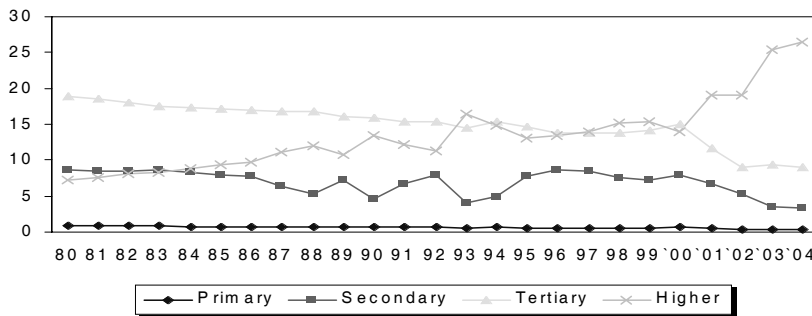


Figure 1. Graduated Women in the Labor Force due to Education Levels, 1980 - 2004

As seen from the above figure, it can be argued that higher education graduated women has an overwhelming superiority over primary, junior secondary and senior secondary graduated women since 2000. From 1980, to date, it has started to show an increasing trend while others started to decrease. The reason of this is that females began to give more importance to education in addition to find better job opportunities in the labor market. That means, as time goes by, there will be more and higher educated women seeking jobs in the labor market (Done by using Table 1).

⁴ Data from State Institute of Statistics-Population and Development Indicators and State Planning Organization, 2003

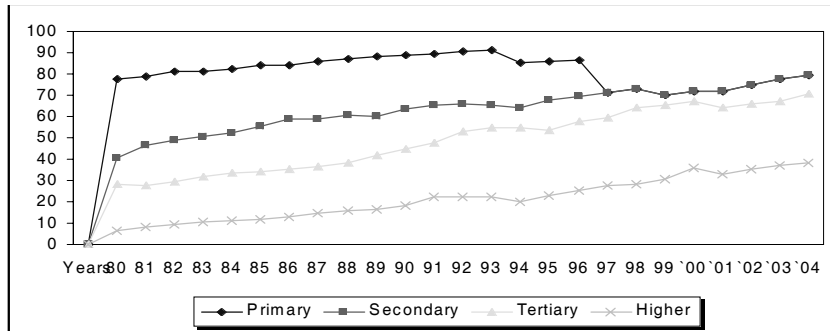


Figure 2. School Enrollment of Women, 1980 - 2004

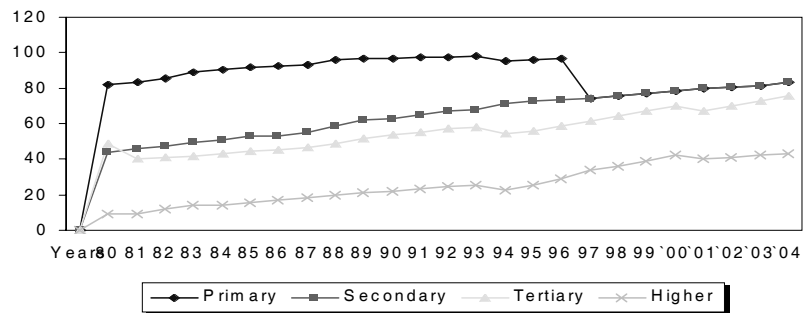


Figure3. School Enrollment of Men, 1980 - 2004

In most frequent cases, male enrollment ratios are higher than female. Because most families can not 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 (Done by using Table 1).

**Table I. Female Labor Force and Human Development Indicators for Turkey
Between 1980 and 2004**

Years	Labor Force (%)	GDP/capita growth rate (%)	School Enrollment				Higher Education (%)	literacy rate adult female (%)	Fertility rate (%)	Unemployment female (%)
			Primary (%)	Secondary (%)	Tertiary (%)					
1980	35,5	-4,60	0,88	8,58	18,84	7,2	35,00	4,26	..	
1981	35,41	2,41	0,86	8,39	18,56	7,6	38,10	4,18	..	
1982	35,32	1,02	0,81	8,48	17,93	8,1	42,60	4,10	23	
1983	35,23	2,39	0,82	8,59	17,52	8,3	43,90	4,00	24,8	
1984	35,14	4,09	0,75	8,33	17,26	8,8	45,10	3,85	29,1	
1985	35,05	1,74	0,77	7,87	17,04	9,37	47,70	3,79	11,1	
1986	34,96	4,61	0,73	7,68	16,93	9,62	51,90	3,66	10,9	
1987	34,87	7,13	0,71	6,3	16,8	11,06	53,40	3,53	10,5	
1988	34,78	-0,07	0,71	5,37	16,7	12	56,50	3,40	10,6	
1989	34,69	-1,90	0,73	7,16	16,1	10,7	59,00	3,20	9,5	
1990	34,6	6,86	0,79	4,61	15,8	13,4	67,40	3	8,5	
1991	34,9	-0,66	0,67	6,73	15,3	12,2	68,90	2,96	7,1	
1992	35,2	4,35	0,62	7,98	15,3	11,3	72,00	2,92	7,7	
1993	35,5	6,40	0,59	4,01	14,5	16,4	76,70	2,88	9,3	
1994	35,8	-6,88	0,66	4,94	15,3	14,9	75,60	2,84	8,1	
1995	36,1	5,59	0,6	7,7	14,7	13,1	76,60	2,8	7,3	
1996	36,4	5,41	0,51	8,69	13,8	13,4	76,30	2,76	6,0	
1997	36,7	5,93	0,57	8,43	13,8	13,9	76,90	2,72	7,8	
1998	37	1,57	0,52	7,58	13,7	15,2	77,60	2,67	6,8	
1999	37,3	-6,11	0,61	7,19	14,1	15,4	78,10	2,62	7,6	
2000	37,6	5,79	0,68	7,91	14,97	14,02	78,30	2,57	6,3	
2001	37,85	-8,70	0,53	6,71	11,63	18,99	78,20	2,52	7,5	
2002	38,1	1,80	0,41	5,27	9,08	18,98	79,90	2,46	9,4	
2003	38,6	2,14	0,38	3,46	9,28	25,43	79,40	2,4	10,3	
2004	39,2	2,19	0,36	3,30	9,08	26,49	78,50	2,37	10	

Source: Republic of Turkey, State Institute of Statistics-Population and Development Indicators and State Planning Organization, 2003; World Bank, 2004 and UNDP 1999; 2004.

GDP per capita growth rates exhibit the economic growth of Turkey during the last twenty-four years, shown in Table I. Although GDP per capita growth rate is not internationally comparable, it gives an insight into economic progress for Turkey. It has been showing a normal progress except four years which effected Turkish economy deeply. In 1991 (GDP per capita growth rate = -0.66%), in 1994 (GDP per capita growth rate = -6.88%), in 1999 (GDP per capita growth rate = -6.11%), and in 2001 (GDP per capita growth rate = -8.70%). The huge decreases in GDP per capita growth rates can be explained by different factors.

As the war between Iraq and Kuwait in 1991 took place in a region which is very close to Turkey's boundaries. Because of uncertainty, almost all economic indicators negatively affected from this war. In 1994 and 2001 Turkey had suffered two big financial crises because of the devaluation of Turkish Lira and injury effects of devaluation raised difficulties in Turkish economy in those years. The earthquake in Marmara region in 1999 caused impetuous effects on Turkish economy. It took time to overcome and straighten the results of the earthquake in Turkey.

Table 2. Employed Population by Employment Status, 1970-2000

Census Year	Total (1)	Employee	Employer	Self-Employed	Unpaid Family Workers	Employee Ratio (%)	Employer Ratio (%)	Self-Employed Ratio (%)	U.F. Workers Ratio (%)
Female									
1970	5 812 545	595 103	11 786	385 419	4 820 237	0,102	0,002	0,066	0,829
1975	6 204 322	876 513	8 122	294 018	5 021 626	0,141	0,001	0,047	0,809
1980	6 813 509	945 851	7 218	323 471	5 535 511	0,139	0,001	0,047	0,812
1985	7 492 733	1 072 481	10 750	351 067	6 058 365	0,143	0,001	0,047	0,809
1990	8 408 414	1 489 263	19 355	612 768	6 286 865	0,177	0,002	0,073	0,748
2000	9 429 736	2 289 330	84 753	564 147	6 491 303	0,243	0,009	0,060	0,688
Male									
1970	9 306 342	3 577 596	93 701	3 650 953	1 984 092	0,384	0,010	0,392	0,213
1975	11 179 506	4 510 014	137 123	3 870 665	2 648 546	0,403	0,012	0,346	0,237
1980	11 708 813	5 216 151	169 241	3 953 786	2 323 995	0,445	0,014	0,338	0,198
1985	13 064 053	5 905 700	182 198	4 311 114	2 663 495	0,452	0,014	0,330	0,204
1990	14 973 479	7 501 464	293 820	4 591 394	2 584 412	0,501	0,020	0,307	0,173
2000	16 567 405	9 024 700	592 563	4 664 344	2 283 709	0,545	0,036	0,282	0,138

(1) Population 15 years age and over. Source: Republic of Turkey, State Institute of Statistics-Population and Development Indicators and State Planning Organization, 2002.

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.

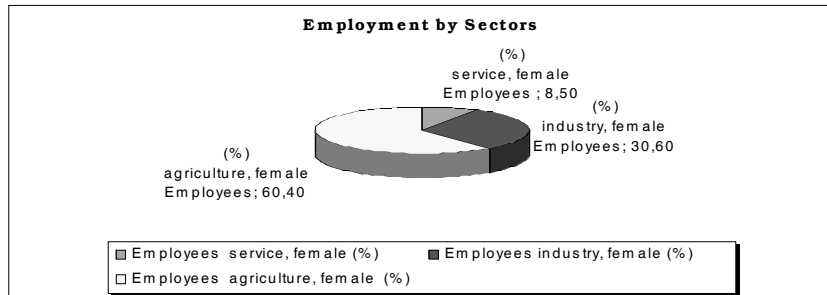


Figure 4. Employment Shares of Women by Sectors in the Society, 1980- 2001

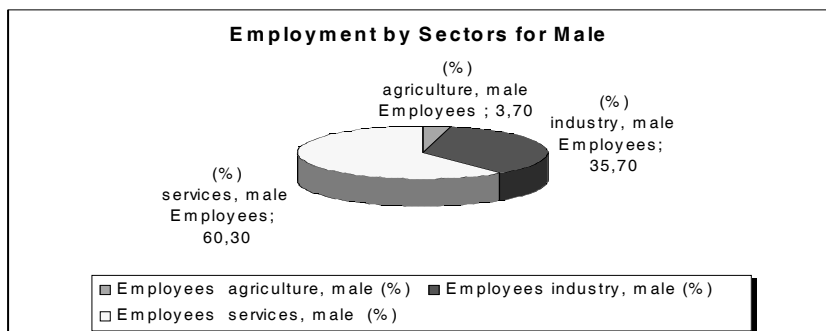


Figure 5. Employment Shares of Men by Sectors in the Society, 1980- 2001

These two figures present the percentages of women and men who work in different sector. As is seen, women have the highest share in agricultural sector (60.40%), while men have the highest in service sector (60.30%). It means that there is an increase in the labor force for female but they are mostly working in agricultural sector generally as unpaid family workers to help their families, to look after the lands they own or to take care of the children they have (Done by using Table 1).

The majority of economically inactive females are housewives and the percentage is given as more than 80% (Human Development Index, 2001). Therefore, it can be argued that women actively participate in economic life in Turkey, but mostly as an unpaid family worker.

Table 3. Activity Rates by Ages for Female in Turkey, 1995 - 2003

	2003	2002	2001	2000	1999	1998	1997	1996	1995
Total (15+)	26,6	26,9	25,9	28,5	31,1	29,3	26,40	30,6	31,9
15-19	20,8	22,4	21,9	24,3	29,5	30	27,1	32,5	33,9
20-24	32,2	33,9	32,4	37,2	39,6	36,2	33,9	36,6	38,6
25-29	32,1	32	30	31,7	33,2	32,3	29,5	31,5	35
30-34	31	31,8	29,9	30,5	33,4	29,9	29	32,7	34,7
35-39	31,1	30,5	29,5	31,6	34,3	32,6	29	34,3	35,1
40-44	29,5	29,2	28,1	29,6	34,4	31,6	27,9	32,5	36
45-49	27,1	27,3	25,7	27,4	30,2	29,3	26,6	29,7	33,4
50-54	23,7	24,1	24,3	26,5	30,2	28	24,7	29,5	33,1
55-59	23,1	22	24,8	25,4	29,6	27,5	23,7	30,4	27,7
60-64	19,4	21,3	18,5	21,7	28,9	23,7	19,9	23,4	23
65+	10,5	10,7	11,6	13,2	16,5	14	10,2	13,4	10,8

Source: (BA)Labour Force Survey

Activity rates by ages for female are very low at all ages as compared to other countries such as European Union countries. Differences are also very high among women. Highly-educated women, ages from 20 to 25, have the highest activity rates than others. Because they have more opportunities to find jobs in the labor market. On the other hand, activity rates are showing a

decreasing trend when the age of women increase. For example, after 25, women leave up their jobs and become economically inactive in the society as unpaid family workers, because they are generally married after that age and end up with to be housewives in order to look at their families and children. But when years compared, no matter what is the age. Nonetheless, all activity rates by all age groups decreases in Turkey. One of the reasons of these is, having higher income distribution and higher GDP per capita for people. As a result of these, more and more women become unpaid family workers.

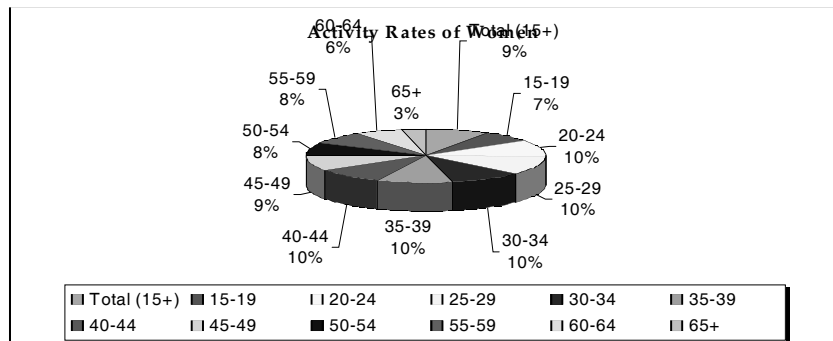


Figure 6. Activity Rates of Women, 1995 - 2003.

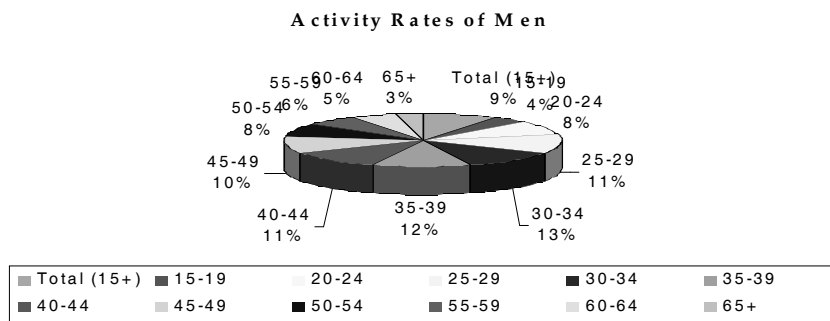


Figure 7. Activity Rates of Men, 1995 - 2003.

Figure 6 and 7 show the percentages of women and men activity rates by age groups. The figure starts at age 15+, because most of the children are employed as child labor in that ages with small incomes. Also, at that age, there are children who never entered schooling (Done by using Table III and Table II in Appendix).

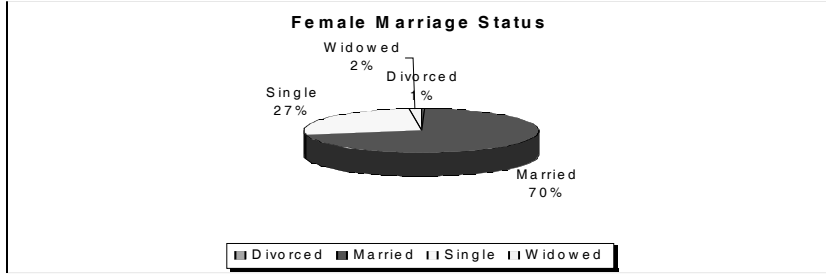


Figure 8. Marriage Status of Women, 1988 - 2002

Although there has been very small number of widow and divorced women in Turkey, most of the women are married as represented in figure 8. They generally become housewives after that marriage because of taking the children's and domestic responsibilities. Female activity rates also support this statement. Because the housewives of female population in 20 - 30 age group has consistently increased up while the activity rates has kept on decreasing. This result shows that education is not the only factor for being economically inactive and unpaid family workers, also marriage negatively affects female labor force participation in Turkey (Done by using Table III in Appendix).

4. Data

Numbers of regressors are 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 expected 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:

$$\Delta (FLF / LF) = \alpha + \beta_1 GDPGR + \beta_2 (\Delta PE) + \beta_3 (\Delta SE) + \beta_4 (\Delta TE) + \beta_5 (\Delta HE) + \beta_6 (\Delta LITR) + \beta_7 (\Delta FERR) + \beta_8 (\Delta FUNR) + \delta_1 D_1 + \delta_2 D_2 + \delta_3 D_3 \quad (1)$$

$$\Lambda (FLF / LF) = \alpha + \beta_1 (\Delta PE) + \beta_2 (\Delta SE) + \beta_3 (\Delta TE) + \beta_4 (\Delta HE) + \beta_5 (\Delta LITR) \quad (2)$$

$$\Delta (FLF / LF) = \alpha + \beta_1 (\Delta LITR) \quad (3)$$

$$\Delta (FLF / LF) = \alpha + \beta_1 (\Delta FUNR) \quad (4)$$

$$\Lambda (FLF / LF) = \alpha + \beta_1 (\Delta FERR) \quad (5)$$

$$\Delta (FLF / LF) = \alpha + \beta_1 GDPGR + \delta_1 D_1 + \delta_2 D_2 + \delta_3 D_3 \quad (6)$$

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 can not 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 analyzed if economic growth will lead to an increase in female labor force by using the impressions of dummy variables.

The data that have been used in empirical part of this paper come from different data sets given below:

- World Bank, 1980 - 2004.
- World Development Indicators (WDI 2003).
- State Planning Organization.
- State Institute of Statistics.
- UNDP, 1990 - 2003.
- LABORSTA, ILO Brureau of Statistics.

Per capita GDP growth rate, some parts of literacy and fertility rates come from World Development Indicators while the school enrollment ratios and marital status are taken from State Planning Organization and State Institute of Statistics. The share of females in the labor force,

employed population by employment status, the shares of females and males employed by sectors, activity rates by sex and age are taken from ILO Bureau of Statistics and UNDP.

5. Estimation Results

The explanatory variables defined in the previous section have been regressed using time-series and the results are provided in Table 4.

Dependent Variable	Constant	GdpGR	PE	SE	TE	HE	LITR	FERR	UNFL	D1	D2	D3	R ² Adj. R ²
FLFPR	0,09 0,858	0,02 (2.17)	-0,012 (-0.48)	-0,03 (-0.95)	0,004 (1.34)	0,021 (1.99)	0,014 (0.89)	3,14 (3.41)	-0,02 (-1.98)	0,11 (0.52)	0,03 (0.16)	-0,04 (-0.91)	0.961 0.767
FLFPR	0,154 2.827		-1,006 (-0.82)	-0,03 (-0.15)	0,055 (1.98)	0,144 (2.12)	0,07 (2.09)						0.984 0.912
FLFPR	32,42 (35.12)						0,06 (4.06)						0.417 0.392
FLFPR	36,84 (0.58)								-0,06 (-1.39)				0.084 0.041
FLFPR	40,94 (39.02)							-1,55 (-4.72)					0.492 0.470
FLFPR	36,05 (117.22)	0,06 (0.88)								-0,73 (-0.50)	1,14 (1.05)	1,34 (0.95)	0.129 -0,05

Table 4 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. In deed, 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.⁵ 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 R² (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 can not 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

⁵ 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.

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.

6. Conclusion

Using time-series regression, this paper empirically concentrates on the effects of the level of education, GDP growth rate and other human development indices 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 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 Southeastern 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 to this, the combination of all of these variables will lead to a higher female labor force participation in the society.

Appendix

Table I. School Enrollments of Women by Educational Levels, 1980 - 2004

Years	Primary (%)	Secondary (%)	Tertiary (%)	Higher Education (%)
80	87,70	40,60	28,4	6,40
81	93,90	46,60	27,9	8,00
82	91,90	49,00	29,7	9,70
83	91,20	50,30	31,7	10,70
84	91,60	52,50	33,3	11,30
85	93,80	55,20	34,3	11,70
86	91,60	58,80	35,2	12,80
87	92,10	58,80	36,6	14,50
88	91,90	60,30	38,5	15,70
89	92,00	60,10	41,7	16,40
90	99,70	63,40	44,9	18,10
91	97,30	65,10	47,7	22,20
92	94,40	65,60	53,0	22,10
93	93,50	65,20	55,0	22,40
94	95,00	64,30	54,7	23,20
95	93,00	87,60	53,3	25,70
96	94,00	94,00	57,6	27,40
97	99,60	99,60	59,4	27,80
98	98,70	98,70	64,0	28,00
99	99,80	99,80	73,7	30,80
00	96,30	96,30	81,0	35,80
01	90,10	90,10	79,8	33,10
02	93,20	93,20	81,4	38,50
03	93,70	93,70	82	40,30
04	96,50	96,50	82,7	43,10

Source: Republic of Turkey, State Institute of Statistics-Population and Development Indicators and State Planning Organization, 2002

Table II: Employment Shares by Sectors in the Society, 1980- 2001.

Years	Employees agriculture female (%)	Employees agriculture male (%)	Employees industry female (%)	Employees industry male (%)	Employees services female (%)	Employees services male (%)
1980	..	..	..	..	..	..
1981	..	..	..	..	..	..
1982	8,50	3,70	30,60	35,70	60,40	60,30
1983	7,30	4,50	27,70	32,60	64,20	62,70
1984	8,10	3,80	28,70	33,20	63,00	62,90
1985	79,00	30,30	8,10	25,10	12,90	44,60
1986	78,85	31,52	8,32	25,89	12,98	43,71
1987	78,62	32,69	8,47	26,57	13,27	41,83
1988	78,20	33,90	8,50	26,60	13,30	39,50
1989	77,70	34,50	9,30	26,40	13,00	39,10
1990	75,80	33,60	9,80	25,70	14,50	40,70
1991	78,70	33,20	7,80	26,10	13,50	40,60
1992	70,50	33,10	14,20	27,30	15,30	39,60
1993	72,30	30,60	11,70	27,10	15,90	42,30
1994	71,40	33,20	11,00	26,30	17,60	40,40
1995	74,80	36,10	8,70	25,90	16,50	38,00
1996	75,30	33,50	8,90	27,30	15,90	39,20
1997	65,40	30,30	13,30	29,20	21,40	40,50
1998	70,00	32,60	10,60	27,20	19,40	40,30
1999	72,20	33,80	9,70	25,40	18,10	40,80
2000	72,80	34,00	10,50	26,30	18,40	41,60
2001	71,00	33,20	9,20	24,70	17,30	40,70

Source: Republic of Turkey, State Institute of Statistics-Population and Development Indicators and State Planning Organization, 2002

Table III: Activity Rates of Men, 1995 - 2003

	2003	2002	2001	2000	1999	1998	1997	1996	1995
Total (15 +)	70.4	70.5	71.7	72,3	73.5	74.9	74.8	75.9	76.5
15-19	35.5	39.2	42.2	45,2	47.7	49.9	48.9	49.8	52.6
20-24	68.4	69.0	71.1	74,9	76.6	77.9	79.9	82.1	81.3
25-29	90.2	90.7	90.5	92	95.0	95.9	96.6	96.6	95.9
30-34	93.6	93.9	94.1	95,3	97.2	97.9	97.5	98.2	97.6
35-39	93.6	94.4	94.6	96,1	97.3	97.5	98.2	98.3	97.8
40-44	91.4	91.5	91.7	92,9	94.4	93.9	94.2	95.8	95.5
45-49	79.9	81.3	82.4	83	83.4	87.4	83.5	83.0	89.0
50-54	65.5	64.7	65.7	68,4	73.3	71.5	71.9	71.0	78.6
55-59	50.8	55.0	56.7	58,5	60.5	61.6	61.0	60.3	65.9
60-64	42.5	43.7	45.3	49,3	54.1	55.3	51.3	54.0	54.9
65 +	25,4	25,7	29,5	31	34.9	32.9	31.9	33.6	33.6

Source: LABORSTA, ILO Bureau of Statistics, 2003.

Table IV: Marital Status of Women

	Divorced	Married	Single	Widowed
1988	122	13,759	5188	322
1989	147	14,189	5247	346
1990	144	14,409	5278	319
1991	129	14,574	5987	320
1992	128	14,747	6078	311
1993	143	14,222	5679	269
1994	130	15,375	6067	304
1995	181	15,588	6189	328
1996	152	16,001	6225	318
1997	176	16,084	6153	342
1998	170	16,524	6326	363
1999	200	16,789	6511	377
2000	218	17,102	6849	398
2001	231	17,347	7145	437
2002	247	17,682	7319	451

Source: Republic of Turkey, State Institute of Statistics-Population and State Planning Organization, 2002.

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