THE EFFECT OF EDUCATION ON LABOUR FORCE PARTICIPATION RATE: THE CASE OF TURKEY

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Abstract

This paper investigates a series of unit root and cointegration test to identify the impact of different education levels on labour force participation in Turkey during the 1960-2000 periods. The educational variables are disaggregated by gender to see the effect of female and male educations at each category on labour force participation over the last 40 years. The main conclusion of this paper is that education has an important effect on labour force participation rates of males and females at every level of educational attainment in Turkey. It is also observed that the effect of educational attainment of females with secondary and university level is the largest on the labour force participation.

Key words: Education, Labour Force Participation, Cointegration, and Turkey

Özet

Bu makalede, 1960-2000 dönemi için, farklı eğitim düzeylerinin Türkiye'deki işgücüne katılım oranına olan etkisinin belirlenmesi için, bir dizi birim kök ve koentegrasyon testleri uygulanmaktadır. Eğitimle ilgili değişkenler, her iki kategorideki erkek ve kadın eğitiminin etkilerinin gözlemlenebilmesi için, son kırk yılı kapsayan dönemi için, kadın ve erkek üzere ayrıştırılmıştır. Çalışmanın temel sonucuna göre, tüm eğitim seviyelerinde, eğitimin kadın ve erkek işgücüne katılım oranları üzerinde önemli etkileri bulunmaktadır. Bunun yanında, kadınların işgücüne katılım oranı üzerine en büyük etkiye, orta öğretim ve üniversite eğitiminin sahip olduğu tespit edilmiştir.

Anahtar kelimeler: Öğrenim, İşgücüne katılma, Koentegrasyon ve Türkiye

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1. INTRODUCTION

As is emphasized by OECD (1989) "education is very important first and foremost as the thread that gives form to the fabric of society. It contributes the basis for individual development, both affective and cognitive. It also embodies, and passes on form one generation to the next, the common values, traditions and culture upon which the coherence of societies depends, while providing a source of social and scientific progress. Unavoidably this has economic significance, both in a general sense and in its direct impact on productivity. This happens in two ways. First is through the role that education can play in expanding scientific knowledge, and transforming it into productivity enhancing technological progress. Second is "by raising the competences and skills of workers and thereby improving their ability both to perform in a particular job and adapt to the demands of emerging jobs" (OECD, 1989:47).

The importance and effects of education on labour force participation for both males and females is widely recognized and well known fact by policy makers and economist. It has been found in many studies such as (OECD, 1989; Psacharopoulos and Tzannatos, 1991; Bulutay, 1996; Tansel, 1996; Kennedy and Hedley, 2003) that educational attainment is a consistent and the most effective determinant of labour force participation rate in both developing and industrialised countries. Especially, the studies of women's labour force participation indicate that the most important personal variable influencing female labour force participation rate is the level of education (Kasnakoglu and Dayioglu, 1996). As the World Bank (1993) reports, many econometric studies of female labour supply in both developed and developing countries show that "schooling is a consistent and among the most effective determinants of female participation, but much less so of men" (World Bank, 1993:40). This effect is seen generally in two forms; as wages and work opportunities in labour market are determined by schooling educated women find it more attractive to work in labour market rather than remain in nonmarket, such as household activities. Secondly, because of the effectiveness of schooling "female labour supply, independent of influences through wages, by breaking down the noneconomic constraints related to the woman's (as well as her family's and society's) attitudes toward market work as opposed to housework" (World Bank, 1993:45).

The aim of this paper is to confirm the proposition of close relationship between education and labour force participation of male and females in the Turkish labour market. In this paper, the impact of education on the labour force is examined for Turkey for a long time period. Hence, this paper differs from previous papers in the following ways:

- a- Longer time series data were used,
- b- The series used will be based on relatively recent data
- c- A vector autoregression model has been estimated employing certain policy variables to investigate the dynamics of labour force participation rate for female and male.
- d- In addition, the educational variables are broken down by gender to see separately the effect of female and male educations at each category on labour force participation over the last 40 years.

The rest of paper proceeds as follows. Section 2 presents the methodology and data. The section 3 devoted to the empirical results. Finally, the last section gives concluding remarks.

2. DATA AND VARIABLES

For this study we use annual female and male labour force (FLF, MLF) , the enrolment of female and male in primary school (FPRIM, MPRIM), in secondary school (FSEC, MSEC) and in university (FUNI, MUNI) for the 1960-2000 period for Turkey. The data is taken from State Institute of Statistics of Turkey (SIS, 2003).

All variables are transformed to natural logs and for females denoted as LFLF, LFPRIM, LFSEC, LFUNI and for males LMLF, LMPRIM, LMSEC and LMUNI.

For the analysis of male and female labour force participation, following variables will be used:

LFLF= f(LFPRIM, LFSEC, LFUNI)
Where
LFLF: Female labour force
LFPRIM: Enrolment of Female in primary school
LFSEC: Enrolment of Female in secondary school
LFUNI: Enrolment of Female in university school

$LMLF= f(LMPRIM, LMSEC, LMUNI)$

Where
LMLF: Male Labour force
LMPRIM: Enrolment of Male in primary school
LMSEC: Enrolment of Male in secondary school
LMUNI: Enrolment of Male in university school

3. ESTIMATION RESULTS

In order to investigate the cointegration among several variables that are used in the above models primarily needs a test for the presence of unit root for every individual variable. The Augmented Dickey Fuller (ADF) test has been applied for examining unit roots and stationarity of all variables (Dickey and Fuller, 1979). If all series are integrated of the same order, we can proceed to test for the presence of cointegration.

Table 1. ADF Tests for Female Variables

Data	Level/ Lag	First Difference/ Lag
LFLF	1,4679/ 0	-4,4746**/ 0
LFPRIM	-1,3978/ 1	-3,0151*/ 0
LFSEC	-2,0154/ 1	-3,5866**/ 0
LFUNI	-0,4846/ 1	-4,5996**/ 0

Appropriate lag is choosen by AIC (Akaike Information Criteria)
** Indicates 1% significance level
* Indicates 5% significance level

Table 2. ADF Tests for Male Variables

Data	Level/ Lag	First Difference/ Lag
LMLF	-0,7443/ 0	-4,8624**/ 0
LMPRIM	1,4441/ 1	-3,1426*/ 0
LMSEC	-1,1855/ 1	-4,0529**/ 1
LMUNI	-1,0701 / 1	-4,5720**/ 0

Appropriate lag is choosen by AIC (Akaike Information Criteria)
** Indicates 1% significance level
* Indicates 5% significance level

As we see from Table 1. and Table 2., the ADF statistics of both male and female variables is stationary in their first differences. Now that, all variables

are stationary at same order, then a cointegration test can be performed to determine the long run (cointegration) relationship among the variables.

In order to determine the cointegration relationship, this paper used Johansen methodology (Johansen, 1988). This analysis yields maximum likelihood estimators of the unconstrained cointegration vectors.

A pth- order vector autoregression, denoted VAR (p) can be explained as:

$$X_t = c + x_1 X_{t-1} + x_2 X_{t-2} + \ldots\ldots x_p X_{t-p} + \varepsilon_t \tag{1}$$

Where $X_t = $ nx1 vector of variables (all variables we will use in our analysis.), c= nx1 vector of constants to distinguish between stationary by linear combinations and differencing, a reparametrisation of equation (1) is needed. Thus the system is equation (1) can be rewritten equivalently as:

$$\Delta X_t = c + \Gamma_1 \Delta X_{t-1} + \Gamma_2 \Delta X_{t-2} + \ldots\ldots \Gamma_{p-1} \Delta X_{t-p+1} + \Pi X_{t-p} + \Delta Q_t + \varepsilon_t \tag{2}$$

where

$$\Gamma_i = -(I - \pi_1 - \ldots \pi_i)\ (i = 1\ldots, p\text{-}1) \tag{3}$$

and

$$\Pi = -(I - \Pi_1 - \ldots -\Pi_p) \tag{4}$$

The 2nd. equation known as a vector error correction model (VECM). Only difference between equation (2) and a standard VAR in differences is the error-correction term, ΠX_{t-p}. The transformation of a VAR model for $I(1)$ variables into equation (2) can be called a cointegrating transformation. The variables X_t are cointegrated, with the cointegrating vectors are the particular columns of the cointegrating matrix. Hence, in a VAR model explaining n variables there can be at most r = n-1 cointegrating vectors, which can also be interpreted as long-run parameters.

Cointegration test results for both female and male are presented in Table 3. and Table 4.

Table 3. Cointegration Tests for Female Labour Force Participation

Hypothesis	Trace Statistic	5% Critical Value	Max-Eigen Statistic	5% Critical Value
r=0	58,4690	47,21*	36,4825	27,07*
r=1	21,9864	29,68	17,1653	20,97

LFLF= -0.3296LFPRIM + 0.0386LFSEC + 0.1877LFUNI (5)

Table 4. Cointegration Tests for Male Labour Force Participation

Hypothesis	Trace Statistic	5% Critical Value	Max-Eigen Statistic	5% Critical Value
r=0	59,9924	53,12*	33,4510	28,14*
r=1	26,5414	34,91	14,3939	22,00

LMLF= 8.8100 + 0.4761LMPRIM - 0.2202LMSEC + 0.2469LMUNI (6)

Trace and Max-Eigen statistics indicate that each group of variables has at most one cointegrated vector at 5% significance level. Equation (5) and Equation (6) show the normalised cointegrated vectors for female and male labour force participation. Equation (5) indicates that while secondary and university education level have positive impact on labour force participation for female, primary education level has negative impact on it. However, Equation (6) is a little different from Equation (5). According to Equation (6) labour force participation for male is positively influenced by both primary and university educational level. Moreover, male participation is negatively influenced by secondary education level.

As is seen from our findings education levels have different effects on men's and women's labour force participation. The affect of primary and university education levels of men on labour force participation is very significant. But, secondary education level has a negative impact on labour force participation for men. The negative influence of secondary education level for men could be the reason of men's tendency to further their schooling and therefore their adjournment of labour market entry. In the case of women, the result shows that education is an important determinant of women's labour force participation, especially at the higher levels. Women with lower education level have difficulties to entry into labour market. When they have lower education

they cannot compete with their male counterparts in the market. However, higher level of education helps them to build confidence to entry into labour force.

These findings are consistent with the micro level evidence from Turkey and other countries about the effect of education on female participation rates (Tansel, 1996; Psacharopoulos and Tzannatos, 1991; Kasnakoglu and Dayioglu, 1996; Ozar and Gunluk-Senesen, 1998). Especially, our findings are quite similar the study which have done by Kasnakoglu and Dayioglu in 1996. They used 1994 Household Income and Consumption Expenditures Survey conducted by the SIS, and identified the factors effecting female and male labour force participation rates in urban Turkey using a probit model. They emphasized that "the labour market participation women increases with higher levels of schooling, the effect being especially felt beyond primary school. More importantly, the marginal effects of schooling turn out to be higher for women compared to men further illustrating the important role education plays in the participation decision of women" (Kasnakoglu and Dayioglu). Our attempt was to make a contribution to this claim by examining the impact of education on labour force participation in the long-run. Also we found the same result that education plays a primary role in the determining the labour force participation of people but more so for females than males.

4. CONCLUDING REMARKS

This study has investigated a series of unit root, and cointegration to identify the relationship between the education level and labour force participation. Moreover, the information on co-integration in variables is taken into consideration in specifying the long- run relations among variables. In addition, the educational variables are disaggregated by gender to see the effect of female and male educations at each category on labour force participation over the last 40 years.

The main conclusion of this paper is that education has an important effect on labour force participation of males and females at every level of educational attainment in Turkey. In addition, another important finding of the long run analysis is the positive and statistically significant impact of female secondary and university education level on labour force participation. The results show that education increases female participation. This strong

relationship between education and labour force participation for male and females show that policy makers should concentrate on increasing people education. In addition, our result suggests that the most effective instrument for integrating women into economy is education therefore the government should give considerable attention to increase women's educational attainment at every level.

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