

The Effects of Apprenticeship Training Scheme on Employment Probability in Turkey*

by

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Abstract:

This paper attempts to measure the impact of apprenticeship training and course attendance programs on the probability of employment. For this purpose, 1997 Household Labor Force Survey which has a special education module is used. Probit models of employment are estimated for females and males separately. Both the apprenticeship training and the course attendance are found to have a positive impact on the probability of employment.

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1. Introduction

There have been no empirical work in Turkey on measuring the effectiveness of the apprenticeship training and the course attendance programs. This is the first study attempting to measure the effectiveness of the apprenticeship training and course attendance on the probability of employment. For this purpose, 1997 Household Labor Force Survey (HLFS) of Turkey which has a special education module is used. Probit models of employment are estimated for females and males separately. Both the apprenticeship training and course attendance programs are found to have a positive impact on the probability of employment. These impacts were not very large but statistically significant.

In many countries apprenticeship programs are important step into the labor market contributing to alleviate youth unemployment problem (Askilden and Nilsen, 2005). It is well known that apprenticeship programs underpinned by a legal framework and state support has remained rather strong in Germany and the surrounding countries such as Austria and Switzerland, where it covers a wide range of occupations and a large proportion of the age cohort (Gospel, 1998). For Britain, modern apprenticeship is a major attempt to revive the labor market route to vocational education and training for intermediate skills (Gospel, 1998).

The objective of apprenticeship training and course attendance programs is to improve the attractiveness of the participant to potential employers or to enable them to establish their own business. These programs serve to enhance the human capital of the participant. This is expected to have two consequences. One is to increase the employers' demand for the participants' labor or the participants acquire the necessary skills to establish their own business. As a result the participants' probability of employment will increase. The second consequence is to increase the wage rate of the participant earned in employment. An

alternative view point is the non-human-capital one, such as Thurow's (1975) job competition model. According to this model, participation in a training program may be used as a signal by the employers of the individual's motivation or capacity for training. Hence, this model predicts an increase both in the employment probability and the wage rate. The human capital and the job competition models are not mutually exclusive but are rather complementary.

The effectiveness of the training program on the probability of employment is examined by Main (1991), Main and Raffe (1983), Main and Shelly (1990) and Denny and Harmon (2000) among others. Pre-and post-training program labor market experience on the part of the participant are used for comparison purposes. The other indicator of the effectiveness of the training programs is the wage effects. This is studied by Ashenfelter (1978), Kiefer (1978) and Bassi (1984) for the U.S. and by Main and Shelly (1990) in Scotland. Such studies involved observations of the wage rate earned by the trainees before and after their participation in the training program.

Frazer (2006) explores the institution of apprenticeship in Ghana. In Ghana, length of apprenticeship programs is roughly three years during which an apprentice learns a trade, such as metal-working or carpentry from a master of that trade. After completing the apprenticeship, the apprentice may be employed by the firm where the apprenticeship occurred, begin working at another firm, or the apprentice may start a new firm and become self-employed (Frazer, 2006). However, the training received by the apprentices cannot be applied to work in other firms due to the idiosyncratic nature of the apprenticeship given by the master, both in terms of technology and business practice (Frazer, 2006). Frazer's model of apprenticeship as specific human capital illustrates that apprenticed workers remaining within the firm are more productive than apprenticed workers employed at other firms are. However, their wages are not higher than apprenticed workers employed at other firms. Thus,

the returns to apprenticeship are in self-employment where workers are rewarded for their apprenticeship.

Acemoglu and Pischke (1998) proposed a new theory of training partly motivated by the institutional structure of the German labor market where firm-sponsored general training is very common. The study found that workers who stay with their firm after the apprenticeship in Germany earn higher wages than those who quit and the workers who change jobs right after the end of their apprenticeship get a wage reduction, unless they are recruited for the military. Obidi (1995) discussed about the indigenous apprenticeship in the Yorubaland of Nigeria with particular reference to training in blacksmithing. According to Obidi (1995), apprenticeship is a process of learning by doing, if properly organized may serve as the key to improving the quality and efficiency of the labor force in government, administration and small enterprises. Puryear (1979) investigates whether the industrial apprenticeship program of Colombia's National Apprenticeship Service (SENA) increases subsequent earnings after adjusting for the effect of other potentially important independent factors. It is implied from the findings of the study that, in terms of earnings, a SENA apprenticeship serves to some extent as a substitute for general secondary education. The study suggests that pre-employment training in vocational institutes such as SENA may have a significant, positive effect on earnings.

Heijke, Meng and Ris (2003) using data on the labor market situation of Dutch higher education graduates analyzed the roles of vocational and generic competencies during the transition from higher education to the labor market. The study confirms the field-limited usefulness of vocational competencies. Training and the level of generic competencies acquired in education are found to be complements, because on-the-job training uses generic

competencies to adjust vocational competencies to the requirement of the job (Heijke, Meng and Ris 2003).

The lack of suitable data have been the main problem in attempting to evaluate the training programs. The often used research design is a before/after design with control group. The HLFS used in this study gathered information about the current labor force status of the respondents and whether or not they have participated in the training programs. The strategy adopted in this study compares the labor market outcomes of a group of individuals who had been on the training program with those of a group of individuals who had not been on a training program.

This paper is organized as follows. Section 2 will give information about the apprenticeship training system in Turkey. The methodology used which is the probit model of employment is introduced in Section 3. Section 4 discusses the data used in this study. Estimation results are presented in Section 5. Conclusions and suggestions for future research appear in Section 6.

2. Apprenticeship training System in Turkey¹

Apprenticeship training was introduced for the first time with the Law no 2089 enacted in 1977. In 1986, Law no 3308 was enacted and titled Apprenticeship and Vocational Education Law. It was amended in 1997 and again in 2001. Formal apprenticeship and non-formal vocational and technical training are regulated under this law. Ministry of Education is the responsible body for carrying out the stipulations of the law. The share in GNP and in the

¹ This section relies on Akpınar and Ercan (2002) and Tunalı (2004).

Ministry of Education budget of the resources allocated to apprenticeship and non-formal education are 0.07 and 2.41 percent respectively in Turkey in 2000 (Tunalı, 2003).

Apprenticeship training is taken by the young who work at enterprises in order to learn a vocation. It consists of theoretical and practical training. The individuals must be at least 14 years old and completed compulsory education.² Since 2001, individuals entering apprenticeship training must be 19 years of age or under.

There are four stages in apprenticeship training. These are candidate apprenticeship, apprenticeship, journeymanship and mastership. Individuals under 14 but have completed their compulsory basic education are considered candidate apprentices. Candidate apprentices and apprentices have the student status and are not counted among the personnel at a workplace. Apprenticeship training takes 2-4 years depending on the type of profession. The first one-three months is a period of probation during which wages have to be paid. Workers less than 16 years of age receive about 85 percent of the minimum wage for older workers. Employers pay at least 30 percent of the minimum wage. Insurance is provided against work accidents and illnesses where the premiums are paid by the state. Enterprises have the responsibility of providing practical training to the candidate apprentices and the apprentices. Vocational Training Centers give theoretical training and further practical training. Supra Training Centers are organized and run by Turkish Confederation of Trades and Craftsmen and function like the Vocational Training Centers.

At the end of apprenticeship period, journeymanship examination, covering theoretical and practical knowledge, is taken. Successful candidates earn a journeymanship certificate. Journeymanship training is organized at Vocational Training Centers outside working hours for a period of three years. At the end of this training journeyman take the mastership

² Before the August 1997 educational reform they must be at least 12 years old and completed the compulsory education of five years. The educational reform extended the compulsory education from five to eight years covering the middle schools.

examination, earning a mastership certificate. This examination can also be taken by those who have worked for at least five years in their profession and by those who graduated from a vocational or technical high school. The masters can also take pedagogy courses at the Vocational Training Centers. They can then train the candidate apprentices and the apprentices.

3. Methodology

In order to estimate the impact of training program experience on employment probability a probit model (Maddala, 1983) is employed. The likelihood of an individual being in employment can be summarized by an unobserved index P^* as a function of individual's characteristics and circumstances:

$$P_i^* = \mu^1 X_i + u_i$$

where X is a vector of variables describing the individual's characteristics and circumstances. μ is a vector of unknown parameters. u is a random variable including unmeasured characteristics.

The observed counterpart of P^* is y which indicates whether or not an individual is in employment at the time of the survey, ($y_i = 1$) or not ($y_i = 0$). y can be expressed in terms of whether the value of the unobserved variable P^* exceeds a certain critical value say zero:

$$\text{Prob. } (y_i = 1) = \text{Prob. } (P^* > 0) = P(u_i > -\mu^1 X_i) \quad (2)$$

Assuming that u are normally distributed with mean zero and variance s^2 we let F and f denote the cumulative and the probability density functions.

$$P(y_i = 1) = F(\mu' x_i)$$

Assuming that there are n individuals, the likelihood of observing those individuals at the survey time in employment or not in employment is given by:

$$L(\mu) = \prod_{y=1} [F(\mu' x_i)] \prod_{y=0} [1 - F(\mu' x_i)]$$

Maximizing the likelihood function will give the Maximum Likelihood Estimates (MLE) of μ .

The variables included in the vector X are the following. The experience variable is represented by a linear and a quadratic term to capture the nonlinearity in the employment profile. Experience is computed as age minus the number of years of schooling minus 6, the age of entry into school (Mincer, 1974). In order to examine the differential impact of the type of schooling, six levels of schooling are distinguished including general and vocational curricula at the high school level. Illiterates and those who are literate without a diploma are combined to form the category of non-graduates. The other categories are: primary school graduates, middle school graduates, general high school graduates, vocational high school graduates and finally the university graduates. These levels are represented by dummy variables where the base category is non-graduates. The experience and education coefficients are expected to be positive and the quadratic experience term coefficient is expected to be negative.

A dummy variable is included indicating whether the individual is a female. Another dummy variable indicates whether the individual lives in an urban location which are defined

as locations with population more than 20 thousand people. Two dummy variables which are important for this study indicate whether the individual ever had the experience of training. One of them indicates whether the individual ever had experience of apprenticeship training. The other dummy variable indicates whether the individual ever had experience of course training. Dummy variables for regions of residence are included to allow for differences in labor market opportunities such as local market wages, prices and unemployment rates.

4. Data

The data used in this study comes from the October, 1997 Household Labor Force Survey (HLFS) conducted by the State Institute of Statistics of Turkey. We restricted the sample to individuals 12 to 65 years of age. The starting age is 12 because until the educational reform of 1997, compulsory schooling was only five years and children graduating from primary school around 12 years of age were able to enter the labor market 65 is the legal retirement age. However most individuals could retire earlier or later. The main characteristics of the raw data are shown in Table 1.

Table 1 Means and Standard Deviations of the Variables, 1997, Turkey

Variables	Total	Female	Male
experience	21.27 (16.0)	21.84 (16.3)	20.67 (15.7)
experience square	708.19 (851.2)	741.69 (887.0)	672.32 (809.6)
Education ^a :			
non-graduate	0.1604 (0.37)	0.2366 (0.43)	0.0787 (0.27)
primary	0.5302 (0.50)	0.5225 (0.50)	0.5384 (0.50)
Middle	0.1209 (0.33)	0.0928 (0.29)	0.1511 (0.36)
High School	0.0959 (0.29)	0.0824 (0.28)	0.1103 (0.31)
Voc. High	0.0426 (0.20)	0.0299 (0.17)	0.0562 (0.23)
University	0.0501 (0.22)	0.0359 (0.19)	0.0652 (0.25)
Urban ^a	0.7150 (0.45)	0.7124 (0.45)	0.7178 (0.45)
Female ^a	0.5172 (0.50)	1.0000	0.0000
Apprenticeship ^a	0.0061 (0.08)	0.0015 (0.04)	0.0110 (0.11)
Course Training ^a	0.0412 (0.20)	0.0486 (0.22)	0.0333 (0.18)
Months of Appr.	0.1741 (2.72)	0.0311 (1.09)	0.3274 (3.74)
Regions ^a :			
Marmara	0.2792 (0.45)	0.2741 (0.45)	0.2846 (0.45)
Aegean	0.1480 (0.36)	0.1482 (0.36)	0.1478 (0.36)
Mediterranean	0.1217 (0.33)	0.1209 (0.33)	0.1226 (0.33)
Central Anatolia	0.1800 (0.38)	0.1823 (0.39)	0.1776 (0.38)
Black Sea	0.1078 (0.31)	0.1099 (0.31)	0.1057 (0.31)
East Anatolia	0.0702 (0.26)	0.0713 (0.26)	0.0689 (0.25)
Southeast A.	0.0931 (0.29)	0.0933 (0.29)	0.0928 (0.29)
No. of Observations	51,022	26,388	24,634

Source: 1997 Household Labor Force Survey. Authors' computations.

Notes: Standard deviations are given in the paranthesis.

a: indicates dummy variables.

The October 1997 HLFS has a special section called “Education and Training Supplementary Questionnaire” which was implemented once only in October 1997. This section elicited information on formal and adult education of the population. The questions that are of importance for this study are as follows. Questions number 52b and 89 asks about apprenticeship experience to the employed and the unemployed or nonparticipating individuals respectively. Question number 52b asks “Have you taken or are you attending any apprenticeship, journeymanship and master training to learn your occupation?” Question number 89 asks the same to the unemployed or nonparticipant individuals. With these questions we have identified those people who have taken apprenticeship, journeymanship or mastership training and we have excluded those who are currently attending such training.

This is shown in Table 1 under “Apprenticeship” and we will refer to this training for short “apprenticeship”. The figures indicate that about 0.61 percent of the total sample have taken apprenticeship training. The same figures are 0.15 percent for females and 1.10 percent for males. The proportion of males who have taken apprenticeship is much larger than that of females. Almost about 8 times more men than women have taken apprenticeship training. This is because most of the training fields for apprenticeship are usually considered male occupations. Months of apprenticeship refer to the duration of apprenticeship training.

The second question is about course attendance. The question number 65 elicits a response from those who are in employment and question number 100 elicits a response from those who are unemployed or nonparticipant. These questions ask “Have you taken or are you attending now any vocational training courses to learn or improve your occupation?”. The examples of such courses are as follows. Computer skills, typing, tourism, hand made flower, carpet weaving, tinned food, beekeeping, accounting, and training on the job. These courses are usually short term courses and they are provided by the private sector firms under government supervision. The participants of these courses receive a certificate upon completion of the course with the seal of the ministry of education. With the response to these questions we have identified people who have taken such courses and we have excluded those who are currently attending such courses. This is shown in Table 1 under “course training”. The figures indicate that about 4.12 percent of the total sample have taken course training. The same figures are 4.86 percent for females and 3.33 percent for males. We note that proportion of females who have taken course training is larger than that of males. Further we note that in the sample, the proportion of those who have taken course training is much larger than those who have taken apprenticeship training. That is, course training is much more widespread than apprenticeship training. The proportion of women who have taken course training is over 32

times more than those women who have taken apprenticeship training while the proportion of men who have taken course training is only one and a half times more.

Table 1 indicates that females have about 22 and males have about 21 years of experience. With regards to education we note the following. About 24 percent of females are in the category of non-graduates. This category includes illiterates and those who are literate but do not have a diploma. The percentage of non-graduates is much lower, only about 8 for males. The primary school graduates constitute the largest educational category. About 52 percent of females and 54 percent of males have primary schooling and no more. The proportion of those in higher educational categories range between 3-9 percent for females and 6-15 percent for males. Males have notably higher educational attainments than females. About 71-72 percent of the sample live in urban areas which are locations with more than 20 thousand population.

5. Estimation Results

This section presents the empirical results for the choice of the employment status. Table 2 displays the maximum likelihood estimate of a probit for employment for the female, male and total samples. The implied marginal effect of each variable on the probability of being in employment evaluated at the mean values of the variables are provided in this table. The results indicate that the years of experience enter the probit for employment equation with highly significant linear and quadratic terms. An additional year of experience increases the probability of being in employment by about 0.69 percent in the total sample and by 0.09 and 1.41 percents in the female and male samples respectively. The probability of being in employment peaks at age 26, 27 and 28 in the total, female and male samples respectively.

The education variables are jointly significant in all samples although middle school coefficients are insignificant in the total and female samples and has a negative sign in the male sample. The base category is non-graduates which consists of those who are illiterate or literate without a diploma. A primary school graduate has about three percent higher probability of being in employment as compared to a non-graduate while the same probabilities are 17, 27 and 45 percent respectively for the high school, vocational high school and university graduates. Thus, a vocational high school graduate is more likely to be in employment than a high school graduate. In the female sample, a primary school graduate has about one percent higher probability of being in employment as compared to a non-graduate while the same probabilities are 19, 32 and 65 percent respectively for the high school, vocational high school and university graduates. A vocational high school graduate female is more likely to be in employment than a high school graduate female. We note the substantially high probability of being in employment for a university graduate female as compared to a nongraduate. In the male sample, a vocational high school graduate has about 4 percent and a university graduate has about 8 percent higher probability of being in employment as compared to a non graduate.

Table 2 Maximum Likelihood Probit Estimates of Employment Status, 1997, Turkey

Marginal Effects (t-ratios)				
Variables	Total	Total	Female	Male
Experience	0.0367 (63.8)	0.0368 (64.0)	0.0053 (10.0)	0.0554 (75.6)
Experience Square	-0.0007 (60.5)	-0.0007 (60.6)	-0.0001 (10.7)	-0.0010 (72.3)
Education ^a :				
Primary	0.0302 (3.58)	0.0302 (3.58)	0.0134 (1.80)	0.0647 (5.01)
Middle	-0.0038 (0.33)	-0.0028 (0.24)	-0.0083 (0.72)	-0.1091 (6.49)
High School	0.1697 (13.2)	0.1624 (13.3)	0.1913 (12.0)	-0.0322 (1.88)
Voc. High	0.2647 (18.6)	0.2662 (18.8)	0.3187 (14.4)	0.0409 (2.30)
University	0.4504 (43.5)	0.4514 (43.7)	0.6508 (42.9)	0.0842 (5.05)
Urban ^a	-0.2773 (46.7)	-0.2778 (46.8)	-0.2892 (41.8)	-0.1468 (21.4)
Female ^a	-0.5117 (115)	-0.5111 (115)	-	-
Apprenticeship ^a	0.2213 (6.76)	0.0510 (1.24)	0.4038 (5.03)	0.0801 (2.89)
Course Training ^a	0.0550 (4.17)	0.0545 (4.13)	0.0228 (2.00)	0.0540 (3.04)
Months of Appr.	-	0.0092 (6.69)	-	-
Regions ^a :				
Aegean	-0.0213 (2.66)	-0.0218 (2.72)	0.0166 (2.17)	-0.0676 (6.10)
Mediterranean	-0.0883 (10.7)	-0.0889 (10.7)	-0.0754 (11.7)	-0.0616 (5.28)
Central Anatolia	-0.1164 (15.9)	-0.1172 (16.7)	-0.0854 (14.9)	-0.0946 (9.00)
Black Sea	0.0033 (0.35)	0.0027 (0.30)	0.0310 (3.49)	-0.0472 (3.71)
East Anatolia	-0.0486 (4.60)	-0.0485 (4.59)	-0.0484 (5.89)	-0.0158 (1.09)
Southeast A.	-0.0034 (0.34)	-0.0032 (0.33)	-0.0300 (3.47)	0.0260 (2.15)
-Log Likelihood	24,231	24,205	10,801	11,647
Chi Square (K)	20,584	20,637	4,260	7,832
Pseudo R-Square	0.2981	0.2989	0.1647	0.2516
No. of Observations	50,633	50,633	26,124	24,509

Source: 1997 Household Labor Force Survey Authors' computations.

Notes: a: indicates dummy variables.

The table gives the marginal effects. The marginal effects for the dummy variables is for the discrete change of the dummy variable from 0 to 1. The associated asymptotic t-ratios are given in the parantheses. K is the number of independent variables.

The marginal effect of residing in an urban location is to lower the probability of being in employment in the total, female and male samples. Conversely urban locations increase the probability of being in unemployment. These results are in concordance with the observations that employment rates are higher in the rural areas than in urban areas. The female dummy variable indicates that the marginal effect of being female is to significantly lower the probability of being in employment. The likelihood function is used to test the null hypothesis that the probability of employment is determined in the same manner in both the female and

the male samples. The resulting Chi-square test statistic exceeded the critical value at five percent level of significance. Thus the hypothesis of equal coefficients is rejected suggesting that the probability of employment of females and males should be modelled separately as it is done here.

Apprenticeship training has positive and statistically significant marginal effects in the total, female and male samples. Apprenticeship training increases the probability of employment by about 22 percent in the total sample, while the same probabilities are 40 and 8 percent respectively in the female and male samples. The 8 percent increase in the employment probability in the male sample is rather low. The marginal effects of course training is much lower than the marginal effects of apprenticeship training. These marginal effects are also positive and statistically significant. Course training increases employment probability by about 5.5 percent in the total sample while the same probabilities are 2.3 and 5.4 percent in the female and male samples respectively. The effects of the apprenticeship training are much larger than the effects of the course training possibly because the apprenticeship training takes years to complete while course training is a short term event with duration of several months.

The dummy variables for the regions of residence are included to allow for local differences in labor markets, unemployment rates, wages and prices. The estimated marginal effects are jointly significant at the one percent level. In the total sample, living in all regions statistically significantly reduce the probability of employment as compared to living in Marmara except in the Black Sea and Southeast Anatolia regions where the estimated marginal effects are insignificant. In the female sample, living in all regions statistically significantly reduce the probability of employment as compared to Marmara except in the Aegean and the Black Sea where the probability of female employment is statistically,

significantly higher than in Marmara. In the male sample, living in all regions statistically, significantly reduce the probability of male employment as compared to Marmara except in the Southeast Anatolia where the probability of male employment is statistically, significantly higher than in Marmara. East Anatolia is significantly not different from Marmara in terms of employment probability. These regional differences in employment probabilities are comparable to those obtained in other studies such as Tansel (2002).

6. Conclusions

There has never been an attempt to evaluate the apprenticeship training and the course training programs in Turkey. This paper remedies this situation by measuring the impact of apprenticeship training and course training programs on the probability of employment. For this purpose 1997 Household Labor Force Survey is used. The October 1997 version of this survey includes a special module of formal and adult education with questions about apprenticeship training and course training programs. Probit models of employment are estimated for the total, female and male samples. Apprenticeship training program is found to increase the probability of employment by about 22, 40 and 8 percents respectively in the total, female and male samples. The course training program is found to increase the probability of employment by about 6, 2 and 5 percents respectively in the total, female and male samples. All of these effects are statistically significant. The effects of the apprenticeship training are much larger than the effects of the course training program. This may be due to the fact that apprenticeship training takes years to complete while course training takes several months only. We can conclude that government intervention in the labor market through programs such as apprenticeship training and course training seem to increase employment

probabilities of both females and males in a significant way. However, this success in increasing the employment probability of the participants must be appraised against the cost. There is no study on the cost aspect of these programs in Turkey. Cost effectiveness of the government provided apprenticeship program must be ascertained. However, the cost effectiveness of the course-training programs are obvious since they are provided by the private suppliers on a commercial basis for a fee which is paid by individual participants. This kind of service would not be provided if there were no demand for it and if it were not profitable. Further, increased probability of employment is not the only beneficial outcome of participation in the training programs. An important impact is to improve the wage possibilities of the participants. Data must be collected on wages to be able to study the effect on wages of the participants in their subsequent work for a complete evaluation of the apprenticeship and the course-training programs.

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