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RECENT TRENDS IN UNDEREMPLOYMENT AND DETERMINANTS OF UNDEREMPLOYMENT IN TURKEY

TÜRKİYE'DE EKSİK İSTİHDAMIN YAKIN DONEMDEKİ TRENDİ VE EKSİK İSTİHDAMI BELİRLEYEN FAKTÖRLER

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ABSTRACT

Underemployment is an important problem as unemployment for most of the developing countries. This paper, by using the Household Labor Force Surveys of 2000 and 2001, aims to examine the impact of individual as well as labor market characteristics of being underemployed in Turkey. In the analysis, we employ a two-step estimation method in which we consider the sample selection problem. The analyses are carried out separately for men and women, and for urban and rural resident individuals. Our results indicate that increases in the education level seem to decrease the probability of being underemployed for both males and females. There is an inverse U-shaped relation between underemployment and age for both men and women.

ÖZET

Gelişmekte olan ülkelerin çoğu için işsizlik kadar önemli bir diğer sorun da eksik istihdamdır. Bu çalışma Türkiye'de kişisel özellikler ve işgücü piyasası özelliklerinin, eksik istihdam üzerine olan etkilerini Hanehalkı İşgücü Anketi 2000 ve 2001 verilerini kullanarak incelemeyi amaçlamaktadır. Çalışmada iki aşamalı tahmin metodu kullanılmış ve analizler hem cinsiyet, hem de ikamet yeri ayırımına göre yapılmıştır. Çalışmanın bulguları, hem erkekler hem de kadınlar için, eğitim düzeyi arttıkça eksik istihdam olasılığının düştüğünü göstermektedir. Ayrıca, her iki cinsiyet için de, yaş ile eksik istihdam olasılığı arasında ters-U ilişkisi gözlemlenmektedir.

Underemployment, sample selection, Gender, Turkey
Eksik Istihdam, Örnek Seçimi, Cinsiyet, Türkiye

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1. INTRODUCTION

Over the last decades, a great number of theoretical as well as empirical studies have been done to analyze the dynamics of labor markets. Underemployment as well as unemployment in developed and developing countries have been the focus of researchers. There are a great number of studies on this important topic, such as Kritz and Ramos (1976), Lauterbach (1977), Gafar (1980), Morrison and Lichter (1988), Eaton (1992), Nord and Sheets (1990), Ruiz-Quintanilla and Claes (1996), Jensen et al. (1999), Lester and McCain (2001), Winefield (2002), Görg and Strobl (2003), and Dhanani (2004). However, there are only a few studies on this subject about Turkey, such as Kasnakoğlu (2002) and Tunalı (2003)[2]. To our best of knowledge, this is the first study that investigates the determinants of underemployment in Turkey by using Heckman (1976)'s two-step estimation method.

"For countries in which no unemployment insurance[3] exits and the self-employed and unpaid family workers constitute a large portion of the employed, the concept of underemployment becomes as important as unemployment" (SIS 2001a: XXVII). Therefore, the problem of underemployment is mainly seen in developing countries like Turkey. Hussmanns et al. (1990:121) supports this by stating that "underemployment has particular relevance in developing countries, notably in connection with agriculture". They also argue for the developing countries that "… the employment situation cannot be fully described by unemployment data alone and should be supplemented with data on underemployment" (p.122). Similar arguments for Turkey can be seen in Özel and Mehran (1992:16). Further, Yeh (2001:2) states that underemployment may generate considerable "distress and hardship" on the persons for the reason that it is frequently "related to marginal work." He also states that "the investigation of the prevalence and the determinants of underemployment have significant policy implications in social welfare research and social policy" (p.2). Hence, determining the main characteristics of the individuals who are most likely to be underemployed is as crucial for those who are unemployed (SIS 2001a: XXVII).

Following the arguments above, this paper examines the underemployment problem in Turkey in the following order. The data and recent trends in underemployment in Turkey are briefly discussed in Section 2. Section 3 provides the econometric model. Section 4 presents the results initially by considering the gender difference and then by residence difference. The final section provides the concluding remarks.

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[2] Tunali (2003) briefly discusses this issue in his report on labor market in Turkey.

[3] The unemployment insurance system is relatively new in Turkey; the first payment was made in February 2002. The coverage of the system is still quite low in comparison to the total number of unemployed individuals. For example, the average number of individuals who were paid unemployment insurance in the first quarter of 2005 was about 80,000 individuals (ISKUR, 2005). This number is quite low compared to the total number of unemployed individuals, which was about 2,750,000 in the same period (SIS, 2005a).

2. DATA AND TRENDS IN UNDEREMPLOYMENT IN TURKEY

The data set used in this analysis is obtained from the Turkish Household Labor Force Survey (HLFS) which is carried out by the State Institute of Statistics (SIS). In the period between 1988 and 1999, the survey was conducted bi-annually, in April and October. After 1999, the survey has been carried out with a different sample size, application frequency, questionnaire design, and estimation dimension (SIS, 2001a). Since 2000 the survey has been carried out on a quarterly basis. The survey includes about 23,000 households in every quarter. In the empirical estimation part of the study, we use the individual level data of the first and second quarters of 2000 and 2001 of the HLFSs. This data set is nationally representative and covers rich information about all individuals in the household. The data includes the following concepts. These are unemployment, employment, underemployment, discouraged workers, marginal worker, seasonal workers, working hours, economic activity, occupation, employment status, unemployment duration, job search method, education level, age, gender and marital status (SIS, 2001a: XXI). The data does not give information about wages or unearned income, which is the main shortcoming of the HLFS survey.

In the HLFS, an individual is considered to be employed if he or she is aged 15 or over who during the reference period were economically active "as regular employee, casual employee, employer, self-employed or family worker" for at least one hour (SIS 2001a:XXIII). In this definition, individuals "with a job, who did not work during the reference period for various reasons but have a job attachment" are also included (SIS 2001a:XXIII). In the definition of underemployment, two main groups of employed persons are included. The first group is the involuntary part-time workers. An individual is considered to be an involuntary part-time worker if he or she "works less than 40 hours because of economic reasons[4] during the reference period and are able to work more at their present job" (SIS, 2001a:XXIV). The second group covered in the underemployment definition of SIS inclusive of the individuals who want to change his/her current job due to an inadequate income or because the job does not match their skills properly (SIS, 2001a; Kasnakoğlu, 2002 and Tunali, 2003:54). The latest part of the underemployment can be considered as an approximation to invisible underemployment. Our objective in this section is to shed some light on underemployment problem in Turkey by considering the following aspects. These are gender, residence, geographical region, age, education, economic activity and types. Prior to this let us compare the movements of unemployment and underemployment with the country's performance. For doing this, we plot the GNP growth rates in Figure 1, and the unemployment and underemployment rates for both males and females in Figure 2 for the period between 1988 and 2004. It is known that the Turkish economy

[4] Economic reasons can be classified as follows: i) work slowdown owing to technical or economic reasons, ii) non-availability of work, iii) could not find full-time job, iv) the job has just started or has come to an end during the last week (SIS, 2001a).

experienced a number of serious economic and financial crises[5] throughout this period. Therefore, we observe near zero or negative growth rates for these years. If we look at the movements of unemployment, underemployment, and GDP growth rates together, we observe that the effects of early crises, in 1991 and 1994, are mostly seen in the underemployment rates of both males and females, rather that the unemployment figures. However, the reverse is seen in the last two economic crises, in 1999 and 2001.

Figure 3 depicts the underemployment rates calculated under the definition used by SIS for both urban and rural resident individuals separately by considering gender difference. Under the examination period of 1988 to 2004 the underemployment rates for males (females) in urban areas have varied between 4.1 (2.3) and 9.45 (7.4) percent, with having its maximum in 1999 (1994) and its minimum in 2004 (2004) (SIS Database, 2004). We observe from the Figure 3 that there is no increasing or decreasing trend in the underemployment rate until 1999, for each gender and residence. The considerable decrease in the underemployment rate after 2000 can be explained by "the methodological changes in the Household Labor Force Surveys in the form of shorter and moving reference periods, larger sample size and higher response rates" (Kasnakoğlu, 2002:146). Further, it is seen from the Figure 3 that for most of the years the underemployment rate in urban areas is larger than rural. But the difference of rural and urban in the underemployment rates is smaller than the difference in the unemployment rate (Taşçı, 2005). A further observation from the Figure 3 is that the rate of underemployment for male is always larger than the rate for women, for both urban and rural residents. One more observation is that the rate for men in rural areas is always larger than the rate for urban areas. In contrast to men, the underemployment rate for women in urban areas is always larger than rural areas.

[5] Tunali (2003:3) states these four shocks as follows. The first one was due to the negative effects of the "Gulf War" in 1991. The second one was owing to the problems related to "the Government's handling of public sector borrowing" in 1994. There are two factors behind the "third crisis" that occurred in 1999. These are "the lagged impact of the Russian crises" and the two earthquakes happened in the Marmara region. The last crisis was "the severest economic crisis in Turkey since the 1950s. Financial markets came to the brink of collapse in November, but the actual crash came in February 2001" (Tunali, 2003:3).

Figure 1: Trends in GNP Growth, 1988-2004[6]

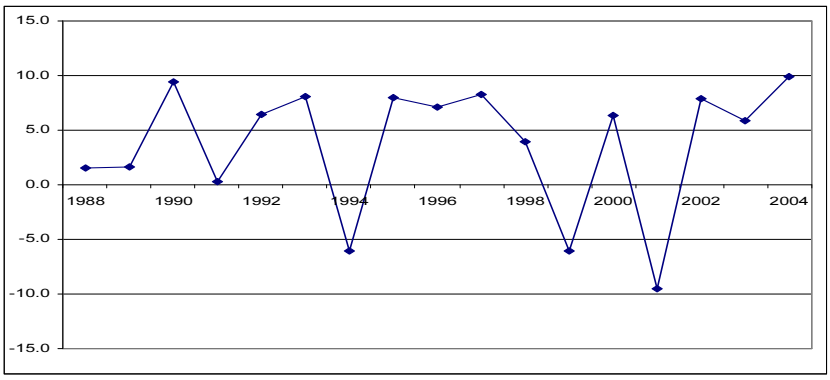


Figure 2: Trends in Unemployment(U) and Underemployment (UE) by Gender in Turkey, 1988-2004.

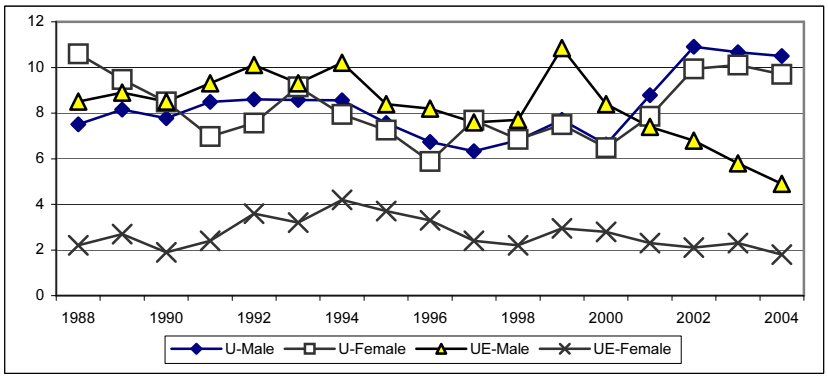
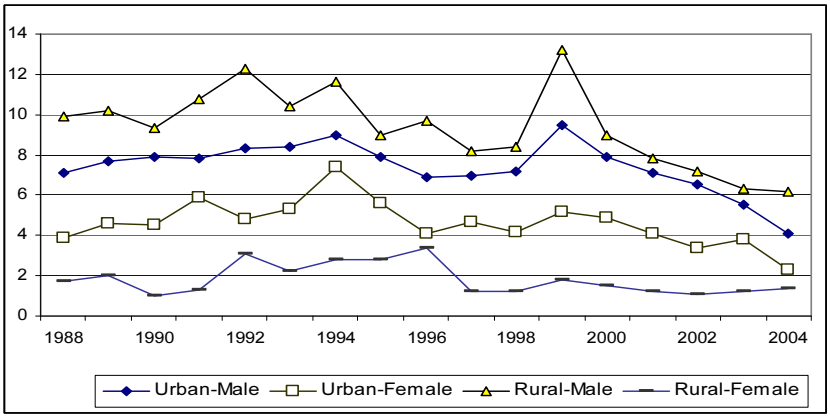


Figure 3: Underemployment Rate by Gender and Residence, 1988-2004

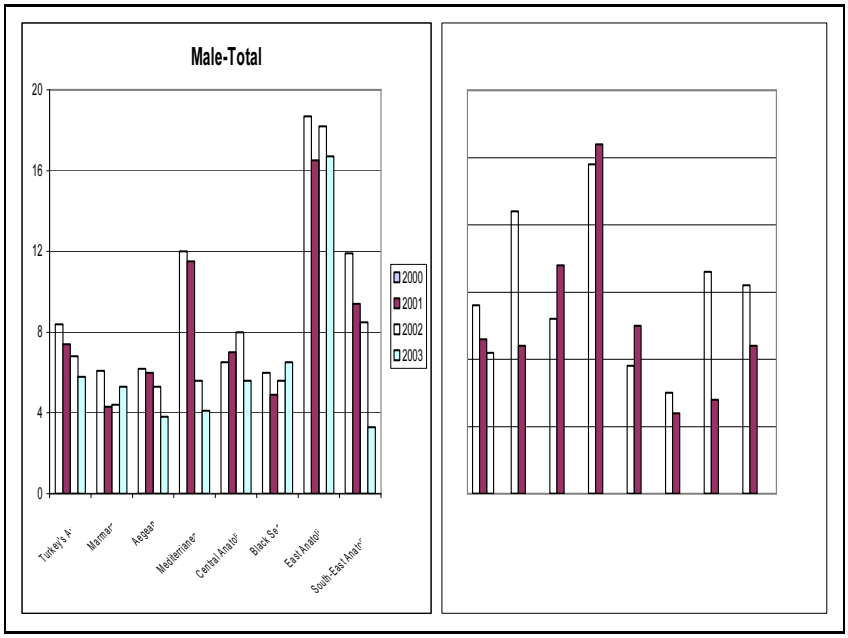


Source: SIS Database (2004), SIS (2005b).

[6] Computed from the website of "Turkish Treasury", i.e., see: *www.hazine.gov.tr*.

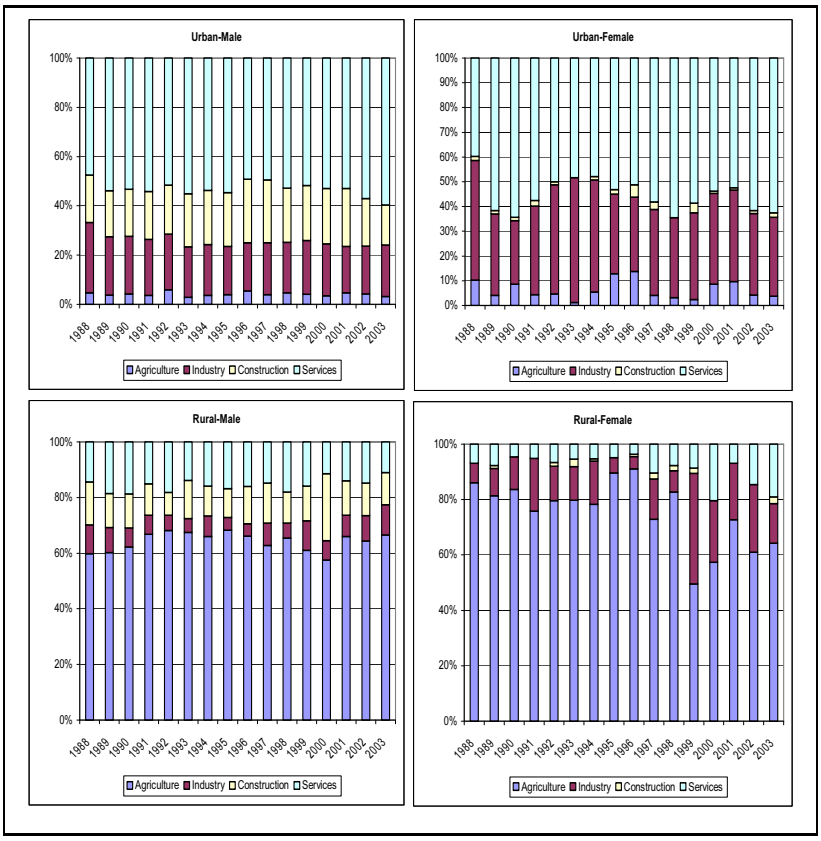
Figure 4 depicts the underemployment by geographical regions of Turkey over the period 2000-2003[7]. We observe from Figure 4 that the male underemployment rate in East and South-East Anatolia is higher than Turkey's average in our observation period, except South-East Anatolia in 2003. Further, the trend in the underemployment rates is a declining one for males residing in the Aegean, Mediterranean and South-East Anatolia regions men, as for Turkey's average. The decreases in underemployment rates are quite large in magnitude: They decline from 12.0 percent to 4.1 for the Mediterranean, and from 11.9 to 3.3 percent for the South-East Anatolia region in the years between 2000 and 2003 (SIS Database, 2004). In contrast to the country's trend, the trends for men in Central Anatolia and Black Sea regions show an increasing trend for much of the period. Moreover, underemployment rate for females in the most developed regions of Turkey, i.e., Marmara and Aegean, are higher than the country average for females for much of the observation period. Similar to men, in contrast to country's trend, the trends for women in Marmara and Central Anatolia show a rising tendency in the majority of our examination period. Finally, for both males and females, the underemployment rates in 2000 and 2001 are greater than the country average in the Mediterranean region. The reverse is observed in the last two years of our examination period.

Figure 4: Underemployment Rates by Geographical Region & Gender: 2000-2003



activity over the examination period of 1988 and 2003 for the urban and rural men and women separately. We observe from Figure 4 that services sector has the highest share in underemployment in the urban areas regardless of gender. The share of services sector in some years for females is larger than the share for men. The industry sector with about 30 percent share has been the second most important sector in the underemployment of female in the period between 1988 and 2003. As expected, the smallest share is observed in agriculture for males, and in construction for females in urban areas for this period. However, the industry and construction sectors, with no clear difference, have the second highest share in the underemployment of urban males. In contrast to urban areas, the share of agriculture in rural areas is the largest one for both males and females.

Figure 5: Underemployment by Economic Activity 1988-2003



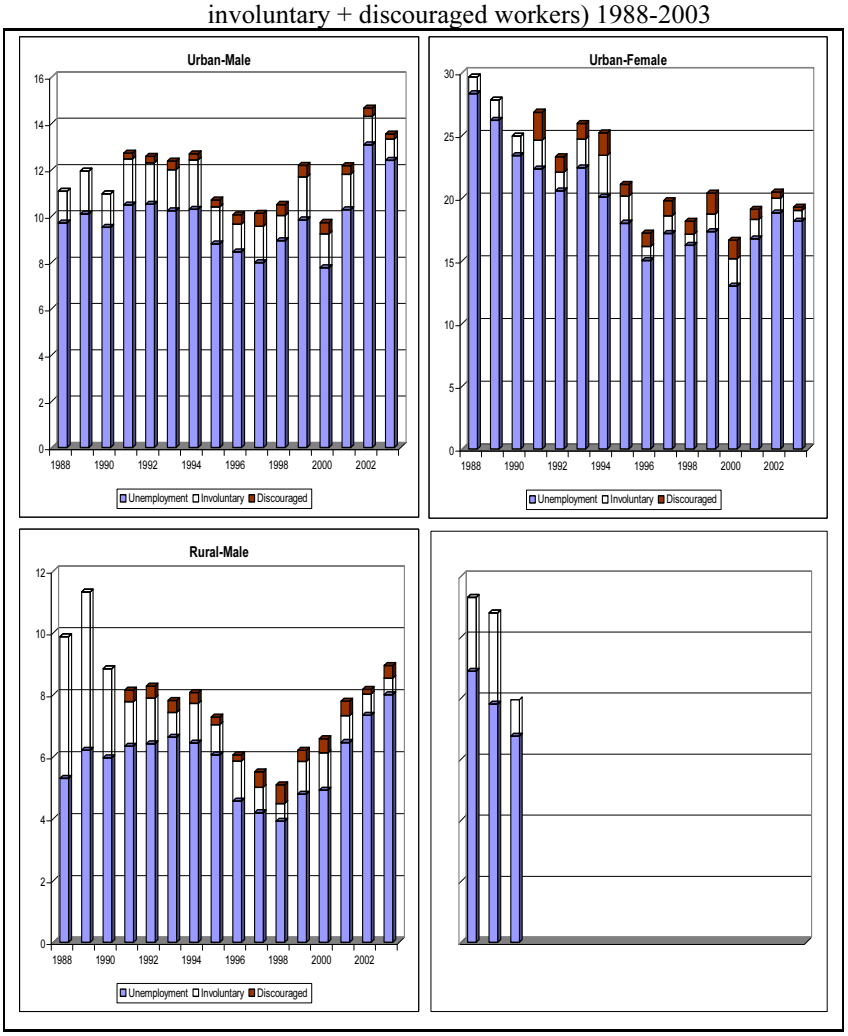
Source: SIS Database, as reported in Taşçı (2005).

Gürsel and Ulusoy (1999:69) affirm that the "comparison of Turkey with other countries is difficult with regards to underemployment characteristics". There may be two or three reasons for this. The first is, as stated by Rittenhouse (1968:37) "the concept of underemployment has as yet no generally agreed definition[8]." Therefore direct comparison of the data sets may not be possible. Another fact, as stated in SIS (2001a:XXII), is that in countries like Turkey with non (or limited) existence of unemployment insurance unemployment is a "luxury". Therefore, individuals, may have "to accept any available job offer" with out taking into account its salary and quality (SIS, 2001a:XXII). In contrast to developing countries, in the developed world availability of unemployment benefits or insurance makes it possible for the unemployed individuals to wait until a suitable job is found (Gürsel and Ulusoy (1999:69)[9]. Underemployment, therefore, mostly exists in the non-developed or developing countries.

In the final part of this section we initially depict the underemployment rates for Turkey over the period of 1988 and 2003, but now using the definition employed by the OECD. We then make a comparison of the underemployment averages with some of the OECD countries. The definition of underemployment used by SIS is different from the definition used by the OECD. In addition to involuntary part-time workers, OECD's definition of underemployment includes unemployed individuals plus discouraged workers (Tunali, 2003). Discouraged workers are the individuals who are available to start a work but give up searching for a work due to the following reasons. The first is that they do no not know where to search. The second reason is that they think that there is no job available for them in the area they live (SIS, 2001a). In Figure 6, we depict the underemployment rate by using the definition employed by the OECD rather than using the SIS definition. Note that because the data on discouraged workers are available after 1990, the effects of this group are zero until 1991. We observe from Figure 6 that the contribution of involuntary part-time workers to underemployment is larger than that of the discouraged workers for males regardless of whether they reside in urban or rural areas. The same conclusion seems to hold also for urban females, with a few exceptions, but not for the rural residents in which, in most of the years, the discouraged workers have a larger contribution than the involuntary part-time workers.

[8] See also Tunalı (2003:55).
[9] See also SIS (2001a:XXII).

Figure 6: Underemployment OECDs Definition (unemployment + involuntary + discouraged workers) 1988-2003



all years, is two times larger than that for men (see Figure 6). One more observation is that the discouraged worker effect for females residing in rural areas is two times greater than that for those in urban areas for much of the period in question. Furthermore, in the last four years of our observation period, the contribution of both involuntary part-time workers and discouraged workers decline in contrast to increasing trend of unemployment for both urban resident males and females. The same trend is not observed for the rural areas. Hence, the effects of the 2000-2001 crises are mostly seen in the unemployment rates of both men and women. In contrast to our expectation, the share of discouraged workers in the labor force does not seem to increase during the most recent (2000-2001) and past economic crises (1994).

Table 1: Underemployment in OECD Countries[10] in 2000s

	MEN				WOMEN			
Country	Unemployment Rate	Involuntary Part-time	Discouraged	Total	Unemployment Rate	Involuntary Part-time	Discouraged	Total
Australia	6.47	4.55	0.33	11.35	5.89	8.94	0.96	15.79
Austria	3.70	0.39	0.03	4.12	3.91	1.93	0.57	6.41
Denmark	3.97	0.72	0.07	4.76	4.69	2.94	0.00	7.63
Finland	8.92	1.42	1.28	11.61	9.78	5.00	1.24	16.02
France	7.82	1.03	0.03	8.88	10.91	3.98	0.00	14.89
Germany	8.00	0.73	0.07	8.80	8.12	2.97	0.21	11.30
Greece	6.74	0.77	0.03	7.54	15.55	2.30	0.44	18.30
Netherlands	2.47	0.21	0.23	2.92	3.05	1.00	0.82	4.88
New Zealand	4.37	2.03	0.74	7.14	5.41	5.32	0.41	11.14
Norway	4.41	0.56	0.25	5.22	3.56	1.44	0.43	5.43
Hungary	6.49	0.24	2.89	9.62	5.35	0.59	2.34	8.28
Czech Republic	6.66	0.16	0.10	6.93	9.83	0.95	0.12	10.90
Slovak Republic	19.11	0.08	n.a.	19.19	18.67	0.66	n.a	19.33
Spain	8.33	0.48	n.a.	8.82	17.36	2.73	n.a	20.09
Sweden	5.70	1.48	1.57	8.74	4.90	4.62	1.63	11.14
Switzerland	2.27	0.54	n.a.	2.81	3.22	1.21	n.a	4.43
Turkey	8.67	0.05	0.38	9.10	7.73	0.02	0.59	8.35
United Kingdom	5.66	1.14	0.24	7.04	4.44	2.28	0.21	6.92
Canada	7.52	2.79	0.26	10.57	6.87	6.34	0.27	13.49
United States	4.88	n.a	0.31	5.19	4.79	n.a	0.27	5.06
G7 Av.	5.91	0.76	0.45	7.12	6.22	1.85	1.14	9.22
OECD Av.	**6.04**	**0.58**	**0.38**	**7.00**	**6.78**	**2.06**	**0.96**	**9.80**

Source: OECD Database (2005).
Note: n.a.: not available.

Table 1 shows the underemployment rates with their components for some of the OECD countries in 2000s for men and women separately. We observe from Table 1 that the rate of underemployment for women in most of the countries is greater than that for men, except for Hungary, Turkey, UK and USA. Similarly, involuntary part-time work is mostly seen among women in the countries examined, except Turkey. Further, for most countries

[10] The values are the average of 2000, 2001 and 2002. The values of discouraged workers and involuntary part-time workers for Turkey are obtained from the SIS database (2005). The other remaining figures in the Table are calculated from the OECD database (2005).

unemployment has the highest share among the other components of underemployment, with the exception of Australian women. Likewise, in the majority of the OECD countries discouraged workers have the smallest share of underemployment with a few exceptions. We further observe that the values of involuntary part-time workers and discouraged workers for Turkey are, in general, lower than those for the other OECD countries examined and for the G-7 countries' averages, for both males and females.

In the remaining parts of the article, we provide the econometric model and then analyze the determinants of underemployment in Turkey using the HLFS data of 2000 and 2001.

3. MODEL

From the definition above we know that to be considered as underemployed (UE) an individual should be employed (E); in other words the underemployment problem is observed only for individuals who work. Therefore, there exists a potential sample selection problem and any estimates based only on the "employment" criterion may be biased. This problem can be solved by using a Heckman (1979) type two step procedure. Hence, in the present paper, the effects of individual and labor market characteristics on becoming underemployed are estimated using selectivity-corrected probit regressions.

The model for the first-step estimation, i.e., for the employment choice can be written as:

$$E_i^* = \beta_1' X_{i1} + \varepsilon_{i1}; \text{ where } \varepsilon_{i1} \sim N(0,1) \quad (1)$$

where E_i^* is a dummy variable which takes the value of 1 if the individual is employed, zero otherwise; β_1 is a parameter vector; X_{i1} is a vector of covariates for individual *i*; and finally, ε_{i1} is a normally distributed error term with a zero mean and unit variance.

The model for the second step, i.e., for the underemployment observation, can be written as:

$$UE^* = \beta_2' X_{i2} + \varepsilon_{i2} \quad (2)$$

where $UE^* = UE$ can only be observed if $E_i^* > 0$, and $(\varepsilon_{i1}, \varepsilon_{i2}) \sim$ bivariate normal $[0,0,1,\sigma_{\varepsilon 2},\rho]$ where $\sigma_{\varepsilon 2}$ is the covariance of ε_{i1} and ε_{i2}. Thus, the model becomes:

$$E[UE|E_i^*=1] = \beta_2' X_{i2} + \rho\sigma_{\varepsilon 2}\lambda(\beta_1' X_{i1}) \quad (3)$$

Estimation of the model is carried out in the following way. In the first step we estimate the model by the maximum likelihood estimation method and obtain the estimates of β_1. In this step we also obtain $\hat{\lambda}_i = \phi(\hat{\beta}_1 X) / \Phi(\hat{\beta}_1 X)$ and[11] $\delta_i = \hat{\lambda}_i(\hat{\lambda}_i + \hat{\beta}_1 X)$ for every

[11] where ϕ and Φ stand for the standard normal density and distribution functions, in that order.

observation in the selected sample (Greene, 1997: 978). In the second step we estimate the selectivity-corrected final model, i.e., probit model again, by maximum likelihood by regressing UE^* on X_{i2}'s and $\hat{\lambda}_i$ (Greene, 1997:978; and Baltagi, 2001:386-389).

4. ESTIMATION RESULTS[12]

In the following sections, we provide the two-step estimation results by gender and residence[13]. Table 2 presents the second step[14] estimation results by gender and residence, respectively. In the tables we estimate the effects of various characteristics such as age, marriage, education and occupation on underemployment of selected groups.

4.1 Estimation Results by Gender

In this part we analyze the determinants of underemployment of men and women separately. The estimation results for the "full" data as well as for the data by "gender" are provided in Table 2. We observe from the "full" data estimates that there are statistically significant differences between men and women. Women, for example, are less likely to become underemployed compared to men. The results for the "full" data also show that "urban" resident individuals are more likely to become "underemployed" compared to "rural" resident individuals. The conclusion does not change if we look at the estimation results under gender separation.

We further observe that married women are less likely to become underemployed. The effects of marriage seem to be negative but statistically insignificant in the men's equation. Furthermore, the estimation results for the region dummies indicate that there is significant regional variation. We observe from the "full" data estimates that individuals in the Marmara and Aegean region are less likely to become underemployed, while individuals in the Mediterranean, East Anatolia and South-East Anatolia are more likely to become underemployed. In terms of the results under gender separation we observe somewhat different results for men with respect to women. For men, we find that while the Marmara residents are less likely to become underemployed, residents in the Mediterranean, East Anatolia and South-East Anatolia regions are more likely to become underemployed. For women, we observe that while living in East Anatolia increases the probability of becoming underemployed, living in the most developed regions of Marmara

[12] In order to check the sensitivity of the results to the exclusion of some variables from the model we have estimated six alternative models for each of the cases. These alternative models excluded some groups of the covariates from the models, such as occupation, status in employment and number of earners. However, our general conclusions generally did not change. We therefore provide the estimation results with the full alternative explanatory variables. The other alternative estimates are available from the author in request.

[13] List of the variables used in the analysis is provided in Appendix Table 1. Further, means and standard deviations of the variables used in the underemployment equation is provided in Appendix Table 2.

[14] The estimation results for the "selection" equations for each of the alternative models are provided in Appendix Table 3.

and Aegean decreases this probability.

Moreover, in terms of the effects of education level we observe from Table 2 that increases in the education level seems to decrease the probability of becoming underemployed. The conclusion seems not to change when we consider the estimation results under gender separation. Regarding the effects of age group in the "full" data case, we observe that while the individuals in their "early career period", i.e., age groups of "20-24" and "25-34" are more likely to become underemployed, the individuals in their "late career" period, i.e., age groups of "45-54" and "55 plus" are less likely to become underemployed, compared to the youngest ones, i.e., the "15-19" age group. Hence, the probability of becoming underemployed seems to initially increase with age and then returns to decrease, i.e. that there is an inverse U-shape relation between age and underemployment and the relation is most clear in the male's equation. We further observe that, as expected, the individuals who live in the high unemployment areas are more likely to become underemployed.

Regarding the effects of the occupation dummies we find that there is a significant difference between the base category of professional and related workers (occup1) and other occupation groups, except administrative and managerial workers (occup2), clerical and related workers (occup3) and non-agricultural workers (occup7). The individuals in the other occupation groups (occup4, occup5 and occup6) are more likely to become underemployed. The conclusion seems to hold for men, but changes slightly for women. Female workers in the "not classified by occupation group" (i.e., occup8) are also more likely to become under employed in addition to the female workers in the occupation groups of occup4, occup5 and occup6 (see Table 2).

Once we control for the status in employment, as shown in Table 2, we observe for both genders that individuals working as "casual employee (statu2)", "self-employed (statu5)", "unpaid family workers (statu6)" are more likely to become underemployed compared to the "regular employees". Men and women differ for following employment statuses. While women working as "paid family workers (statu3)" are more likely to become underemployed, men working as "employer (statu4)" are less likely to become underemployed.

To capture the family responsibility of the individuals we included the "head of household", dummy which takes the value of one if the individual is the head of the household. We observe from the "full" data case that being the head of the household seems to decrease the probability of becoming underemployed. The same conclusion, as expected, holds for men, but not for women, since men are the traditional breadwinners of the household. To capture income support from the family we included the number of earners as an explanatory variable in the underemployment equation. We observe from all of the estimation results that this variable does not have any significant effect on becoming underemployed, even though it is in the expected sign for men, but not for women.

4.2 Estimation Results by Residence

Estimation results for urban and rural residents are also provided in Table 2. We observe from the table that women, whether they are in urban or rural areas, are more likely to become underemployed. But a statistically significant difference is observed only in the urban areas. Marriage seems to decline the likelihood of being underemployed for women residing in urban and rural areas, and for men in rural areas.

We further observe that residents of both urban and rural areas of the Mediterranean and East Anatolia regions are more likely to be underemployed compared to Central Anatolia. However, while rural-resident individuals in the Marmara (and Aegean at 10 percent significance level) region are less likely to be underemployed, rural-resident individuals in the Mediterranean, East Anatolia and South-East Anatolia are more likely to be underemployed.

Regarding the estimation results about the effects of education on being underemployed we observe for both urban and rural resident individuals that educated individuals are less likely to be underemployed compared to non-graduates, with the exceptions of middle school, vocational high school and two-year university graduates in the urban areas. With regard to the effects of age dummies, we observe for both urban and rural resident individuals that, as we found in the previous section, there is an inverse-U shaped relation between underemployment and age. The probability of being underemployed initially increases with age, until it reaches the 35-44 age group for urban and 25-34 age group for rural areas, and then proceeds to decline. Regarding the effects of the unemployment rate we found, again the expected result that individuals in provinces with high unemployment are more probable to be underemployed, regardless of whether they live in urban or rural areas.

We further observe that while there is no significant variation between the occupational groups in the urban areas, there are significant differences between them in the rural areas. The individuals in the following occupation groups are more likely to be underemployed compared to the "professionals and related workers". These are "sales workers (occup4), "service workers (occup5)", "agricultural workers (occup6)" and "non-agricultural workers (occup7)".

Concerning the effects of status in employment, we find that individuals working as casual employee, paid family workers and those who are self-employed are more likely to be underemployed compared to regular employees in both urban and rural areas. Further, while unpaid family workers are more likely to be underemployed in the rural areas, employer are less likely to become underemployed in the urban areas. As expected, being the head of a household seems to decrease the probability of being underemployed for both urban and rural individuals. Moreover, in contrast to our expectation the number of earners within the family seems to decrease the probability of being underemployed in the urban areas.

Table 2: Selectivity Corrected Estimation Results All, by Gender, and by Residence Difference

Variables	FULL-DATA	MALE	FEMALE	URBAN	RURAL
urban	0.139***	0.106***	0.370***		
	[0.020]	[0.022]	[0.058]		
female	-0.229***			-0.721***	-0.025
	[0.029]			[0.057]	[0.035]
FemMar	-0.350***			-0.134***	-0.003
	[0.044]			[0.048]	[0.034]
married	-0.022	0.004	-0.310***	-0.363***	-0.249***
	[0.027]	[0.029]	[0.051]	[0.084]	[0.055]
Marmara	-0.103***	-0.109***	-0.131**	-0.02	-0.135***
	[0.025]	[0.028]	[0.066]	[0.056]	[0.029]
Aegean	-0.059**	-0.043	-0.191**	-0.083	-0.067*
	[0.029]	[0.032]	[0.075]	[0.055]	[0.034]
Mediterrian	0.203***	0.226***	0.055	0.234***	0.170***
	[0.027]	[0.029]	[0.072]	[0.055]	[0.031]
BlackSea	-0.022	-0.019	-0.07	-0.05	-0.026
	[0.028]	[0.031]	[0.070]	[0.053]	[0.033]
EastAnatolia	0.522***	0.570***	0.233***	0.631***	0.445***
	[0.027]	[0.029]	[0.084]	[0.047]	[0.035]
SouthEastAnatolia	0.108***	0.135***	-0.088	0.062	0.113***
	[0.030]	[0.032]	[0.098]	[0.062]	[0.035]
PrimarySchool	-0.123***	-0.185***	-0.153***	-0.094**	-0.211***
	[0.026]	[0.031]	[0.058]	[0.047]	[0.034]
MiddleSchool	-0.228***	-0.320***	-0.107	-0.077	-0.350***
	[0.033]	[0.037]	[0.086]	[0.063]	[0.040]
HighSchool	-0.390***	-0.501***	-0.219**	-0.273***	-0.513***
	[0.035]	[0.040]	[0.088]	[0.072]	[0.042]
VocHighSchool	-0.289***	-0.404***	-0.069	-0.01	-0.440***
	[0.041]	[0.046]	[0.098]	[0.090]	[0.048]
TwoyearsUniv	-0.294***	-0.405***	-0.172	0.134	-0.504***
	[0.064]	[0.074]	[0.140]	[0.157]	[0.073]
Univ4pl	-0.505***	-0.647***	-0.314**	-0.586***	-0.659***
	[0.054]	[0.062]	[0.130]	[0.196]	[0.061]
age2024	0.145***	0.164***	0.042	0.242***	0.103***
	[0.028]	[0.032]	[0.062]	[0.050]	[0.035]
age2534	0.101***	0.092***	0.054	0.139**	0.065*
	[0.030]	[0.035]	[0.067]	[0.054]	[0.037]
age3544	-0.05	-0.065*	-0.069	0.006	-0.089**
	[0.033]	[0.038]	[0.076]	[0.063]	[0.040]
age4554	-0.278***	-0.285***	-0.363***	-0.258***	-0.269***
	[0.037]	[0.042]	[0.092]	[0.070]	[0.044]
age55pl	-0.527***	-0.581***	-0.457***	-0.569***	-0.445***
	[0.046]	[0.053]	[0.120]	[0.084]	[0.058]
unemprate	1.780***	1.764***	1.747***	1.195***	1.913***
	[0.215]	[0.233]	[0.613]	[0.393]	[0.263]
occup2	0.086	0.123*	-0.421	-0.139	0.102
	[0.069]	[0.073]	[0.334]	[0.220]	[0.073]
occup3	0.002	-0.093	0.115	-0.176	-0.024
	[0.051]	[0.061]	[0.097]	[0.170]	[0.054]
occup4	0.228***	0.236***	0.274**	0.046	0.224***
	[0.046]	[0.051]	[0.107]	[0.146]	[0.049]
occup5	0.225***	0.176***	0.376***	0.088	0.203***
	[0.048]	[0.052]	[0.114]	[0.144]	[0.050]
occup6	0.130***	0.224***	-0.207*	0.064	0.203***
	[0.049]	[0.054]	[0.115]	[0.139]	[0.057]
occup7	0.259***	0.226***	0.418***	0.242*	0.229***
	[0.045]	[0.048]	[0.106]	[0.137]	[0.047]
occup8	0.129	0	0.495***	0.352	0.061
	[0.088]	[0.105]	[0.178]	[0.222]	[0.097]
statu2	0.882***	0.857***	1.095***	0.937***	0.861***
	[0.020]	[0.021]	[0.062]	[0.053]	[0.022]
statu3	1.146***	NA	1.107***	1.602***	0.895***
	[0.099]		[0.112]	[0.350]	[0.104]
statu4	-0.291***	-0.329***	0.057	-0.031	-0.343***
	[0.041]	[0.043]	[0.202]	[0.113]	[0.045]
statu5	0.403***	0.299***	0.837***	0.333***	0.413***
	[0.022]	[0.024]	[0.067]	[0.054]	[0.025]
statu6	0.166***	0.276***	0.373***	0.302***	0.028
	[0.031]	[0.035]	[0.070]	[0.062]	[0.044]
numearners	-0.003	-0.013	0.017	-0.009	-0.032***
	[0.008]	[0.010]	[0.020]	[0.012]	[0.012]
head	-0.098***	-0.063**	0.063	-0.134***	-0.069**
	[0.027]	[0.030]	[0.072]	[0.050]	[0.034]
year2001	-0.142***	-0.129***	-0.216***	-0.124***	-0.143***
	[0.014]	[0.015]	[0.036]	[0.027]	[0.016]
Q2	-0.006	-0.014	0.045	-0.129***	0.028*
	[0.014]	[0.015]	[0.037]	[0.029]	[0.016]
mills	0.135***	0.127***	0.139**	0.02	0.092***
	[0.030]	[0.038]	[0.058]	[0.068]	[0.034]
Constant	-1.737***	-1.634***	-2.227***	-1.503***	-1.453***
	[0.078]	[0.088]	[0.192]	[0.186]	[0.092]
LR chi2	6877.821	5442.53	1274.635	2465.833	4919.643
Prob>chi2	0	0	0	0	0
Psedue R-Sq	0.143	0.135	0.18	0.187	0.141
Log-Likelihood	-20616.729	-17454.688	-2899.223	-5349.151	-14990.445
Observations	82506	62599	19897	24650	57856

Standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

5. SUMMARY OF THE RESULTS AND CONCLUDING REMARKS

This paper examines the determinants of underemployment in Turkey using the Household Labor Force Survey data of 2000 and 2001. Analyses in the paper are, first carried out for men and women; and, second for urban and rural resident individuals, respectively. These analyses are performed using the definition employed by the State Institute of Statistics rather than OECD's definition. In this part we provide a summary of the main findings and observations.

Men, regardless of their residence, are more likely to be underemployed compared to women, although the difference is statistically not significant. These results in general are consistent with the macro level data obtained from the HLFS database. We further find that being married seems to decrease the probability of being underemployed for women, but not for men.

Furthermore, we find that individuals who live in the least developed region of Turkey, i.e., in East-Anatolia, are more likely to be underemployed regardless of whether they live in urban or rural areas. The same also holds for the Mediterranean residents. In these two regions, the majority of underemployed individuals were either engaged in agricultural activities or worked in the construction sector in 2000 (HLFS, 2001b).

One of the important findings of the study is that educated individuals are less likely to be underemployed compared to non-graduates. This result is, in general, consistent with the theoretical expectation that individuals with low human capital are more likely to be underemployed. The result is particularly true for individuals in urban areas and for women.

We also observe an inverse-U relationship between underemployment and age. This result is also consistent with our expectation that the probability of being underemployed initially increases with age and then decline. The effect of the unemployment rate is also in the expected direction in that increases in the unemployment rate seem to increase the probability of being underemployed.

Finally, regarding the effects of status in employment, we find that casual employees, paid family workers, the self employed and unpaid family workers are more likely to be underemployed compared to "regular" employees.

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Appendix: Table 1: List of the Variables

1. "Urban" is a dummy variable taking value 1 if a man or woman lives in a town of more than 20,000 inhabitants and 0 otherwise
2. "Female" is a dummy variable taking value 1 if the sex is female and 0 otherwise
3. "married" is a dummy variable taking value 1 if the survey respondent is married and 0 otherwise
4. "FemMar" is an interaction dummy taking value 1 if the sex is female and marital status is married and zero otherwise.
5. Region of residence is a set of seven dummies: Central Anatolia (base category), Marmara, Aegean, Mediterranean Black Sea, East Anatolia, and South East Anatolia.
6. Education consists of a set of six dummies: The reference category includes those who are illiterate plus those who are literate but did not graduate from a school. The other education categories are "Primary School", "Middle School", "High School", "Vocational High School", "Two-Year University", and "Four-Year University and over" ("Univ4pl").
7. Age is a set of six dummies:
   "age1519": Age 15-19 (base category)
   "age2024": Age 20-24
   "age2534": Age 25-34
   "age3544": Age 35-44
   "age4554": Age 45-54
   "age55pl": Age 55 and over.

8. "unemprate" is the local unemployment rate.
9. Occupation in the job (last job for the unemployed persons) consists of eight dummies: "occup1": professional and related workers (base category), "occup2": administrative and managerial workers, "occup3": clerical and related workers, "occup4": sales workers, "occup5": service workers, "occup6": agricultural workers, "occup7": non-agricultural workers, "occup8": workers not classified by occupation.
10. Status in the current job (last job for the unemployed persons) consists of six dummies: "status1": regular employee (base category), "status2": casual employee, "status3": paid family workers, "status4": employer, "status5": self employed, "status6": unpaid family workers
11. "numearners" is the number of earners in the household
12. "Head" is a dummy variable taking value 1 for the head of households, and 0 otherwise.
13. "year2001" is a dummy variable taking value 1 if the observation comes from the year of 2001, and 0 otherwise.

Variable used only in the selection into employment equation:
14. "fertsay" is the number of individuals in the household

Appendix Table 2: Means and Standard Deviations of the Variables Used in the Underemployment Models

	FULL-DATA		MALE		FEMALE		URBAN		RURAL	
Variable	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
UnderEmploed	0.085	0.279	0.099	0.298	0.043	0.203	0.075	0.264	0.090	0.286
urban	0.701	0.458	0.747	0.435	0.558	0.497	0.000	0.000	1.000	0.000
female	0.241	0.428	0.000	0.000	1.000	0.000	0.357	0.479	0.192	0.394
FemMar	0.150	0.357	0.000	0.000	0.624	0.484	0.258	0.437	0.105	0.306
married	0.745	0.436	0.783	0.412	0.624	0.484	0.752	0.432	0.741	0.438
Marmara	0.250	0.433	0.255	0.436	0.232	0.422	0.131	0.338	0.300	0.458
Aegean	0.128	0.334	0.124	0.329	0.143	0.350	0.150	0.357	0.119	0.324
MiddleAnatolia	0.137	0.344	0.140	0.347	0.127	0.333	0.133	0.340	0.139	0.345
Mediterrian	0.144	0.352	0.151	0.358	0.125	0.330	0.106	0.308	0.161	0.367
BlackSea	0.159	0.365	0.138	0.345	0.224	0.417	0.227	0.419	0.129	0.336
EastAnatolia	0.099	0.299	0.103	0.304	0.089	0.284	0.170	0.376	0.069	0.254
SouthEastAnatolia	0.082	0.275	0.089	0.285	0.061	0.239	0.082	0.274	0.083	0.275
NonGraduate	0.088	0.283	0.053	0.225	0.195	0.396	0.185	0.389	0.046	0.209
PrimarySchool	0.490	0.500	0.516	0.500	0.411	0.492	0.614	0.487	0.438	0.496
MiddleSchool	0.111	0.314	0.130	0.336	0.054	0.226	0.079	0.269	0.125	0.331
HighSchool	0.127	0.333	0.131	0.337	0.115	0.318	0.062	0.241	0.155	0.361
VocHighSchool	0.069	0.253	0.069	0.254	0.066	0.248	0.030	0.170	0.085	0.279
Twoyear Univ.	0.026	0.160	0.022	0.148	0.038	0.192	0.011	0.103	0.033	0.178
Univ4pl	0.089	0.285	0.079	0.269	0.122	0.327	0.020	0.138	0.119	0.324
age1519	0.091	0.287	0.081	0.274	0.120	0.325	0.118	0.323	0.079	0.270
age2024	0.108	0.311	0.092	0.289	0.159	0.366	0.108	0.310	0.109	0.311
age2534	0.287	0.453	0.290	0.454	0.278	0.448	0.230	0.421	0.312	0.463
age3544	0.283	0.450	0.296	0.457	0.240	0.427	0.234	0.423	0.304	0.460
age4554	0.159	0.366	0.168	0.374	0.132	0.338	0.180	0.384	0.151	0.358
age55pl	0.072	0.258	0.072	0.258	0.071	0.258	0.130	0.337	0.046	0.210
unemprate11	0.081	0.035	0.082	0.035	0.077	0.035	0.066	0.036	0.087	0.033
occup1	0.101	0.301	0.085	0.279	0.151	0.358	0.033	0.179	0.130	0.336
occup2	0.029	0.168	0.035	0.183	0.011	0.105	0.011	0.104	0.037	0.188
occup3	0.078	0.268	0.063	0.243	0.125	0.331	0.025	0.158	0.100	0.301
occup4	0.136	0.343	0.161	0.367	0.060	0.237	0.051	0.220	0.173	0.378
occup5	0.117	0.321	0.129	0.335	0.079	0.270	0.062	0.242	0.140	0.347
occup6	0.226	0.418	0.157	0.364	0.443	0.497	0.654	0.476	0.044	0.204
occup7	0.304	0.460	0.362	0.481	0.123	0.329	0.159	0.366	0.366	0.482
occup8	0.009	0.092	0.009	0.094	0.008	0.087	0.004	0.064	0.011	0.102
statu1	0.468	0.499	0.482	0.500	0.426	0.495	0.180	0.384	0.591	0.492
statu2	0.102	0.302	0.118	0.322	0.052	0.221	0.076	0.265	0.113	0.316
statu3	0.003	0.051	0.000	0.013	0.010	0.101	0.001	0.025	0.003	0.059
statu4	0.065	0.246	0.082	0.274	0.011	0.103	0.022	0.148	0.083	0.275
statu5	0.218	0.413	0.247	0.431	0.125	0.331	0.343	0.475	0.164	0.371
statu6	0.145	0.352	0.071	0.257	0.376	0.484	0.378	0.485	0.045	0.208
numearners	1.920	1.226	1.747	1.131	2.461	1.350	2.591	1.587	1.633	0.892
head	0.573	0.495	0.733	0.442	0.070	0.256	0.442	0.497	0.629	0.483
year2001	0.495	0.500	0.497	0.500	0.491	0.500	0.500	0.500	0.493	0.500
Q2	0.525	0.499	0.517	0.500	0.552	0.497	0.556	0.497	0.512	0.500
N	82506		62609		19897		24650		57856	

Appendix: Table 3: Estimation Results for the "Selection into Employment" Equation

Variables	FULL-DATA	MALE	FEMALE	URBAN	RURAL
urban	-0.105***	0.072***	-0.417***		
	[0.013]	[0.017]	[0.022]		
female	-0.330***			-0.211***	-0.347***
	[0.017]			[0.037]	[0.020]
FemMar	-1.031***			0.542***	0.682***
	[0.028]			[0.042]	[0.026]
married	0.603***	0.643***	-0.510***	-0.412***	-1.322***
	[0.022]	[0.026]	[0.023]	[0.055]	[0.034]
Marmara	-0.154***	-0.081***	-0.347***	-0.347***	-0.105***
	[0.016]	[0.020]	[0.028]	[0.035]	[0.018]
Aegean	-0.107***	-0.077***	-0.230***	-0.293***	-0.013
	[0.018]	[0.023]	[0.031]	[0.034]	[0.022]
Mediterrian	-0.007	0.058**	-0.147***	0.121***	0.009
	[0.018]	[0.023]	[0.033]	[0.040]	[0.021]
BlackSea	-0.087***	-0.125***	-0.155***	-0.016	-0.069***
	[0.018]	[0.023]	[0.030]	[0.034]	[0.022]
EastAnatolia	0.231***	0.269***	0.228***	0.237***	0.262***
	[0.021]	[0.026]	[0.038]	[0.036]	[0.027]
SouthEastAnatolia	0.233***	0.301***	0.107**	0.219***	0.267***
	[0.022]	[0.027]	[0.042]	[0.045]	[0.026]
PrimarySchool	-0.094***	0.089***	-0.095***	-0.119***	0.091***
	[0.017]	[0.024]	[0.025]	[0.028]	[0.023]
MiddleSchool	-0.072***	-0.01	0.005	-0.195***	0.120***
	[0.021]	[0.028]	[0.039]	[0.044]	[0.027]
HighSchool	0.269***	0.232***	0.625***	0.211***	0.440***
	[0.022]	[0.030]	[0.036]	[0.050]	[0.027]
VocHighSchool	0.615***	0.477***	1.113***	0.851***	0.770***
	[0.025]	[0.034]	[0.041]	[0.063]	[0.030]
TwoyearsUniv	1.496***	1.103***	2.144***	1.941***	1.655***
	[0.035]	[0.051]	[0.052]	[0.106]	[0.040]
Univ4pl	1.847***	1.433***	2.521***	2.339***	1.997***
	[0.026]	[0.038]	[0.040]	[0.088]	[0.031]
age2024	0.183***	0.198***	0.208***	0.086**	0.160***
	[0.020]	[0.025]	[0.032]	[0.041]	[0.023]
age2534	0.592***	0.642***	0.509***	0.396***	0.613***
	[0.021]	[0.028]	[0.033]	[0.042]	[0.024]
age3544	0.573***	0.569***	0.498***	0.423***	0.566***
	[0.023]	[0.032]	[0.035]	[0.046]	[0.026]
age4554	-0.301***	-0.481***	-0.120***	-0.145***	-0.435***
	[0.024]	[0.033]	[0.039]	[0.048]	[0.028]
age55pl	-1.125***	-1.408***	-0.457***	-0.855***	-1.378***
	[0.026]	[0.035]	[0.044]	[0.050]	[0.032]
unemprate	-1.136***	-1.867***	0.302	-0.546*	-1.407***
	[0.155]	[0.194]	[0.274]	[0.287]	[0.192]
occup2	1.399***	1.222***	1.283***	2.456***	1.293***
	[0.037]	[0.042]	[0.091]	[0.119]	[0.040]
occup3	1.776***	1.504***	1.881***	2.386***	1.713***
	[0.021]	[0.031]	[0.031]	[0.068]	[0.023]
occup4	1.922***	1.601***	2.084***	2.584***	1.834***
	[0.022]	[0.027]	[0.041]	[0.067]	[0.024]
occup5	2.022***	1.550***	2.622***	2.646***	1.925***
	[0.020]	[0.025]	[0.038]	[0.052]	[0.022]
occup6	1.846***	1.381***	2.127***	2.393***	1.471***
	[0.024]	[0.032]	[0.042]	[0.051]	[0.032]
occup7	1.910***	1.473***	2.276***	2.510***	1.801***
	[0.016]	[0.022]	[0.032]	[0.045]	[0.018]
occup8	1.526***	1.099***	2.193***	2.336***	1.405***
	[0.047]	[0.060]	[0.082]	[0.126]	[0.053]
statu2	-0.046***	-0.121***	0.116***	-0.204***	0.034*
	[0.016]	[0.018]	[0.038]	[0.038]	[0.019]
statu3	0.485***	-0.861***	0.599***	-0.2	0.684***
	[0.082]	[0.291]	[0.089]	[0.305]	[0.087]
statu4	1.006***	0.930***	1.046***	1.004***	1.030***
	[0.033]	[0.035]	[0.117]	[0.100]	[0.036]
statu5	0.718***	0.645***	1.005***	0.808***	0.700***
	[0.018]	[0.022]	[0.037]	[0.042]	[0.021]
statu6	0.389***	0.057	0.437***	0.365***	0.216***
	[0.023]	[0.035]	[0.038]	[0.045]	[0.033]
numearners	1.018***	1.091***	0.977***	0.792***	1.173***
	[0.006]	[0.009]	[0.010]	[0.010]	[0.008]
head	0.322***	0.499***	0	0.333***	0.337***
	[0.020]	[0.026]	[0.035]	[0.040]	[0.025]
year2001	-0.068***	-0.041***	-0.131***	-0.093***	-0.051***
	[0.009]	[0.012]	[0.016]	[0.019]	[0.011]
Q2	0.028***	0.026**	0.032*	0.247***	-0.022**
	[0.010]	[0.012]	[0.016]	[0.021]	[0.011]
fertsay	-0.214***	-0.183***	-0.254***	-0.182***	-0.218***
	[0.003]	[0.004]	[0.005]	[0.005]	[0.004]
Constant	-2.104***	-2.213***	-2.323***	-2.683***	-2.401***
	[0.035]	[0.045]	[0.057]	[0.068]	[0.042]
LR chi2	175305.126	66125.386	68006.659	41702.566	134726.771
Prob>chi2	0	0	0	0	0
Psedue R-Sq	0.657	0.546	0.677	0.656	0.674
Log-Likelihood	-45758	-27511.493	-16197.832	-10957.962	-32639.832
Observations	196025	94644	101381	46056	149969

Standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%