Education-occupation mismatch in Turkish labor market

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Abstract

There is a consensus that one of the most important ingredients for high and sustainable growth is human capital accumulation. Yet, a different strand of literature argues that there are some frictions in the labor markets of most countries that result in possible education-occupation mismatches, and consequently inefficiencies. Despite a significant amount of research using data from advanced economies there are very few studies on developing economies. Considering that human capital is scarce in these countries, whether it is efficiently allocated is arguably relatively more important. This paper using data from two different years examines the incidence of overeducation in Turkey. The findings show that there is a significant amount of over- and undereducated workers, and they are paid significantly less than those with the same level of education but working in jobs that require education levels that match their own. The magnitude of the incidence and the impact of mismatches on wages are, however, not too different than in most developed economies.

Keywords: *human capital, overeducation, returns to schooling, Turkey*

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1 Introduction

It is an established fact, both theoretically and empirically, that human capital accumulation is an essential ingredient for high levels of and sustainable growth (Lucas, 1988; Barro, 1991; Mankiw et al., 1992). It is not surprising then for most international organizations to advise and urge developing countries to increase the educational attainment levels of their populations. Indeed, in the last couple of decades the literacy rate has increased all around the world. Many developing country governments allocated a significant amount of their revenues to subsidize education.

Meanwhile, a different strand of literature, following the seminal paper of Duncan and Hoffman (1981), draws attention to the incidence of overeducation, that is, the share of individuals who work in jobs that require less education than they have acquired. Groot and van den Brink (2000) using a meta analysis based on available studies to date conclude that while the level of overeducation depends on the measure used to estimate the incidence, the 'true' level of overeducation is around 23% in developed countries and that there was no significant change between the 1980s and 1990s. Furthermore, they find that there is a substantial penalty on overeducation, that is, individuals that have higher levels of education than the required level earn less than their counterparts who have the same level of education but are working in jobs that require their level of education. If the phenomenon of overeducation is also present in developing countries, then the efficiency of resource allocation to subsidize education becomes questionable. It may imply that the observed gain in growth is less than the potential if the scarce and valuable resource were, at least partially, allocated at other ends, for example, to improve the quality of job matching.

Unfortunately, almost all studies on overeducation use data from advanced economies, with the exception of Quinn and Rubb (2006) who investigate the Mexican labor market. They find that a significant portion of Mexican males are overeducated[1], and the number of Mexican males that are overeducated

[1]Overeducation, as will be explained later, is measured in relative terms. Therefore, it is possible for some workers to be overeducated even when the supply of skilled labor is limited.

exceeds the number that are undereducated. Moreover, their analysis indicates that there is some increase in the incidence of overeducation from the late 1980s to late 1990s. They also estimate the return to and additional year of overeducation that is around half of the return to a year of required education. Their estimates are close to the ones found in developed economies, yet, given the limited resources in a developing country, the opportunity cost of education-job mismatches is expected to be higher in Mexico.

Following their lead, this paper measures the incidence of overeducation in another developing country, namely Turkey, and discusses its consequences for productivity[2]. In the last twenty years Turkey has made a special effort to increase the educational attainment level of her population. The literacy rate increased from 82% in 1990 to 96% in 2010. During the same period average years of schooling of the working age population increased from 5.3 years to 6.4 years in 2000 and, following the change in the mandatory education law requiring a minimum of eight years of education instead of five in 1997, average years of schooling reached 7.5 years in 2010. Earlier studies on the relationship between education and wages in Turkey report very high private returns for each additional degree, particularly on university degrees (Tunali, 2003; Duygan and Guner, 2006; Tansel and Bircan, 2010). Consequently, every year around 1.5 million students are competing in a nationwide exam to be allocated into one of 400 thousand available slots in the universities. A significant number of those who are applying for the exam are spending large sums of money and time for preparation. In recent years, the government, overwhelmed by the sheer numbers, also increased the number of universities most of which are publicly funded. The spending and effort put into education, particularly to higher education, in Turkey, whether publicly or privately, is not negligible.

The present study examines the incidence of mismatches and returns to overeducation in Turkey, using data from 1994 and 2002 Household Budget and Expenditure Surveys. On the one hand, it will extend the analysis by Quinn and Rubb (2006) to another developing country and discuss whether their results can be generalized; on the other hand, given the current government

[2]The study by Galasi (2008) on overeductaion in Europe also includes some observations from Turkey.

policies to expand university education and the allocation of both private and public resources to acquire higher levels of education in Turkey it will serve for a better understanding of the relationship between education and productivity.

2 Theoretical framework

There is a multitude of explanations for the existence of overeducation and they are explained in detail elsewhere (e.g., McGuinness, 2006). Here, they are briefly summarized with their relevance to a developing economy context.

The neoclassical model of human capital theory based on Becker (1964) assumes that each worker is paid his or her marginal productivity which depends on the level of human capital the person has accumulated over time. The empirical counterpart of this model is due to Mincer (1974) and specifies wages as a function of years of formal education. In the neoclassical model firms are fully utilizing the skills of each worker by changing their production process to fit the changes in the supply of skilled workers. Thus, the model does not allow any mismatches. If somehow a person is paid less than the market rate corresponding to his education, then either the education level does not fully capture the skill level of the individual or it is a temporary phenomenon as in Sicherman and Galor (1990) where individuals accept lower paying jobs initially if the job offers a higher probability of promotion. A third explanation of the existence of mismatches within an efficient equilibrium framework points out the variations in production processes across sectors with respect to required skills and heterogeneity in the preferences of workers about jobs (Gottschalk and Hansen, 2003). The supply of labor of each skill type depends on the relative wages across sectors for each specific skill and overeducation is not necessarily a sign of misallocation of resources nor does it mean involuntary assignment of individuals across sectors.

The other explanations of the incidence of overeducation imply inefficiencies in the labor market. The job competition model of Thurow (1975) assumes that workers are competing for jobs and firms hire them based on the cost of their training. Since more educated individuals may require lower training, they are more likely to receive offers and are also more likely to accept some of these offers even for jobs for which they have more than adequate education

since they are competing for any employment. The model implies that the specific nature of the job determines the wage rate rather than the individual's characteristics. The Thurow model is in some way related to the screening model of Spence (1973) in which, due to imperfect information in the labor market, workers are signalling their ability through acquiring higher levels of education.

Another plausible explanation for the existence of overeducation is based on the costs associated with job search (Jovanovic, 1979). In most developing countries, including Turkey, the number and size of formal institutions that minimize both the cost of job search and the informational imperfections, such as employment agencies, are negligible. Most people turn to their friends and relatives to find a job. If such mechanisms are inefficient, then most jobs will be filled irrespective of the ability of the worker but rather whom he or she knows (Mortensen and Vishwanat, 1994). Individuals with lower skills may fill vacancies that require higher levels of education, and consequently, the skilled workers crowded out from most positions accept jobs with lower required levels of education. This mechanism may explain not only overeducation but undereducation as well.

Finally, the assignment models of the labor market emphasize the quality of matches. The main point of these models is that assigning heterogenous individuals to different occupations is quite likely to result in mismatches (Sattinger, 1993), and the characteristics of jobs are equally important as the characteristics of the individuals. Occupations themselves have a productivity ceiling, therefore some skills of the workers may not be fully utilized. Considering that many jobs in a developing country require less skills than jobs in an advanced economy and relative inflexibility in adjustment of production processes, the incidence of overeducation and lower returns to surplus education are more likely outcomes in these economies.

3 Data and methodology

The data used in this study comes from the Household Budget and Expenditure Surveys (HBES) conducted in 1994 and 2002 and cover 26,236 and 9,555 households, respectively, representing Turkish population. In the following

analysis only individuals who are employed full-time in a permanent job in non-agricultural sector are considered. The sample is also restricted to individuals who are between ages 20 and 64. Since mandatory education has been increased to eight years in 1997, individuals that are younger than 20 in 2002 will necessarily have a higher level of education. Excluding them abates a possible bias due to changes in mandatory education law to some extent[3].

After all these restrictions there are 11,408 and 4,967 individuals in 1994 and 2002, respectively. The surveys report the highest level of degree earned. There are six education groups, illiterates, literates without a degree, 5-year primary school graduates (called 'junior primary' in this paper), 8-year primary school graduates, high school graduates and college and above graduates. High school and college graduates are assigned 11 and 15 years of education, respectively. Literate individuals without a degree are assigned only one year of education[4].

The occupation classification in each survey uses different schemes. While the early survey reported occupations based on the International Standard Classification of Occupation designed in 1968 (ISCO68), the later uses a recent one, ISCO88. In 1994 two-digit classification of occupations are used. After merging certain occupations to the closest one due to the limited number of observation, there are 70 occupations. In 2002, three-digit classifications of ISCO88 are used and, after merging occupations with too few observations with the closest category, there are 75 different occupations. While it is possible to match occupations in different classifications, it can not be done perfectly. It is known that ISCO68 is more sensitive to employment status and industry whereas ISCO88 is more skill oriented. In order not to introduce additional bias, no attempt has been made to convert one to the other.

There are a few different ways of measuring overeducation. The standard methods are typically grouped into two, subjective and objective measures of

[3]Despite the fact that the mandatory education was five years before 1997, there are many individuals with less education than five years. Apparently, the law has not been strictly observed in early years.

[4]In early 1980s the government pushed a campaign to teach basic writing a reading skills to illiterates by offering one-year courses. Therefore, the assignment of only one year of schooling to these individuals may be more appropriate

overeducation. There are two different measures in the former group: The first one is job analysis where a set of experts decide an optimal level of education for a specific occupation. The second one is self-assessment where individuals are asked whether they have an appropriate level of education for their jobs.

The objective measures are based on realized data, and there are basically two different approaches. The first approach defines a person as over- or undereducated if the acquired level of schooling of that individual is one standard deviation higher or lower than the mean schooling in that occupation (Verdugo and Verdugo, 1989). The other approach is closely related and uses the modal education level to differentiate over- and undereducation from the required level (Kiker et al., 1997). The meta analysis of Groot and van den Brink (2000) shows that each provide different estimates for the incidence. Due to data limitations, the realized data approach is taken here, and for comparison purposes with each other and previous studies both the standard deviation and mode methods are employed in the following analysis.

Following the literature, to determine possible causes of over- and undereducation a multinomial logit model is estimated. The specification of the model is limited with the availability of data. The specification includes gender and marital status as well as a dummy variable for whether the person reports that he/she is the head of the household and their interactions. The latter variable is used to test whether there are any evidence for gender-segmented labor markets. Frank (1978) argues that female employees are more likely to be overeducated as they are not primary bread-earners and their job opportunity set is restricted within the location of where their partners work.

The data set also contains various information on the labor market experience of individuals. The industry and the size of the firm the individual is employed at, whether the individual is a member of a trade union and whether he/she is employed by state sector[5] are other control variables. Turkey also has a considerable informal sector. The minimum wage laws and excessive taxation on labor makes informal employment attractive for both some employers

[5]Turkey had large State Economic Enterprises that employed a major share of the labor force. However, starting from mid-1980s most of these firms are been privatized. Still some existed in the years when the data were collected and I attempt to control for being a state employee using a dummy variable.

and employees. To identify informal sector employees a question that asks whether the person has social security which is required for every employee by law is used. There is no information on the total labor market experience of individuals, however, potential experience is calculated as the difference between individual's age and completed levels of education minus six years.

Another interesting question about overeducation is whether it has an impact on wages. Following the incidence analysis, a wage equation based on a standard Mincerian model, however extended by Duncan and Hoffman (1981) is also estimated. The original Mincerian equation regresses wages on a set of individual characteristics and on the actual level of education:

$$\ln w_i = \gamma_a S_i^a + X_i'\beta + \epsilon_i \tag{1}$$

where X is a vector of control variables, S_i^a is the actual years of schooling of individual i, and γ_a captures returns to an extra year of education. The extension of Duncan and Hoffman simply decomposes actual education into three components, required, over- and undereducation:

$$\ln w_i = \gamma_r S_i^r + \gamma_o S_i^o + \gamma_u S_i^u + X_i'\beta + \epsilon_i \tag{2}$$

where S_i^r is the number of years required to perform the job individual i is holding, $S_i^o = \max(0, S_i^a - S_i^r)$ is the surplus schooling years beyond the required years that individual attained, and $S_i^u = \max(0, S_i^r - S_i^a)$ is the level of undereducation. The sign and magnitude of the coefficients in front of the education variables determine whether mismatches in the labor market have important implications. In the standard Mincerian setting, the requirement of a job should not determine the wage level, consequently the coefficients of the second equation should obey the restriction that $\gamma_r = \gamma_o = |\gamma_u|$. On the other hand, in Thurow's job competition model, wages are determined by the marginal productivity which is fixed for each job, hence independent of the worker's assets including human capital. In that case, $\gamma_o = \gamma_u = 0$.

In the empirical model the variables to control for individual characteristics are the ones described above, required, overeducation and undereducation variables are obtained from the incidence analysis. Wages are hourly wages calculated as monthly salaries adjusted for inflation divided by the product of 4.33 (average number of weeks in a given month) and reported usual hours.

4 Results

4.1 Incidence

Table 1 provides the estimates for the incidence of over- and undereducation in Turkey in 1994 and 2002. As reported almost in all studies, the severity of the incidence of overeducation changes with the way it is measured. In 1994 20% of workers were overeducated, and 16.5% were underestimated using the modal method. The numbers are much smaller, 13.5% and 9.9%, respectively, when a standard deviation from the average years is used as thresholds for required education. In 2002, there are more overeducated and less undereducated workers compared to 1994, regardless of the method used to estimate incidence. While the demographics of the population change over time and, moreover, the occupation classification is not the same in both years, one may argue that there has been a slight increase in the share of overeducated individuals.

Table 1: Incidence of overeducation and undereducation

	Mode		Mean	
	1994	2002	1994	2002
All				
Overeducated	20.3	24.6	13.4	15.1
Required ed.	63.2	60.7	76.7	75.3
Undereducated	16.5	14.7	9.9	9.6
Males				
Overeducated	21.0	25.3	13.4	14.8
Required ed.	61.9	59.3	77.1	75.1
Undereducated	17.1	15.4	9.6	10.1
Females				
Overeducated	17.0	21.4	13.5	16.3
Required ed.	68.9	66.8	74.8	76.5
Undereducated	14.1	11.9	11.7	7.3

There are also significant gender differences in overeducation. Among women the incidence of both overeducation and undereducation is much lower than male workers. In the Turkish case, not only are females less overeducated, but the share of women who were undereducated decreases over time too, apparently contradicting with Frank's (1978) argument. The interaction

of two forces could explain this finding. On the one hand, females in Turkey are less educated despite the fact that average years of schooling of women has increased almost three times faster than that of males in the last thirty years; on the other, labor force participation may depend on the availability of suitable jobs. Instead of accepting jobs with a lower required education, most women may have chosen not to be part of the labor force. Indeed, Tunali and Baslevent (2006) report that labor force participation among married women is very low compared to single females.

The only other study which was not specifically on Turkey but uses data from Turkey is by Galasi (2008). He, using self-assessment of a small sample of workers, 252 to be exact, to define overeducation reports that only 1.4% of Turkish workers think they have appropriate level of education, whereas the European average is 8%, ranging between 18% and 4%, excluding Turkey. The share of Turkish workers who think that they are overeducated is 27.4% lower than the European average of 33%.

In comparison to Mexico (Quinn and Rubb, 2006), Turkey seems to have less overeducated employees. The other two countries that Quinn and Rubb (2006) refer to in their study are Hong Kong (Ng, 2001) and Portugal (Kiker et al., 1997). Compared to the evidence in these countries, the degree of overeducation in Turkey is similar to the Portuguese case. Similarly, the share of undereducated workers is much smaller than in Mexico and Hong Kong, but higher than in Portugal. It should be noted that in terms of per capita income in international purchasing poverty terms Turkey has been the poorest country among those mentioned above. Probably the occupation classification differs across these studies, however, in general it is possible to claim that the incidence of overeducation shows some variation across different developing countries.

To test the hypothesis that some people acquire higher levels of education to compensate for some weaknesses, particularly the lack of experience a set of multinomial logit models are estimated. Table 2 and Table 3 provide coefficient estimates for log odds ratios, that is the odds of being over- and undereducated relative to being adequately educated, in years 1994 and 2002, respectively. In 1994 there is evidence that overeducation is compensating for the lack of experience. However, while the coefficients have the expected signs in 2002

Table 2: Determinats of overeducation, 1994

	Mode		Mean	
	Under	Over	Under	Over
Act. Educ	-0.2825**	0.3247**	-0.5910**	0.4968**
	(0.0167)	(0.0165)	(0.0315)	(0.0213)
Female	0.3158	-0.6023**	0.9912**	-0.3514
	(0.2736)	(0.2067)	(0.3413)	(0.2232)
Hh Head	0.3399	-0.4278**	0.0284	-0.4396*
	(0.1905)	(0.1481)	(0.2489)	(0.1740)
Fem. Hh Head	-1.0313**	-0.4591	-1.1279*	-0.3429
	(0.3675)	(0.4514)	(0.4655)	(0.5272)
Married==1	-0.4888*	0.4463*	-0.4293	0.5953**
	(0.2207)	(0.1821)	(0.2979)	(0.2126)
Mar. Fem.	0.0728	-0.1408	-0.2952	-0.0848
	(0.3259)	(0.2597)	(0.4202)	(0.2900)
Exper	-0.0509**	-0.0536**	-0.0592*	-0.0687**
	(0.0192)	(0.0204)	(0.0288)	(0.0263)
Expersq/100	0.1451**	0.0661	0.1580**	0.0628
	(0.0325)	(0.0446)	(0.0457)	(0.0623)
Union	-0.5257**	0.7003**	-0.5564**	0.7693**
	(0.1131)	(0.1083)	(0.1365)	(0.1394)
Formal	0.2034	-0.3850**	0.5491**	-0.7387**
	(0.1431)	(0.1434)	(0.1819)	(0.1862)
State Sector	0.5239**	0.0063	0.6654**	0.1747
	(0.1492)	(0.1296)	(0.1735)	(0.1735)
Constant	-0.4802	-3.1817**	0.9788	-5.3855**
	(0.4168)	(0.4004)	(0.5274)	(0.5261)
Observations	11408		11408	
Pseudo-R-sq.	0.2171		0.3442	

The model also includes dummies for industry, firm size and twelve regions.
Robust standard errors in parentheses.
** and * denote significance at 1%, and 5% levels.

Table 3: Determinats of overeducation, 2002

	Mode		Mean	
	Under	Over	Under	Over
Act. Educ.	-0.2476**	0.2398**	-0.4310**	0.5524**
	(0.0256)	(0.0216)	(0.0434)	(0.0298)
Female	0.3653	-0.8810**	0.6088	-0.8225**
	(0.3164)	(0.2121)	(0.3622)	(0.2762)
Hh Head	-0.0271	-0.0642	0.5337	-0.0367
	(0.2667)	(0.1931)	(0.3124)	(0.2737)
Fem. Hh Head	0.1031	0.0797	-0.3863	0.3013
	(0.7753)	(0.4263)	(0.8158)	(0.5303)
Married	0.1809	-0.0813	0.0286	-0.1077
	(0.2833)	(0.1927)	(0.3436)	(0.2890)
Mar. Fem.	-0.4991	0.2521	-0.3571	0.3732
	(0.4737)	(0.3147)	(0.5074)	(0.3948)
Exper	0.0002	-0.0309	-0.0744	-0.0359
	(0.0326)	(0.0228)	(0.0412)	(0.0320)
Expersq/100	0.0162	0.0223	0.1284	-0.0037
	(0.0558)	(0.0539)	(0.0696)	(0.0838)
Union	0.1460	0.1994	0.5980*	0.3498
	(0.2267)	(0.1576)	(0.2706)	(0.1932)
Formal	0.1116	-0.2259	0.2512	-0.9053**
	(0.1672)	(0.1420)	(0.1999)	(0.1952)
State Sector	0.2183	-0.1553	-0.1335	-0.1785
	(0.3188)	(0.2025)	(0.4076)	(0.2622)
Constant	-0.0628	-3.2747**	-0.2115	-6.6065**
	(0.7676)	(0.5809)	(1.1468)	(0.7049)
Observations	4967		4967	
Pseudo-R-sq.	0.1578		0.2968	

The model also includes dummies for industry, firm size and twelve regions.
Robust standard errors in parentheses.
** and * denote significance at 1%, and 5% levels.

they are not significant. The effect of experience on the probability of being undereducated is similar to that of being overeducated in both years, negative and significant in 1994 and insignificant in 2002.

Females are estimated to be less likely to be overeducated than males in both years, however, there is not a significant relationship between the gender of the individual and undereducation except in one case. Yet the estimated coefficients of female households heads in 1994 indicate that they are more likely to be undereducated, supporting the previous conjecture. Women in Turkey take part in the labor force only when they have to, and being a female household head most of the time corresponds to single or widowed females.

The significance of most of the other variables vanishes in 2002. In 1994, however, married workers were more likely to be overeducated and less likely to be undereducated. Similarly union membership is closely related to being over- and undereducated. The formal sector employees are found significantly more likely to be overeducated rather than having adequate education in both years. This implies that individuals are trading formal sector employment with education. Most interestingly, in 1994 being a state sector employee increases the odds of being undereducated.

4.2 Effects on wages

Tables 4 and 5 provide estimates on how surplus years affect wages in 1994 and 2002, respectively. The first column in each table shows the estimates of the Mincerian wage equation. There is a significant and considerably high return on each year of actual education, 9.3% in 1994 and 7.7% in 2002. There is a slight decline in the return in the later year. The other variables have expected signs though with different levels of significance. For example the gender difference disappears in 2002, whereas married individuals turn out to earn more in the later year. The level of experience has a positive effect on wages, and the coefficient of squared experience is negative, implying that the impact of experience is declining. Workers who are members of a trade union or working in the formal sector or employees of a state owned enterprise earn significantly higher wages. The magnitude of the coefficients of these variables can be interpreted showing the importance of institutional framework.

Particularly, the employees of the state sector earning so much higher wages, and yet more of them are undereducated can also be interpreted as political favoritism.

The second and third columns (using mode and mean definitions, respectively) in the tables present the estimates of the extended version of the Mincerian equation by Duncan and Hoffmann (1981) where the actual education level is decomposed into years of required-, over- and undereducation. This version nests the standard Mincerian equation and tests of whether the surplus years are significantly different than the required years of education, $\gamma_r = \gamma_o = |\gamma_u|$, are provided at the bottom of each table. Similarly, the implication of the job competition model by Thurow (1975) which implies that only job characteristics determine the wage rate can also be tested imposing the equality $\gamma_o = |\gamma_u| = 0$. Both specifications are rejected in favor of Duncan and Hoffmann's model in the data. Furthermore, the return to a year of required education is around one percent larger than the return to actual education.

The coefficient estimates of over- and undereducation are significant and have the expected signs consistently in all specifications. The coefficient of overeducation is positive and significantly different from the coefficient of required education and smaller in magnitude. This implies that overeducated workers are earning more than their colleagues with lower levels of educational attainment in their jobs yet less than workers with same level of education who work at adequate jobs. The penalty on overeducation is around 2.9% per year using the mode definition in 1994 and 3.4% in 2002. The penalty is higher, 5.5% and 7.5% in the respective years, in the estimation where the mean method is used. While there is some decline in the returns to required education, the penalty on overeducation has increased over time.

The differences in the return to required eductation and surplus education point out some problems in the assignment of jobs in the labor market. Considering that per capita income is much lower in Turkey compared to European countries (in purchasing power terms per capita income in Turkey is 40% of average of 27 members of the European Union) to be able to catch up with advanced economies requires better allocation of already scarce human capital.

Table 4: The effects of overeducation and undereducation on wages, 1994

	Mincerian	Mode	Mean
Act. Educ.	0.0934**		
	(0.0030)		
Overeducation		0.0732**	0.0543**
		(0.0059)	(0.0042)
Req. Education		0.1017**	0.1087**
		(0.0031)	(0.0038)
Undereducation		-0.0959**	-0.1346**
		(0.0046)	(0.0112)
Female	-0.1496**	-0.1590**	-0.1538**
	(0.0408)	(0.0410)	(0.0424)
Married	0.0619	0.0686*	0.0950**
	(0.0340)	(0.0339)	(0.0352)
Mar. Fem.	0.0126	0.0137	-0.0095
	(0.0498)	(0.0499)	(0.0514)
Exper	0.0448**	0.0427**	0.0394**
	(0.0036)	(0.0036)	(0.0039)
Expersq/100	-0.0632**	-0.0600**	-0.0603**
	(0.0068)	(0.0069)	(0.0074)
Union	0.3501**	0.3672**	0.3413**
	(0.0219)	(0.0217)	(0.0220)
Formal	0.1136**	0.1039**	0.1153**
	(0.0326)	(0.0329)	(0.0338)
State Sector	0.2334**	0.2287**	0.2518**
	(0.0263)	(0.0263)	(0.0262)
Constant	8.8981**	8.8895**	8.8093**
	(0.0705)	(0.0706)	(0.0728)
Observations	11408	11408	11408
R^2	0.4582	0.4632	0.4470
F-Test $\gamma_r = \gamma_o = \lvert\gamma_u\rvert$		13.14	54.33
p-value		0.000	0.000
F-Test $\gamma_o = \lvert\gamma_u\rvert = 0$		296.14	161.59
p-value		0.000	0.000

The model also includes dummies for industry, firm size and twelve regions.

Robust standard errors in parentheses. ** p<0.01, * p<0.05.

Table 5: The effects of overeducation and undereducation on wages, 2002

	Mincerian	Mode	Mean
Act. Educ.	0.0768**		
	(0.0046)		
Overeducation		0.0549**	0.0318**
		(0.0059)	(0.0050)
Req. Education		0.0893**	0.1071**
		(0.0050)	(0.0057)
Undereducation		-0.0666**	-0.0950**
		(0.0075)	(0.0151)
Female	-0.0198	-0.0551	-0.0461
	(0.0556)	(0.0566)	(0.0541)
Married	0.1541**	0.1421**	0.1681**
	(0.0441)	(0.0439)	(0.0433)
Mar. Fem.	-0.0923	-0.0710	-0.0862
	(0.0638)	(0.0637)	(0.0632)
Exper	0.0347**	0.0334**	0.0267**
	(0.0051)	(0.0050)	(0.0048)
Expersq/100	-0.0482**	-0.0468**	-0.0390**
	(0.0100)	(0.0097)	(0.0097)
Union	0.2334**	0.2423**	0.2353**
	(0.0303)	(0.0303)	(0.0303)
Formal	0.3037**	0.2926**	0.2950**
	(0.0379)	(0.0381)	(0.0378)
State Sector	0.3491**	0.3333**	0.3562**
	(0.0449)	(0.0449)	(0.0443)
Constant	13.7079**	13.6575**	13.5398**
	(0.1354)	(0.1377)	(0.1336)
Observations	4964	4964	4964
R^2	0.5060	0.5161	0.5128
F-Test $\gamma_r = \gamma_o = \lvert\gamma_u\rvert$		23.80	65.34
p-value		0.000	0.000
F-Test $\gamma_o = \lvert\gamma_u\rvert = 0$		74.90	38.08
p-value		0.000	0.000

The model also includes dummies for industry, firm size and twelve regions.

Robust standard errors in parentheses. ** p<0.01, * p<0.05.

5 Conclusion

There is a growing literature on the possible education-occupation mismatches in developed economies. Some frictions are causing misassignment of workers to jobs, many individuals are working in jobs that require less education than they have acquired and are consequently paid less than their counterparts who work in jobs that match with their educational attainment level. With the exception of Quinn and Rubb's (2006) study of the Mexican labor market, no research exists on whether the same phenomenon is also observed in other developing countries.

Using data from two different years, this paper examined the incidence of overeducation in Turkey. The findings show that the share of overeducated workers in total employment is less in Turkey than Mexico, and at a similar level as in many developed economies. Thus, there is some evidence that the experience of developing countries with respect to education-occupation mismatches is not necessarily similar. Nonetheless, the findings are in line with most earlier research. Overeducated employees are earning more than the workers with less educational attainment but significantly less than those who have the same degree but are working in an adequate job.

These findings are arguably more important in a developing country context because the resources, particularly human capital, is scarce in these economies. Considering they are lagging advanced economies in terms of per capita income, efficient use of these limited resources is more important. Two findings need to be highlighted. First, there is some evidence that education is compensating for some other characteristics, in this case, the lack of experience. This is an important issue to be considered by education experts about the content and means of education. Second, working in the formal sector or in the state sector makes significant differences both in being over-/undereducated and in the distribution of wages. The improvements in the institutional framework can increase the efficiency in the labor market. While there is no variable to measure the problems that occur in job search in this paper, recent household labor force surveys in Turkey show that among those who have found a new job in the last three years, two thirds claim that they used their own means to find a job and one third indicate that they used

friends and relatives. Less than one percent use formal employment agencies whether public or private.

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