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Male-female Labor Market Participation and the Extent of Gender-based Wage Discrimination in Turkey

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Abstract
A gender differential in wages is considered to be discriminatory if the differential cannot be explained by gender differences in productivity. Numerous studies have been performed to measure the extent of gender wage discrimination in countries across the world, and most report a substantial amount of wage differential after adjusting for productivity differences. This differential has been attributed to labor market discrimination against women. Using data from 2003 and 2010 Household Budget Surveys conducted by Turkish Statistical Institute, this study examines the male-female earnings differentials and measures the extent of pay discrimination in Turkey. To analyze the components of the earnings gap, two methodologies are employed: The standard Oaxaca–Blinder decomposition method and the Juhn–Murphy–Pierce decomposition method. The results of the study indicate that in both years, a significant portion of the observed wage differential is attributable to wage discrimination which records a rise over the period.

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Keywords Male-female earnings differentials; gender wage discrimination; Oaxaca–Blinder Decomposition; Juhn–Murphy–Pierce decomposition

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1.Introduction

The female labor force participation rates and female-to-male earnings ratios have substantially increased in many countries over the last century. However, the wage gap between men and women still remains large. A sex differential in wages is considered to be discriminatory if the differential cannot be explained by sex differences in productivity. Numerous studies have attempted to measure the extent of gender wage discrimination in several countries across the world. Most research to date show that there exists a substantial amount of wage differential after adjusting for sex differences in productivity, which is frequently interpreted as evidence of pay discrimination against women.

In Turkey, the situation is even more bleak. Women's limited participation in economic life is one of the most salient features of the labor market. Female labor force participation rate (LFPR), measured as 23.5 percent in 2009, is almost one third of OECD and EU-19 countries' rates at 62 and 64 percents, respectively (World Bank, 2009). Further, several studies have demonstrated that wage discrimination against women is also a serious systemic problem in Turkey. Thus, women in Turkey not only suffer from serious barriers to employment but also a significant pay discrimination even if they manage to enter the labor market.

A thorough analysis of gender pay discrimination has become even more important with the start of European Union (EU) accession negotiations in 2005. The European Commission (EC) accentuates that Turkey's progress in lessening the gender wage gap and increasing gender equality is only limited. The 2006 Progress Report indicates that exceptionally low levels of women's participation and the prevailing discrimination in the Turkish labor market are of significant concern, and stresses the need for promoting gender equality in pay, access to employment and social security. A draft report of the Committee on Women's Rights and Gender Equality (FEMM) in 2007 also underlines the same issue, and reiterates the call for further action to enhance gender equality. Turkish government, in response, has accelerated efforts to promote gender equality and non-discrimination on all grounds. In particular, the Committee on Equality of Opportunity for Women and Men under the Grand National Assembly of Turkey was established in 2009 to be responsible for protecting and improving women's rights in social and economic life, and to assure gender equality.

Against this background, our motivation is to extend the existing literature by analyzing the earnings performances of male and female workers and measuring the extent of pay discrimination in the Turkish labor market, using 2003 and 2010 Household Budget Survey (HBS) of the Turkish Statistical Institute (TurkStat). The empirical analysis consists of decomposing the gender pay differentials via the Oaxaca-Blinder (OB) (Oaxaca 1973; Blinder 1973) and Juhn-Murphy-Pierce (JMP) (1991, 1993) methodologies. First, we apply the original method proposed by Oaxaca and Blinder which requires estimating separate wage equations for males and female workers. Then the selectivity-corrected wage regression estimates are used to decompose the pay gap into two components: (1) explained part which is attributable to gender-specific observed differences in the various characteristics, and unexplained part which is frequently interpreted as pay discrimination. Next, we use the JMP method which extends the Oaxaca-Blinder decomposition, and allows analyzing gender pay gap at different points of the earnings distribution and accounting for the effects of the unobservable characteristics on the wage differentials. Moreover, we also decompose the change in the wage gap from 2003 to 2010 utilizing the JMP method.

The literature on gender wage gap in Turkey is scant, and most analyses are limited to the conventional Oaxaca-Blinder methodology. To the best of our knowledge, this study is the first to apply the Juhn-Murphy-Pierce decomposition into the gender pay gap in the Turkish labor market. Further, we include cohort dummy variables in our wage model specification in addition to the

standard human capital variables. In this way, our study will be the first to control for cohort dummy effects in Oaxaca-Blinder and Juhn-Murphy-Pierce decompositions of wage differentials.

The remainder of the paper is organized as follows; Section 2 provides an overview of the Turkish labor market. Section 3 reviews the existing literature on gender wage gap in the Turkish labor market. The theoretical background for Oaxaca-Blinder, Juhn-Murphy-Pierce decomposition methodologies and Heckman's procedure are described in Section 4. Section 5 presents the empirical specification and section 6 explains the data. Estimation results are reported and discussed in Section 7. Finally, Section 8 provides conclusions and implications for policy.

2. Overview of the Labor Market in Turkey

Despite having a young and dynamic population, Turkey has several structural problems in its labor market including low employment rate, high unemployment rate, widespread informality and large rural-urban differentials. The rise in the working age population continuously exceeds that in employment creation, hence results in low employment rate. Turkey's employment rate, measured as 43 percent in 2010, is remarkably low relative to international standards and one of the lowest among OECD member countries. Similarly, Turkey's 48.8 percent labor force participation rate (LFPR) in 2010, is more than 10 percentage points below that of average LFPR of OECD members.

The main underlying factor behind Turkey's unfavorable labor market position is women's exceptionally limited participation in economic life. As illustrated in Table 1, female employment and participation rates have been consistently low throughout the 2000s. Turkey's 23.6 percent LFPR in 2007, is almost one third of OECD and EU-19 countries' rates at 62 and 64 percents, respectively.

Table 1: Main Labor Market Indicators

	2003			2007			2010		
	Total	Female	Male	Total	Female	Male	Total	Female	Male
Labor force (thousand)	23640	6555	17086	23114	6016	17098	25641	7383	18257
Employment (thousand)	21147	5891	15256	20738	5356	15382	22594	6425	16170
Labor force participation rate	48.3	26.6	70.4	46.2	23.6	69.8	48.8	27.6	70.8
Unemployment rate	10.5	10.1	10.7	10.3	11.0	10.0	11.9	13.0	11.4
Employment rate	43.2	23.9	62.9	41.5	21.0	62.7	43.0	24.0	62.7

Source: TURKSTAT, Household Labor Force Survey (non-institutional population by gender and year) (http://www.tuik.gov.tr/VeriBilgi.do?tb_id=25&ust_id=8)

Turkish economy has been undergoing a deep structural transformation since the beginning of the 1980s. Shifting from agriculture to manufacturing, rapid urbanization and integration with the global economy increased the need for more skilled workers. This transformation necessitated reallocation of labor from lower to higher productivity activities which translated into a substantial change in sectoral employment trends. From 1980 onwards, share of agricultural employment in total employment has fallen significantly, and the weight of industry and services has increased sharply. As Table 2 illustrates, agricultural exodus has continued throughout the 2000s. These changes have been the main culprit of in the already low and declining levels of female employment and participation rates. The jobs available in the rural areas are mostly in agriculture and suitable for women having

low educational attainments. Those low skills women working as unpaid family workers in agriculture are forced to leave employment when they migrate to urban areas, given cultural/social forces and their low levels of education. As follows, urban unemployment rates are higher, employment and labor force participation rates are lower.

Table 2: Sectoral Distribution of Employment

	2003			2007			2010		
	Total	Female	Male	Total	Female	Male	Total	Female	Male
Agriculture	33.8	58.5	24.3	21.7	43.1	17.8	24.7	41.6	18.2
Industry	17.3	12.8	19.1	21.8	15.2	21.7	19.4	14.7	21.2
Services	48.9	28.7	56.6	56.5	41.7	60.5	55.9	43.7	60.6

Source: TURKSTAT, Household Labor Force Survey (Employment by gender, year and sector of economic activity) (http://www.tuik.gov.tr/VeriBilgi.do?tb_id=25&ust_id=8)

The low female employment and participation rates in the Turkish labor market are also significantly related to women's low levels of education (World Bank 2009; Ercan 2007). As illustrated in Table 3, participation rates in the Turkish labor market vary to a great extent with educational attainment. There is a positive relation between educational attainment and male LFPR at all levels of education. For female, this positive relationship strengthens remarkably with university diploma. This result depicts that low levels of female employment and participation rates are mainly a high-school or lower educational attainment phenomena.

Table 3: Educational Distribution of Employment

	2003				2010			
	Labor force (thousand)	Employment (thousand)	LFPR* (%)	UR** (%)	Labor force (thousand)	Employment (thousand)	LFPR* (%)	UR** (%)
TOTAL								
Illiterate	1606	1493	28.2	7.0	1151	1082	19.8	6.0
Below high school	14859	13351	47.5	10.2	15195	13427	46.8	11.6
High school	4552	3971	53.3	12.8	2727	2294	51.4	15.9
University	2624	2333	77.7	11.1	4057	3612	78.8	11.0
FEMALE								
Illiterate	1097	1042	23.6	5.0	791	771	16.3	2.4
Below high school	3595	3322	23.4	7.6	3803	3410	23.8	10.3
High school	966	768	28.9	20.5	712	535	30.4	24.9
University	897	759	69.5	15.3	1512	1271	71.0	15.9
MALE								
Illiterate	509	451	48.7	11.4	360	310	36.8	13.7
Below high school	11264	10029	70.7	11.0	11392	10018	69.2	12.1
High school	3586	3202	69.0	10.7	2015	1760	68.1	12.6
University	1727	1574	82.7	8.9	2545	2341	84.3	8.0

Source: TURKSTAT, Household Labor Force Survey (Employment by gender, year and education) (http://www.tuik.gov.tr/VeriBilgi.do?tb_id=25&ust_id=8) *Labor force participation rate, **Unemployment rate

There are also other cultural and economic barriers to women's under-representation in the Turkish labor market. Research show that cultural barriers, i.e. women's reproductive role, traditional gender division of labor in the Turkish family structure and family/social pressures for being a housewife, are more important. Economic barriers, on the other hand, are related to the quality of work for low skill women in urban areas. Low wages, expensive child care, long and strict working hours, and the high probability of being employed informally are listed among the leading economic factors restraining female labor force participation in Turkey (World Bank 2009).

Another salient feature of the Turkish labor market is widespread informality. According to the Turkish Statistical Institute (TurkStat), the share of informal employment in the Turkish labor market stands high at 38.4 percent as of January 2012. As mentioned above, informality is indeed one of the main reasons underlying low levels of female employment, especially in urban areas. Urban jobs offer favorable employment opportunities to women with university diplomas, but low skill women are typically employed in the informal sector. Moreover, there exists a large wage gap between formal and informal employment, and within informal sector female workers have much lower earnings compared to male workers. These low-paid, low quality jobs without any social security in the informal sector raise concerns regarding returns to education, resulting in little/no incentive for women to invest in their education. This restricts growth potentials of the economy in the long run, and is called under-participation trap (Taymaz 2010).

In sum, there exist significant barriers to female employment and participation in the Turkish labor market, putting Turkey remarkably low and behind relative to international standards. Along these lines, a major research question is whether those women who can make it into the labor market despite all these difficulties are subject to any pay discrimination. The 5th Article of Labor Law No.4757 stipulates that pay discrimination in any form based on race, religion, gender, political views is illegal. Yet, previous research to date shows that pay discrimination against women stands high in Turkey. In the following analysis, we aim to analyze the pay discrimination against women in the Turkish labor market in a more detailed and comprehensive way than prior studies.

3. Gender-Based Wage Discrimination in Turkey: Review of Empirical Evidence

There exist only a limited number of studies on gender wage gap in Turkey which in general focus on a single year and use Oaxaca-Blinder decomposition. Our study is relatively more comprehensive and detailed considering its time span and methodologies covered. To our knowledge, this is the first study to employ Juhn-Murphy-Pierce wage decomposition technique in the Turkish labor market context.

Dayioğlu and Kasnakoğlu (1997), using 1987 Household Income and Expenditure Survey data set, estimate wage regressions made up mostly of human capital variables. The analysis covers wage workers, employers and own-account workers. The Oaxaca decomposition results reveal that 64 percent of the gender earnings gap is due to wage discrimination. The most important determinant of the wage discrimination is work experience. Another finding of the study is that the positive effect of education on female wages is quite remarkable and lowers the degree of discrimination.

Yamak and Topbaş (2004) analyze the extent of male-female wage discrimination, using 1994 Household Consumption Expenditures Survey and Oaxaca-Blinder decomposition method and its extension developed by Cotton (1988). The results show that wage discrimination accounts for 78 and 80 percents of the gender wage gap according to Oaxaca-Blinder and Cotton methodologies, respectively.

Tansel (2005) investigates the sectoral differences male-female earnings gap using 1996 Household Consumption Expenditure Survey and Oaxaca decomposition technique. The estimation results reveal that 42 percent of the gender earnings gap in the private sector is attributable to discrimination. On the other hand, gender-based wage discrimination is relatively smaller in the public sector which is mainly due to the fact that female in the public sector have an advantageous position in terms of the wage determining characteristics. The main reason underlying the gender wage gap in favor of men in the private sector is the higher returns to wage-determining characteristics for male workers. The unexplained part of the gender wage differential in the private sector is larger than that in the public sector, implying that discrimination against women is more severe in the private sector.

Hisarciklilar and Ercan (2005) using 1988 Household Labor Force Survey examine gender-based wage differentials and its possible effects in the Turkish labor market. The Neumark (1988) extension of Oaxaca decomposition analysis shows that human capital characteristics of women significantly reduce the wage differential, and that wage gap in the labor market is mostly due to discrimination.

The analyses of Cudeville and Gürbüzer (2007) using 2003 Household Budget Survey report a gender wage gap in favor of men at on average 25.2 percent, and reveal that 60 percent of the gap stems from wage discrimination. Comparing the results with that of European countries, the authors claim that the gender-based wage discrimination in Turkey is similar to that of some south European countries. However, they also emphasize that wage discrimination is only an insufficient indicator of discrimination against women, and that the main distressing concern is in fact the underrepresentation of women in the labor market.

Using 2002 Household Budget Survey data set, Gürler and Üçdoğruk (2007) investigate the factors underlying the differences in the male-female labor force participation and wage rates in Turkey. The Oaxaca decomposition analyses reveal the presence of a significant gender wage discrimination. The extended wage regression decomposition estimations depict that only 14.96 percent of gender wage differentials stem from differences in endowments, and 85.8 percent is indeed due to discrimination.

In their analysis of gender-based wage differentials in the Turkish labor market, Ilkkaracan and Selim (2007) use 1995 Employment and Wage Structure Survey and Oaxaca decomposition method based on Mincerian wage regression models. The reduced wage model comprising only the conventional human capital variables displays that 43 percent of the male-female earnings gap is attributable to discrimination. When the model is extended to incorporate occupation, sector and firm characteristics variables, the share due to wage discrimination falls to 22 percent.

4. Theoretical Background

4.1. The Oaxaca Technique for Decomposition of the Wage Gap

The standard method to analyze the components of the male-female earnings gap is the decomposition approach proposed by Oaxaca (1973) and Blinder (1973). Oaxaca-Blinder (OB) decomposition technique requires estimating wage regressions for samples of individual men and women separately. Then the predicted wage gap between the two groups is decomposed into two components: one that is attributable to gender-specific observed differences in the various individual characteristics, and one that is frequently interpreted as discrimination.

Assume the wage equations for male (m) and female (f) workers are given as follows:

$$W_m = \beta_m X_m + \varepsilon_m \quad (1)$$

$$W_f = \beta_f X_f + \varepsilon_f \quad (2)$$

W represents the wage vector and is specified in logarithmic form so that the estimated coefficients measure approximately the proportionate effect on wages of changes in the right-hand side variables. X is the coefficient vector of worker characteristics such as education, experience, marital status, region, etc. β is a vector of coefficients and ε_i $(i = m, f)$ is a disturbance term.

Ordinary least squares (OLS) estimation of a wage equation for any given group of workers provides a regression line which passes through the means of the variables:

$$\overline{W_m} = \beta_m \overline{X_m} \quad (3)$$
$$\overline{W_f} = \beta_m \overline{X_f} \quad (4)$$

If females receive the same returns as do males for their endowments of wage determining characteristics (i.e., if females were given the male pay structure), then their average wage would simply be written as:

$$\overline{W_f^*} = b_m \overline{X_f} \quad (5)$$

This is interpreted as the average wage for women that would prevail in the absence of wage discrimination (where wage discrimination is defined as unequal pay for the same endowments of wage-determining characteristics). Subtracting (5) from (3) yields the difference between average male earnings and the average hypothetical female earnings that would prevail if the male wage structure is assumed to apply to females. This differential reflects their different endowments of wage-generating characteristics in a non-discriminatory labor market, that is:

$$\overline{W_m} - \overline{W_f^*} = b_m \overline{X_m} - b_m \overline{X_f} = b_m(\overline{X_m} - \overline{X_f}) \quad (6)$$

Subtracting (4) from (5) gives the difference between average hypothetical non-discriminatory wage and actual wage of female workers, which represents different returns to the same wage-generating factors:

$$\overline{W_f^*} - \overline{W_f} = b_m \overline{X_f} - b_f \overline{X_f} = (b_m - b_f)\overline{X_f} \quad (7)$$

Adding (6) and (7) yields the following equation where male and female total average wage differential can be decomposed into two parts:

$$\overline{W_m} - \overline{W_f} = b_m(\overline{X_m} - \overline{X_f}) + (b_m - b_f)\overline{X_f} \quad (8)$$

The first component $b_m(\overline{X_m} - \overline{X_f})$ is the wage differential due to differences in the endowments of wage-generating characteristics $(\overline{X_m} - \overline{X_f})$ evaluated at the male returns (b_m), whereas the second term $(b_m - b_f)\overline{X_f}$ corresponds to the differences in the returns $(b_m - b_f)$ that males and females get for the same endowment of wage-generating characteristics ($\overline{X_f}$). This latter component is taken as reflecting wage discrimination.

An alternative decomposition of the earnings gap is derived by identifying the female wage structure as the non-discriminatory benchmark. If equation (5) is replaced with $\overline{W_m^*} = b_f \overline{X_m}$, the average hypothetical wage that males could expect to earn if they were paid according to the female pay structure, the following is obtained:

$$\overline{W_m} - \overline{W_f} = b_f(\overline{X_m} - \overline{X_f}) + (b_m - b_f)\overline{X_m} \tag{9}$$

The difference between equations (8) and (9) is that in the former male wage structure is assumed to apply to both males and females in the absence of discrimination, whereas in the latter female wage structure is taken as the benchmark non-discriminatory wage. The two equations are alternative representations of the decomposition and neither is preferred over the other. Even though the two equations will not produce equivalent results, there is no theoretical reason or advantage to choose one equation over the other. This gives rise to the so-called index number problem.[1] Since economic theory provides little guidance on this, the general approach is to report both of the estimates. In this research we will follow the same way.

4.2. Sample Selection Bias and Heckman's Two-Step Methodology

A potential problem in the standard Oaxaca-Blinder decomposition method is non-random sample selection which may cause OLS estimates be biased. This problem arises when the decision to participate in the labor market is correlated with wage or some of the regressors, thereby violating the zero conditional mean assumption. That is, for certain individuals the wages earned were they to participate in the labor market would not be sufficient, and these individuals therefore choose not to be in the labor force. (Their reservation wages are greater than the market wage.) Note that wages of such individuals are not observed in the sample since these people do not work. Under plausible assumptions it can be shown that when such individuals are selectively excluded from the sample, although the expected value of the error term for the population as a whole may be zero, for the observed sample it is likely to be nonzero. In such cases, estimation by ordinary lest squares yields biased estimates of the intercept and slope coefficients. In other words, OLS regression (not corrected for selectivity bias) proceeds on the erroneous assumption that the conditional mean of the error term in the sample of workers is zero. This is why OLS regression estimates, if based on samples restricted to workers, will be biased.

In order to address the sample selectivity issue, we use Heckman (1979)'s two-step procedure. Heckman (1979) shows that the sample selection problem can be viewed as a specification error in which a variable is incorrectly omitted from the wage equation. Heckman's procedure involves first estimating a probit regression on whether an individual participates in the labor market conditional on a vector of individual characteristics, and calculating Mill's ratio for each individual. The inverse of the Mill's ratio given as $\lambda_i = \phi(Z_i)/[1-\Phi(Z_i)]$ is then added as a regressor to the earnings equation, whose parameters can then be consistently estimated by ordinary least squares. In this specification, ϕ and Φ correspond to the normal density and normal distribution functions, and $Z_i = -X_i\beta/\sigma$ where X_i is the vector of covariates and β is the vector of coefficients in the participation equation.

[1] This issue is discussed in Cotton (1988). A third alternative suggested by Cotton is to define the nondiscriminatory norm as the weighted average of the male and female coefficients.

In order to introduce Heckman correction into the Oaxaca-Blinder decomposition, equations (1) and (2) can be rewritten as:

$$W_m = \beta_m X_m + \gamma_m \lambda_m + \varepsilon_m \tag{10}$$

$$W_f = \beta_f X_f + \gamma_f \lambda_f + \varepsilon_f \tag{11}$$

where $\lambda_i \ \ (i = m, f)$ corresponds to the inverse of the Mill's ratio, and $\gamma_i \ \ (i = m, f)$ to its coefficient. The selectivity corrected decomposition equations given in (8) and (9) would then be rewritten as:

$$\overline{W}_m - \overline{W}_f = \underbrace{b_m(\overline{X}_m - \overline{X}_f)}_{\text{Endowment Effect}} + \underbrace{(b_m - b_f)\overline{X}_f}_{\substack{\text{Remuneration Effect} \\ \text{(Discrimination)}}} + \underbrace{(\hat{\gamma}_m \hat{\lambda}_m - \hat{\gamma}_f \hat{\lambda}_f)}_{\text{Selectivity}} \tag{12}$$

$$\overline{W}_m - \overline{W}_f = \underbrace{b_f(\overline{X}_m - \overline{X}_f)}_{\text{Endowment Effect}} + \underbrace{(b_m - b_f)\overline{X}_m}_{\substack{\text{Remuneration Effect} \\ \text{(Discrimination)}}} + \underbrace{(\hat{\gamma}_m \hat{\lambda}_m - \hat{\gamma}_f \hat{\lambda}_f)}_{\text{Selectivity}} \tag{13}$$

In contrast to equations (8) and (9), (12) and (13) include a third component which is frequently interpreted as the selectivity effect on wage differentials. There are alternative views on how to account for the selectivity term in the literature.[2] We prefer the approach where the selectivity effect is subtracted from the observed wage difference, without making any a priori assumption (Duncan and Leigh 1980; Reimers 1983; Boymond *et al*. 1994). Following this vein, equations (12) and (13) would be revised as (Neuman and Oaxaca, 2004):

$$(\overline{W}_m - \overline{W}_f) - (\hat{\gamma}_m \hat{\lambda}_m - \hat{\gamma}_f \hat{\lambda}_f) = \underbrace{b_m(\overline{X}_m - \overline{X}_f)}_{\text{Endowment Effect}} + \underbrace{(b_m - b_f)\overline{X}_f}_{\substack{\text{Remuneration Effect} \\ \text{(Discrimination)}}} \tag{14}$$

$$(\overline{W}_m - \overline{W}_f) - (\hat{\gamma}_m \hat{\lambda}_m - \hat{\gamma}_f \hat{\lambda}_f) = \underbrace{b_f(\overline{X}_m - \overline{X}_f)}_{\text{Endowment Effect}} + \underbrace{(b_m - b_f)\overline{X}_m}_{\substack{\text{Remuneration Effect} \\ \text{(Discrimination)}}} \tag{15}$$

The second term on the left side of the above equations is interpreted as the part of the average male-female wage differential attributable to sample selection bias.

4.3. Juhn-Murphy-Pierce Decomposition

In the Juhn-Murphy-Pierce (JMP) method (Juhn, Murphy and Pierce 1991, 1993), wage gap can be decomposed not only at the mean but also across the whole wage distribution. Moreover, one can also account for the impact of the unobservable characteristics in addition to the observable effects. As in the OB decomposition, we first estimate two separate wage equations for male and female:

$$W_{mi} = b_m X_{mi} + \hat{\varepsilon}_{mi} \tag{16}$$

$$W_{fi} = b_f X_{fi} + \hat{\varepsilon}_{fi} \tag{17}$$

[2] For a detailed discussion on the alternative ways of introducing the selectivity term into the Oaxaca-Blinder decomposition, see Neuman and Oaxaca (1998, 2004).

The dependent and independent variables are all defined as in the OB decomposition method, and male wage structure is assumed as the non-discriminatory benchmark wage. The raw male-female wage differential can be decomposed as follows:

$$\begin{aligned} W_{mi} - W_{fi} &= b_m X_{mi} + \hat{\varepsilon}_{mi} - b_f X_{fi} - \hat{\varepsilon}_{fi} \\ &= \underbrace{b_m (X_{mi} - X_{fi})}_{\text{Endowment Effect}} + \underbrace{X_{fi}(b_m - b_f)}_{\substack{\text{Remuneration Effect} \\ \text{(Discrimination)}}} + \underbrace{(\hat{\varepsilon}_{mi} - \hat{\varepsilon}_{fi})}_{\text{Unobservable Effect}} \end{aligned} \tag{18}$$

The first term on the right-hand side measures the individual factors determining wage rates, called as *differences in observed characteristics, or* the *endowment effect.* For example, all else being equal, an increase in women's educational levels relative to men's would decrease the gender gap. The second term reflects the impact of the differences in returns to observed wage-generating characteristics, that is *differences in prices for observed characteristics,* or the *remuneration effect.* It is frequently interpreted as discrimination. The third term represents the differences in the *residual wage distribution (unobservable effect),* and corresponds to the contribution of *differences in unobservable quantities and prices* to the wage gap. Note that if evaluation is performed at the mean, the last term on the right-hand side $(\hat{\varepsilon}_{mi} - \hat{\varepsilon}_{fi})$ will be zero, and equation (18) will be simplified into the OB decomposition.

JMP method enables decomposing the wage gap at various points of the wage distribution, thereby renders quantile analysis possible:

$$\begin{aligned} \overline{W}_m^q - \overline{W}_f^q &= b_m \overline{X}_m^q + \bar{\varepsilon}_m^q - b_f \overline{X}_f^q - \bar{\varepsilon}_f^q \\ &= \underbrace{b_m (\overline{X}_m^q - \overline{X}_f^q)}_{\text{Endowment Effect}} + \underbrace{\overline{X}_f^q (b_m - b_f)}_{\substack{\text{Remuneration Effect} \\ \text{(Discrimination)}}} + \underbrace{(\bar{\varepsilon}_m^q - \bar{\varepsilon}_f^q)}_{\text{Unobservable Effect}} \end{aligned} \tag{19}$$

$\overline{X}_m^q$ ve $\overline{X}_f^q$ corresponds to means of quantile q.[3] The JMP technique is used in several studies to compare gender earning differences across time (Blau and Kahn, 1992, 1994, 1996, 1997). Using the JMP notation, wage equation for a male worker in period *t* can be formulated as:

$$W_{mit} = \beta_{mt} X_{mit} + \sigma_{mt} \theta_{mit} \tag{20}$$

where $\varepsilon_{mit} = \sigma_{mt} \theta_{mit}$. In equation (20), σ_{mt} represents the standard deviation of the error term for male workers in year *t*, θ_{mit} is the standardized disturbance term which can be interpreted as standardized unobservables component.

Male-female log wage gap can be defined as follows using the average terms:

$$W_{mt} - W_{ft} = \beta_{mt} (X_{mt} - X_{ft}) + \sigma_{mt} (\theta_{mt} - \theta_{ft}) \tag{21}$$

[3] Equations (18) and (19) can also be defined under the assumption that female wage structure is the non-discriminatory benchmark wage.

Alternatively,

$$D_t = W_{mt} - W_{ft} = \beta_{mt}\Delta X_t + \sigma_{mt}\Delta\theta_t \tag{22}$$

where $\Delta X_t = (X_{mt} - X_{ft})$ and $\Delta\theta_t = (\theta_{mt} - \theta_{ft})$. Equation (22) decomposes the wage gap into two components: one that is attributable to changes in wage-determining factors ($\beta_{mt}\Delta X_t$) and the other attributable to changes in the wage inequality ($\sigma_{mt}\Delta\theta_t$). The wage gap difference between years 1 and 0 can then be decomposed as:

$$D_1 - D_0 = \beta_{m1}\Delta X_1 + \sigma_{m1}\Delta\theta_1 - \beta_{m0}\Delta X_0 - \sigma_{m0}\Delta\theta_0 \tag{23}$$

Adding and subtracting $\beta_{m1}\Delta X_0 + \sigma_{m1}\Delta\theta_0$ to the right-hand side of the equation, and rearranging:

$$D_1 - D_0 = \underbrace{\beta_{m1}(\Delta X_1 - \Delta X_0)}_{\text{Observed Characteristics Effect}} + \underbrace{(\beta_{m1} - \beta_{m0})\Delta X_0}_{\text{Observed Remuneration Effect}} + \underbrace{\sigma_{m1}(\Delta\theta_1 - \Delta\theta_0)}_{\text{Gap Effect}} + \underbrace{(\sigma_{m1} - \sigma_{m0})\Delta\theta_0}_{\text{Unobserved Remuneration Effect}} \tag{24}$$

The first term on the right-hand side of equation (24) is *"observed characteristics effect*" or "observed *endowment effect*", which reflects the contribution of the changing male-female differences in wage-determining factors to trends in the gender gap ($D_1 - D_0$). For example, holding all else constant, gender wage gap will decrease if average education level of women becomes higher than that of men. Thus, the endowment effect will be negative.

The second term is the *observed remuneration effect,* or the *observed prices effect* reflecting the impact of the variation in the returns to males' observable characteristics. For example, if returns to education for males increase from year 0 to year 1, gender wage gap will also increase. Thus, the observed remuneration effect will be positive.

The third component is called the *gap effect,* or the *ranking effect,* and measures the impact of the changes in the relative positions of women in the male residual wage distribution after controlling for observed characteristics. In other words, it reflects whether women rank higher or lower within the male residual wage distribution compared to the previous year. If, for example, discrimination falls, women's relative position will improve, leading to a decrease in the gender wage gap and a negative ranking effect.

Lastly, the forth term is called the *unobserved remuneration effect,* or *dispersion effect,* and represents the impact of the changes in the wage dispersion between the two years. The changes in the gender wage gap depend also on the change the extent of male wage dispersion while the relative ranking of women in the male residual wage distribution is assumed to remain the same. If the wage dispersion increases, gender wage gap will also increase and the unobserved remuneration effect will be positive.

The first and third terms measure gender-specific factors, while the second and the fourth terms measure "wage structure" effect. In the standard Oaxaca-Blinder decomposition framework, the sum of first and second terms represents the variation in the "explained" differentials, which are due to the effects of changes in wage-determining factors and their prices. The sum of third and fourth terms reflects the variation in the "unexplained" differentials that are due to the changes in the male wage dispersion and female ranking within the male residual wage distribution.

5. Specification of Participation and Wage Equations

The empirical specification of male and female wage equations is based on the seminal *post-schooling investment model* and *human capital earnings function* of Mincer (1974). In the Mincer's human capital earnings function, wages are determined by mainly three variables: education, work experience and experience squared.[4] The standard model was extended to incorporate both human capital variables and other variables which are thought to affect wages in general. The human capital earnings function is fundamentally based on the *human capital theory* of Becker (1962, 1964), Schultz (1960, 1961) and Mincer (1958, 1962). The semi-log wage equation to be estimated in our analysis is:

$$\ln W = \beta_1 + \beta_2 EDUC + \beta_3 EXP + \beta_4 EXPSQ + \beta_5 TENURE + \beta_6 TENURESQ + \beta_7 HOURSW + \beta_8 PRIVATE + \beta_9 INDUSTRY2 + \beta_{10} INDUSTRY3 + \beta_{11} UNION + \beta_{12} OCC1 + \beta_{13} OCC2 + \beta_{14} OCC3 + \beta_{15} OCC4 + \beta_{16} OCC5 + \beta_{17} OCC6 + \beta_{18} OCC7 + \beta_{19} OCC8 + \beta_{20} COH25-34 + \beta_{21} COH35-44 + \beta_{22} COH45-54 + \beta_{23} COH55-64 + \beta_{24} INFORMAL + \beta_{25} FIRMSIZE + \beta_{26} \lambda + \varepsilon_i$$

lnW:	The logarithm of monthly wage. (Total net income as wage or salary in the survey month)
EDUC:	Years of formal education completed.
EXP:	Years of professional work experience. (For the potential work experience, following Mincer (1974), Age-Education-7 variable is used as a proxy variable.)
EXPSQ:	Experience squared.
TENURE:	Length of service in the last firm.
TENURESQ:	Tenure squared.
HOURSW:	Hours worked per week.
PRIVATE:	1 if the person is a private sector employee, 0 if public sector employee.
INDUSTRY2:	1 if the person works in agriculture, 0 otherwise.
INDUSTRY3:	1 if the person works in manufacturing industry, 0 otherwise. (The reference group is "service sector workers")
UNION:	1 if the person is a union member, 0 otherwise.
OCC1:	1 for legislators, senior officials and managers, 0 otherwise.
OCC2:	1 for professionals, 0 otherwise.
OCC3:	1 for technicians and associate professionals, 0 otherwise.
OCC4:	1 for clerks, 0 otherwise.
OCC5:	1 for service workers, shop and market sales workers, 0 otherwise.
OCC6:	1 for crafts and related trade workers, 0 otherwise.

[4] For a comprehensive discussion of related literature, see Willis (1986).

OCC7:	1 for plant and machine operators and assemblers, 0 otherwise.
OCC8:	1 for elementary occupations, 0 otherwise.
	(The reference group is "Skilled agricultural and fishery workers").
COH25-34:	1 if the person is between 25-34 years of age, 0 otherwise.
COH35-44:	1 if the person is between 35-44 years of age, 0 otherwise.
COH45-54:	1 if the person is between 45-54 years of age, 0 otherwise.
COH55-64:	1 if the person is between 55-64 years of age, 0 otherwise.
	(The reference group is 15-25 years of age)
INFORMAL:	1 if the person is registered to the Social Security Institute, 0 otherwise.
FIRMSIZE:	The number of people in the firm.
λ :	Inverse of the Mill's ratio.

In the human capital theory, formal education is accepted to be the most important human capital investment. Becker (1964) reported that education significantly increases one's productivity, hence earnings after accounting for direct and indirect costs and controlling for family status, ability, etc. A vast number of research in the following literature also confirmed the positive relationship between human capital and earnings. Spence (1973) developed an alternative hypothesis called "Signaling Hypothesis" where he argues that even if education does not directly increase productivity, it serves as a signal of individuals' talents and productivities to firms and employers. Berndt (1990) argues that employers can use education degree as a signal not only because assessing the productivity of individuals is costly, but also because the level and quality of one's education in general serve as a very good proxy for his/her ability. In sum, both human capital and signaling hypotheses purport a positive relationship between schooling investment and earnings.

Human capital investment does not end with formal schooling, but continues with a more specialized on-the-job training once an individual enters the labor force.[5] Formal schooling and on-the-job training works both as a complement and/or substitute to each other. Mincer (1962) argues that on-the-job training includes both formal and other training programs, and knowledge acquired with experience. Therefore, work experience should also be considered when calculating investment on occupational training.

According to the human capital theory, an individual's wage is a second degree function of his/her professional work experience. In the early ages, where individuals rapidly accumulate human capital through formal schooling and occupational training, earnings also increase expeditiously. When human capital accumulation reaches to a maximum in the middle ages, one's earnings also arrive at its peak. In the older ages, earnings begin to deteriorate gradually as human capital depreciation sets in. Thus, professional work experience and earnings display a quadratic relationship, and hence the variables *EXP* and *EXPSQ* are expected to have positive and negative signs, respectively.

A similar quadratic relationship holds for the variable *TENURE* which is defined as number of years spent in the last job. That is, the variables *TENURE* and *TENURESQ* are expected to have positive and negative signs, respectively. In his seminal work, Becker (1964) classified on-the-job training as "specific" if it is valuable only for the firm it is acquired and "general" if it enhances worker's

[5] Becker (1962, 1964) and Mincer (1962, 1974) provide a detailed discussion on "on-the-job training".

productivity for all firms. The cost of a general training is typically borne by workers as they will be the ones to receive whole of the return to training in the form of higher future income, regardless of whether they stay in the firm or change job. On the other hand, specific training cannot be used gainfully in other firms which therefore strengthen the dependence between the worker and the employer. The employer will be willing to pay higher wages to the trained worker who becomes more productive in the firm, considering the risk of poaching and loosing him/her. The employee, whose training will be specific only to that firm, will also be unwilling to quit. Therefore, the optimal solution is sharing of the costs and returns of the specific training between the employer and the employee.

In some cases, occupational training may involve both specific and general training modules. Then the firm will be willing to pay more as the firm-specific part of the training gets larger. That is, the profit-maximizing firm will offer the market wage rate to employees with general training, and above-market wage to employees with specific training. Following this line of thinking, one expects a positive relationship between time spent in the last job which represents specific training and wages. However, the relationship between the two is quadratic since that specific training typically reaches a maximum at some point, and depreciates afterwards.

The hours worked (*HOURSW)* and union membership (*UNION*) variables are expected to affect earnings positively. Given that the base category for the occupation dummies (OCC_i) is "skilled agricultural and fishery workers", one expects lower earnings for the "elementary operations" workers and higher earnings for all other occupation groups. For the sectoral effects, given the base group of "services", workers in "agriculture" are likely to have lower earnings, thus *INDUSTRY2* dummy should display a negative coefficient. The dummy *INFORMAL* proxies whether one is an informal worker, and is expected to have a negative sign. The *FIRMSIZE* dummy denotes the size of the firm, and is assumed to display a positive association with wages.

Lastly, the term λ is the inverse of the Mill's ratio estimated from the participation equations. In the following discussion, the coefficient estimates for λ will be discussed separately for male and female samples.

In general, factors which determine an individual's potential market wage and/or reservation wage affect his/her labor force participation status as well. For example, those with higher wage rates and lower reservation wages are more likely to participate in the market (Hamermesh and Rees 1993; Bowen and Finegan 1969). Following this line of thought, we specify the following variables to be included in the participation probit equations:

AGE: Age of the person.

AGESQ: Age squared.

EDUC: Years of formal education completed.

CHYOUNG: 1 if there are children 7 years old and under living with the person, 0 otherwise.

STUDENT: 1 if the person is currently a student, 0 otherwise.

MARRIED: 1 if the person is married, 0 otherwise.

HHSIZE: Number of individuals in the household.

HEAD: 1 if the person if a household head, 0 otherwise.

COH25-34: 1 if the person is between 25-34 years of age, 0 otherwise.

COH35-44: 1 if the person is between 35-44 years of age, 0 otherwise.

COH45-54: 1 if the person is between 45-54 years of age, 0 otherwise.

COH55-64: 1 if the person is between 55-64 years of age, 0 otherwise.

OTHERINC: The sum all income received by the household except wage income.

The dependent variable in the labor force participation probit equation is a dummy variable which takes the value 1 if the individual is working at the time of the survey, and 0 otherwise.

Labor force participation decision depends heavily on one's potential market wage and reservation wage. Reservation wage is the lowest wage rate at which a worker would be willing to accept a particular job, and depends mainly on the total economic value of one's leisure time and household production. The common assumption is that if the market wage rate is greater than the reservation wage, an individual decides to participate in the market.

According to the human capital theory, labor force participation and age has an inverse-U shape relationship. A young worker with little or no experience typically does not have any option but to consent with a low wage, and hence will be more reluctant to enter the market. Moreover, young are more likely to postpone labor force participation in order to invest in their human capital via formal schooling. As mentioned above, formal schooling is only one way of human capital formation. One can also accumulate human capital through on-the-job training. In general, as age increases, a worker's human capital stock acquired through on-the-job training will also rise, which will then improve his/her compensation and lead to higher willingness for participation. However, at later points in the age distribution, motivation to further invest in human capital typically falls, existing human capital stock starts to depreciate and the market wage starts to decline in response. Furthermore, the value of leisure time and thus the reservation wage will be greater for an older individual because of the wealth he or she has accumulated during his or her working life. As a result, an older individual will be less likely to be in the labor market. Therefore, age is assumed to have a quadratic relationship with participation in the human capital theory, hence the variables age (*AGE*) and age squared (*AGESQ*) are expected to display positive and negative signs, respectively.

Higher levels of education raise the opportunity cost of not working, thus engenders higher probability of labor force participation. Therefore, the education variable (*EDUC*) is expected to have a positive coefficient.

It is well-documented in the literature that married women with small children are less likely to participate in the labor market. This adverse effect is even more salient in countries like Turkey where cultural attitudes and social norms ascribe primary responsibility of family care to women. The reservation wage of mothers with small children will also be higher since the opportunity cost of time spent outside home is higher. Following this line of reasoning, the coefficients of *CHYOUNG* and *MARRIED* variables in the participation probit equation are expected to yield negative signs. On the other hand, being married and having children usually enforce male labor force participation given their traditional bread-winner role in the society. Consequently, they tend to have lower reservation wages than single men with no children.

Regarding household type variables, being household head (*HEAD*) is expected to positively affect both male and female labor force participation. The size of the household (*HHSIZE*) is assumed to have a positive relationship with male labor force participation, whereas its effects on female labor supply is ambiguous. Larger household size means greater housework burden for women but also greater financial needs. Thus, the overall impact will depend on whichever effect dominates. Lastly, it

is generally assumed that the higher are the income of other household members, the less likely an individual participates in the labor force. Therefore, the variable *OTHERINC* is expected to have a negative coefficient.

6. Data

The data used in this analysis is drawn from the Household Budget Survey (HBS) conducted by the Turkish Statistical Institute (TurkStat). The survey provides detailed information on the consumption habits, types of consumption expenditures, socio-economic characteristics, employment status, total income, sources of income, etc. of the subjects. The samples are selected and assigned survey weights to be representative of the non-institutionalized Turkish resident population. A two-stage stratified sampling procedure is used in sample selection. The interviews are administered as a result of eight times of visits in a month including 1 visit prior to the survey month, twice during the first and second weeks, once during third and fourth weeks and once following the end of the survey month. In case of non-response, the substitution approach is used. Household is taken as the sample unit and defined as the community which is comprised by one or more than one members living in the same dwelling either with blood relationship or not, and participate in the income and expenditures together with the services and management of the household.

The analysis below focuses mainly on the years 2003 and 2010 HBS data set. The original samples consist of 25,920 and 13,248 households for the years 2003 and 2010, respectively. The sample data set is designed to comprise only the labor force between 15-64 years of age. For wage analysis purposes, casual workers, employers, own-account workers and unpaid family workers are excluded from the sample and only regular employees working for a wage/salary are considered.

The descriptive statistics are given in Table 4. The variables listed before *AGE* cover only wage workers, whereas the remaining variables (*AGE*, *MARRIED*, *CHYOUNG*, *STUDENT*, *OTHERINC*, *HHSIZE* and *HEAD*) comprise all individuals in the sample between 15-64 age. Note that the variable *EDUC* is reported twice, where the first row corresponds to wage workers and the second row to total sample.

When data is subdivided by gender, the wage gap against women can be observed to rise over time. Yet, the average female wage prevails at approximately 80 percent of the average male wage for both years.[6] The zero minimum wage applies to casual workers.

Regarding the education statistics, two main points are striking. The average schooling of the working individuals sample is remarkably higher than that of the total sample, male and female subsamples, hence implying a positive relationship between education and employment. This relation is even more pronounced for female subjects. Also noteworthy is the finding that average education level of men is significantly higher than women in the total sample, which reverses when we restrict the sample to working individuals only. That is indeed a mere result of the fact that educational attainment of working women is significantly high in Turkey despite women's exceptionally low levels of participation.

[6] Wages are not real wages. Therefore, percentage changes over time are not discussed.

Table 4: Descriptive Statistics

	2003						2010					
	MEN			WOMEN			MEN			WOMEN		
Variable	Avr.	Min	Max	Avr.	Min	Max	Avr.	Min	Max	Avr.	Min	Max
WAGE	388.24	0	7661.61	310.08	0	7581.8	1069.15	0	20583	856.34	0	15050
EDUC	8.19 7.91	0 0	18 18	9.11 5.93	0 0	18 18	8.55 8.17	0 0	18 18	9.09 6.31	0 0	18 18
EXP	20.19	0	58	15.36	0	58	19.86	0	55	17.27	0	55
TENURE	8.15	0	46	5.54	0	50	7.59	0	50	5.51	0	50
HOURSW	50.84	1	99	43.77	1	99	53.14	1	99	44.27	1	99
PRIVATE	0.71	0	1	0.73	0	1	0.70	0	1	0.76	0	1
INDUSTRY2	0.03	0	1	0.10	0	1	0.03	0	1	0.07	0	1
INDUSTRY3	0.28	0	1	0.26	0	1	0.27	0	1	0.24	0	1
INFORMAL	0.34	0	1	0.42	0	1	0.33	0	1	0.40	0	1
FIRMSIZE	2.33	1	4	2.39	1	4	2.39	1	4	2.37	1	4
UNION	0.12	0	1	0.08	0	1	0.12	0	1	0.09	0	1
AGE	34.48	15	64	34.41	15	64	34.89	15	64	35.49	15	64
MARRIED	0.64	0	1	0.66	0	1	0.63	0	1	0.67	0	1
CHYOUNG	0.30	0	4	0.31	0	5	0.27	0	4	0.28	0	5
STUDENT	0.16	0	1	0.11	0	1	0.17	0	1	0.14	0	1
OTHERINC	89.2	0	22800	28.8	0	5260	192.6	0	33872	90.75	0	1500
HHSIZE	4.71	1	20	4.74	1	23	4.5	1	20	4.47	1	20
HEAD	0.59	0	1	0.05	0	1	0.58	0	1	0.08	0	1

In our sample, the average work experience of men (around 20 years) is higher than that of women (around 15 years). Regarding the time spent in the current job, the variable *TENURE* displays that men on average work for longer periods in the same job compared to women. Also notable is that men on average work 50-53 hours per week and women 43-44 hours per week, which are both well above the average number of working hours in developed countries.[7]

The dummy variables assume the values 0 and 1 representing the minimum and maximum values, respectively. Their averages denote the share of that group in the total sample. Along this framework, the shares of male working in the private sector are 71 and 70 percents in 2003 and 2010, respectively. Whereas, the shares of women working in the private sector are slightly higher than that of men at 73 and 76 percents. The shares of men working in the agriculture sector (*INDUSTRY2*) are around 3 percents for both years. Note that the rate of female workers in agriculture has declined from 10 percent in 2003 to 7 percent in 2010. These figures imply that women in the rural areas still work in the agriculture sector despite the ongoing structural transformation and accompanying migration to urban areas. Shares of workers in manufacturing sector (*INDUSTRY3*) prevail at 25 percent and record a slight fall from 2003 to 2010. Regarding informal employment, which is a major incidence in the Turkish labor market, we see that the rate stands at around 40 percent despite a minor decline between 2003 and 2010. Informal employment is even more prevalent among female workers with low skills who typically have no option but to work informally. Share of having a union membership has fallen to 9 percent among male workers and only 6 percent in 2010 among female workers. Union membership in Turkey for both genders is remarkably lower than that in developed countries.[8]

[7] The OECD average is between 31-41 hours.

[8] For example, shares of union members among men and women are respectively 28.5 and 29.1 percents in UK, 28 percents in Canada (Blanchflower 2006).

As mentioned above, all the variables starting with *AGE* comes from the total sample including both working and non-working individuals. The mean age in our sample for men and women is 35. The shares of men and women who are married stand at around 65 percent, and who have 0-6 age children is 30 percent in 2003 and 28 percent in 2010. Students make up a larger fraction of men than women. Among males, being a household head is quite common at 60 percent, in contrast to the 5-8 percent rate among women. Lastly, the average size of the household is 4.7 in 2003 and 4.5 in 2010, which is a mere reflection of the Turkish family structure where a number of different generational nuclear families live together.

7. Estimation Results

7.1. Estimation Results for the Wage and Participation Equations

The estimation results for male and female labor force participation equations in 2003 and 2010 are presented in Table 5. Looking at the individual coefficients, we observe that most of the coefficients are significant at the 1% level, and the signs are mostly as anticipated.

The coefficient estimates for *AGE* and *AGESQ*, with positive and negative signs respectively, are significant in all estimations. That is to say, age and the probability of labor force participation display an inverse-U shaped quadratic relationship. This result well conforms to the human capital theory which posits that individuals typically have lower earnings in the early years of their working life, thereby lower probabilities of participating in the labor market. As one gets older and accumulates human capital through on-the-job training, his/her remuneration will escalate in response which will enhance his/her willingness to work. However, individuals' motivation for investing in on-the-job training tends to fall as they get older. This results in depreciation of existing human capital, and hence cutbacks in the prevailing market wage. Ultimately, labor force participation probability will fall accordingly.

Education (*EDUC*) reveals a significantly positive relationship with participation, confirming the theory. The higher the level of education of an individual, the greater is his/her probability of labor force participation. The figures also show that this positive effect of education on the probability of labor force participation is higher for females compared to that of males. This result is consistent with the previous work in the literature (see Dayioğlu and Kasnakoğlu 1997; Gürler and Üçdoğruk 2007).

Being married (*MARRIED*) and having a small child (*CHYOUNG*) are found to lower female labor force participation probabilities. The significantly negative coefficient estimates for these variables for women demonstrate that women on average tend to prioritize housework responsibility over employment. Whereas, being married increases the likelihood of participation for men who assume the bread-earner role in the traditional Turkish family culture.

Household head status (*HEAD*) displays a positive relation with participation for both men and women. However, this effect seems to be stronger for men. In particular for 2003, the coefficient estimate from the male sample is quite higher than that of the female sample.

As household size (*HHSIZE*) increases, household expenses are expected to rise. Therefore, one would typically anticipate a positive relationship between the two. However, our results posit a significantly negative relationship between participation and household size. This result could be attributable to the existence of other household members who are employed and are contributing to the household income. The same coefficient estimate for females is also negative and even more significant, which could be linked to the aggravated housework for women concomitant with higher household size.

Table 5: Probit Estimates for Male and Female Labor Force Participation

	2003				2010			
	Male		Female		Male		Female	
Variable	**Coefficients**	**t-ratios**	**Coefficients**	**t-ratios**	**Coefficients**	**t-ratios**	**Coefficients**	**t-ratios**
Intercept	-2.738*	(-15.92)	-3.856*	(-18.81)	-2768171*	(-10.14)	-4012012*	(-12.75)
AGE	0.163*	(14.76)	0.150*	(10.93)	0.187*	(10.42)	0.183*	(8.7)
AGESQ	-0.002*	(-17.27)	-0.002*	(-9.86)	-0.002*	(-10.77)	-0.002*	(-8.16)
EDUC	0.035*	(11.2)	0.115*	(34.42)	0.040*	(8.65)	0.101*	(22.16)
CHYOUNG	0.030	(1.33)	-0.181*	(-7.41)	-0.043	(-1.18)	-0.200*	(-5.67)
STUDENT	-1.168*	(-28.99)	-0.811*	(-16.28)	-0.824*	(-16.67)	-0.282*	(-5.06)
MARRIED	0.519*	(12.4)	-0.537*	(-16.11)	0.459*	(7.26)	-0.471*	(-9.75)
HHSIZE	-0.014**	(-2.44)	-0.038*	(-5.62)	-0.036*	(-4.31)	-0.049*	(-4.69)
HEAD	0.823*	(17.96)	0.367*	(6.08)	0.770*	(11.63)	0.607*	(8.22)
COH25-34	0.185*	(3.55)	-0.049	(-0.92)	-0.186**	(-2.01)	-0.049	(-0.54)
COH35-44	0.192**	(2.21)	-0.102	(-1.22)	-0.529*	(-3.5)	-0.053	(-0.38)
COH45-54	-0.108	(-0.94)	-0.344*	(-2.75)	-0.725*	(-3.59)	-0.132	(-0.68)
COH55-64	0.00026	(0)	-0.199	(-0.99)	-0.636**	(-2.32)	-0.138	(-0.47)
OTHERINC	-1.72E-09*	(-47.95)	-1.29E-09*	(-11.27)	-0.001*	(-21.92)	-0.001*	(-11.29)
N	22930		26605		8654		9681	

Note: * Significant at the 1% level. ** Significant at the 5% level. *** Significant at the 10% level.

The coefficient estimates for the *STUDENT* variable are negative and strongly significant for both men and women. Therefore, one can conveniently argue that being a student reduces the probability of labor market participation to a great extent. Considering the cohort dummy variables, estimation results seem to be quite mixed in terms of both sign and significance, thereby rendering any solid conclusions sceptical. The *OTHERINC* variable displays a significantly negative coefficient sign for both men and women confirming the expectations. As household income increases, one is on average less likely to seek employment.

The estimation results for the wage equations are provided in Table 6.[9] The Wald statistics shows that wage regressions have a good performance for both male and female samples. The education variable (*EDUC*) is positive and highly significant for both male and female wage regressions. Thus, education can be listed among the most important factors affecting earnings. Also notable is the fall in the coefficient estimates of education variable from 2003 to 2010 for both samples though more pronounced for that of male, implies that returns to education have slightly decreased between these two years. The coefficient estimates of 0.057 for men and 0.048 for women in 2003, denote that one year of additional schooling increases the monthly earnings by 5.7 and 4.8 percents for male and female, respectively. Thus our results confirm the basic premises of the human capital theory which predicates a positive relationship between education and remuneration.

[9] Both labor force participation and wage equations are also estimated without cohort dummy variables (*COH*) incorporated. The results are very similar, thus are not reported here.

The human capital theory suggests that an individual's wage rate will increase rapidly early in his or her life as human capital is accumulated through formal schooling and on-the-job training, it will reach its maximum near the point in mid-life when human capital is at its largest, and it will eventually decline as the effects of reduced human capital accumulation are outweighed by the effects of depreciation in human capital. Thus the human capital theory suggests that the earnings equations should be quadratic in experience, implying that they should include both *EXP* and *EXPSQ* variables, with a positive sign expected for the coefficient of variable *EXP* and a negative sign for the coefficient of variable *EXPSQ*. The wage regressions for both years yield the expected positive and negative signs respectively for *EXP* and *EXPSQ* variables for both samples. The variables are statistically significant for men for both years, whereas *EXPSQ* turns insignificant for females in 2010. Similar to the education variable, we observe a fall in the returns to experience for both men and women from 2003 to 2010. The level of experience for which log monthly earnings is maximized in 2003 is 46.25 years for men and 25.83 years for women. Whereas for 2010, the figures almost revert, and stand at 33.75 for men and 45 years for women.

Table 6: OLS Estimates for Male and Female Earnings Equations

	2003				**2010**			
	Male		**Female**		**Male**		**Female**	
Variable	**Coefficients**	**t-ratios**	**Coefficients**	**t-ratios**	**Coefficients**	**t-ratios**	**Coefficients**	**t-ratios**
Sabit	18.336*	(283.74)	17.638*	(94.96)	5636718*	(54.18)	5237362*	(15.51)
EDUC	0.057*	(25.80)	0.048*	(7.25)	0.039*	(10.71)	0.043*	(4.82)
EXP	0.037*	(14.65)	0.031*	(6.05)	0.027*	(6.36)	0.018**	(2.26)
EXPSQ	-0.0004*	(-9.05)	-0.0006*	(-5.24)	-0.0004*	(-4.68)	-0.0002	(-1.32)
TENURE	0.029*	(15.97)	0.029*	(6.35)	0.024*	(9.3)	0.025*	(4.72)
TENURESQ	-0.0007*	(-10.44)	-0.001*	(-5.45)	-0.0005*	(-5.82)	-0.0007*	(-3.46)
HOURSW	0.004*	(14.18)	0.009*	(15.11)	0.0069*	(14.54)	0.019*	(20.98)
PRIVATE	-0.121*	(-9.21)	-0.119*	(-3.72)	-0.205*	(-8.93)	-0.265*	(-5.85)
INDUSTRY2	-0.147*	(-5.61)	-0.376*	(-8.88)	-0.166*	(-4.01)	-0.293*	(-4.23)
INDUSTRY3	0.036*	(3.35)	-0.068**	(-2.17)	0.006	(0.32)	-0.135*	(-3.11)
UNION	0.111*	(8.11)	0.103*	(2.89)	0.161*	(6.65)	0.140*	(2.70)
OCC1	0.566*	(10.20)	1.379*	(8.76)	0.455*	(5.26)	0.271	(0.87)
OCC2	0.359*	(6.66)	1.044*	(7.03)	0.384*	(4.5)	0.155	(0.52)
OCC3	0.249*	(4.65)	0.834*	(5.66)	0.194**	(2.32)	-0.103	(-0.34)
OCC4	0.143*	(2.70)	0.687*	(4.70)	0.082	(0.98)	-0.254	(-0.85)
OCC5	0.070	(1.36)	0.582*	(4.01)	0.008	(0.1)	-0.298	(-1.00)
OCC6	0.126**	(2.44)	0.556*	(3.80)	0.056	(0.69)	-0.840*	(-2.79)
OCC7	0.153*	(2.95)	0.577*	(3.85)	0.067	(0.82)	-0.209	(-0.69)
OCC8	-0.075	(-1.47)	0.536*	(3.79)	-0.090	(-1.13)	-0.329	(-1.12)
COH25-34	-0.043**	(2.01)	0.038	(0.95)	0.054	(1.47)	0.116***	(1.75)
COH35-44	-0.075**	(-2.34)	-0.024	(-0.35)	-0.0003	(0.00)	0.085	(0.76)
COH45-54	-0.122*	(-2.81)	0.072	(0.70)	-0.028	(-0.35)	0.075	(0.47)
COH55-64	-0.197*	(-3.14)	0.017	(0.10)	-0.005	(-0.05)	-0.018	(-0.07)
INFORMAL	-0.192*	(-17.23)	-0.411*	(-14.85)	-0.300*	(-16.72)	-0.401*	(-9.78)
FIRMSIZE	0.077*	(18.63)	0.072*	(7.47)	0.068*	(10.77)	0.095*	(7.12)
λ	-0.127*	(-8.09)	-0.014	(-0.41)	-0.194*	(-7.4)	-0.06	(-1.19)
Wald ist.	12800.01		4316.42		3345.3		2721.46	
N	12985		3149		5341		1932	

Note: * Significant at the 1% level. ** Significant at the 5% level. *** Significant at the 10% level.

Estimation results reveal a statistically significant quadratic relationship for the number of years spent in the last job (*TENURE*) for both genders and years in question, thereby confirming Becker (1964)'s theory. In his seminal work, Becker (1964) distinguishes between two types of training: General training and specific training. General training is defined as the type of training that, once acquired, is equally useful in all other firms. That is, general training increases the productivity of a worker in any firm. Specific training, on the other hand, is the type of training that increases productivity only in the firm it is acquired. That is, it is usable only in the firm providing the training, and the value of the training is lost once the worker leaves the firm. The cost of general training is typically borne by workers as they will be the ones to receive whole of the return to training in the form of higher future income, regardless of whether they stay in the firm or change job. On the other hand, specific training cannot be used gainfully in other firms which strengthens the dependence between the worker and the employer. The employer will be willing to pay higher wages to the trained worker who gains higher productivity in the firm, considering the risk of poaching and loosing him/her. The employee, whose training will be specific only to that firm, will also be unwilling to quit. Therefore, it will be optimal the optimal solution is sharing of the costs and returns of the specific training between the employer and the employee. Looking at Table 6, the statistically significant positive coefficient estimate for the variable *TENURE* illustrates the importance of firm-specific (or employer-specific) training in the Turkish labor market. Moreover, the significantly negative coefficient for the variable *TENURESQ* evidences a quadratic relation between *TENURE* and earnings. Indeed, specific training gradually accumulates and reaches to a maximum at some point in working life, thereafter starting to retrench over time. The coefficient estimates for the year 2003 show that log monthly wages are maximized at 20.71 and 14.5 for men and women, respectively, given that they work with the same employer. The corresponding 2010 figures are estimated at 24 for men and 17.86 for women.

Membership to a union (*UNION*) possesses a highly significant and positive sign for both years and genders. Along these lines, one can argue that union membership improves earnings potential in the Turkish labor market. Membership to a union raises earnings by 11.1 for men and 10.3 percent for women in 2003. This effect rises slightly in 2010, reaching 16.1 percent for men and 14 percent for women. There are only few studies in the literature which takes into account of the union membership effects on earnings in the Turkish labor market. Thus, our results are of significant importance in terms of disclosing the influence of unions on male and female earnings potentials.

The dummy variable *PRIVATE* represents the effect of working for the public/private sector on earnings, and displays a significantly negative coefficient estimate for both genders and years under study. Accordingly, men working in the private sector in 2003 had 12.1 percent lower earnings compared to that of men working in the public sector, and for women, private sector wages were on average 11.9 percent lower than public sector wages. The discrepancy between private and public sector remuneration has widened in 2010, reaching as high as 20.5 percent for men and 26.5 percent for women. These results are a mere reflection of the deterioration of private sector wages against public sector wages in Turkey in the aftermath of the 2008 economic crisis.

Confirming our priors and consistent with the existing literature, hours worked per week at the current job (*HOURSW*) is significantly positive for both men and women. Whereas, when magnitude of the coefficient estimates are compared, returns to working hours are found as larger for women.

The sector dummy *INDUSTRY2* have a significantly negative coefficient for both years and genders as anticipated. That is, workers in agriculture earn less than workers in the manufacturing industry. Relatively higher absolute values for the coefficients of women in both 2003 and 2010 imply that female wages are more adversely affected compared to that of male if working in the agriculture. This is a reflection of the fact that, as a result of the traditional structure, women are overrepresented in the agriculture rendering female labor supply abundant in this sector. This result is reinforced by the

extremely low levels of female labor force participation in the urban areas, where college degree is typically a necessity for female employment.

INDUSTRY3 variable is significantly negative for women for both years. Whereas, it is only significant in 2003 for men and displays a positive coefficient estimate. That is, women working in manufacturing on average earn less than women in services sector as opposed to men who typically have higher returns in manufacturing compared to services industry. The finding can also be linked to the fact that female labor informality is considerably high in the manufacturing sector.

Regarding the occupation dummies (*OCCi*), one would expect workers in the base category of "skilled agricultural and fishery workers" to earn less than workers in all other occupations. The estimation results confirm this expectation, particularly for the year 2003. The result is more evident for legislators, senior officials and managers (*OCC1*), and professional occupational groups (*OCC2* and *OCC3*). For example, men working as legislators, senior officials and managers in 2003 earn about 566 percent higher than their counterparts in skilled agriculture.

INFORMAL and *FIRMSIZE* variables have highly significant and negative and positive signs, respectively for both genders and years. These results indicate that informal employment is often associated with inferior earnings, and that employment in large firms carries a wage premium

Cohort dummy variables (*COH*), in general, seem to have a low performance. The coefficient estimate for the male sample despite being statistically significant in 2003, holds a negative sign as opposed to expectations.

Lastly, the inverse of Mill's ratio (λ) obtained from the participation equations yields a negative coefficient estimate for both years and genders, yet it is statistically significant only for the male sample. The significantly negative coefficient estimate for men evidences the existence of a sample selection bias in the male sample. The error term in the participation equations represent the "unobservable factors affecting labor market participation". Therefore, the negative and statistically significant coefficient estimate for λ implies that unobserved characteristics that earn a premium in the labor market make the individual more likely to be observed in the labor market.

7.2. Decomposition of Male-Female Wage Differentials

The Oaxaca decompositions of male-female wage differentials for 2003 and 2010 are presented in Table 7.

Table 7: Oaxaca-Blinder Decomposition of the Male-Female Earnings Differential, 2003-2010

	2003		**2010**	
	Male-Female Earnings Differential Due to Differences in (%):		**Male-Female Earnings Differential Due to Differences in (%):**	
Specification	**Endowments**	**Returns (Discrimination)**	**Endowments**	**Returns (Discrimination)**
Evaluated at Male Returns (b_m) (Eq. (14))	38.37	61.63	36.84	63.16
Evaluated at Female Returns (b_f) (Eq. (15))	42.72	57.28	35.03	64.97

Table 7 shows that if female wage structure is assumed as the non-discriminantory benchmark wage, wage discrimination accounts for 57.28 and 64.97 percents in 2003 and 2010, respectively. The same shares turn out as 61.63 and 63.16 when male wage structure is taken as the benchmark. These results indicate that a significant portion of the gender pay gap in Turkey is indeed attributable to pay discrimination (in favor of men) even after controlling for a large set of wage-determining variables. The results also reveal that discrimination has risen over time.

The estimation results conform to the previous research to a significant extent. As discussed in the literature review section, for example, Yamak and Topbaş (2004) find that 80 percent of the wage gap is due to discrimination, and Tansel (2005) reports a 42 percent discrimination in the private sector using 1994 data. Gürler and Üçdoğruk (2007) calculate the same rate to be 85.8 percent for 2002, and Cudeville and Gürbüzer (2007) around 60 percent for the year 2003. Cudeville and Gürbüzer (2007) re-estimate the reduced form wage regression comprising only human capital variables, and observe that the share of wage discrimination rises to 90 percent as expected. Similarly, the results of Ilkkaracan and Selim (2007) display a 43 percent share of wage discrimination in the overall gender gap earnings using the reduced form wage regression, and a 22 percent share re-estimating the extended form model incorporating occupation, sector and firm characteristics variables.

The reason of estimating the reduced form models which only comprise the human capital variables is that the extended models might under-estimate the actual extent of wage discrimination. The main critique against the use of extended wage models in estimating earnings gap is that some variables which should be discarded in such analyses are controlled. Wage discrimination is defined as different returns to same wage-determining endowments. Whereas, if variables other than human capital variables such as occupation, sector, and region of residence are also included in the model, then discrimination would be defined as different returns to individuals with same endowments who work in the same occupation, same sector and reside in the same region. For example, if occupation is included as a covariate in the wage model, one would indeed be ignoring the fact that ease/possibility of access to certain jobs or occupations might well be different for male and female workers. This would result in mis-measurement of the actual effects of occupational segregation which is another form of gender discrimination.[10] Similar arguments could also be made for other variables such as sector of economic activity, region of residence, union membership, etc.[11]

In our study, we estimate both extended and reduced form wage regressions. As expected, the share that is attributable to discrimination in the gender earnings gap rise significantly when reduced models are used. The reduced model which comprises only the variables *EDUC*, *EXP*, *EXPSQ*, *TENURE* and *TENURESQ* yields the share of wage discrimination for the years 2003 and 2010 to be 79.20 and 85.38 percents respectively if female wages are taken as the reference category; and 90.54 and 92.77 percents if male wages are taken as the reference category. Therefore, we can argue that occupational and industrial segregation against women in Turkey is quite large, confirming the results of the Cudeville and Gürbüzer (2007), Yamak and Topbaş (2004) and Gürler and Üçdoğruk (2007) studies reporting reduced model estimation results.

[10] Occupational segregation is defined as female workers being concentrated in occupations with lower pay and worse working conditions. Industrial segregation is also defined in similar fashion.

[11] In Oaxaca-Blinder methodology, particularly in the estimations of extended wage models, the share of wage gap that is not attributed to discrimination might indeed be due to other forms of discrimination. For example, discriminatory acts limiting women's access to productivity-enhancing characteristics (i.e. education, tenure) or to wage-enhancing labor market characteristics (i.e. the nature of occupation and industry, firm size, union membership and collective bargaining). These forms of discrimination also contribute to male-female earnings differentials. The Oaxaca-Blinder method, in particular when extended wage models are used, fails to account for these different forms of discrimination, and thereby typically underestimates the extent of overall discrimination.

The Juhn-Murphy-Pierce decomposition (Equation 19) results are reported in Table 8. Men are taken as the reference category. The figures in the first line of each cell indicate the raw values, and in the second line display the shares on the total wage rate. At first sight, one can see that gender wage gap falls with higher levels of the wage distribution. This result is a mere reflection of the fact that women in the upper quantiles of the wage distribution in Turkey are mostly women with higher educational achievements. We also find that the gender wage gap does not alternate much over time, except for a slight rise in the lowest income group (10^{th} quantile) where it rises from 0.69 in 2003 to 0.88 in 2010.

The remuneration effect which can be interpreted as pay discrimination against women stands between 49.58 and 118.13 percents considering both years and all wage quantiles. Another notable finding is that the remuneration effect rises with higher wage quantiles, indicating that discrimination is more salient along upper income groups compared to lower income workers.

Tablo 8: Juhn-Murphy-Pierce Decomposition of the Male-Female Earnings Differential, 2003-2010

Year	Quantile	Male-Female Earnings Differential Due to Differences in:			
		Total Male-Female Wage Differential	**Endowment Effect (differences in observed characteristics)**	**Remuneration Effect (differences in prices for observed characteristics)**	**Unobservables Effect**
2003	10th	0.6931458 100	0.33567047 48.43	0.3436527 49.58	0.01382256 1.994
	25th	0.3566742 100	0.15771866 44.22	0.217886 61.09	-0.01893044 -5.307
	50th	0.3794899 100	0.17612648 46.41	0.1945248 51.26	0.00883865 2.329
	75th	0.1198006 100	0.04397392 36.71	0.0879459 73.41	-0.01211929 -10.116
	90th	0.1410942 100	0.0267849 18.98	0.1221886 86.60	-0.00787926 -5.584
2010	10th	0.8832507 100	0.33964872 38.45	0.44665 50.57	0.09695196 10.977
	25th	0.4054651 100	0.22866774 56.40	0.2162929 53.34	-0.03949547 -9.741
	50th	0.2388921 100	0.07269716 30.43	0.1678462 70.26	-0.00165129 -0.691
	75th	0.1642008 100	0.03771162 22.97	0.1550903 94.45	-0.02860117 -17.418
	90th	0.1053605 100	-0.00026321 -0.25	0.1244617 118.13	-0.01883793 -17.879

Note: Male are the reference group. The number in the second row of each cell represents shares in the total wage.

The underlying reason for a rather less evident pay discrimination in lower wage groups could be that workers in this group earn only in subsistence levels anyway, thus there is not much place for marked

discrimination. As Table 8 illustrates, both endowment and remuneration effects contribute positively to gender gap for all years and income groups (the only exception being the 90^{th} quantile in 2010). In other words, women are disadvantaged considering both wage-determining characteristics and returns to these endowments. However, the third component of "unobserved remuneration effect" mostly holds a negative sign and hence works to close the earnings gap. This implies that the effects of unobserved skills and market value of these skills work in favor of women, and are particularly evident for upper income groups (75^{th} and 90^{th} quantiles). Thus, despite suffering from higher levels of discrimination, women in the upper income quantiles can mitigate these discrimination effects to some extent via their unobserved skills and pecuniary market returns to these skills.

This fact is also related to gender wage gap falling with higher quantiles in the earnings distribution. Women in the upper quantiles of the distribution are mostly well-educated, thus are significantly likely to hold the unobserved skills which are valuable in the market. Therefore, "the unobservables effect" assumes negative and relatively large values, thereby offsetting the total wage gap. For example, the remuneration effect for the 75^{th} quantile stands at 73.41 and 94.45 percents in 2003 and 2010, respectively. Whereas for the same quantile, unobservable remuneration effect is negative for both years (-10.12 for 2003 and -17.42 for 2010), which in turn yields a relatively low total wage gap (0.12 and 0.16 for 2003 and 2010, respectively).

The results of the decomposition of the change in the male-female earnings gap from 2003 to 2010, using Juhn-Murphy-Pierce methodology (equation (24)), are presented in Table 9.

Table 9: Juhn-Murphy-Pierce Decomposition of Changes in the Male-Female Earnings Differentials, 2003-2010

Male-Female Earnings Differential Due to Differences in:			
Observed Characteristics Effect	**Observed Remuneration Effect**	**Gap Effect**	**Unobserved Remuneration Effect**
-0.034618	0.017818	0.0235157	0.020466

As the table illustrates, the effect of the observed characteristics turns out negative. That is to say, the changes in the male/female wage-determining endowments differentials from 2003 to 2010 have worked to reduce the existing gender earnings gap. Put differently, the wage-determining endowment differentials of women have on average increased relative to that of men over the seven years course.

The observed remuneration effect in the second column of Table 9 represents the effect of the change in the returns to the observable wage-determining characteristics of men. The positive value implies that a rise in the rate of returns to wage-determining endowments of men aggravates the gender gap. In other words, women's position in terms of returns to wage-determining individual characteristics has worsened relative to men from 2003 to 2010.

The gap effect (or ranking effect) represents the effect of the changes in women's relative position in the male unexplained earnings distribution, after controlling for the wage-determining variables. The gap effect turns out as positive, meaning that women have lost their ranking in the male unexplained earnings distribution from 2003 to 2010. In other words, women's relative earnings levels have worsened over time. A positive gap effect could also be the result of discrimination against women and/or falls in women's unobservable productivity levels.

The unobserved remuneration effect, which reflects the effect of the changes in the wage dispersion between the two years, has a positive coefficient. This means the dispersion in male earnings has risen over time which in turn increased the male-female earnings differentials.

8. Conclusion

Turkish economy achieved stable and high growth rates in the aftermath of the 2001 economic crisis. The average annual growth rates stood high at 4.8 percent over the 2003-2010 period. Despite the macroeconomic success, however, Turkish economy could not increase its employment-generating capacity and record any improvement in its distressing labor force participation and unemployment rates. The ongoing agricultural exodus has continued throughout the 2000s apace. These changes have been the main culprit of the already low and declining levels of female employment and participation rates. The jobs available in the rural areas are mostly in agriculture and suitable for women having low educational attainments. Those low skilled women working as unpaid family workers in agriculture were forced to leave employment when they migrate to urban areas, given cultural/social forces and their low levels of education. As follows, urban unemployment rates are higher, employment and labor force participation rates are lower. As mentioned in the introduction, women's limited participation in economic life is one of the most salient features of the labor market. Female labor force participation rate (LFPR), measured as 23.5 percent in 2009, is almost one third of OECD and EU-19 countries' rates at 62 and 64 percents, respectively (World Bank 2009). Further, several studies have demonstrated that wage discrimination against women also is a serious systemic problem in Turkey. That is, women in Turkey not only suffer from serious barriers to employment but also a significant pay discrimination even if they manage to enter the labor market.

Against this background, our motivation is to extend the existing literature by analyzing the earnings performances of male and female workers and measuring the extent of pay discrimination in the Turkish labor market, using 2003 and 2010 Household Budget Surveys of the Turkish Statistical Institute. The empirical analysis consists of decomposing the gender pay differentials via the Oaxaca-Blinder (OB) and Juhn-Murphy-Pierce (JMP) methodologies. Utilizing the JMP method, we also decompose the change in the wage gap from 2003 to 2010.

The OB decompositions show that a significant portion of the gender pay gap in Turkey is indeed attributable to pay discrimination. Alternative methods and estimations display that between 57.28 and 64.97 percents of the gender earnings gap is due to discrimination against women. The JMP decompositions, on the other hand, reveal that pay discrimination is more evident among the upper income groups. However, women in the upper end of the earnings distribution have generally higher levels of education. Thus, despite suffering from discrimination, women in the upper income quantiles can mitigate the effects of discrimination to some extent via their unobserved skills and pecuniary market returns to these skills. Along these lines, one can argue that Blau and Kahn (1997)'s idea of "swimming upstream against rising income inequality" holds in Turkey to some extent.

The JMP decomposition of the changes in the male-female earnings differentials between 2003 and 2010 reveals that differentials in wage-determining characteristics have lessened over time in favor of women, but that rate of returns to wage-determining endowments of men have risen which may have increased the gender gap between the two years. The finding that pay discrimination has increased over time is consistent with the results of the OB decompositions of 2003 and 2010 earnings regressions.

The results of our study are in general aligned with the previous research on pay discrimination in Turkey. Even though pay discrimination based on gender is banned by laws in Turkey, our study and

other reveal that enforcement seems to be insufficient. Previous research also shows that pay discrimination is quite common in some European Union member countries as well. In particular, 70-80 percent of the male-female wage differentials are reported to be stemming from pay discrimination in southern European countries such as Greece, Spain, Portugal and Italy (Meurs and Ponthieux, 2005). Along these lines, one can argue that the incidence in Turkey is not that severe. However, pay discrimination is not the best indicator of gender discrimination against women. The fact that the exclusion of women from the labor market and the prevalence of occupational and sectoral discrimination have been confirmed by not only ours but also several other previous studies should not be neglected when considering the evidence in Turkey.

Thus, it is evident that besides enacting and enforcing prohibitive laws against pay discrimination, enhancing women's labor market participation and access to jobs with better pay and work conditions are of great concern. There are several policies which could be used to promote women's job market related skills, thereby their employability potentials such as increasing the schooling rates for girls in all educational levels, creating job opportunities for first-time job-seekers, and establishing decent child-care facilities.

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