Economic and Econometric Evaluation of the Turkish Labor Market

by

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Abstract

This dissertation is organized in three chapters that deal with issues on labor market changes in Turkey. The first chapter estimates how historical internal migration impacted the gender pay gap in the Turkish Labor Market regionally and occupationally. For this purpose I used Turkish Household Budget Survey data which are retrieved from Turkish Statistics Institute. Getting advantage of the nice future of the micro level data sets help to explain the changes from 2002 to 2013. I first explain the factors influencing regional gender pay differences in the Turkish Labor Market. Then, I apply the Oaxaca-Blinder decomposition method to estimate potential wage gap between genders. The chapter also uses the Propensity Score Matching method to analyze regional and occupational differences over the 12 years period. The results present a clear wage gap between genders in favor of female labors. In addition to this, the regional gender wage gap is higher in rural are than urban areas due to the thinner laborers market in rural areas. The results revel that unskilled workers in agriculture, stockbreeding, fisheries and forestry areas had the highest pay gap in each year during the study period.

The second chapter investigates a specific policy that was proposed to increase labor force participation in all females and young males who are between 18 to 29 years old. The policy was implemented in July 2008 giving insurance incentive to employers who hired additional female workers and young male workers after the date. The policy provided a 100% insurance incentive for 5 years with a decreasing rate for the following years. The Income and Living Conditions surveys for 2006 and 2011 provided information about labor force participation before and after policy implementation. To analyze the policy impact, I applied a

nonlinear difference in difference model using the micro level data sets. The findings reveal that the policy had different impacts depending on the region of Turkey. After the policy was applied, the highest labor force participation was in East Marmara, while 6 of the 12 regions of Turkey had no statistically significant impact. This chapter was published at http://ijmas.com/CurrentIssueDetails.aspx?ID=4020.

The third chapter provides information about the decision mechanism of individuals in the Turkish Labor market. In other words, it estimates laborers' employment choices among not working, working in the public sector, private sector, and others. For estimation, I estimated Mincer's wage equation with appropriate correction for selectivity bias using Heckman on 2011 Household Budget survey results. Then, the individuals' sectoral choice was estimated by a multinomial logit model. The finding reveals that the wage gap in the public sectors is less than other sectors. Also, the majority of individuals were employed in the public sectors. Both females and males prefer public sector compared to private and other sectors. Higher educational attainment may decrease the disparity between the public and private sectors for both genders. Therefore, policy makers should focus on increasing educational attainment and working condition toward equal payment instead of increasing the wage bill of public sectors. This chapter was published at http://www.jiarm.com/APR2017/paper30352.pdf

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List of Abbreviations

ABPRS	Address Based Population Registration System
DID	Difference In Difference
FEM	Fixed Effects Model
HBS	Household Budget Survey
HLFS	Household Labor Force Survey
HILDA	Household, Income and Labor Dynamics in Australia
ILCS	Income and Living Condition Survey
ISIS	Islamic State of Iraq and Syria
LFP	Labor force participation
MLM	Multinomial Logit Model
NN	n-Nearest neighbor matching
NUTS	Nomenclature of Units for Territorial Statistics
N-DID	Nonlinear Difference in Difference Model
OB	Oaxaca-Blinder Model
OLS	Ordinary Least Squares
PSM	Propensity Score Matching
PKK	Kurdistan Workers' Party
REM	Random Effects Model
RLS	Restricted Least Squares
TSI	Turkish Statistics Institute

UIF	Unemployment Insurance Fund
UNHRC	United Nations Human Rights Council
1:1	n-Nearest neighbor matching- one to one sample matching
1:n	n-Nearest neighbor matching-one to n sample matching

Chapter 1:

Regional and Occupational Differences in the Gender Pay Gap:

Evidence from the Turkish Labor Market

Abstract

A recent increase in internal migration due to terrorist activities associated with the Islamic State in Iraq and Syria (ISIS) and the Kurdistan Workers' Party (PKK), as well as the Syrian internal conflict may negatively impact the labor force in Turkey. The most recent data from the United Nations Human Rights Council (UNHRC) show that around 1.6 million Syrians migrated to Turkey from 2011 to December 2014. These security problems and migration from Syria may negatively impact Turkish Labor Market both regionally and occupationally. Therefore, this research seeks to understand how historical internal migration impact occupational wage gap in the gender wage gap from 2002 to 2013. For this purpose, we used Household Budget Survey data which is a micro level yearly data set since 2002 which is used to examine the potential wage differences. The wage gap can be higher in rural areas than urban areas over the aforementioned period, in part due to the supply of unskilled work in rural areas. Therefore, as the second goal, this paper also estimates how different regions have been impacted by internal migration. The Oaxaca decomposition model and Propensity Score Matching are applied on 12 years of data to investigate regional and occupational wage differences in the gender wage gap. The results of analyses suggest that there is a regional wage gap of roughly 14 percentage points over the observation period. This study makes two fundamental contributions to the economic inequality literature of Turkey. First, to the best of

my knowledge, this paper is the first to examine the long-run regional and occupational wage differential rather than a specific year. Second, it investigates the link between recent increases in internal migration (from rural to urban areas) and the evolution in the gender wage gap of Turkish labor market.

Keywords: *discrimination, gender pay gap, internal migration, propensity score matching. regional and occupational analysis*

1.1 Introduction

In recent years, although there have been a number of improvements in education, technology, and social rights in many industrialized countries, inequality problems persist. Among these, the gender-based wage differential is one of the most common forms of social inequality (OECD, 2004). Labor statistics routinely ignore unpaid work which a large percentage of performed by women, such as domestic labor, family farm work, and other informal income generating activities (Donahoe, 1999), so the fact that female workers are overlooked, undercounted, and undervalued is not new. Even though the gender wage gap has been decreasing for some developed countries (Beaudry and Lewis, 2014, Yamaguchi, 2014), female workers, especially in developing countries including Turkey, have historically experienced unequal wages.

From a neoclassical perspective, there is a link between gender equality and an efficient economy. For example, Braunstein(2011) found that gender-based wage discrimination significantly reduced women's labor force participation, stunting growth because countries do not use their resources efficiently. Hence, the primary purpose of this study is to investigate the evolution of gender-based wage gap in the Turkish labor market over the last 12 years. This study makes two fundamental contributions to the economic inequality literature of Turkey. First, to the best of my knowledge, this paper is the first to examine the long-run regional wage differential (12 years) rather than a specific year. It investigates the link between recent increases in internal migration (from rural to urban areas) and the evolution in the gender wage gap for Turkey.

As a second issue, I examine the gender wage gap in different types of regions and occupations after the internal migration process which may affect different occupations in

different ways. Because rural workers' primary sectors are in agriculture or forestry, the rural labor supply may decrease in response to migration to urban areas (White and Wolaver, 2006).

In Turkey, internal migration has been continuous for over 60 years, but it has gained momentum recently. Below, I summarize the fundamental reasons for migration from the 1950s to today to explain how it may have impacted the labor market over time.

The first, the internal migration process began in the 1950s when the Marshall Plan was accepted in Turkey. The plan's purpose was to increase agricultural output rapidly by the introduction of mechanization. However, this situation reduced job opportunities in rural areas, especially for agricultural laborers, causing migration from rural to urban areas. Then, in the 1980s, reductions in agricultural subsidies, changes of transportation systems (improvement in the highway system), and increases in terrorism activities of the Kurdistan Workers' Party (PKK, a terrorist organization in Eastern Turkey) accelerated internal migration (Tanrivermis and Bulbul, 2007).

Unfortunately, security problems still exist due to the Syrian internal conflict and The Islamic State in Iraq and Syria's (ISIS) terrorist activities. The most recent data from the United Nations Human Rights Council (UNHRC) show that around 1.6 million Syrians migrated to Turkey between 2011 and December 2014 due to Syrian internal conflict. These immigrants have been residing primarily in rural areas due to job opportunities in agriculture (Corabatir et al, 2014). This situation also gave momentum to internal migration, especially in southeastern Turkey.

According to the Turkish Statistical Institute (TSI) census survey results, 75% of the population resided in rural areas in the 1950s, while in 2012 only 20 percent of Turkish people lived in rural areas (See Table 1.1). Even if the actual population has increased from 5.244.000 to

58.449.000 in urban areas while it has risen from 15.703.000 to 17.178.000 in rural area over 60 years, the percentage has dropped significantly from 75% to 22.7% in rural area. I mean over a 60-year period, the rural population decreased by nearly 55 percent due to the aforementioned agricultural policies and security problems.

Table 1.1: The proportion and growth of urban-rural population in Turkey (1950–2012)

Years	**Urban**				**Rural**			
	Population (Thousands)	Population (%)	Women Labor Force	Men Labor Force	Population (Thousands)	Population (%)	Female Labor Force	Male Labor Force
1950	5.244	25	-	-	15.703	75	-	-
1980	19.645	43.9	1.400	6.500	25.091	56.1	4.200	6.200
1990	33.949	59.2	1.572	7.195	23.395	40.8	4.588	6.795
2000	44.006	65	2.379	9.797	23.146	35	3.809	7.093
2005	46.097	67.3	3.236	11.978	19.872	32.7	2.514	4.894
2010	56.222	69.9	4.655	12.709	16.500	30.1	2.987	5.549
2012	58.449	77.2	4.964	13.222	17.178	22.7	3.228	5.925

Sources: Turkish Statistical Institute. 1950's labor statistics are not available since the collection began later of the date.

In Turkey, internal migration has been continuous, possibly impacting the labor market in a negative way, particularly for women labors. Bicerli and Naci (2009) stated that the majority of female workers who are generally employed in agriculture do not have sufficient opportunities or incentives to participate in the urban labor force after the migration process. Even if women enter the Turkish labor force, they may face lower wages because of negative attitudes toward female workers resulting from the attitudes of a patriarchal society that are reflected in government policies.

Turkey is characterized by a male-dominated society and conservative politics, with the current ruling party as one example. The Justice and Development Party (AKP) has been the ruling party since 2002 and is defined as conservative and patriarchal, and promoting moral values (Dedeoglu and Elveren, 2012).AKP politics are often framed by religion and have become increasingly dominant regarding the regulation of social and cultural domains (Acar and Altunok, 2013). Therefore, the conservative and patriarchal political leanings of Turkish society may negatively impact the gender pay gap. In light of current conditions, the gender-based wage differential is examined for different regions (urban-rural) and occupations and following hypotheses are stated;

1. A gender-based wage differential has persisted in the Turkish labor market over the study period;
2. The gender wage gap is higher in rural areas than urban areas over the 12 years, in part due to the supply of unskilled work in rural areas.
3. The gender wage gap is higher among unskilled laborers in comparison to other workers.

To analyze these three hypotheses, I used Household Budget Survey (HBS) results from 2002[1] to 2013, which were collected by the TSI.

1.2 Literature Review

There are many theoretical and empirical studies explaining discrimination in the labor market. From the neoclassical perspective, consumers, workers and employers reveal that equally productive workers will earn the same wage at least in the long run in competitive markets. Simply state the theory assumes perfect competition, profit maximization, and

[1]Because Turkey has been governed by the AKP since 2002, the data set was chosen starting with 2002. After 2013 there were not any information about urban and rural settlements in Household Budget Survey. Therefore, I keep the study period between 2002 and 2013.

homogeneity of workers. Hence, in a competitive market, wage discrimination against a specific group, like race or sexes cannot remain in the long run.

In Becker's theory (1971), discrimination arises from distaste that is modeled by means of employers' utility functions. In the theory, employers do not only regard profit but also consider gender, race, religion or origins-based composition of their workforce depending on their taste. Suppose an employer who is biased toward females (or males) will obtain positive utility by hiring females (males). A monopsonistic explanation of discrimination was defined by Robinson (1969) who applied Pigou's (1932) third degree price discrimination concepts in the labor market. The market is assumed imperfectly competitive and firms have more monopsony power over their female workers than over their male workers.

Oaxaca (1973) is one of the seminal empirical studies examining wage differentials. He described a discrimination coefficient of different productivity in labor market which is the difference between observed and unobserved wage ratio, or counterfactual. His decomposition model allows coefficients to vary by sub-group, and quantile regression decomposition, which allows impacts to vary across the distribution. He examined the reasons for discrimination against female workers by using the 1967 Economic Opportunity Survey data in the US urban labor market. Hirsch (2009) showed how part-time /full-time wage gaps for women and men declined as one controls for worker, location, and detailed job characteristics. Aldan and Gaygisiz (2006) researched discrimination in Turkey by province applying a β-convergence Markov Chain model with data on Provincial Gross Domestic Products. However, they did not find any convergence among the provinces.

Jefferson and Preston (2005) analyzed earning disparities in the Australian Labor Market, showing that private pension schemes generate around 30 percent smaller returns for female

workers than for men. They also illustrated that by taking into account additional gender disparities in occupation and job promotion opportunities, a much higher gap may be produced. Blau and Kahn (2006) performed a similar analysis for the gender pay gap from 1980 to 1990. They examined indirect evidence as to whether the smaller residual reduction in the gender wage gap because of women reaching "glass ceilings". They concluded that there is some evidence in support of a gap, even when accounting for changes in preference and the slowing rate of computerization.

Scheider (2013) examined income inequality differences over the wage distributions of different groups (race and gender) applying a Dagum distribution by using the CPS (Current Population Survey) ASEC data (Annual Social and Economic Supplement data). The analysis illustrates how significant a multi-metric inequality analysis is by including trends in inequality and the role of the income distribution. He also researched income distribution changes by group (working white men, white women, black men, and black women). He concluded that only white men experienced change in within group earning inequality, whereas black men and black women did not reflect any significant results. Hirsch et al (2013) investigated regional differences in impacts on gender discrimination in Western Germany. They applied a flexible semi-parametric propensity score matching approach. Their results reflected that there is an approximately 10% gender wage differential among young workers and that workers' wages are permanently lower in urban than rural regions.

Beaudry and Lewis (2014) is one of the most recent studies investigating gender discrimination. The authors implemented Nopo's (2004) non-parametric approach to decompose the gender pay gap into explained and unexplained components by using in cross-city data from 1980 to 2010. They concluded that the male and female pay gap have decreased as the adoption

of personal computers became more prevalent. However, Nopo's (2004) exact matching method is criticized since highly differentiated characteristics and the number of cells which contain a given combination of covariates turn out to be limiting (Frolic, 2007 and Hirsch et al. 2013).

In the literature, many articles used Beckerian theory to explain discrimination. Nevertheless, Becker's discrimination theory has been criticized because it is not clear about regional differences. Also his theory would be costly for employers in a long run competitive market (Madden, 1977). Therefore, I think Hirsch' spatial duopsony model which uses Hotelling style duopsony model and Robinsonian discrimination may give more clear explanation for regional differences and it is given in appendix part.

1.3 Theoretical Information

There are many theoretical studies explaining discrimination in the labor market. Becker's discrimination theory (1971) is one of the seminal studies that explains discrimination. In the theory, discrimination arises from distaste that is modeled by means of employers' utility functions. In the theory, employers do not only regard profit, but also consider gender, race, or the origin-based composition of their workforce depending on their taste. For example, an employer who is nepotistic toward females (or males) will obtain positive utility by hiring females (males). Nevertheless, Becker's discrimination theory has been criticized because it is not clear about regional differences. Additionally, his theory would be costly for employers in a long-run competitive market (Madden, 1977). For these reasons, I adopt Hirsch's (2009) spatial duopsony model, which uses a Hotelling-style duopsony model and Robinsonian discrimination. Hirsch's theory informs a simple duopsony model of the labor market in which workers and employers are located in different places and the assumptions are as follows:

There are equally productive workers and a number of competitive firms. Firm *j* and its two direct competitors, firms *j* - 1 and *j* + 1, which are both at an equal distance *Y* from this firm. All workers face travel costs including direct and indirect (time, opportunity) costs. Workers' homes are equally distributed along the real line on the density function *D*, and firms' wage offers are independent of distance. Firm *j* pays a wage *w* and its competitor pays w_1. A worker is located at distance *y* from his or her workplace, so $0 \leq y \leq Y$. Workers choose their employers such that their incomes are maximized. If *t* is the travel cost per unit of distance, a worker's income acquired from firm *j* is $w - ty$ and from *j*'s competitor is $w_1 - t(Y - y)$. Hence, the worker will work for firm *j* as long as $w - ty > w_1 - t(Y - y)$ and otherwise worker will work for firm *j*'s alternative. Consider *y** to be the distance from firm *j* at which point a worker is indifferent to working for firm *j* or its competitor as follows:

$$y^* = \frac{w - w_1 + tY}{2t}.$$

Workers at distance $y^* > y$ from firm j prefer to work for firm *j* while those at distance $y^* < y$ prefer to work for firm *j*'s competitors Therefore, firm *j*'s labor supply is $L(w, w_1) = Dy^*$.

On the labor demand side, to determine an optimal wage for firm *j*, all firms are assumed to be profit maximizers. Firms produce homogeneous goods with a constant marginal revenue product of labor β. Firms face fixed costs *F*. The profit maximization problem is $\mathrm{Max}_{\mathrm{w}}\pi(\mathrm{w}, \mathrm{w}_1)$ and the first order condition for optimization is $\partial\pi(w, w_1)/\partial w = 0$. Then, the firm's optimal wage offer is $w(Y) = \beta - tY$ given by some fixed distance between firms as *Y*. Setting $\pi(w, w_1) = 0$, provides the distance between firms given some wage *w* as $Y(w) = \frac{F}{D(\beta - w)} \rightarrow$

$Y'(w) = \frac{F}{D[(\beta - w)^2]} > 0$. In the long run[2], the equilibrium wage is given by $w^* = \beta - \sqrt{ft/D}$. If β is large enough, then $w^* > tY^*/2$. Because firms offer a positive income, I assume equilibrium exists.

In Turkey, there is a dual labor market consisting of D_u, the urban labor market, and D_r, the rural labor market. The urban labor market is more densely populated by workers than the rural labor market $(D_u > D_r)$ because of internal migration. Worker density may impact profitability and wages, yet it does not affect marginal decision-making in the theory that is summarized as follows:

A higher (lower) worker density in urban area causes the labor market to be more (less) profitable for new firms. This leads to more (less) firms entering the market so that the distance between firms decreases (increases). The rise of competition among firms in the urban labor market increases (decreases) wages. In the Turkish labor market, the urban area (D_u) is more profitable than the rural area (D_r),which is explained by the following equation:

$$w_u^* - w_r^* = \sqrt{ft/D_r} - \sqrt{ft/D_u}.$$

Increases in workers' wages in urban areas make the area more attractive for workers; however, the situation may not affect all workers in the same way. Assume Turkey's condition, where t_f represents women's travel costs and t_m represents men's travel costs and $t_f > t_m$. In other words, women's indirect travel cost generally tend to be higher than men's, considering that women generally undertake childcare, care of elderly people, household work and production in Turkey. Moller (2013) stated that women have higher opportunity costs than men because they still undertake most of the childcare, household production, and so on.

[2] The zero-profit condition defines an upward sloping curve. In the long run, the equilibrium wage setting condition and zero-profit condition are determined by the symmetric Nash equilibrium under free entry (Salop, 1979).

Furthermore, Maani and Cruickshank (2010) showed some evidence that travel costs are lower for male workers than female workers who have more domestic responsibilities in the United Kingdom. The reason of this conclusion is that females' labor supply at the firm level is less elastic than males' (Ransom and Oaxaca, 2010).Taking all these factors into account in this theory, regional gender wage differences can be explained by the following equation:

$$\Delta_r - \Delta_u = \sqrt{\frac{ft_f}{D_r}} + \sqrt{\frac{ft_m}{D_u}} - \sqrt{\frac{ft_f}{D_u}} - \sqrt{\frac{ft_m}{D_r}} \text{ , so } \Delta_r - \Delta_u > 0.$$

This equation implies that the wage differential is larger in rural areas than urban areas. In other words, the wage differential in more dense labor markets (urban) Δ_u should be smaller than for less dense labor markets (rural) Δ_r.

1.4 Experimental Section

1.4.1 Methodology

Many methods have been proposed in the literature to estimate gender-based wage differentials, but the most common is the Oaxaca (1973) and Blinder (1973) method, hereafter referred to as OB. A separate wage function is estimated for females and males as follows:

$$ln(\widehat{w_i^f}) = \widehat{\alpha_0^f} + \widehat{\alpha_i^f} X_i^f + \varepsilon_i^f \text{ and } ln(\widehat{w_i^m}) = \widehat{\alpha_0^m} + \widehat{\alpha_i^m} X_i^m + \varepsilon_i^m, \qquad (1,2)$$

where w, is the hourly wage level, α is a vector of coefficients calculated using ordinary least squares, and the subscripts *f* and *m* represent females and males, respectively. *X* denotes a vector of human capital characteristics, including age, education (completed degree), experience (completed years), marital status, region, occupation, the number of workers in a workplace, sector, and type of work (full time or part time). Here, the hourly wage function is decomposed into the endowment effect (personal characteristics) and remuneration effect (difference in return). Wage differences can be calculated using a semi-logarithmic wage function as follows:

$$ln(\widehat{w_i^{m|f}}) = \widehat{\alpha_0^f} + \widehat{\alpha_i^f} X_i^m \text{ and } ln(\widehat{w_i^{f|m}}) = \widehat{\alpha_0^m} + \widehat{\alpha_i^m} X_i^f, \quad (3,4)$$

$$ln(\widehat{w_i^m}) - ln(\widehat{w_i^{m|f}}) > 0 \text{ or } ln(\widehat{w_i^f}) - ln(\widehat{w_i^{f|m}}) < 0, \quad (5,6)$$

$$lnw_i^m - lnw_i^{m|f} = diff_m \text{ and } lnw_i^f - lnw_i^{f|m} = diff_f. \quad (7,8)$$

Although the OB decomposition model is commonly used, the approach is criticized because it does not allow wage-level determination if there is no discrimination (e.g., Barsky et al, 2002, Nopo, 2004 and 2008). Therefore, this study also uses propensity score matching (PSM) for the unexplained part of the gender pay gap. Frolic (2007) states that PSM disentangles the impact of observable and unobservable heterogeneity in an analysis of discrimination, relaxing the parametric assumption of OB's decomposition.

PSM was first introduced by Rosenbaum and Rubin (1983), followed by Rosenbaum (1995) and Heckman (1997). It is primarily used to compare two groups of subjects, but it can be applied to multiple groups. An example of assigning the observations into two groups involves the treated group that receives the treatment and the control group that does not. Treatment *D* is a binary variable that determines if the observation is in the treatment group or not, where *D* = 1 for treated observations and *D* = 0 for control observations. The probability that *D = 1* is estimated by a probit or logit model to assign observations into treated and untreated groups, using explanatory variables, that affect the likelihood of being assigned into the treated group. In this study, PSM is estimated by a probit model,

$$\widehat{Pr}[d_i = 1|x_i] = \theta(x'\hat{\beta}), \quad (9)$$

where d_i is a dummy variable taking the value 1 if a worker *i* is male (treatment group) and 0 otherwise (control group), x_i is a vector of observable characteristics, β is the estimated vector of coefficients, and θ is the cumulative distribution function of the standard normal distribution.

Treatment and control groups are matched by personal characteristics. The PSM estimator differs not only in the way the neighborhood for each treated individual is defined and the common support problem is handled, but also with respect to the weights assigned to neighbors. There are different types of PSM: nearest neighbor, caliper, stratification and interval, kernel matching, and weighting.

In this study uses *N*-nearest neighbor (NN) matching, in which the absolute differences between estimated propensity scores for the treatment and control groups are minimized. 1:1 and 1:N matches with replacement are examined to increase average matching quality and decrease bias. I also apply caliper matching, which sets a tolerance level on the maximum propensity score distance, in order to avoid bad matches from NN. Caliper matching leads to individuals from the comparison group being chosen as a matching partner for a treated individual that lies within its propensity range, and any values that fall outside the range are removed (Smith and Todd, 2005). The comparison of each male observation with its *n*-nearest female neighbor is based on the common support *S* to minimize the absolute difference between the estimated PSM for control and treatment groups. I calculate the NN matching with replacement for $n = 1$. Then, the individual's gender pay differential is calculated using the following equation:

$$\Delta_{\%,i} = ln(w_i / w_{k(i)}), \quad (10)$$

$$k_i = \widehat{Pr}\langle d_i = 1 | x_i, d_i = 1\rangle - \widehat{Pr}\langle d_k = 1 | x_k, d_k = 0\rangle, \quad (11)$$

where *k(i)* is the nearest female observation in the common support in S. Then the unexplained gender pay gap can be calculated using:

$$E(\Delta_{\%}) = 1/T \sum_i^n \widehat{\Delta_{\%,i}}, \quad (12)$$

where *T* denotes the total number of matched males. For the PSM, I compare the wage of each man with a comparable woman or group of women. Caliper matching is also calculated with a range of $|P_i - P_j| < e$, where P_i is the estimated propensity score for a treated subject *i*, P_j is the estimated propensity score for a control subject *j*, and *e* is the predetermined range value. To evaluate the differences between urban and rural areas, $E(\Delta_{\%})$ is estimated separately for both types of region.

1.4.2 Data

This study uses the Turkish Household Budget Survey (HBS) dataset which is a household level micro dataset commonly used for similar research (Tansel, 2005, Kara, 2006). The HBS[3] provides information on socioeconomic structures, standards of living, and consumption patterns of households, which can be used to test the viability of socioeconomic policies that are implemented. Using the dataset, it is possible to obtain information on consumers' expenditures for goods and services along with socioeconomic characteristics of households, employment status of household members, total income of households, and income sources for both rural and urban areas.

The 2002-2013 dataset used in this study is retrieved from the TSI. The 2002 household budget survey includes 9,555 sample households, while for 2013, it includes 10,060 sample households. The samples are selected and assigned survey weights[4] by the TSI so that they are representative of the non-institutionalized Turkish resident population. A two-stage stratified sampling procedure is applied for sample selection for each year. The interviews are administered as a result of eight visits in one month, including one visit prior to the survey

[3]The TSI has been conducting surveys regularly every year. For sample households, the survey is conducted between January 1 and December 31.

[4] Results of the HBS are weighted and published for the most recent population projections. Until 2009, the aforementioned population projections were calculated based on general population censuses. In 2007, the Address Based Population Registration System (ABPRS) was established.

month, two visits during the first and second weeks, one visit during the third and fourth weeks and, one visit following the end of the survey month. In cases of non-response, the substitution approach is used. A household is taken as a sample unit and defined as the community that is comprised of one or more than one member living at the same residence with as close a relative as possible.

To test the three hypotheses given in the introduction, the sample individuals are restricted to those over 15 years old, which is the youngest legal working age in Turkey[5]. Wages are the sum of cash earnings, overtime payments, and bonuses. Hourly wages are obtained by dividing reported monthly wages based on imputed monthly hours of work. Rural and urban regions are based on population, so that if the regional population is lower than 20,000, the area dummy variable takes on the value 1, and 0 otherwise. Educational attainment is categorized as: (1) no diploma, (2) less than a high school diploma, (3) high school diploma, (4) college (or university) diploma, (5) graduate degree or professional qualification. The work environment of respondents is captured by number of workers in a firm: (1) 1–9 workers, (2) 10–24 workers, (3) 25–49 workers, and (4) over 50 workers. Marital status is categorized as(1) single, (2) married, (3) widowed, and (4) divorced. A dummy is used for private (1) versus public sectors (0). Another dummy is created for full-time (1) and part-time[6]worker (0).Occupations are categorized into five main groups[7] as follows: (1) managers and professionals, (2) clerical services and sales workers, (3) agricultural workers, stockbreeding, forestry, and fisheries (4) artists and designers, and (5) others.

[5]Age variables are given based on an individual's date of birth until 2006, but after that, TSI categorized ages in 13 subgroups from 0 to 99. Thus, the first four years are reorganized based on 13 categories to be consistent within the entire data set. Then, I used only 10 subgroups whose ages are over 15 years old.
[6]If a laborer's weekly hours of work are over 35 hours, then the job is defined as full-time and part-time otherwise.
[7]The TSI divides the occupations into nine subgroups in the 2002 data set, whereas in 2013, occupations were divided into 18 subgroups. To make our data set consistent for each of the year, I merge them in five main subgroups.

1.5 Empirical Results

In order to estimate the gender wage gap between regions and occupations, the OB decomposition method and PSM were applied to the 12-year data set. In Table 1.2, the absolute and relative raw wage gaps were presented at different quantiles of the wage distribution. The general trend demonstrates that the raw gender gap increased from 2002 to 2013. On average, women earned 28.60 percent less than men in 2002, while they earned 33.04 percentage less than men in 2013: the raw gender wage gap has increased over the 12 years of observation. The highest gender wage gap was in 2008, when the global financial crisis impacted global markets, which was when the unemployment rate reached its decadal peak, according to the TSI. At the end of 2008, the unemployment rate for women was higher than for men. Considering the overall study period, the absolute wage gap at, for example, the 50th quantile, shows the difference between wages at the 50th quantile of female and male wage distributions. For the 12-year period, men at the 50th quantile earned 27.1 % more than women (or 4.45 Turkish lira per hour). Over the entire study period, the wage gap takes a convex U-shape.

Table 1. 2: Absolute and Relative raw gender wage gap at means and selected quantiles

Years	Mean		10th quantile		25th quantile		50th quantile		75th quantile		90th quantile	
	(TL)	(%)	(TL)	(%)	(TL)	(%)	(TL)	(%)	(TL)	(%)	(TL)	(%)
2002	3.67	27.30	3.50	32.40	3.77	31.80	3.90	26.80	3.99	27.30	4.05	32.10
2003	3.81	28.20	3.59	31.70	3.83	30.80	4.01	25.10	4.04	27.70	4.22	33.20
2004	3.74	27.50	3.72	26.10	3.96	29.70	4.12	26.20	4.33	27.30	4.44	33.10
2005	4.26	28.60	4.08	27.70	4.47	30.10	4.38	25.40	4.75	28.10	4.98	32.90
2006	4.28	29.10	3.89	26.80	4.12	29.30	4.44	25.70	4.64	27.20	4.81	33.40
2007	4.28	29.90	3.93	27.40	4.23	28.90	4.49	27.30	4.68	28.10	4.85	32.90
2008	4.92	33.10	4.44	29.10	4.75	26.40	4.73	29.30	5.01	31.90	5.44	35.40
2009	4.75	32.60	3.91	27.90	4.26	25.70	4.55	27.90	4.76	29.30	4.94	33.80
2010	4.34	31.10	3.98	29.00	4.32	27.10	4.61	27.10	4.81	32.00	4.98	33.40
2011	4.55	30.90	4.06	30.10	4.41	28.90	4.68	26.90	4.79	31.10	5.04	32.70
2012	4.66	32.40	4.29	31.80	4.07	30.70	4.68	27.90	4.88	32.90	5.21	32.50
2013	4.85	33.04	4.32	32.90	4.25	32.80	4.77	29.90	4.92	34.50	5.41	33.40
Average	4.35	30.42	3.98	29.41	4.20	29.35	4.45	27.13	4.63	29.78	4.86	33.23

* Wage is hourly wages . The absolute wage gap is measured in current Turkish Liras (TL) and the relative wage gap in % of female wages. The results are calculated by authors.

The analysis starts by first using the OB decomposition method to the estimated semi-logarithmic wage equations-3, and 4 given in Section III. The decomposition results are presented in Table 1.3. Wage equations 5 and 6 were estimated separately for females and males for each study year and the results are shown in Table 1.4 for 2002 and 2013. Results showed that 28 percent of total wage difference between male and female workers occurred due to discrimination in 2002 and 36 percent in 2013. It is clearly seen from Table 1.3 that discrimination against female workers has increased from 2002 to 2013.

With respect to behavioral characteristics, discrimination would be reduced by providing more education to female workers during a study year (Table 1.3). It means that the discrimination coefficients were lower among highly educated women in comparison to others. As expected, private sector employers preferred male workers. Female workers in private sectors consistently obtained lower wages than male workers during the study period[8]. It may be due to the conservative attitude of society which may have more impact on private sectors rather than public sectors[9]. Bright (2005) states that the public sector is assumed that it has been under political and nonlabor budgetary issues especially in developing countries, therefore public sector jobs were generally thought more equal payment than private sectors job.

[8] HBS data provide information about individuals sector until 2011. After the date there is not any sectoral information in HBS.

[9] The detailed information about sectoral differences are represented in Chapter-3.

Table 1.3: Oaxaca Decomposition Model for 2002 and 2013

	2002		2013	
Variables	$\widehat{\alpha_0^f}$	$\widehat{\alpha_i^f} X_i^m$ (Discrimination Effects)	$\widehat{\alpha_0^f}$	$\widehat{\alpha_i^f} X_i^m$ (Discrimination Effects)
Intercept		0.281		0.361
Experience	0.1481	-0.101	0.231	-0.113
Experience^2	-0.0712	0.0124	-0.216	0.0703
15-24 years old	0.0342	0.0702	-0.0483	0.0333
24-29 years old	0.098	0.062	0.0983	0.0647
30-34 years old	0.011	-0.0072	0.0341	0.0282
35-39years old	-0.032	-0.027	-0.0185	-0.0371
40-44 years old	0.0085	0.0412	-0.062	-0.0137
45-49 years old	0.0206	-0.0431	-0.0276	-0.0326
50-54 years old	0.0167	-0.0132	-0.0419	-0.0514
55-59 years old	0.0112	-0.0191	-0.027	-0.0917
60-65 years old	0.018	0.008	0.015	0.012
Full Time Labor	0.049	0.0388	0.073	0.092
Private Sector	0.0335	0.0472	-	-
Rural	0.0934	0.1341	0.1598	0.1974
less than a high school D.	0.021	0.0125	0.0921	0.0319
A high school D.	-0.0114	-0.0501	-0.0863	-0.0621
College D.	-0.038	-0.0413	-0.0891	-0.0406
Grad D &specialists	-0.034	-0.0794	-0.106	-0.0902
Single	0.0102	0.0194	0.0771	0.0381
Married	-0.049	-0.0258	-0.091	-0.0307
Divorced	0.0003	0.0056	0.0245	0.037
Managers &professionals	-0.092	-0.0161	-0.078	-0.0678
Clerical, Services, Sales workers	0.0041	0.0081	0.087	0.072
Agriculture, forestry & fisheries workers	0.0589	0.049	0.0542	0.0971
Artist & Designers	-0.0019	-0.0007	-0.0098	-0.0102
workers#10-24	0.0117	0.0058	-0.0038	-0.095
workers#25-49	-0.0121	-0.0298	-0.032	-0.0147
workers >50	-0.0509	-0.0366	-0.046	-0.0535

* $\ln(\widehat{w_i^m}) - \ln(\widehat{w_i^{m|f}}) > 0$ equation is calculated and m, f symbolize male and female workers respectively. Base variables: 65+ for ages, part-time for illiterate for education, full time workers for works type, public sectors for sectors, urban areas for the regions, widow for marital status, others for occupations, 1-9 workers for the # of workers in a work place are chosen. There is not any information about sectors' of individuals after 2011 in HBS. All years are calculated but they are not reported for brevity.

For occupational differences, the results show that in the agriculture, forestry, and fisheries industries[10], workers have faced higher discrimination than in other occupational groups during the 12 years. Considering the number of workers in a workplace, large-scale firms pay in general more equal wages in comparison to other firms. This might be the positive impact of labor unions and other organizations in the Turkish labor market. Not only divorced and widowed women, but also young female workers acquired lower wages in comparison to other workers. In Turkey many women work as unpaid family workers for housework, children or elderly care. Considering the range of maternity ages such as between 20 and 35, the younger female can face lower wage in comparison to their male counterparts, this situation suggests that there has been a negative impact of conservative attitudes of society against female workers.

[10]In these industries a physical factor may be effective; however, the HBS data do not include such an information of individuals.

Table 1.4: Wage Equation of Female and Male Worker for 2002 And 2013.

	Male Workers- $\ln(\widehat{w_i^m})$				Female Workers- $\ln(\widehat{w_i^f})$			
Variables	**2002 Parameter Estimate**	**Std Error**	**2013 Parameter Estimate**	**Std Error**	**2002 Parameter Estimate**	**Std Error**	**2013 Parameter Estimate**	**Std Error**
Intercept	4.128*	0.163	7.017*	0.107	3.515*	0.008	5.961*	0.137
Exp	0.063*	0.003	0.148*	0.003	0.052*	0.043	0.161*	0.047
Exp^2	-0.211*	0.007	-0.101*	0.002	-0.264*	0.037	-0.076*	0.036
15-24 years old	-0.814	0.078	-0.185*	0.064	-0.126*	0.033	-0.122*	0.033
24-29 years old	-0.384*	0.074	-0.407*	0.060	0.130	0.034	0.234*	0.034
30-34 years old	0.340*	0.073	0.231*	0.059	-0.038	0.035	0.103*	0.047
35-39 years old	0.344*	0.073	0.220*	0.059	-0.026*	0.033	0.009*	0.032
40-44 years old	0.276*	0.071	0.105*	0.058	0.110*	0.031	0.094	0.031
45-49 years old	-0.148*	0.072	0.041*	0.058	-0.092*	0.029	-0.143	0.029
50-54 years old	0.124*	0.074	-0.073*	0.059	-0.063*	0.024	-0.076	0.027
55-59 years old	0.161	0.079	0.086	0.062	0.164	0.037	0.009	0.046
60-65 years old	-0.038	0.078	-0.065	0.060	-0.074	0.038	-0.099	0.041
Full time labor	0.294*	0.028	0.897*	0.029	0.271*	0.048	0.617*	0.049
Private Sector	0.074*	0.028	-	-	-0.452*	0.030	-	-
Rural Area	-0.007*	0.024	-0.297*	0.018	0.588*	0.049	0.439*	0.050
less than a high school degree	-0.263*	0.125	-1.258*	0.079	-0.208*	0.041	-0.419	0.041
high school D	0.774*	0.121	0.891*	0.073	0.399*	0.030	0.211*	0.035
College Degree	1.718*	0.12	1.416*	0.072	1.522*	0.870	0.954*	0.990
Grad D &specialists	1.287*	0.121	2.506*	0.070	1.081*	0.043	1.734*	0.042
Single	0.385*	0.095	0.454*	0.061	-0.194*	0.040	-0.315*	0.045
Married	0.343*	0.09	0.240*	0.055	0.348*	0.043	0.733*	0.018
Divorced	0.056*	0.124	0.041	0.096	-0.416	0.013	-0.358	0.050
Managers &professionals	0.231*	0.03	0.696*	0.030	0.117*	0.049	0.540*	0.035
Clerical, Services, Sales workers	-0.134*	0.029	-0.236*	0.026	0.458*	0.035	0.897*	0.030
Agriculture, forestry & fisheries workers	-0.113*	0.041	-0.960*	0.037	0.374*	0.026	0.408*	0.031
Artist & Designers	0.093	0.026	0.130	0.027	0.080	0.038	0.108	0.047
workers#10-24	0.119*	0.026	0.274*	0.024	0.143*	0.048	0.191	0.029
workers#25-49	0.330*	0.03	0.419*	0.107	0.250*	0.032	0.355*	0.023
workers >50	0.431	0.037	0.748*	0.003	0.309*	0.024	0.497*	0.050
R^2	0.542		0.461		0.614		0.546	
N	8246		10322		1846		2704	

***** shows that variable is significant at 5% level. Dependent variable is lnW (hourly wage).Base variables: 65+ for ages, part-time for illiterate for education, full time workers for works type, public sectors for sectors, urban areas for the regions, widow for marital status, others for occupations, 1-9 workers for the # of workers in a work place are chosen. All years are calculated but they are not reported for brevity. After 2011, HBS does not provide any sectoral information of individuals.

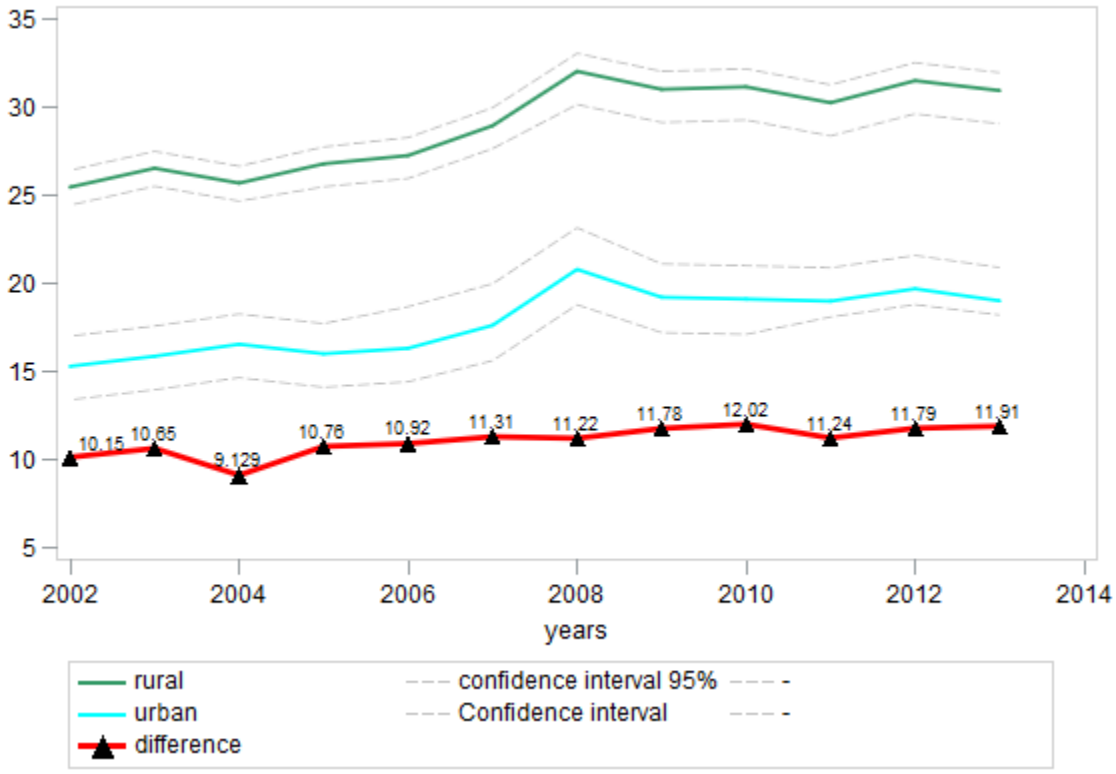
I also examine both NN matching (1:1 and 1:*N*) and also caliper matching with replacement to eliminate the impact of unobservable heterogeneity in an analysis of discrimination. For each year, the unexplained gender pay gaps were estimated in both urban and rural areas by implementing these methods.

The NN matching, 1:1 match, and 1:*N* match results are illustrated in Figures 1.1 and Figure 1.2, respectively, and demonstrate that both methods result in similar gaps in the Turkish labor market for the 12-year period. First, the 1:1 matching results represents that the pay gap fluctuated between 25 percent and 33 percent in rural areas, while it ranged between 14 percent and 19 percent in urban areas during the study period. The gender wage gap, however, never reached below the 14 percent level for both the 1:1 and1:N matching results during the study period. This situation clearly supports our first hypothesis that there was a gender-based wage differential in the Turkish labor market during the 12-years period.

To check the robustness of the analysis results, caliper matching is employed as shown in Figure 1.3. As caliper parameter, I prefer to used 0.2, which is the most common caliper. The results of caliper matching represent a gender wage gap average of 30 percent in rural areas. The urban wage gap fluctuating from 27 percent to 35 percentage for the 12 years period in rural areas. On the other hand, the wage gap was average at 18 percent in urban areas between 2002 and 2013. Both caliper matching and n-nearest neighbor matching results give similar pattern: that the gender wage gap had been increasing over the aforementioned period for both urban and rural areas. Unfortunately, the results indicated that there were no improvements in favor of female workers during the period. The regional difference in the gender wage gap varied around 10 to 15 percent during the same period, supporting my second hypothesis.

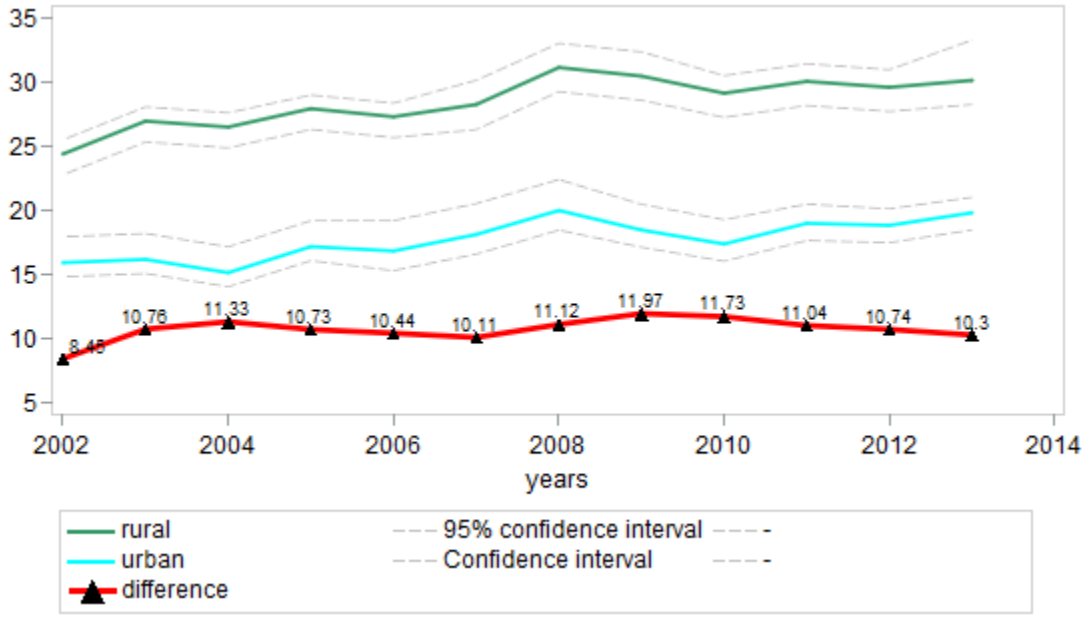
For the third hypothesis, I investigate the impact of internal migration on different occupations for the same period. These results are presented in Table 1.5 for both n-nearest neighbor and caliper matching with replacement methods. Based on these two analyses, among the occupation groups, unskilled workers in agriculture, stockbreeding, fisheries and forestry areas had the highest pay gap in each year. For two of the matching methods, the results indicate a lower pay gap among managers and professionals in comparison to other workers. This confirms my third hypothesis that unskilled workers in particular faced lower wages. The occupational gap increased from 2002 to 2013, likewise regional differences contributed to the gender-based pay gap.

Figure 1.1: Unexplained gender pay gap (%) Nearest neighbor matching



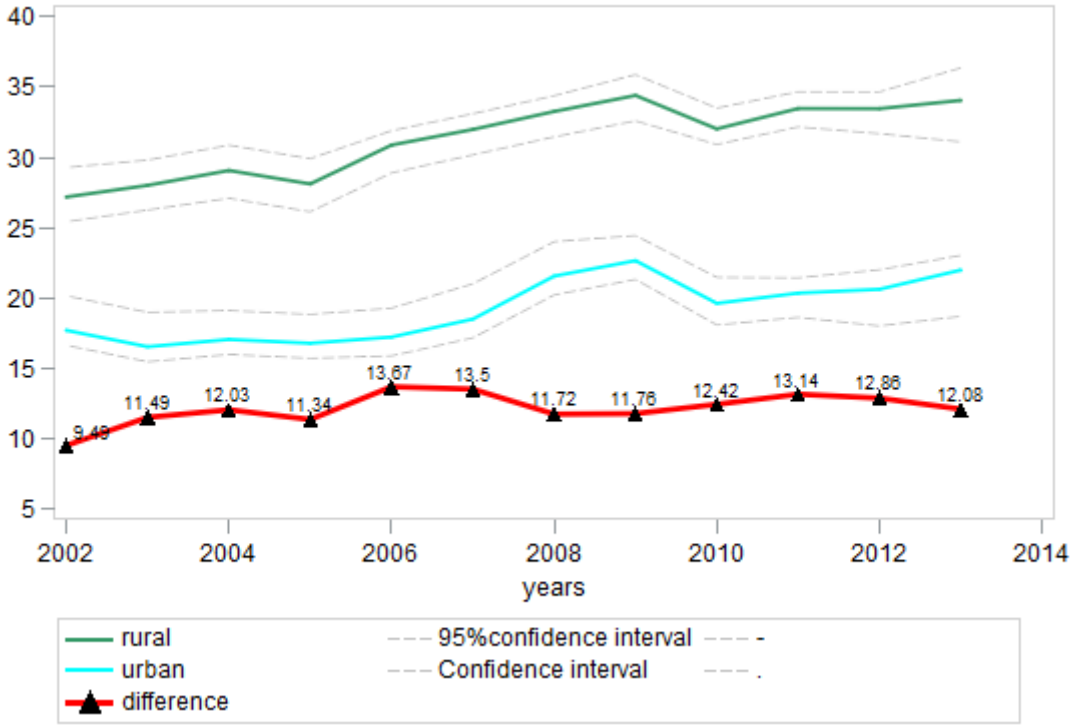
*Unexplained gender pay gap between regions 2002-2013 by using nearest neighbor matching with replacement (thin dashed line is 95%confidence band)

Figure 1.2: Unexplained gender pay gap (%) 1 to N matching



*Unexplained gender pay gap between regions 2002-2013 by using 3 nearest neighbor matching with replacement

Figure 1. 3: Unexplained gender pay gap (%) Caliper matching



*Unexplained gender pay gap between regions 2002-2013 by using Caliper Matching with replacement (x: 0.2)

Table 1.5:Unexplained Component of The Gender based wage gap based on different matching algorithm by Job Characteristics

Years	2002	2004	2006	2008	2010	2012	2013
Nearest Neighbor Matching*							
Managers & Professionals	-0.210	-0.127	-0.111	-0.097	-0.092	-0.117	-0.141
Clerical& Services	0.021	0.034	0.033	0.042	0.049	0.032	0.051
Ag, Forestry &fisheries	0.126	0.153	0.132	0.140	0.156	0.172	0.168
Designer & artists	-0.009	0.034	0.041	0.037	0.046	0.043	0.054
Caliper Matching**							
Managers & Professionals	-0.218	-0.131	-0.109	-0.102	-0.088	-0.145	-0.161
Clerical& Services	0.022	0.025	0.041	0.049	0.038	0.046	0.055
Ag, Forestry &fisheries	0.154	0.154	0.129	0.174	0.163	0.181	0.174
Designers & artists	-0.008	0.012	0.032	0.046	0.044	0.053	0.061

*****Nearest neighbor matching are represented by using 3 nearest neighbors. ** caliper for used Caliper matching is 0.2". All scores are given % percent wages.

1.6 Conclusion

In this paper, both the regional and occupational wage gap were investigated using 12 years of micro-level data. For this reason, Household Budget Survey Results are used from 2002 to 2013. I applied the OB decomposition method and the results indicating a clear wage gap of around 36 percent exists against women for 2013. The results also pointed out that the wage gap was less for female workers in large-scale firms. This may be the result of the positive impact of labor unions in Turkey because union members are often paid more equal wages and also have better work conditions in comparison to other workers. Additionally, highly educated women have attained more equal wages levels while the less educated women get more discriminated.

Relaxing the parametric assumption of the OB method, two matching methods are examined for estimation which are n-nearest neighbor matching and Caliper matching methods to the individuals, making for a more robust analysis. The matching analysis results for both models were quite similar. Between 2002 and 2013, female workers received approximately 28 percent lower wages than men in rural areas compared to about average 16 percent lower wages than men in urban areas. The results of the analysis showed that during the decade, the regional wage gap remained fairly stable at 14 percent between rural and urban areas.

For occupational perspective, the women managers and professionals are less probable to discriminated among others. On the other hand, women workers in agriculture, fisheries and forestry industries discriminated at average 15 percent over the 12 years period for both NN matching and caliper matching methods. Moreover, the matching method supports the OB method results, or vice versa; that there was more discrimination against unskilled laborers in comparison to other workers. Ultimately, the results of this study clearly support my three

hypotheses that a gender-based wage gap existed in the Turkish labor market in the 12 years period.

The link between the recent increases in internal migration and gender pay gaps by region and occupation in Turkey has been analyzed. As the recent term of Turkey is evaluated, Turkey has an efficient economy based on some economic indicator such as income per capita and gross domestic product (GDP) from 2002 to 2013 (Taskin, 2014). For instance, the income per capita increased by 43 percent and GDP expanded more than twice during the study period (TSI). Considering these economic developments, unequal income distribution was expected to decline. However, the results of the analyses support the opposite view of the positive expectations in the labor market. I believe this situation may occur due to the highly conservative and patriarchal attitudes of society and government which as stated by Dedeoglu and Elveren (2012). The results of this study are consistent with Braunstein (2011), who pointed out that market imperfections and 'sticky' institutions may cause to gender inequality, which in turn may have a direct effect on economic growth, investments in human and physical capital in labor markets.

On the other hand, the internal migration situation may have accelerated because of the Syrian internal conflict and the ISIS terrorist organization, especially in southeastern Turkey. Under the circumstances, almost 3 million (most recent data from TSI) Syrians have migrated to Turkey and these immigrants generally reside in rural areas and have been illegally hired as cheap labor, which can also be detrimental towards women's pay. This situation may continue in the near future and continue to impact unequal pay both regionally and occupationally in the Turkish labor markets. Therefore, I believe the findings of this paper present the benchmark for the evolution of Turkish wage inequality in the coming decades.

1.7 References

Aldan, A., and Gaygisiz, E. (2006) "Convergence across provinces of Turkey: a spatial analysis." *Working Papers 0609*, Research and Monetary Policy Department, Central Bank of the Republic of Turkey.

Acar, F., Altunok G (2013) "The 'politics of intimate' at the intersection of neo-liberalism and neo-conservatism in contemporary Turkey." *Women's Studies International Forum* 41: 14–23(2013). DOI: http://dx.doi.org/10.1016/j.wsif.2012.10.001

Barsky, R., Bound, J., Charles, K. K., and Lupton, J. P. (2002) "Accounting for the black–white wealth gap: a nonparametric approach." *Journal of the American statistical Association*, *97*(459), 663-673. DOI :10.1198/016214502388618401

Blau, F. D. and Kahn., L., M, **(**2006) "The U.S. Gender Pay Gap in the 1990s: Slowing Convergence." *Industrial and Labor Relations Review* 60 (1): 45–66.

Beaudry, P. and Lewis, E. (2014) "Do Male-Female Wage Differentials Reflect Differences in the Return to Skill? Cross-City Evidence from 1980–2000." *American Economic Journal: Applied Economics* 6(2): 178–194. DOI: 10.3386/w18159

Bicerli, M.K., Naci, G. (2009) "Female Labor Force Participation in Urbanization Process: the Case of Turkey." *MPRA*, #18249, (2).URL: https://mpra.ub.uni-muenchen.de/18249/

Blinder, A. S. (1973) "Wage discrimination: Reduced form and structural estimates." *Journal of Human Resources* 8: 436–455.

Bright, L. (2005) "Public employees with high levels of public service motivation who are they, where are they, and what do they want?." *Review of public personnel administration*, *25*(2), 138-154.

Braunstein, E.(2011) "Gender Equality and Economic Growth." *Feminist Economics*3 (2):54-67.URL: http://cins.ankara.edu.tr/6_5.html

Corabatır, A, H., Husseini,M., Hashem,J., A., L., and Wahby, S. (2014) "Ensuring quality education for young refugees from Syria." *Refugee Studies Centre. University of Oxford.* URL: https://www.rsc.ox.ac.uk/files/publications/other/rr-syria-youth-education-2014.pdf

Dedeoglu,S., and Elveren,A.Y. (2012) "Gender and Society in Turkey: The Impact of Neoliberal Policies." *Political Islam, and EU Accession.* New York: I.B. Tauris

Donahoe, A.D.(1999) "Measuring Women's Work in Developing Countries." *Population and Development Review* 25(3):543-576DOI: 10.1111/j.1728-4457.1999.00543.x

Frolic, M.(2007) "Propensity Score Matching Without Conditional Independence Assumption with an Application to the Gender Wage Gap in the United Kingdom." *Econometrics Journal* 10 (2): 359-407 DOI: 10.1111/j.1368-423X.2007.00212.x

Jefferson, T., and Preston, A. (2005) "Australia's Other Gender Wage Gap: Baby Boomers and Compulsory Superannuation Accounts", *Feminist Economics*, 11 (2).

Heckman, J. (1997) "Instrumental variables: A study of implicit behavioral assumptions used in making program evaluations." *Journal of human resources*, 441-462.DOI: 10.2307/146178

Hirsch, B (2009)"The Gender Pay Gap Under Duopsony: Joan Robinson Meets Harolds Hotelling", *Scottish Journal of Political Economy*, 56(5), pp, 543-559.

Hirsch, B., Keonig,. M, and Mioller, J (2013) "Is There a Gap in the Gap? Regional Differences in the Gender Pay Gap", *Scottish Journal of Political Economy*, 60, (4).

Household Budget Survey Data, Turkish Statistical Institutehttp://www.tuik.gov.tr/Microdata/HBA.html

Kara,O (2006) "Occupational gender wage discrimination in Turkey." *Journal of Economic Studies* 33(2): 130-143DOI: http://dx.doi.org/10.1108/01443580610666082

Nopo, H (2004) "Matching as a Tool to decompose Wage Gaps", *IZA Discussion Paper* No.981, January 2004. DOI:10.1162/rest.90.2.290

Nopo, H. (2008) "Matching as a Tool to Decompose wage gaps." *Review of Economics and Statistics* 90 (2): 290-299 (2008) DOI:10.1162/rest.90.2.290.

Organization for Economic Cooperation and Development/Inequality http://www.oecd.org/social/inequality.htm

Pigou, A. C. (1932) *The Economics of Welfare, 4th ed*. London: Macmillan.

Ransom, M.R., and Oaxaca, R.L (2010) "New Market power models and Sex Differences in Pay." *Journal of Labor Economics* 28 (2): 267-290
DOI: http://dx.doi.org/10.1086/651245

Robinson, J. V. (1969) *The Economics of Imperfect Competition, 2nd ed*. London: Macmillan.

Rosenbaum, P. R., and Rubin, D. B. (1983). "The central role of the propensity score in observational studies for causal effects." *Biometrika*, *70*(1), 41-55.
DOI: 10.1093/biomet/70.1.41

Scheider, M, (2013) "Illustrating the Implications of How Inequality is Measured: Decomposing Earnings Inequality by Race and Gender," *Journal Labor Review,* 34:476–514

Schneider, M. and Buckley, J. (2003) "Making the Grade: Comparing DC Charter Schools to Other DC Public Schools." *Educational Evaluation and Policy Analysis*, *25(2)*, 203-215.

Smith, J. A., and Todd, P. E. (2005) "Does matching overcome La Londe's critique of non experimental estimators?." *Journal of econometrics*, *125*(1), 305-353.
DOI: http://dx.doi.org/10.1016/j.jeconom.2004.04.011

Maani, S., A. and Cruickshank, A., A., (2010) "What is the effect of housework on the market wage, and can it explain the gender wage gap?" *Journal of Economic Survey*, 24 (3):402-427

Madden, J., F., (1977) "A spatial theory of sex discrimination", *Journal of Regional Science*, 17(3):369-380.

Oaxaca, R.(1973) "Male-Female Wage Differentials In Urban Labor Markets." *International Economic Review* (14)3: 693-708. DOI: 10.2307/2525981

Tanrivermis, H., and Bulbul, M.(2007) "The Role of Agriculture in Turkish Economy at the Beginning of the European Union Accession Negotiations." *Journal of Applied Sciences*7: 612-625.
URL: http://docsdrive.com/pdfs/ansinet/jas/2007/612-625.pdf

Tansel, A (2005) "Public-Private Employment Choice, Wage Differentials, and Gender in Turkey." *Economic Development and Cultural* Change 53(2): 453-477
DOI: 10.1086/425374

Taskin, T. (2014) "GDP Growth in Turkey: Inclusive or Not?.Research and Monetary Policy Department," *Central Bank of the Republic of Turkey* 1-14.
URL:http://search.proquest.com/openview/d3ce873416d4297caf9f9932f2346e87/1?pq-origsite=gscholar

United Nations Human Rights Council.http://www.unhcr.org.tr, accessed 26December 2014.

Yamaguchi, S. (2014) "Changes in Returns to Task-Specific Skills and Gender Wage Gap" (August 23, 2016). Available at SSRN: https://ssrn.com/abstract=2035833 or http://dx.doi.org/10.2139/ssrn.2035833

Wolaver, A., M., and White, N. E,(2006) "Racial wage differences among young male job changers: the relative contribution of migration, occupation change, site characteristics, and human capital." *Growth and Change* 37(1): 34–59
DOI: 10.1111/j.1468-2257.2006.00303

World Bank's Turkey Economic Reforms, Living Standards and Social Welfare Study.(2000) Report No. 20029-TU, *Poverty Ruction and Economic Management Unit*, World Bank:D.C

Chapter 2:

Impacts of Policy Changes on Female Labor Force Participation

Abstract

In Turkey female workers' labor force participation is low compared that of male workers. Therefore, the Turkish government implemented a policy to increase female labor force participation in July 2008. The policy included an insurance incentive for employers that hired additional female workers (over 18 years old) and male workers who are between 18 and 29 years old. Workers' insurance would be paid by the government's unemployment funding agency for 5 years at a decreasing rate of 100%, 80%, 60%, 40%, 20%, respectively under the condition of hiring female or young male workers. Therefore, the objective of this study is to examine how the policy changes affected female and young male workers' labor force participation. For this purpose a nonlinear Difference in Difference Method (DID) is applied to Income and Living Condition Survey results (ILCS), which are micro level data sets. I used 2006 and 2011 since the policy was validated between July 2008 and on June 2010, then they can get insurance incentives. Even though the new insurance policy seems to motivate employers to recruitments additional female workers, the results indicates very low impact of the policy depending on the regions.

Keywords*: Discrimination, Nonlinear Difference In Difference, Policy Impact*

2.1 Introduction:

In Turkey, labor force participation (LFP) for female workers has been consistently low in comparison to male workers for over centuries. The most recent labor statistics from Turkish Statistics Institute (TSI) show that over all, female labor force participation was 26.7%, while the rate for male workers was 64.8% in 2014. Among different age groups, the highest LFP was 95.4% for male workers in the 35-39 age group, while the highest rate for female workers in the 25-29 age group was 38% (TSI, 2014). The LFP rate for male workers was as almost 3 times as higher than their female counterparts. Moreover, Turkey has the lowest female LFP among the European Union (EU)[11] and the candidate countries of the EU (TSI, 2014). Also, in comparison to OECD countries, for instance female labor force participation was 71.2% in Australia, 74.2% in Canada and 67.3 in France in 2015, and LFP rate was considerably low in the Turkish Labor market.

There are many reasons behind the low rate of female labor force participation comparison to male workers, such as male-dominated society, unskilled labors dropped off after migration from rural to urban, maternity, and females' responsibility of housework. Another reason was the 2007 Great Recession caused one of the deepest downturn in the labor market in the long run (Elsby, et. al. 2010). In depth and decline in economic activity have led financial market recession and then real market down in the USA, after that the real markets in European countries and rest of the world were negatively affected.

Female labor force participation has been a subject of intense of research for more than a century. For example Mammen and Paxson (2000) study present some relation between female labor force participation and per capita income to be U-shaped. Their findings also presents some

[11]See the link : http://ec.europa.eu/eurostat/statistics-explained/index.php/Gender_statistics

evidence that female participation rate is high in agricultural economies and family responsibilities in less developed countries. On the other hand female labor force participation is lowest in urbanized, or middle-income countries which are mainly use manufacturing sector (Mammen and Paxson, 2000).

Ozer and Bicerli (2003) examined the determinants of females labor force participation rates. They used panel data regressions of Restricted Least Squares (RLS), Fixed Effects Model (FEM), and Random Effects Model (REM). Their findings represents a significant relationships between females labor participation rates and group specific variables of unpaid family workers, ratio of the housewives to the female labor force, and ratio of the retired people to the civilian population 12 years old and over. Another interesting results of the study is that not finding a significant relationships between some macroeconomic variables, such as inflation rate, unemployment rate and growth rate and the females labor participation rates. Based on the finding the authors claimed that there may be a lack of integration of female workers into labor markets.

Kilic, and Ozturk (2014) analyze the barriers to the labor force participation of women in Turkey using the Household Budget Surveys for the period of 2002-2008. They used a probit model for the analysis of the data set. Their finding present that education, marital status, economic resources, gender perception in society, and the location of residence are the some crucial factors affecting females labor force participation. Another finding of the study present that the probability of the females labor force participation increases when the education level increase especially in urban areas.

In the light of all the given information, the Turkish government implemented a new policy in July 2008. It purposed to increase women's work participation and create a more equal work place environment. This policy was announced[12] on 26 May 2008 and administered on the first of July 2008. It was planned to be valid until the 30th of June 2009, but it was extended until the 30th of June 2010. In this policy, the employers' liability insurance would be paid by the unemployment insurance fund (UIF) under the following conditions:

- If employers hire additional male workers between July 2008 and June 2010 who are between 18 and 29 years old.
- If employers hire additional female workers between July 2008 and June 2010 who are older than 18 years old.

Employees can also benefit from the policy only if they hired additional workers, thus it was not valid for previous workers who were hired before July 2008. Under the given conditions, workers' liability insurance would be paid in full by the unemployment insurance fund but only the equivalent portion of minimum wage would be paid in the first year. Then, the following years the liability insurance would be covered at 80%, 60%, 40%, 20% equivalent portion of minimum wage, respectively.

The net monthly minimum wage paid to a worker was 527.13 Turkish Liras (TL) in 2008, as an example, while the gross wage was 809.19 TL. The difference between gross and real wages (809.19-527.13 = 282.06 TL) are paid by employers as insurance payment in regular circumstances. The differences, 282.06 TL (monthly insurance) would be paid by the unemployment insurance fund (UIF) to employers who hired additional young male or female workers after the policy implementation aforementioned. The yearly around 3384.72 TL

[12] 4447 is the number of Unemployment Insurance Law and 5763 is the number of article.

(282,06 X 12 months) amount would be covered by the unemployment insurance fund for the following 5 years for one additional worker by reducing gradually.

On the other hand, if workers were paid more than minimum wages, employers had to cover the remain portion of the insurance. For example, if workers' salary was 1500TL, then employers might only obtain 282.06TL which was equivalent of insurance payments to the part of minimum wages from UIF, but remaining portion of insurance would not be covered by UIF. Since the policy gives incentives to employers, I expect that number of hired female workers and young male workers may increase. Specifically, it could increase the number of workers who generally had lower levels education and thus willing to accept minimum wages. In the light of all these information, the following hypotheses are constructed:

1. Ho: Employers are indifferent hiring between female and male workers after the policy implementation.

   H_A: Employers are different hiring between female and male workers after the policy implementation.
2. H_0: Employers are indifferent hiring between different age groups after the policy implementation. (men 18-29 age group versus men over 30)

   H_A: Employers are different hiring between different age groups after the policy implementation. (men 18-29 versus over 30)

The rest of the chapter is organized as follow: in section II the methodology and data are given. Then analyses results are given in the Section III. Section IV provides the concluding comments.

2.2 Experimental Section

2.2.1 Methodology

2.2.1.1 Background Information

To examine similar policies, various modeling are used in the literature. Heckman type selection model is an example which has a selection and an outcome equation jointly estimated assuming a bivariate normal error term (Goldberger 1972, based on Heckman's 1976). Another highly popular method is propensity score matching using nonparametric matching techniques (Schneider and Buckley, 2003). In this study, I prefer to apply difference in difference model with micro level data which is the most prominent identification strategy to analysis of policy's impacts (Athey and Imbens, 2006; Puhani, 2012). The DID is explained and applied using 2006 (pre-treatment term) and 2011 (post-treatment term) Income and Living Condition Survey (ILCS) results to estimate the policy impacts. Before explanation of the DID model, I introduced some basic model explanations as follows;

$$y = \beta_0 + \beta_1 X_1 + u \qquad (1)$$

where β_0 and β_1 are parameters to be estimated, x is explanatory variable, u is random error and y is an outcome variable.

The marginal impact of explanatory variable is explained by 1 unit change on dependant variable. Thus it can be calculated by the following differential function; $\frac{\partial E[y|x_1]}{\partial x_1} = \beta_1$. However, if outcome is a dummy or discrete variable like gender, the marginal impact is not obtained by differential function given above. It is calculated as is follows;

$$E[y|x_1 = 1] - E[y|x_1 = 0].$$

Understanding the interaction term is also crucial, so it is briefly explained here. Interaction term may be described as changes in the marginal impact of independent variable

urged by changes another independent variable's value which are represented by cross-partial derivatives or differences, also known as interaction effects, or modifiers. Since I am interested in the interaction between gender and age in this study, I stated the interaction term adding the equation -1 as is follows;

$$y = \beta_0 + \beta_1 Age + \beta_2 Gender + \beta_{12}(Age * Gender) + u \quad (2)$$

An equation with an interaction term let not only the intercept but also the marginal impacts of age E(y|x) on to be different for female and male.

On the other hand evaluation of the interaction term is changes if the model is not simple linear model which is the case for this study.

$$E[y|Age, Gender] = F\big(\beta_0 + \beta_1 Age + \beta_2 Gender + \beta_{12}(Age * Gender)\big) \quad (3)$$

where the F function can be a logit, or probit transformation, or any other nonlinear functions. Since x_1(age) is a continuous variable, the marginal impact of it $[\vartheta = \beta_0 + \beta_1 Age + \beta_2 Gender + \beta_{12}(Age * Gender)]$ in the equation-3 can be calculated on the conditional expected value of y is as follows:

$$\frac{\partial E[y|Age,Gender]}{\partial Age} = \frac{dF}{d\vartheta}\frac{d\vartheta}{\partial Age} = \frac{dF}{d\vartheta}(\beta_1 + \beta_{12} Gender) \quad (4)$$

The marginal impact of independent variables are not constant over its entire range in a nonlinear model on the contrarily a linear model, like equation 2.

In a nonlinear model, cross-partial effect can be different from zero, even if β_{12} equals to zero (Ai and Norton, 2003). It can be explained by using the following equation $\vartheta = \beta_0 + \beta_1 Age + \beta_2 Gender + \beta_{12}(Gender * Age)$, and the results are as follows;

$$\frac{\partial^2 E[y|Age, Gender]}{\partial Age \partial Gender} = \frac{\partial}{\partial Gender} E\left[\frac{dF}{d\vartheta}(\beta_1 + \beta_{12} Gender)\right] =$$

$$= \left[\frac{dF}{d\vartheta}(\beta_{12} Gender)\right] + \left[\frac{d^2F}{d\vartheta^2}(\beta_1 + \beta_{12} Gender)(\beta_2 + \beta_{12} Age)\right]$$

While examining a nonlinear model an appropriate choice of the scale estimation is crucial because a misspecified model can lead to biased results (Basu et al., 2006). It can be log transformation if dependent variable is a continuous variable or a nonlinear transformation of the probability that the outcome equals 1 which is a logit or probit model, when the dependent variable is a binary. In this study, I applied a logit model to evaluate nonlinear difference in difference model. The detail of the DID model, nonlinear DID model, and logit model are explained in the following sections.

2.2.1.2 Nonlinear Difference in Difference Model

The DID is explained and applied using 2006 (pre-treatment term) and 2011 (post-treatment term) Income and Living Condition Survey (ILCS) results to estimate the policy impacts.

In the DID method, the treatment effect is modeled by estimating the differences between outcomes measured at different times (or different points) for both the treated and control observations (those not in the program), then comparing the difference between groups. A linear regression is used in policy analysis when a treatment and a control group and at least two time periods (before and after) involvement. I start by presenting simple linear difference-in-differences models for a continuous outcome using a similar way in Athey and Imbens (2006) and Puhani (2012). Simple linear DID model follows;

$$y = X\beta + \beta_1 T + \beta_2 D + \beta_{12}(T \times D) + u \quad (5)$$

where D is a dummy variable equals to one if the individuals is from treatment group, zero otherwise (control group). T is a binary time period, if an individual from post treatment period gets 1, zero otherwise (pre-treatment period). X represents some additional explanatory variables including constant term. In this paper, 2006, and 2011 are pre-treatment and post-treatment periods in sequences.

$$E(y|X, D = 0, T = 0) = X\beta$$

$$E(y|X, D = 0, T = 1) = X\beta + \beta_1$$

$$E(y|X, D = 1, T = 0) = X\beta + \beta_2$$

$$E(y|X, D = 1, T = 1) = X\beta + \beta_1 + \beta_2 + \beta_{12}$$

where $\beta_1$is a difference in expected outcome from post and pre-treatment period for control group. The difference E(y|x) from the pre-treatment period to post-treatment period for the treatment group is $\beta_1 + \beta_2$. Then β_{12} shows the DID in E(y|x) between control and treatment group across the two periods (Karaca-Mandic, et al., 2012). β_{12} shows estimation for treatment effect on treated.

The DID aforementioned is a linear model with continuous outcome. On the other hand, in this paper the outcome which is an individual works or not is a binary (see data section for detailed information about variables). Thus, the linear DID cannot be used. In a nonlinear DID, (N-DID) such as model with limited dependent variables like logit, and probit, the treatment effect cannot be constant across the treated group because the outcome variable is bounded (Ai and Norton, 2003; Athey and Imbens, 2006). Applying logit or probit model as examples of nonlinear models let the conditional probability that y=1 can be explained using equation-5.

$$P(y = 1|x) = X\beta + \beta_1 T + \beta_2 D + \beta_{12}(T \times D) \quad (6)$$

Similarly in the linear model, a nonlinear DID model can be explained as follows;

$$P(y = 1|X, D = 0, T = 0) = F(X\beta)$$

$$P(y = 1|X, D = 0, T = 1) = F(X\beta + \beta_1)$$

$$P(y = 1|X, D = 1, T = 0) = F(X\beta + \beta_2)$$

$$P(y = 1|X, D = 1, T = 1) = F(X\beta + \beta_1 + \beta_2 + \beta_{12})$$

where β_{12} as an estimation of difference in difference allows a measure of treatment effect on treated. Using β_{12} can provide a difference to the linear index during the post-treatment period, therefore the P(y=1|x) conditional probability is different over and above "*the difference attributable to the nonlinearity of the model subjects in the treatment group versus control group"* (Karaca-Mandic et al., 2012). This additional differences in the differences facilitate a calculation of the treatment effect on the treated. To clarify that in the non-linear model because the movement from D=1 to D=0, (or D=0 to D=1*)*, induces a change in $\Delta F/\Delta T$. To isolate the true difference $\Delta F/\Delta T$for the treatment group in a non-linear model, it is necessary to calculate the value of $[F(\beta_1+\beta_2+\beta_{12})-F(\beta_2)]-[F(\beta_1)-F(0)]$ holding *D* equal to one (for the effect of the treatment on the treated) while changing *T=1 x D=1* from zero to one. That expression is:

$$(DID|D = 1) = [F(\beta + \beta_1 + \beta_2 + \beta_{12}) - F(\beta_2)] - [F(\beta_1) - F(0)] -$$

$$[F(\beta_1 + \beta_2) - F(\beta_2)] - [F(\beta_1) - F(0)]$$

$$= F(\beta_1 + \beta_2 + \beta_{12}) - F(\beta_1 + \beta_2) \quad (7)$$

In the equation-7, β_{12} provides a test that the treatment effect on the treated is different from zero. $F(\beta_1+\beta_2)-F(\beta_2)$implies that *T=1* and *D=1,* but D *x T= 0.* Equation 7 is equal to zero if and only if β_{12} is equal to zero. Thus, a test that β_{12} is equal to zero provides a test that the treatment effect on the treated is different from zero. In a nonlinear DID model, the

treatment effect is not equal to the cross differences of observed outcome; however "*it is the difference between two cross differences; the cross differences of the conditional expectation of the observed outcome minus the cross differences of the conditional expectation of the potential outcome without treatment"* (Puhani, 2012). This difference in cross differences expresses to the incremental impact of interaction coefficient (Karaca-Mandic, et al, 2012). The differences in a non linear DID model with a strictly monotonic transformation function of logit model follows the sign of the interaction term coefficient in a linear model (Athey and Imbens, 2006).

2.2.1.3 Logit Model

In this paper nonlinear DID model is formulated using a logit model. Logit models can be explained by using odds ratio instead of marginal effect (Kleinman and Norton 2009). A logit model without any interactions can be interpreted by the natural logarithm of the odds ratio. To formulate simple logit model with an interaction term which is age (or age category) and gender where *x* denotes the vector of covariates, the log odds are:

$$ln(odds|x) = ln\left(\frac{P(y=1|x)}{P(y=0|x)}\right) = \beta_1 x_1 + \beta_2 x_2 + \beta_{12}(x_1 \times x_2) \qquad (8)$$

β_{12} in equation shows the coefficient of interaction term and it can be explained by the natural logarithm of two odds ratios obtained by holding x_2 at 0 (or 1) and incrementing x_1 by one unit. The β_{12}, the coefficient on the interaction term may be explained as follows;

If x_2 =0, then $ln\left(\frac{P(y=1|x)}{P(y=0|x)}\right) = \beta_1 x_1$

If x_2=1, then $ln\left(\frac{P(y=1|x)}{P(y=0|x}\right) = \beta_2 + (\beta_1 + \beta_{12})x_1$.

When x_2 equals 0, a unit change of changes in x_1, the log odds ratio in β_1, while the corresponding change is $(\beta_1 + \beta_{12})$ when x_2 equals 1.

2.2.2 Data

In this study, Turkey's Income and Living Condition Survey Results (ILCS) are used. ILCS[13] is a micro level data sets and cover income distribution between individuals and households, measuring the living conditions of the people, social exclusion and poverty with the income dimension, determining the profile and some information about labor TSI (TSI 2015). For instance, it includes information about economic activity of workers, such as employment status, occupation, hours worked, number of worker in a work place. Moreover, it is possible to produce estimation on Turkey's RS Level-1 (12 NUTS[14]) from ILCS data.

The ILCS data set for 2006 and 2011 years are used in this study. The 2006 ILCS includes 30,187 interviewed persons while in 2011, the ILCS sample size is 40,680. The data set consist 2 years data before (2006) and after (2011) the policy change. This allows to evaluate the effect of the policy changes by using difference–in-differences estimator which is explained in the methodology. Age variable is restricted over 18 since the policy impacted only those ages.

In this study, there is a binary outcome variable which is an "individual's works or not", the variable that takes on a value of 1 if an individual works, and 0 otherwise. The natural experiment includes two different groups. The first one is that treatment group- thought to be affected by the experiment (male who are 18-29 or all female) and control group- group that not

[13] ILCS provides both panel and cross section data set option.
[14] NUTS is Nomenclature of Units for Territorial Statistics. NUTs represent a geographical code standard for referencing the subdivisions of Turkey for statistical purposes

affected by the experiment (male over 30 years old). To test the policy, I created a youth dummy variable for individuals who are between 18 and 29 years old.

The policy change is controlled by a variable-called "post" if year is 2011, and 0 otherwise. Since the policy impacted specific gender, I used gender as a control variable, I took the variable that is equal to 1 if the person is "male", and 0 otherwise. Also, because the policy specifically purposed to increase number of young workers who are 18-29 years old, the following interaction term is also created; y.male (male*young)[15]. Y.male gets 1 if gender variable equals to 1 and young variable equals to 1. Interaction variables are crucial in this study, thus the evaluation of interaction in a nonlinear model is given in the methodology section. It helps to compare the magnitude of the policy effects between different age groups. For instance, young male workers who are 18-29 can be compared by interpretation of the interaction term variable "young*male *post," which estimates the impacts of the policy change for young males (18-29 years old) versus males over 30 years old.

Moreover, some additional explanatory variables are used in the model such as marital status, education (degree completed), work experiences (completed years), income including any type of resources, NUTS, and type of settlement of individuals (urban or rural). Since individuals' income level have an impact on labor force participation decisions, I included all types of income. The income variable shows individuals' total yearly income including salary and other types of income, such as rents, dependents' benefits, or others.

For marital status, the categorical dummy created which are: (1) single, (2) married, (3) widowed, and (4) divorced. Educational attainment is categorized as: (1) primary school diploma, (2) a high school diploma, (3) technical high school diploma, (4) college (or university)

[15] A young female dummy did not created for 18-29 years old female because the policy impacted all female.

diploma, (5) graduate degree or professional qualification. I also created a dummy for settlement of individuals; if a person lives in an urban[16] area gets 1, zero otherwise. In the ILCS data set there are 12 defined NUTS denoted by a categorical variable created for these districts. These districts[17] are Istanbul, West Marmara, East Marmara, Aegean, West Anatolia, Mediterranean, Central Anatolia, East Black Sea, West Black Sea, South East Anatolia, North East Anatolia, Central East Anatolia.

2.3 Empirical Results

First of all, individuals under the age of 18 are removed since the policy is effective only for workers who are over 18 years old. To calculate the DID model, the ILCS data for 2006 is merged with 2011. If there is any unmatched observation, they are removed. They may be associated with individuals not involved in ILCS for both years for some reason, such as individuals moving to a new location with no forwarding address or individuals are dead. At the end of the matching process, I had 20,105 observations for each year (40,210 observation in total). Table-2.1 presents descriptive statistics for the sample.

The first step of analyzing the policy impact between genders and age groups, is estimation of a logit model. The logit model helps to explain whether or not the interaction term

[16] If the regional population is lower than 20,000, the area called rural, otherwise is urban.
[17] The provinces of the regions are represented as follows;
Istanbul is just Istanbul province.
East Marmara is Bursa, Eskisehir, Bilecik, Sakarya, Duzce, Bolu, Yalova and Kocaeli.
West Marmara is Tekirdag, Edirne, Kirklareli,Balikesir and Canakkale.
Aegean is Izmir, Aydin, Denizli, Mugla, Afyonkarahisar, Kutahya, Usak and Manisa.
West Anatolia is Ankara, Konya, and Karaman.
Mediterranean is Antalya, Isparta, Burdur, Mersin, Hatay, Kahramanmaras, Osmaniye, and Adana.
Central Anatolia is Kirikkale, Aksaray, Nigde, Nevsehir, Kirsehir, Kayseri, Sivas, Yozgat.
East Black Sea is Trabzon, Ordu, Giresun, Rize, Artvin, Gumushane.
West Black Sea is Zonguldak, Karabuk, Bartin, Kastamonu, Cankiri, Sinop, Samsun, Tokat, Corum, and Amasya.
South East Anatolia is Gaziantep, Adiyaman, Kilis, Sanliurfa, Diyarbakir, Mardin, Batman, Sirnak and Siirt.
North East Anatolia is Erzurum, Erzincan, Bayburt, Agri, Kars, Igdir, and Ardahan.
Central East Anatolia is Malatya, Elazig, Bingol, Tunceli, Van, Mus, Hakkari and Bitlis.

and independent variables fit in the model well. The details of logit model are given in the section-2 and in the equation-4. According to logistic regression results (see Table-2.2), income has negative significant impact on y which is a person works at a job or not after the policy treatment. Age has a statistically significant impact on outcome, while gender is insignificant.

Only 6 of the 12 regions have statistically significant and positive coefficients which are Istanbul, East Marmara, West Marmara, Aegean, Mediterranean, and Central Anatolia. Since the policy specifically purposed to increase the number of young workers (male), I created a young dummy variable which includes 18-29 years old. The young dummy is statistically significant and signifies a negative impact on works' condition. For interaction term between gender and young (young*male), the z-statistic indicates that this variable explains much of the variation in the dependent variable. Even when most of the coefficients of dependent variable are significant, the estimated coefficients cannot be interpreted directly as they do not represent marginal effects. Therefore, I report marginal effects of the independent variables on the conditional expected value of dependent variable which is employee working condition. However estimation of a logit regression is a necessary step in order to calculate the marginal impacts of the independent variables.

Table 2. 1: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Work condition (y)	40210	0.657134	0.474673	0	1
Experience	40210	21.93012	14.54044	0	47
Primary school	40210	0.380688	0.460704	0	1
A high school degree	40210	0.196024	0.372107	0	1
Technical High school degree	40210	0.154643	0.330317	0	1
Collage or Undergraduate Degree	40210	0.166754	0.343591	0	1
Graduate degree	40210	0.098692	0.442341	0	1
Single	40210	0.246077	0.430729	0	1
Married	40210	0.698466	0.45893	0	1
Widowed	40210	0.022805	0.149282	0	1
Divorced	40210	0.032653	0.177728	0	1
Urban	40210	0.849842	0.357231	0	1
Male	40210	0.76872	0.421656	0	1
Young (age 18-29)	40210	0.231902	0.422052	0	1
Age-square	40210	1620.123	897.1211	324	4225
Istanbul	40210	0.150456	0.357523	0	1
East Marmara	40210	0.072368	0.2591	0	1
West Marmara	40210	0.134714	0.341423	0	1
Aegean	40210	0.108677	0.311237	0	1
East Anatolia	40210	0.146676	0.353787	0	1
Mediterranean	40210	0.118425	0.323115	0	1
Central Anatolia	40210	0.047002	0.211646	0	1
East Black Sea	40210	0.050185	0.21833	0	1
West Black Sea	40210	0.048096	0.213972	0	1
South East Anatolia	40210	0.042426	0.201562	0	1
North East Anatolia	40210	0.028351	0.165974	0	1
Central East Anatolia	40210	0.052622	0.223281	0	1

Table 2.2:Logistic Regression Results

Logistic regression Number of obs = 40210
LR chi2(12) = 764.35 Prob> chi2 = 0.0000 Log likelihood = -319.4356
Pseudo R2 = 0.7003

variables	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
age	0.086*	0.011	7.980	0.000	0.065	0.108
Age square	-0.001*	0.000	-6.420	0.000	-0.001	-0.001
Male	0.203*	0.031	6.620	0.000	0.143	0.262
Young	-0.488*	0.023	-21.510	0.000	-0.543	-0.332
young*male	-0.193*	0.057	-3.381	0.000	-0.414	-0.181
inc	-0.091*	0.003	-30.307	0.000	-0.010	-0.001
exp	0.135*	0.019	7.105	0.000	0.054	0.217
urban	0.161*	0.034	4.781	0.000	0.102	0.171
Single	0.097*	0.021	4.615	0.000	0.092	0.225
Married	0.081*	0.019	4.264	0.000	0.071	0.145
Widowed	0.078*	0.023	3.392	0.000	0.073	0.153
Primary school	0.148*	0.034	4.328	0.000	0.581	0.714
A high school degree	0.156*	0.039	4.007	0.000	0.118	0.193
Technical High school degree	0.184*	0.042	4.432	0.000	0.145	0.277
Collage or Undergraduate Degree	0.134*	0.026	5.156	0.000	0.125	0.253
Istanbul	0.174*	0.019	9.154	0.000	0.140	0.281
East Marmara	0.189*	0.037	5.109	0.000	0.179	0.241
West Marmara	0.117*	0.014	8.357	0.000	0.105	0.233
Aegean	0.124*	0.031	3.934	0.000	0.037	0.204
Central Anatolia	0.029	0.059	0.488	0.625	-0.087	0.145
Mediterranean	0.095*	0.026	3.660	0.000	0.033	0.204
East Anatolia	0.064*	0.010	6.678	0.000	0.061	0.093
East Black Sea	0.006	0.072	0.087	0.822	-0.125	0.158
West Black Sea	0.123	0.082	1.506	0.092	-0.020	0.266
South East Anatolia	-0.005	0.076	-0.070	0.945	-0.154	0.144
North East Anatolia	-0.007	0.086	-0.086	0.931	-0.176	0.161
_cons	-4.284*	0.151	-28.382	0.000	-4.580	-3.989

* shows the variable is significant at 0.05 alpha level. Graduate degree, divorced and Central East Anatolia are omitted to use as base levels. If an individual's age is between 18 and 29 then, young gets1, zero otherwise.

In the Table-2.3, marginal effects of independent variables and interaction terms are represented. The interaction effect with young and the male is statistically significant, and it presents 16% negative results. In other words, workers who are 18-29 years old are 16% less probable to be hired than male workers who are over 30.

Income has an 11% negative impact while experience has a 4% positive effect on workers being hired after the policy implementation. Having a technical high school degree has the highest impact 19% among all degrees. While having a high school degree has a 16% positive impact being hired after the policy implementation, having a college or university degree has a positive 9.5% impact being hired. It means that a worker with a high school or technical high school degree is more probable to be hired after the policy implementation as compared to base line.

Moreover, only 6 of the 12 NUTS marginal impacts are statistically significant and positive: East Marmara, Istanbul, West Marmara, Aegean, West Anatolia, and Mediterranean. It is logical since many factories are located in Istanbul, Kocaeli and Bursa provinces and these provinces are highly populated. On the other hand, the 6 regions are not statistically significant and these NUTS are unfortunately less developed areas. In Figure-2.1 (Map), the magnitude of impacts of NUTS is represented for illustration. The darkest red indicates the highest impact which is in East Marmara, whereas the lightest red represents the lowest impact which is in West Anatolia.

The urban dummy is also statistically significant and individuals who lived in urban areas had 19.6% more chance of being hired after the policy implementation than workers in rural areas. This also supports that some highly populated provinces (urban areas) such as Antalya, and Izmir in the Mediterranean and Aegean regions respectively, located in NUTS came

statistically significant after the policy implementation. Moreover, these areas have more access to transportations such as ports etc... and also closer to market to Europe. Even if some provinces have high population and some developed industrial environment, the dummy variables for these provinces are not significant. In the South East-Anatolia for example, women generally work as unpaid labor in which is the culture of the society in this area. Marriage status categories, all of the categories are significant and positive impact. All of the marriage status has positive impact and approximately 8% positively affects employment working conditions and there are not any big differences among them. Single, marriage, widowed people have 8.7%, 9% and 8% more chance respectively to being hired have possibilities after policy implementation compared to based category.

Table 2.3: Marginal Effects In The Model

Expression : Pr(outcome), predict() /Delta-method

Delta-method						
	dy/dx	Std. Err.	z	P>z	[95% Conf.	Interval]
age	0.091*	0.010	9.106	0.000	0.065	0.108
Age square	0.000*	0.000	-6.415	0.000	0.000	0.000
Male	0.194*	0.024	8.258	0.001	0.067	0.267
Young	-0.008	0.010	-0.810	0.418	-0.027	0.011
Young*male	-0.163*	0.037	-4.394	0.000	-0.214	-0.113
inc	-0.119*	0.032	-3.743	0.000	-0.188	-0.020
exp	0.041*	0.008	5.125	0.000	0.033	0.077
urban	0.196*	0.042	4.661	0.000	0.157	0.285
Single	0.087*	0.015	5.875	0.000	0.058	0.105
Married	0.091*	0.015	6.071	0.000	0.063	0.109
Widowed	0.080*	0.018	4.451	0.000	0.055	0.093
Primary school	0.135*	0.016	8.276	0.000	0.110	0.174
A high school degree	0.160*	0.009	16.134	0.000	0.106	0.182
Technical High school degree	0.193*	0.011	18.246	0.000	0.178	0.208
Collage or Undergraduate Degree	0.095*	0.015	6.007	0.000	0.090	0.242
Istanbul	0.190*	0.054	3.052	0.000	0.188	0.311
East Marmara	0.213*	0.047	4.526	0.000	0.221	0.399
West Marmara	0.157*	0.020	7.914	0.000	0.104	0.188
Aegean	0.098*	0.021	4.647	0.000	0.088	0.133
Central Anatolia	0.005	0.018	0.295	0.960	-0.021	0.022
Mediterranean	0.110*	0.009	12.295	0.000	0.097	0.220
East Anatolia	0.073*	0.021	3.650	0.694	0.032	0.101
East Black Sea	0.000	0.013	-0.011	0.992	-0.026	0.026
West Black Sea	0.019	0.020	0.929	0.157	-0.007	0.045
South East Anatolia	-0.004	0.014	-0.291	0.771	-0.031	0.023
North East Anatolia	-0.001	0.016	-0.049	0.961	-0.032	0.030

*Shows that variable is significant at 0.05 alpha level. dy/dx for factor levels is the discrete change from the base level. Graduate degree, divorced and Central East Anatolia are omitted to use as base levels.

The question what is the marginal effect of dependent variable on the conditional expected value of y, when the interaction between age and genders are the most crucial issue to evaluate. Therefore, I calculate the correct marginal impacts of gender (female versus male) by the incremental effect of age is calculated and represented Table-2.4.

The average change in the predicted conditional probability that outcome equals 1, which means individuals are employed after the policy treatment for 1 year increase in age differs between females and males by 2.3 [0.034-0.011] percentage points with male having higher marginal age effects on average. Put in differently, the average change in the predicted conditional probability that for a 1 year age increase 0.011 (0.034) percentage point increase the chance of female (male) being hired.

Table 2.4, Average marginal effects for different ages

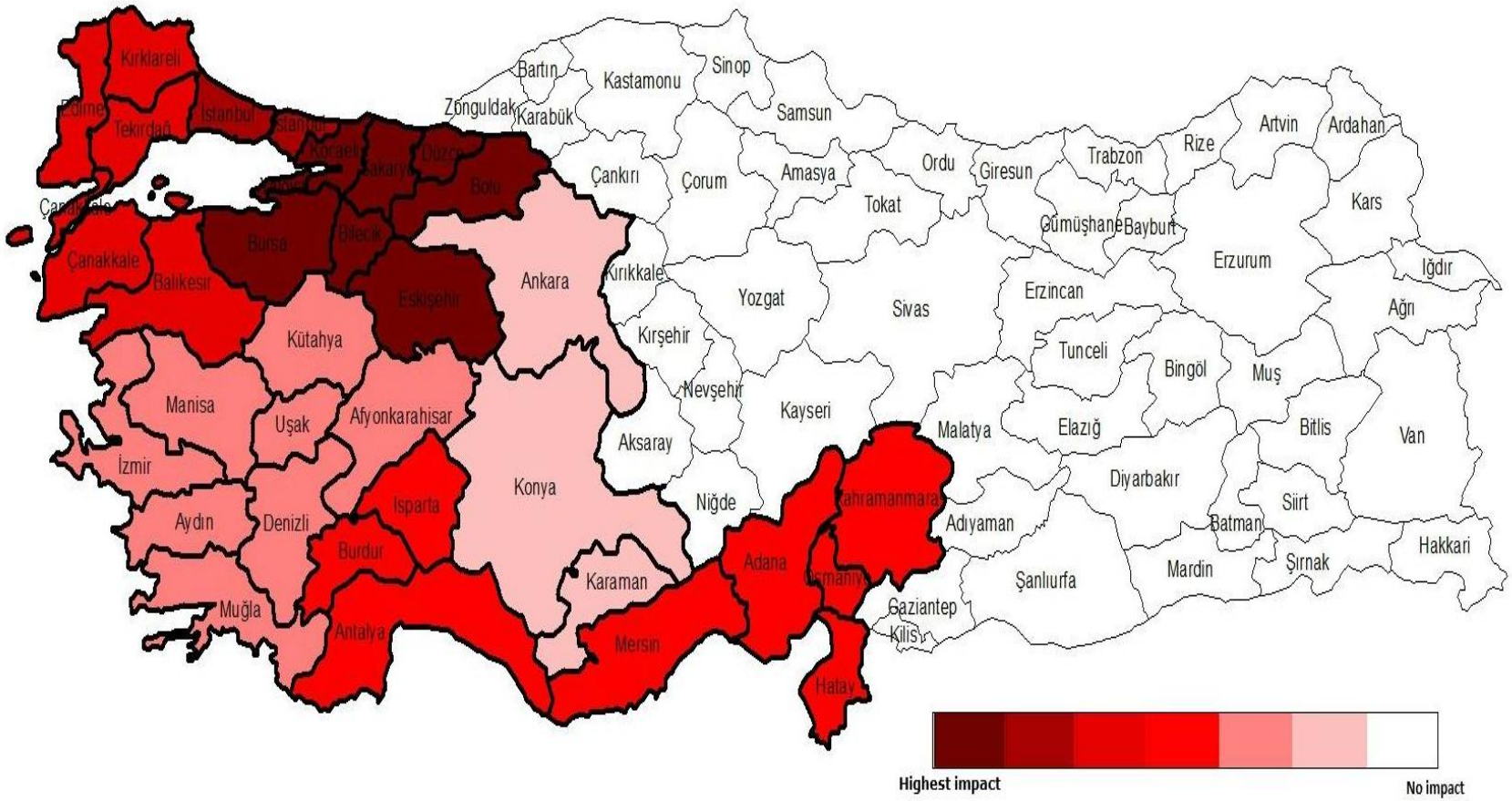
margins, dydx(age) at(gender=(0 1)) post
Expression : Pr (outcome), predict()
dy/dx w.r.t. : age

1._at : gender (female) = 0

2._at : gender (male) = 1

Delta-method							
		dy/dx	Std. Err.	z	P>z	[95% Conf.	Interval]
age							
	_at						
	1	0.011*	0.000	6.220	0.000	0.010	0.031
	2	0.034*	0.000	17.250	0.000	0.016	0.077

TURKEY'S NUTS MAP



2.4 Conclusion

The objective of this research is to estimate the effects of a new policy on labor force participation. Taking advantage of the features of the micro level data sets (ILCS), two groups of workers were constructed. The treatment group is comprised of workers who were affected by the Turkish labor policy (or treatment) geared towards women and young men and control group, which consisted workers who unaffected by the policy. First, I matched the ILCS data using pre-treatment which was before policy implementation 2006 and post-treatment which was after the policy implementation 2011. The outcome variable is a binary choice in which a person works or does not. Since the outcome is not a continuous variable, a nonlinear DID model is more suitable than a linear model. The purpose of the policy was specifically to increase the number of young male or female workers in all ages, so an interaction term was created to examine how this policy affected individuals of different age and gender groups. Since the logit model does not allow to direct probabilistic interpretation of interaction terms, I also report marginal impacts of independent variables including interactions between young, female and male.

The results showed that the employment probability of male workers is nearly 20% hired after the policy implementation in comparison to female workers. The interaction terms are the most crucial part of this study, and are negative and statistically significant. The probability being hired after treatment that young females between the ages 18 and 29 years old, is 22% lower when compared to female workers who are over 30 years old. When the young male workers (18-29) compared with male workers who are over 30 years old, the probability of being hired was 16% lower the first group after the policy treatment as compared to others. Ultimately, the results show that this policy was not effective since its purpose was to increase employment among young male workers.

I also examine the incremental effect of age on the two genders in Table-2.4. The results show the average change in predicted conditional probability after the policy treatment for a year increase in age differs between female and male workers by 23% points. Male workers of different ages have a higher probability of being hired on average after the policy implementation.

Another interesting outcome of this study is half of the regions did not benefit from this policy as shown in Figure-2.1 (Map). In other words, 6 of the 12 NUTS did not show any statistically significant results. Thus, the policy was ineffective in areas such as Central Anatolia, Central East Anatolia, East Black Sea, West Black Sea, South East Anatolia, and North East Anatolia. I believe that the policy could not cover the structure of local people in these areas. For example, in East Black Sea and West Black Sea, labors are generally employed in agriculture or fisheries, and they work seasonally. Also, South East Anatolia and North East Anatolia still struggle with terrorist activities. Therefore, people in these regions either migrate to other regions or work for local businesses instead of working for big companies. In addition, the policy ruled out the Turkey' traditional customs, especially in rural areas. In rural areas women have not joined the labor force because of their family responsibilities, such as maternity, childcare, or elderly care. Even though the policy provides an incentive for female labors to be hired unfortunately many areas do not provide labor opportunities for women. This is a result of institutional problems such as insufficient day care or elder care options throughout Turkey. Even if some regions have these options for female labors, other regions lack such support and thus hinder female labor force participation.

To conclude, I recommend this policy should be revised to help provide needed institutional support in order to fully correspond to the reality of Turkish society. Thus labor

force incentives should be tailored to meet the local needs of various regions I consider that policy maker should revise this policy since it was not able to fully correspond the reality of Turkish society. Another issue is the interaction impacts among other policies should be evaluated by policy makers. For instance, there was another labor policy which was implemented in 2004, and this policy was valid until 2012. This policy gave 100% insurance incentive to employers in industrial business and 80% insurance incentive to employers in other type of business, under condition if business had more than 10 workers and hired additional female and male workers in 49 provinces[18] in Turkey. This policy may decrease the be at odds with other policies since it also includes all male workers without age restrictions. I believe this policy was responsible for neutralizing the insurance incentive for female workers.

[18] The rule number 5048 and the policy was valid in the following provinces; Adiyaman, Afyon, Agri, Aksaray, Amasya, Ardahan, Batman, Bartin, Bayburt, Bingol, Bitlis, Cankiri, Diyarbakir, Duzce, Elazig, Erzincan, Erzuru, Giresun, Gumushane, Hakkari, Igdir, Kars, Kilis, Karaman, Kastamonu Kirsehir, Malatya, Mardin, Mus, Ordu, Osmaniye, Siirt, Ainop, Sivas, Sanliurfa, Sirnak, Tokat, Usak, Van, Tunceli, Nigde, Kahramanmaras, Corum, Artvin, Kutahya, Trabzon, Rize, Nevsehir. On 04.01.2005 business in Gokceada and Bozcaada were included with the rule number 5568.

2.5 References

Ai, C., and Norton, E. C. (2003) "Interaction terms in logit and probit models." *Economics letters*, *80*(1), 123-129.
DOI: https://doi.org/10.1016/S0165-1765(03)00032-6

Athey, S. and Imbens, G. (2006) "Identification and Inference in non linear difference in difference models", *Econometrica* 74:431-497.
DOI: 10.1111/j.1468-0262.2006.00668.x

Basu, A., Arondekar, B. V., and Rathouz, P. J. (2006) "Scale of interest versus scale of estimation: comparing alternative estimators for the incremental costs of a comorbidity." *Health economics*, *15*(10), 1091-1107. DOI: 10.1002/hec.1099

Başlevent, C., and Onaran, Ö. (2004) "The effect of export-oriented growth on female labor market outcomes in Turkey." *World Development*, *32*(8), 1375-1393.
DOI:https://doi.org/10.1016/j.worlddev.2004.02.008

Elsby, M. W., Hobijn, B., and Sahin, A. (2010) *The labor market in the Great Recession,*, National Bureau of Economic Research. 10(15) 2-47

Goldberger, A. S. (1972) *Selection bias in evaluating treatment effects: Some formal illustrations*. University of Wisconsin-Madison.

Heckman, J. (1976) "The Common Structure of Statistical Models of Truncation, Sample Selection, and Limited Dependent Variables, and a Simple Estimator for Such Models." *Annals of Economic and Social Measurement*, 5, 475-492.
URL: http://www.nber.org/chapters/c10491

Karaca-Mandic, P., Norton, E. C.,and Dowd, B. (2012) "Interaction terms in nonlinear models." *Health services research, 47*(1pt1), 255-274. DOI: 10.1111/j.1475-6773.2011.01314.x

Kilic, D., and Ozturk, S. (2014) "Türkiye'de Kadınların İşgücüne Katılımı Önündeki Engeller ve Çözüm Yolları: Bir Ampirik Uygulama." *Amme İdaresi Dergisi, 47*(1), 107-130.

Kleinman, L. C.,and Norton, E. C. (2009) "What's the risk? A simple approach for estimating adjusted risk measures from nonlinear models including logistic regression." *Health services research, 44*(1), 288-302.

Income and Living Condition Survey, Turkish Statistics Institute, http://www.tuik.gov.tr/UstMenu.do?metod=bilgiTalebi

Mammen, K., and Paxson, C. (2000) Women's work and economic development. *The Journal of Economic Perspectives*, *14*(4), 141-164. DOI: 10.1111/j.1475-6773.2011.01314.x

Organization for Economic and Cooperation Development, OECD Labor Force statistics by gender. (2015) https://stats.oecd.org/Index.aspx?DataSetCode=LFS_SEX

Ozer, M., and Bicerli, K. (2003) " Türkiye'de Kadın İşgücünün Panel Veri Analizi."Available at http://www.acarindex.com/dosyalar/makale/acarindex-1423869751.pdf

Puhani, A. P. (2012) "The treatment Effect. the cross difference, and the interaction term nonlinear "difference-in-differences" models", *Economic Letters*, 115, 85-87. DOI: https://doi.org/10.1016/j.econlet.2011.11.025

Scheider, M, (2013) "Illustrating the Implications of How Inequality is Measured: Decomposing Earnings Inequality by Race and Gender," *Journal Labor Review,* 34:476–514 DOI: 10.1007/s12122-013-9168-y

Schneider, M. and Buckley, J. (2003)"Making the Grade: Comparing DC Charter Schools to Other DC Public Schools." *Educational Evaluation and Policy Analysis, 25(2),* 203-215.

Wooldridge, J. (2007) "What's new in econometrics? Lecture 10 difference-in-differences estimation", *NBER Summer Institute. Available at: www. nber. org/WNE/Slides7–31–07/slides_10_diffindiffs. pdf, accessed April, 9,* 2011

Chapter 3:

Labor Employment Choice among Employment Sectors

Abstract

This chapter examines how sectoral choices may differ among the public, private, and other sectors based on individual preferences. I specifically focus on the gender-based choice differential among sectors in the Turkish labor market. In the study, the 2011 Turkish Household Budget Survey (HBS), which is retrieved from the Turkish Statistics Institute, is used for estimation. I first apply Mincer's (1974) wage equation with appropriate correction for selectivity bias using Heckman's methos (1979). I then estimate each individual's sectoral choice using a multinomial logit model. The analysis results show that recruitment in the public sector is higher than that in the private sector because of higher wages. Also, a higher educational attainment may decrease the disparity between the public and private sectors choices.

Keywords; public-private differential, gender wage gap, logit model, selectivity corrected

3.1 Introduction

Wage differentials among races, occupations, sectors, and between genders have been a subject of intense of research for more than a century. The public and private sector wage differential (or pay gap) is a good example of sectoral differential. In a competitive market, profit maximization (or cost minimization) is supposed to be the factor that influences choices, yet employers may have goals other than competitiveness. In a perfectly competitive market, discrimination would be eliminated in the long run (Becker,1975), yet discrimination is observed in the labor market. There are many reasons for this. As an example, the public sector is assumed to have been political and social constraints accompanied by nonlabor budgetary issues, especially in less developed countries such as Turkey. Lausev (2013) presented evidence that depending on individuals' or households' job-related characteristics, the public wage premium is mostly positive at the mean. Bright (2005) also stated that many governmental sector wages may duplicate the private sectors' wage levels for comparable jobs.

Sectors may differ in several areas, such as job security, working hours, hiring advancement, location, skill requirements, and others. For instance, a centralized collective wage bargaining system demonstrating negotiation power, employment protection legislation, and working hours, has had an impact on sectoral choice. Greater unionization implies higher wages. Workers with a lower set of skills are most likely to be affected by collective bargaining power because of minimum wage advantages in the public sector (Blanch and Bryson, 2010). On the other hand, there is a penalty for working in the public sector for workers with a higher skill set as opposed to a premium for lower-skilled workers. Thus, a worker with a specific set of personal characteristics, preferences, and skills may find private (public) employment more attractive than public (private) employment.

According to the Turkish Statistics Institute's latest results, in 2015 there were 3,521,000 public sector workers in a total workforce of 26,621,000, so total public employment was 14%, and the majority of the workers were employed in private sector or other sectors. Also the same year, for the age range of 15 to 65 years, labor participation was made up of 35% women and 77% men. By industry, workers were employed in agriculture, industry, construction, and services by 20.5%, 20%, 7%, and 52.5%, respectively.

In the literature, the public–private sector wage gap has been researched in many studies. For example, Baron and Cobb-Clark (2010) examined the gender wage gap across public and private sector wage distributions in Australia. They adapted the semi-parametric methodology proposed by DiNardo et al. (1996) to decompose the distribution of the wage gap into its separate components using Household Income and Labor Dynamics data set from 2001 to 2006. Regardless of the labor market sector, differences in wage-based features can more concisely determine the gender wage gap of Australians with low income. In contrast, wage gap among workers with high income cannot be determined in both sectors, so glass ceilings can be widely distributed (Baron and Cobb-Clark, 2010).

Cai and Liu (2011) researched the public-private sector wage gap using the first six wages from 2001 to 2006 of the Household, Income and Labor Dynamics in Australia (HILDA) which is a panel data set. They implemented quantile regression to analyze if the sectoral wage impact varies along the wage distribution. Their results showed that public sector wage premium are more balanced than private sector wages for females. Another crucial finding of the study presented that sectoral wage gap might be explained by the observed gap of individuals and the job characteristics (Cai and Liu, 2011).

Fernández-de-Córdoba, et. al., (2012) developed a model to determine public sector wages and employment by using a general equilibrium model. The model helped to understanding of the dynamics of public-private sector wages. Their results represented a positive correlation between public and private sector wages. Also, the private sector' wages were found as a leading role while determination process (Fernández-de-Córdoba, et. al., 2012)

There are also several studies associated with public-private sectoral wages in the Turkish labor such as Akarcay-Gurbuz and Polat, 2014; Akhmedjonov and Izgi, 2012; Duman and Duman, 2015. Selim and Celik (2014) examined the wage differential between the public and private sectors using OLS and quantile regression, and their results showed that female laborers in private sectors earned less than their male counterparts in both the private and public sectors.

Nevertheless, the decision made by individual workers has not been a point of focus in the Turkish labor market. This chapter may fill the gap by examining how workers, who have different human capital characteristics or preferences, may have different probabilities of choosing public versus private sector jobs. To clarify, the purpose of this study is to estimate the individuals' sectoral choices among "private employment, public employment, other employment, and unemployed" I also estimate the gender-based choice differences among sectors. To do this, the data from the 2011 Household Budget Survey (HBS) were used in this study. This chapter is organized as follows: Section II discusses the empirical methods. Detailed information about the data set is given in section III, and section IV presents the analytical results. Section V provides the concluding comments.

3.2 Methods

In the inequality literature, many studies have employed the Oaxaca-Blinder decomposition model to calculate unexplained wage gaps among different genders, sectors,

occupations, or regions, similarly that I researched in the chapter-1. The Oaxaca-Blinder [19](1974) method uses Mincer's (1974) forms of traditional human capital framework (Akhmedjonov and Izgi, 2012). Mincer's (1974) semi-logarithmic wage equation approach is as follows:

$$LnW_{ij} = \beta_0 + \beta_j X_{ij} + U_{ij} \quad (1)$$

where W is hourly wages of individuals, β_0 is the intercept, β is a vector of unknown parameters that are calculated by OLS, and X is a vector of individuals' characteristics. U is the random error term (Uj~iidN [0, σ^2]), and j denotes sectors. For this case, I have three sectors, which are public, private, and others.

Mincer's wage equation is subject to bias, which appears in the form of self-selection and the innate ability of individuals. To correct for sample selection bias, I followed the method of Heckman (1979), which consists of two equations: the earnings regression equation and a sample selection equation. Heckman (1976) suggested that sample selection bias may result from ignoring the sample selection. To correct potential sector selection bias, I assumed that individuals face four common choices similarly Tansel (2005) and Daoud and Shanti (2012):

1. Not employed (j=0),
2. Public sector employment (j=1),
3. Private sector employment (j=2),
4. Other sector employment (j=3).

Here, the base category is "not employed," and the characteristics of choices are "wage" and "nonwage" compensation. Workers' characteristics, including human capital, will determine workers' sectoral choices.

[19] For detailed information about Oaxaca (1974) and Bliender (1974) decomposition model see Chapter-1 methodology section.

Individuals may choose to work in one of three different sectors or not work depending on their wage and nonwage compensation. For sectoral choice, I applied a multinomial logit model, hereafter MLM. The probability of selecting sector j is calculated by following equation:

$$p_j = \frac{exp(Z\alpha_j)}{1+\sum_{j=1}^{m} exp(Z\alpha_j)} \qquad (2)$$

where α_j is the parameters of the alternative of j. Sectoral choice is affected by Z, which is a vector of explanatory variables. Then, the likelihood of sectoral choices can be determined using two-stage estimation (Trost and Lee, 1984). The probabilities of individuals' sectoral choice (or not working) can be estimated by maximum likelihood (Tansel, 2005; Daoud and Shanti, 2012). Then the selection term for alternative j is explained as follows;

- In the first stage, $\lambda_j = \frac{\theta(S_j)}{\phi(S_j)}$ and $S_j = \phi^{-1}(p_j)\theta$ and ϕ are implied for standard normal density function and the standard distribution function, respectively.
- In the second stage, λ_j is entered among the explanatory variables of the wage equations and then calculated by OLS.

The explanatory variables are included in the wage equations and also in the multinomial logit model.

3.3 Data

This study uses data from the 2011 Household Budget Survey. Similar studies in the literature have implemented the Household Labor Force Survey (HLFS) data (Hosgor and Smits, 2008), which is also a micro level data set complied by the Turkish Statistics Institute. The HLFS's goal is to observe labor market conditions in the context of the Labor Market Information System project; however, it was not suitable for analyzing employment choice. This

is because the HLFS results have only one income variable which includes any kind of income, such as bonuses, or over-payments. It does not provide any other unearned income such as rents. Therefore, I used the Household Budget Survey (HBS[20]) results, which provide information on socioeconomic structures, standards of living, and consumption patterns of households, which can then be used to test the viability of socioeconomic policies that are implemented. Using the data set, it is possible to obtain information on consumers' expenditures for goods and services along with socioeconomic characteristics of households, employment status of household members, total income of households, and income sources at the urban, rural, and national level.[21]

The 2011[22] HBS has a sample of 31,122 individuals. The age range of 15–65 is used, which is the legal working age span in Turkey. Wages are the sum of cash earnings, overtime payments, and bonuses. The survey has information about income collected yearly wages, and nonwage compensation. Nonwage compensation is comprised of rent of any kind of properties or lands and commercial or industrial vehicles. The survey also had information on work hours per week. The hourly wages are obtained by dividing reported yearly wages by imputed yearly hours of work.

In this study, the possible sector options are "public, private, and other" (self-employed, foundation, union, international organization, nongovernmental organization, political party, and cooperatives). Then, the characteristics of choices are "wage" and "nonwage" compensation in each sectors. The choosers' characteristics are "gender," "age," "experience," and "education, and type of settlements." If the individual is male, he gets 1; 0 otherwise. Experience is classified

[20]The TSI has been conducting surveys regularly every year since 2002. For sample households, the survey is conducted between January 1 and December 31.
[21]It is not possible to make estimations on a regional basis using the HBS data set.
[22] After 2011, HBS does not have any information about individuals' sectoral information. Since 2011 was the most recent data including individuals' sectoral information, I had to use it.

in yearly increments, but if an individual worked less than six months then a zero increment is assigned in the HBS. The age variable is given as yearly completed age. Educational attainment is categorized as (1) lower than a high school diploma, (2) a high school diploma, (3) vocational or technical high school diploma, (4) college (or university) diploma, (5) graduate degree or professional qualification. Rural and urban settlements are given in the HBS based on population so that if the regional population is lower than 20,000, the area dummy variable takes the value 1; 0 otherwise.

3.4 Empirical Results

First, the descriptive statistics of variables are categorized by gender and sector. For brevity, I only reported their mean and standard deviation. The statistics can be seen in Table 3.1. The number of female workers is fewer than that of their male counterparts for every sector. Individuals working public sector jobs are seven times bigger the number of private sector workers for both genders. For each of the sectors, the number of male workers is twice that of female workers. The hourly wage of male workers is 24% higher than that of female workers in private sector jobs while the hourly gender wage gap is around 8% in the public sector. Some previous studies reported a higher gender wage gap in the private sector in favor of females (Tansel, 2005; Akarcay-Gurbuz and Polat, 2014).

Table 3.1: Descriptive Statistics

	Public Sector				Private Sector				Other Sectors			
	Female		Male		Female		Male		Female		Male	
Variables	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Ln hourly wages	5.909	0.916	6.423	0.565	4.833	1.461	5.952	1.126	3.111	1.144	4.158	1.555
Unearned income (yearly)	510.364	1107.41	953.1	1491.84	567.196	3039.69	808.74	1287.89	271.210	547.568	444.281	721.022
Experience	10.02	8.403	14.185	9.353	9.993	11.461	10.424	12.145	4.400	4.037	11.561	9.285
Experience^2	170.875	229.861	288.6	299.509	231.204	475.563	256.133	500.368	32.400	37.634	217.756	257.472
Location (rural)	0.299	0.458	0.322	0.468	0.308	0.462	0.298	0.457	0.305	0.461	0.310	0.462
Educational Attainments												
Less than high school	0.763	0.425	0.697	0.460	0.097	0.296	0.221	0.415	0.814	0.389	0.741	0.438
High school	0.077	0.267	0.111	0.314	0.067	0.251	0.141	0.348	0.090	0.286	0.120	0.325
Technical High school	0.063	0.243	0.104	0.305	0.057	0.233	0.103	0.305	0.052	0.222	0.065	0.246
Collage	0.089	0.285	0.081	0.273	0.693	0.462	0.486	0.500	0.043	0.202	0.070	0.256
Sample Size	3540		7760		505		1170		4142		9968	

Hourly wages and unearned income are given in Turkish Liras.

Mandel and Semyonov (2014) examined the sectoral wage differential in 26 countries. Their study represented evidence that gender wage gap may differ vastly in terms of magnitude and outlier cases. The study suggested that depending on individual, household, and job-related characteristics, in a majority of cases, the public wage premium is positive at the mean. Also, it is higher for lower wages or lower qualifications, and greater for women (Mandel and Semyonov, 2014). The standard deviation of hourly log wages is 1.46 for female workers in private administration work whereas it is 0.91 in public administration. Similarly for female workers, male workers' hourly wages have lower standard deviation in public sector jobs than private sector jobs. This shows that the hourly wage distribution in the public sector is less spread than private sector wage distributions.

In all sectors, male workers have more experience than their female counterparts. The results are logical considering the probability of female workers leaving their job because of maternity, childcare, or elderly care. Put differently, their experience is not continuous. If educational attainments are compared, females are more educated than males in both the public and private sectors. For instance, 69% of female workers in the private sector has a college degree while 48% of male have a college degree in private sector work. On the other hand, male workers in both the public and private sectors have more technical (vocational) high school degrees than their female counterparts. Since some jobs require more physical skills, males who obtained technical high school degrees may benefit an increased the likelihood of being hired, but the HBS data does not provide any information about individuals' physical traits. Deem and Brehony (2005) stated that a higher educational attainment corresponds to a higher probability of participating in public sectors jobs, yet it is completely opposite what the 2011 HBS raw data results showed in the Turkish labor market.

Male workers have more unearned income than female workers in every sector; this is consistent with other findings in Turkey which are attributed to social conservatism. In Turkey, females generally do not own land, houses, or any vehicles even if they are wealthy; their spouses or fathers manage these kinds of properties for rent or sale. Because of Islamic law (Sharia law), females can obtain half the amount of what their male siblings inherited. Even if Turkey were to rule as a constitutional secular state and not by Islamic law, some ultraconservative people would likely follow Islamic law for heritage and the renting or owning properties. Therefore, females' unearned income levels are lower than those of males.

Furthermore, I used the multinomial logit model (MLM) to estimate individuals' choices. The MLM is reported separately for females and males in Table 3.2 and Table 3.3, respectively. In this study, individuals have four different choices: not working, public sector job, private sector job, and other sectors. Individuals who prefer not to work are chosen as the base category. The mean values of the variables and relevant asymptotic t-ratio[23] are represented to explain the marginal effect of each variable on the likelihood of selecting one of them. Experience levels for all sectors and both genders significantly increased the probability of employment for all sectors in comparison to "not working." The income effects of individuals were measured by earned income and unearned income.

Unearned income for both females and males were negative and statistically significant. This means that the likelihood of choosing one of three sectors in comparison to "not working" decreased with higher unearned income. On the contrary, unearned income and hourly wage had statistically significant and positive marginal effects for both genders in all sectors, so higher log hourly wages increased sector choice compared to "not working."

[23] The null hypothesis that the slopes are jointly equal to zero can be rejected at the alpha equals 5% level for both females and males

Table 3.2: Maximum Likelihood Multinomial Logit Estimation of female Employment Choices among Sectors

Variables	Public Sector		Private Sector		Other Sectors	
	Marginal Effect	t-ratio	Marginal Effect	t-ratio	Marginal Effect	t-ratio
Constant	-0.035	3.75	-0.111	12.4	-0.057	5.75
Ln hourly wages	0.143	16.41	0.162	19.21	0.121	11.57
Unearned income (yearly)	-0.036	2.41	-0.067	4.69	-0.012	17.41
Experience	0.004	1.14	0.020	4.07	0.040	7.03
Experience^2	-0.029	4.19	-0.075	9.41	-0.009	3.2
rural	-0.215	23.27	-0.312	27.2	-0.30	26.1
Educational Attainments						
Less than high school	0.054	8.52	0.097	11.9	0.084	10.38
High school	0.092	11.27	0.066	9.54	0.004	2.89
Technical High school	0.067	9.24	0.043	7.23	0.021	4.22
Collage	0.145	20.84	0.173	23.62	0.033	6.18
Log-likelihood	-25312					
Pseudo-R^2	0.426					

hourly wages and unearned income are given by Turkish Liras. t-ratio shows, the absolute value of the asymptotic t-ratio. Base categories are graduate degree, urban area, and not working.

Table 3.3: Maximum Likelihood Multinomial Logit Estimation of Male Employment Choices among Sectors

Variables	Public Sector		Private Sector		Other Sectors	
	Marginal Effect	t-ratio	Marginal Effect	t-ratio	Marginal Effect	t-ratio
Constant	-0.141	19.75	-0.183	22.7	0.164	11.42
Ln hourly wages	0.151	18.37	0.181	22.14	0.144	14.37
Unearned income (yearly)	-0.071	3.49	-0.091	9.5	-0.014	6.11
Experience	0.008	6.14	0.033	7.41	0.045	7.94
Experience^2	-0.014	11.42	-0.022	21.18	-0.007	14.02
rural	-0.194	20.19	-0.251	29.4	-0.24	22.9
Educational Attainments						
Less than high school	0.014	2.52	0.027	3.9	0.034	5.23
High school	0.042	6.47	0.071	10.04	0.017	3.92
Technical High school	0.079	13.24	0.123	19.73	0.091	16.14
Collage	0.165	24.84	0.143	26.06	0.123	5.75
Log-likelihood	-32375					
Pseudo-R^2	0.354					

hourly wages and unearned income are given by Turkish Liras. t-ratio shows, the absolute value of the asymptotic t-ratio. Base categories are graduate degree, urban area, and not working.

For educational attainment, all levels of education were statistically significant and increased the probability of joining both public and private sectors. Females with a higher educational attainment prefer private and public sectors compared to "not working." On the contrary, females with lower education prefer to work in other sectors since many (uneducated) less educated women work as unpaid family workers especially in rural areas.

For settlement factors of individuals, for males, likelihood of working in all sectors are higher in urban areas than in rural areas compared to the choice not to work. The likelihood of females choosing public and private sector is higher than the choice not to work in urban areas compared to rural areas. The likelihood of choosing other sectors for females are negative but not statistically significant in rural areas. Since other sectors included all kinds of family workers, some seasonal workers, self-employed individuals, and nongovernmental organizations, it may follow a specific pattern especially in rural areas of the eastern part of Turkey. However, the HBS data do not provide information about the specific regions of the individuals.

The selection-corrected estimation of the sectoral wage equations for genders are presented by sector in Table 3.4. The selection terms were mostly positive and statistically significant for males for every sector, indicating that males who choose to work in the public and private sectors have higher productivity than the average. On the contrary, the selection terms for men were not statistically significant for other sectors. Implying that the covariance in those sectors are weak. In the case of females, the selection terms were negative and statistically significant in the public and private sectors and insignificant in the other sectors. It also indicates that unobservable characteristics that increase the probability of wage employment in public and private sectors also have a negative impact on the females' earnings.

Table 3.4: Selectivity Corrected of Wage Equations by Gender and Sectors

	Public Sector				Private Sector				Other Sectors			
	Female		Male		Female		Male		Female		Male	
Variables	**Coefficient**	**t-ratio**	**Coefficient**	**t-ratio**	**Coefficient**	**t-ratio**	**Coefficient**	**t-ratio**	**Coefficient**	**t-ratio**	**Coefficient**	**t-ratio**
Constant	5.03	29.26	6.27	33.26	4.11	20.16	5.22	23.55	2.87	20.43	3.77	24.82
Experience	0.062	3.67	0.092	7.4	0.098	8.41	0.135	8.135	0.041	3.17	0.071	5.25
Experience^2	-0.009	1.57	-0.004	1.75	-0.039	1.18	-0.013	2.09	-0.005	1.044	-0.015	3.12
rural	-0.195	6.48	-0.17	7.45	-0.201	4.57	-0.162	3.65	-0.175	3.75	-0.156	4.162
Educational Attainments												
Less than high school	0.463	5.12	0.31	8.46	0.107	2.264	0.184	4.05	0.527	3.921	0.481	3.548
High school	0.127	2.44	0.46	10.31	0.094	1.514	0.131	3.08	0.090	2.047	0.120	4.125
Technical High school	0.136	2.77	0.54	11.54	0.063	1.037	0.097	2.107	0.052	1.026	0.076	1.637
Collage	1.152	1.028	0.74	14.73	1.392	10.46	1.006	7.691	0.913	8.736	0.870	7.561
Selection term	-0.035	2.88	0.016	1.81	-0.021	2.67	0.091	3.22	0.017	0.53	0.082	3.27
R2	0.421		0.362		0.374							
Root MSE	0.435		0.3807		0.481							

Hourly wages and unearned income are given in Turkish Liras. t-ratio shows, the absolute value of the asymptotic t-ratio. Base categories are graduate degree, urban area, and not working.

There is a negative correlation between the omitted factors in the employment sector models and the omitted factors in the wage equations. In addition, the selection terms are insignificant for females in other sectors, demonstrating that the covariance between the sectoral choice equation and the error term in the wage equation is not strong.

All the educational attainments are positive and statistically significant for both males and females for all sectors, meaning that all education levels have a positive return on wages. Experience has a statistically significant and positive impact on wage equations for both females and males in all sectors. However, the magnitude of the experience impact is lower in females compared to their male counterparts for every sector. Females' experiences may not be continuous. In other words, it may be interrupted because of maternity or family care; thus, the impact of experience is comparatively lower than that for males in all sectors. Also, the quadratic term for experience was negative for all three sectors. It still shows similar results with linear experience, where returns from experience are lower for females than for males for all sectors. In the private sector, the curvature of the wage experience profile is steeper than that of other sectors for both females and males.

The estimates for settlements of individuals show that there are regional differences in favor of urban areas in all sectors. It means that log wages are higher in urban areas for all sectors compared to "not working." The log wages for both genders in private and public administration have a higher return compared to other sectors in urban areas.

3.5 Conclusion

The objective of this paper is to estimate the employment sectoral choices based on the set of individual characteristics and sector characteristics. Taking advantage of the nice features of the micro level data of the 2011 HBS, individuals have four common choices, which are "public," "private," "other sectors," or "not employed." For estimation of employment choices, first I applied Mincer's (1974) wage equation. The log hourly wages are regressed on a set of educational attainments, experience, and the settlements of the individuals. Employment sectoral choice is calculated with a four-way multinomial logit model with "not working" as the base category. Then, to eliminate potential bias, selectivity-corrected sectoral wage equations estimated for males and females separately.

The first finding of this study is that the log hourly wages in public administration are higher than in other sectors for both females and males. These findings are represented with raw data. In addition, the log hourly wages are higher in the public sector than other sectors when observable characteristics are controlled and selectivity correction is applied for both genders. There are some exceptions for females at the university level, where hourly wages are higher in private administration than public administration. The lowest hourly wages are in other sectors, and this may result from some other factors such as unionization being weaker in other sectors.

When the selectivity correction is applied to analysis, the results indicate that males in public and private sector have higher productivity than others. It also implies unobservable characteristics increase the probability of wage employment in the public and private sector. On the other hand, for females, the coefficient of the selectivity correction variable is negative indicating the likelihood of wage employment in public and private sectors also has a negative impact on the females' earnings. In other words, there is a negative correlation between the

omitted factors in the employment sector models and the omitted factors in the wage equations. Moreover, for other sector employment, the selection term outcomes are not statistically significant. Thus, it demonstrates the covariance between the equation of individuals' sectoral preference and the error term in the wage equation is not strong.

All estimation results in this study implies that hourly wages are clearly higher in the public sector; there are many reasons for this such as union bargaining power or governments' non-budgetary issues. Also, employment in the public sector is seven times higher than that in the private sector for both females and males. Recruitment is higher for males than their female counterparts in all three sectors. With higher wages and higher employment, government budgetary problems may arise. On the other hand, education clearly has a positive impact on both females and males not only for the public sector but also other sectors. Therefore, increasing educational attainment may increase the probability of recruitment for other sectors. Mammen and Paxson (2000) represent similar results in their study. Their results show that low levels of female education, the income effect of male earnings, and the separation of home and work environments contribute to lower participation rates. On the contrarily, females are highly educated in high-income countries with large service sectors. In addition to this ,According to Becker (1975), in human capital theory, schooling is an investment activity that increases worker productivity and the expected returns later in life. Instead of increasing the wage bill in public sectors, policymakers may focus on increasing educational attainment and working toward equal payment for both females and males.

3.6 References

Akhmedjonov, A., and Izgi, B. (2012) "Does it pay to work in the public sector in Turkey?." *Applied Economics Letters*, *19*(10), 909-913. DOI: http://dx.doi.org/10.1080/13504851.2011.607124

Barón, J. D., and Cobb-Clark, D. A. (2010)" Occupational segregation and the gender wage gap in private-and public-sector employment: a distributional analysis." *Economic Record*, *86*(273), 227-246. DOI: 10.1111/j.1475-4932.2009.00600.x

Becker, G. S. (1975) Human Capital, 2nd edition. The National Bureau of Economic Research, New York: Columbia University Press.

Bright, L. (2005) "Public employees with high levels of public service motivation who are they, where are they, and what do they want?." *Review of public personnel administration*, *25*(2), 138-154. DOI: 10.1177/0734371X04272360

Cai, L., and Liu, A. Y. (2011) "Public–private sector wage gap in Australia: variation along the distribution." *British Journal of Industrial Relations*, *49*(2), 362-390. DOI: 10.1111/j.1467-8543.2009.00773.x

Cameron, C. and Trivedi, P. (2005) *Microeconometrics Method and Application,* Cambridge University Press

Çelik, O., and Selim, S. (2014) "Analysis of Public-Private Sector Wage Differentials In Turkey By Quantile Regression Approach," *Celal Bayar Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, *21*(1), 205-232. DOI: http://dx.doi.org/10.18657/yecbu.26375

Daoud, Y. and Shanti, R. (2012) "Wage differentials and employment sector choice for Palestinian men and women: An empirical assessment." MPRA Paper No. 39782.Munich Personal RePEc Archive

Deem, R., and Brehony, K. J. (2005) "Management as ideology: The case of 'new managerialism'in higher education." *Oxford review of education*, *31*(2), 217-235. DOI: http://dx.doi.org/10.1080/03054980500117827

DiNardo, J., and Fortin, N. and Lemieux, T. (1996) "Labour Market Institutions and the Distribution of Wages", 1973-1992: a Semi Parametric Approach. *Econometrica, 64*(5), 1001. DOI: 10.3386/w5093

Duman A, and Duman A (2015) "The Effects of Trade Union Membership on Wage at Public and Private Sectors in Turkey." Labor and Society, (1): 11-29.

Fernández-de-Córdoba, G., Pérez, J. J., and Torres, J. L. (2012) "Public and private sector wages interactions in a general equilibrium model." *Public Choice*, *150*(1-2), 309-326. DOI: 10.1007/s11127-010-9705-7

Hosgor, G.A., and Smits, J. (2008) "Variation in labor market participation of married women in Turkey" *Women's Studies International Forum*, 31(2), 104–117 DOI: https://doi.org/10.1016/j.wsif.2008.03.003

Household Budget Survey, Turkish Statistics Institute. URL: http://www.tuik.gov.tr/MicroVeri/HBA2012/english/index.html

Lausev, J. (2013) "What has 20 years of public–private pay gap literature told us? Eastern European transitioning vs. developed economies", *Journal of Economic Surveys*. DOI: 10.1111/joes.12039.

Madalla, G., S, (1993) Limited Depended and Qualitative Variables in Econometrics, Cambridge University Press

Mandel, H., and Semyonov, M. (2014) " Gender pay gap and employment sector: Sources of earnings disparities in the United States, 1970–2010." *Demography*, *51*(5), 1597-1618.

DOI:10.1007/s13524-014-0320-y

Mammen, K., and Paxson, C. (2000) "Women's work and economic development." *The Journal of Economic Perspectives*, *14*(4), 141-164. URL: http://www.jstor.org/stable/2647079

Melly, Blaise (2005) "*Public-Private sector wage differentials in Germany: Evidence from quantile regression"* Emprical Economics. (30). p: 505-520. DOI:10.1007/s00181-005-0251-y

Oaxaca, R.(1973) "Male-Female Wage Differentials In Urban Labor Markets." *International Economic Review* (14)3: 693-708. DOI: 10.2307/2525981

Ramos, R., Sanroma, E., and Simón, H. (2014). "Public-private sector wage differentials by type of contract: evidence from Spain." *Applied Economics Ref. Network XREAP2014-08*.

Chapter 4:

Conclusion And Suggested Policies

This dissertation is comprised of three chapters that deal with issues on the Turkish Labor Market economically and econometrically. First chapter researches the regional and occupational gender pay gap from 2002 to 2013 data set which is the most recent data set providing information about individuals' settlement type. I started to explain how historical internal migration has been impacted in Turkish Labor Market from 1950s to today. Internal migration is crucial due to the fact that it effects labor density in different region of Turkey. I used Turkish Household Budget Survey data set which are retrieved from the Turkish Statistics Institute.

I applied the Oaxaca-Blinder decomposition method to estimate potential wage gap between genders in different regions, and different occupations. To put it differently, I examined the gender pay gap in the regional gap, using type of settlements of individuals (rural-urban areas). The analysis results show that there has been a gender pay gap over all 12 years study period. Unexplained gender pay gap was 28% in 2002 while it was 36% in 2013. I have also applied the Propensity Score Matching method to analyze regional and occupational differences over the 12 years period.

The results presented a clear wage gap between genders in favor of female labors. N nearest neighbor (1:1) matching results represents that the pay gap fluctuated between 25 percent and 33 percent in rural areas, while it ranged between 14 percent and 19 percent in urban areas during the study period. The regional gender wage gap is higher in rural areas than urban areas over all 12 years period. It may be because of thinner laborers market in rural areas or lower set

of skilled labors. Additionally, it may be because of informal employments. After Syrian internal migration, around 3 million Syrian migrated to Turkey and these immigrant were hired as cheap labors. This can also be another reason of the regional wage gap in the Turkish Labor Market.

From occupational perspective, the women managers and professionals are less probable to be discriminated among others. Female workers in agriculture, fisheries and forestry industries discriminated at average 15 percent over the 12 years period for both NN matching and caliper matching methods. In addition, the matching method supports the Oaxaca-Blinder (1974) method results, or vice versa; that there was more discrimination against lower set of skilled laborers in comparison to other laborers.

In the second chapter, I examined a labor policy which specifically focused to increase females' labor force participation. As explained in the first chapter, Turkish Labor market has been struggling with unequal pay gap for a while and also females labor force participation has been low compared to their male counterparts in many regions of Turkey. Therefore, Turkish government implemented a policy that was proposed to increase labor force participation in all females and young males who are between 18 to 29 years old. The policy was implemented in July 2008 by providing insurance incentive to employers who hired additional female workers and young male workers after the date.

The policy provided a 100% insurance incentive in a decreasing rate for 5 following years (See chapter-2 for detailed information). I used Income and Living Conditions surveys for 2006 and 2011 providing information about labor force participation before and after policy implementation. To analyze the policy impact, first, I matched the ILCS data using pre-treatment which was before the policy implementation (2006), and post-treatment, which was after the policy implementation (2011). Then I used non linear Difference in Difference model to examine

the policy impact. Since the outcome variable is a binary choice in which an individual works or does not after policy, a nonlinear model is more suitable. The purpose of the policy was specifically to increase the number of young male or female workers in all ages, so using an interaction term was crucial to examine how this policy affected individuals of different age and gender groups. Since the logit model does not allow to direct probabilistic interpretation of interaction terms, I also reported marginal impacts of independent variables including interactions between ages and genders.

The results of the study showed that the employment probability of male workers is nearly 20% more than their female counterparts after the policy implementation. The probability being hired among different age group, young females between the ages 18 and 29 years old, is 22% lower when compared to female workers who are over 30 years old. When the young male workers (18-29) compared with male workers who are over 30 years old, the probability of being hired was 16% lower for the first group after the policy treatment as compared to others. Ultimately, the results show that this policy was not effective since its purpose was to increase employment among young male workers. The results also represents that the policy had different impacts depending on the region of Turkey. After the policy was applied, the highest labor force participation was in East Marmara, while 6 of the 12 regions of Turkey had no statistically significant impact.

I also examine the incremental effect of age on the two genders and the results show the average change in predicted conditional probability after the policy treatment for a year increase in age differs between female and male workers by 23% points. Male workers of different ages have a higher probability of being hired on average after the policy implementation.

In contrast to the first 2 chapter, I investigate the decision mechanism of individuals in the Turkish Labor Market. In other words, it estimates laborers' employment choices among not working, working in the public sector, private sector, and other sectors. For analysis, I estimated Mincer's wage equation with appropriate correction for selectivity bias using Heckman on 2011 Household Budget survey results. Then, the individuals' sectoral choice was estimated by a multinomial logit model. The results of the research reveal that the wage gap in the public sectors is less than other sectors. Also, the majority of individuals were employed in the public sectors. Both females and males prefer public sector compared to private and other sectors. Higher educational attainment may decrease the disparity between the public and private sectors for both genders.

Suggested Policies;

1. All estimation results show that there is a gender pay gap in the Turkish Labor Market. Thus, the policy makers should work towards more equal payment for both females and males.
2. Labor policies should be revised to help provide needed institutional support in order to fully correspond to the reality of Turkish society.
3. Labor force incentives should be tailored to meet the local needs of various regions.
4. The interaction impacts among different policies should be evaluated because it may completely eliminate or decrease the impact of the purpose of policy.
5. The results in the chapter-3 imply that hourly wages are clearly higher in the public sector. Therefore, government budgetary problems may arise. On the other hand, education clearly has a positive impact on both females and males not only for the

public sector but also other sectors. Therefore, increasing educational attainment may increase the probability of recruitment for other sectors.

6. Schooling is also an investment activity that increases worker productivity and the expected returns later in life. Instead of increasing the wage bill in public sectors, policymakers may focus on increasing educational attainment.