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WAGE INEQUALITY IN TURKEY: WHAT CHANGED DURING 1994 - 2011?*

TÜRKİYE'DE ÜCRET EŞİTSİZLİĞİ: 1994-2011 DÖNEMİNDE NE DEĞİŞTİ?

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Abstract

This paper aims to investigate the evolution of male wage inequality from 1994 to 2011 in Turkey. The quantile regression method and OLS techniques are applied on Household Budget Survey data to estimate the extended Mincerian human capital earnings equation in order to analyze the changes in the wage distribution between these years. The results reveal that education is one of the crucial parameters that affect the wage inequality in Turkey. Within wage inequality among university graduates has increased for high to medium spreads for the successive almost 10 year periods. In addition, unionization also plays significant role on wage level in 2002 and 2011. In 2002, the return of being union membership is getting larger moving into higher tails of the wage distribution. On the other hand, the highest return of being a union membership is achieved at the lower tails of the distribution in 2011. Furthermore, the effects of experience, age, the size of the companies, public sector, geographic location variables on wage inequality are also discussed in this study.

Keywords: Wage Inequality, Returns to Education, Quantile Regression

JEL Classifications: C21, J31, I26

Öz

Bu çalışma 1994-2011 yılları arasında Türkiye'deki erkek çalışanların ücret eşitsizliklerindeki gelişmeleri incelemeyi amaçlamaktadır. Bu yıllar arasındaki ücret dağılımlarını analiz etmek amacıyla, Hanehalkı Bütçe Anketleri veri seti kullanılarak, quantile regresyon ve Sıradan En Küçük Kareler yöntemleriyle genişletilmiş "Mincer" kazanç denklemi tahmin edilmiştir. Sonuçlar eğitimin Türkiye'deki ücret eşitsizliği üzerinde etkili olduğunu göstermiştir. 1994-2011 yılları arasındaki yaklaşık iki on yıllık periyodu karşılaştırdığımızda üniversite mezunları arasında yüksek ücretlilerle orta ücretliler arasındaki eşitsizlik artmaktadır. Bunun yanısıra, sendikalaşma 2002 ve 2011 yıllarında ücret seviyesinde önemli bir rol oynamaktadır. 2002 yılında, sendikalaşma ücret dağılımının yukarı kısmında daha fazla getiri sağlarken, 2011 yılında sendikaya üye olmanın en yüksek getirisi dağılımın aşağı kısmında gerçekleşmektedir. Ayrıca çalışmada, deneyimin, yaşın, firma büyüklüğünün, kamu

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ya da özel sektörde çalışıp çalışmamanın, kır-kent ayrımının ücret eşitsizlikleri üzerindeki etkisi de tartışılmaktadır.

Anahtar kelimeler: Ücret Eşitsizlikleri, Eğitimin Getirisi, Quantile Regresyon

JEL Sınıflaması: C21, J31, I26

1. Introduction

Turkey has experienced major developments since 1990s in terms of education and economic environment. The university graduates in the labor market has increased dramatically, education system has changed in 1997and the unions have lost power for the 1994-2011 period. All these factors have affected the wage distribution of Turkey. Even though the wage inequality exhibits decreasing trend since 1990s in Turkey, it is still high compared to many developed countries. Therefore, the factors that affect the wage inequality gains greater importance. This paper aims to investigate the effects of education, deunionization, firm size and the other possible variables on wage inequality during the period in Turkey.

The vast majority of literature has devoted to analyze the wage inequality trends in many countries. This issue is elaborated from the several perspectives. Katz and Murphy (1992), Krueger (1993), Autor, Katz and Krueger (1998), Acemoglu (2002), Acemoglu and Autor (2011), analyze the issue from the "skill-biased technological change" approach which underlines the importance of technology in explaining a dramatic increase in the skill premium in US since 1970s. Card and Dinardo (2002) and Lemieux (2006) emphasized the role of the institutions like minimum wage requirements, deunionization in explaining wage inequality trends in the US. Goldberg and Pavcnik (2007) present various empirical models estimating the income inequality in developing economies.

The study done by Kızılırmak (2003) is one of the early studies focusing on wage inequality for the years 1988-99 by using SIS annual and quarterly manufacturing statistics in Turkey. The author showed that relative demand for skilled labor has increased due to largely within industry changes in Turkey for the given period (Kızılırmak, 2003: 12). Kara (2006) and Ilkkaracan and Selim (2007) investigated the gender wage gap by using Oaxaca decomposition method but with a different datasets and Ilkkaracan and Selim (2007) also computes Duncan&Duncan Segregation Index. Kara (2006) used Turkish Household Expenditure and Income Survey, while Employment and Wage Structure Survey for 1994 is used by Ilkkaracan and Selim (2007). Kara (2006) estimated gender wage differential at the occupational level, and found that "gender wage gap decreases with education, is less in the public sector, and varies across occupations" (Kara, 2006: 30). Ilkkaracan and Selim (2007), in their analysis also underline the importance of which sector the women work in addition to usual underlying factors of gender wage gap.

Bakış and Polat (2015) have investigated the evolution of wage inequality in Turkey for the period of 2002-2010 by using Household Labor Force Survey data. They applied supply and demand analysis as in Katz and Murphy (1992) and showed that for all categories real wages has

increased for that period, but the real wage of employees having less than primary education has dramatically increased, while their employment share has also drastically decreased. On the other hand, both real wage and employment share for the workers having college degree have risen (Bakış and Polat, 2015: 186). Popli and Yılmaz (2016) investigated the wage inequality trends in Turkey by using detailed decomposition analysis and found that due to compulsory education reform and a sudden increase in the number of universities, increasing supply of educated labor has a large effect on wage distribution for the period of 2002-2010.

Quantile regression analysis is commonly used by wage inequality analysis, particularly for the developed economies. Martins and Pereira (2004) used quantile regression estimates of returns to education for 16 countries; Buchinsky (1994) and Angrist, Chernozhukov and Fernandez-Val (2012) for US. There are also studies using quantile regression methods for developing countries. Azam (2012) analyzed Urban India wage data and came up with a solution that education might increase the wage inequality in Urban India. Tansel and Bodur (2012) studied male wage inequality in Turkey for the period of 1994-2002 by using quantile regression methodology and ordinary least squares (OLS). The dataset is basically 1994 Household Income and Consumption Expenditure Survey and 2002 Household Budget Survey by TURKSTAT. Particularly, their results showed that "the within-group male wage inequality has increased while the between-group male wage inequality declined over the study period" (Tansel and Bodur, 2012: 118).

In this paper, the next section is devoted to explain the recent development in economic environment and education system in Turkey. Section three presents, the data, descriptive statistics about wage and employment. Fourth section introduced the empirical model and finally, fifth section discusses the results of the empirical model and the last section concludes.

2. Economic Environment and Developments in the Education System in Turkey

The wage structure has been deeply affected by the changes in the economic environment and education. Therefore, the developments in 20 years have gained more and more importance in terms of wage dynamics in Turkey. After 1980, Turkey has gone through structural transformations. She abandoned import substitution policies and followed export led growth strategies. In 1990s, economic environment of Turkey was very unstable as in the case of the other developing economies. High inflation and high interest rates with high budget deficits characterize this period in Turkey and the country witnessed successive big crisis in 1990s. The first crisis happened in 1994 when the GDP contracted by 5.5% in real terms, the currency TL was devalued by around 50% against the US dollars. Besides, the share of wages in value added declined by 22% in this year (Boratav, 2012: 190). Together with the volatile economic growth, macroeconomic instability was pervasive during these years. Finally, following the 1998-1999 crisis, the decade ended up with another severe economic crisis occurred in 2001.

In 2001, the economy was contracted by %5.96 in real terms and unemployment rate jumped to 8.4%. Following, successive reforms were announced and gradually public debt declined. Turkey experienced rather stable economic growth, but high unemployment rate until 2008. Between 2002 and 2007, the average GDP growth rate was around 7.1%. However, in 2008, the global economic crisis hit the Turkish economy severely; the unemployment rate reached to 14% in 2009 and up to 2011, it remained high. On the average for the years between 2008 and 2011, the GDP has grown only 3.4%. However, after 2011, the economy recovered substantially and the average GDP growth reached to 6.1 for the years between 2012 and 2015. Furthermore, the share of compensation of employees in value increased from 28.1% in 1998 to 33.1% in 2015.

Not only economic environment but also social and relatedly education system has experienced substantial changes during these years. Especially in 1997, the five year-compulsory education system has been increased to 8 years by the government. The parents who did not sent their children at this age interval could expose monetary sanctions and incarceration at the extreme cases. As expected, with this policy, compulsory education attendance has increased, but surprisingly high school attendance has also increased e.g. high school attendance increased by 27% when compared to 2000-2001 to 2003-2004 school years. In the preceding interval, the increase was recorded only 10.5% (Kırdar, Dayıoğlu and Koç, 2015,: 7-8). Therefore, one of the main implications of this policy as Kırdar *et al.* (2015) suggested is its strong spillover effects to post compulsory schooling years (Kırdar, *et al.* 2015: 36).

In 2012, the education system changed again and called as 4+4+4. With this policy change, the compulsory education is aimed to increase 12 years but with interrupted phases as 4 years primary school, 4 years middle school and 4 years high school. The implications of this policy remain controversial and the literature regarding this policy change is rather immature.

The other significant development in the education system is an increase in the number of the universities in the last three decades. At the beginning of 1990s, the number of universities has almost doubled (1.7 times) compared to 1980s. After 2000s, the policy called "university for each city" and the encouragement of the private sector into higher education system has also led to a dramatic increase in the establishment of the new universities. As a result, in 2016, there are 183 universities operating in (Turkey Council of Higher Education, https://istatistik.yok.gov.tr/ access: 31 May 2017). Naturally, the number of students attending to university has also skyrocketed during these years. This development obviously affects the employment structure of Turkey in a way that the share of university graduates in total employment has highly likely increased which in turn should lead to change in the wage dynamics in Turkey.

3. Wage Inequality in Turkey: Past and Present Experiences

This section focuses more on the wage dynamics of Turkey since 1990s. In order to compare the 1990s and 2000s in terms of wage and employment, Household Budget Survey [1] is used as

1 In 1994, it is called as Household Income and Consumption Survey.

in the case of study done by Tansel and Bodur (2012). Wide variety of information could be found in the HHBS as age, marital status, gender, the level of schooling completed, employment status, job status, branch of economic activity, social security registration status, monthly wages, annual wages and weekly working hours and being a member of labor union, etc. Unfortunately, information about union membership is not included in 1994 survey.

Only regular and casual employees are taken into account. Age below 15 and above 64 which constitute 48% of total employees; and workers working less than 8 and more than 84 which constitute 1% of total employees are excluded from the analysis. The wage covers monthly cash and in-kind payment Hourly working hours are calculated as by dividing the regular monthly wage to 4.33 [2]. Weekly wage is divided into weekly hours for regular jobs. The details about data could be found in Appendix.

Prior to the detailed analysis of wage inequality for the years 1994, 2002 and 2011, table 1 shows the descriptive statistics of the wage distribution across years. The table shows that mean real hourly wage for men declined in 2002 compared to 1994 and reached the highest level in 2011. Also, standard deviation has increased in 2002 and then further decreased in 2011. This means that an increase in real wage does not lead to larger spread, contrary it becomes smaller while mean real wage has increased. Especially, an increase in real wage in 5^{th}, 10^{th} and 25^{th} quantile is distinct.

The log wage differential between 90^{th} to 50^{th} percentiles for men has decreased to 0.97 in 2011, also the log wage differential between 90 and 10 percentiles also decreased to 1.76 in 2011 from 2.44 in 1994. However, it is worth to note that the developed economies have experienced relatively lower wage differential between 90 and 10 percentiles in 2001-2005 period. For example, in US, UK, Germany and France, the wage differential between 90 and 10 percentiles is 1.60, 1.28, 1.06 and 1.14 (Guvenen, Kuruscu and Ozkan, 2014: 819) respectively which are all below than Turkish ones.

The log wage differential between median and 10^{th} percentile has also substantially decreased for men from 1994 to 2011. The reason behind a decrease in log wage differential between 50 to 10 percentiles in Turkey could be a result of an increase in minimum wage level in 2004 (Bakış and Polat, 2014), (Gürcihan-Yüncüler and Yüncüler, 2016) or "polarization" issue which could be described as "with expanding job opportunities in both high-skill, high-wage occupations and low-skill, low-wage occupations, coupled with contracting opportunities in middle-wage, middle-skill white-collar and blue-collar jobs" (Autor, 2010: 1) might have played a significant role in declining wage inequality between low skilled and medium skilled labor. On the other hand, log wage differential between 90^{th} and 50^{th} percentiles has also declined which is somewhat contradictory to the polarization experiences in the developed economies.

2 Tansel and Bodur (2012), Bakış and Polat (2014) divided/multiplied by monthly/weekly data by 4.3 in order to convert monthly/weekly data into weekly data/monthly.

Table 1: Summary Statistics for Male and Female Wage Earners, 1994-2011

		Man			*Women*	
Years	***1994***	***2002***	***2011***	***1994***	***2002***	***2011***
Mean Real Hourly Wage (1) (2)	5.14	4.85	5.48	3.95	3.91	5.24
Standard Deviation	0.082	0.11	0.065	0.104	0.14	0.14
Real Hourly Wage*						
q5	0.91	.91	1.36	0.67	0.57	1.04
q10	1.26	1.24	1.87	0.91	0.82	1.45
q25	2.08	1.93	2.85	1.45	1.63	2.35
q50	3.63	3.23	4.09	2.71	2.64	3.54
q75	6.36	5.83	6.55	4.99	4.72	5.61
q90	10.44	10.18	10.91	9.08	8.56	11.50
q95	13.49	13.44	13.65	11.36	11.64	14.74
q99	27.26	24.59	22.47	18.96	20.03	26.64
Log Dispersion						
Log90-50	1.05	1.15	0.97	1.21	1.17	1.17
Log50-10	1.38	0.95	0.78	1.09	1.17	0.89
Log 90-10	2.44	2.10	1.76	2.30	2.35	2.06
Educational Dummies	%	%	%	%	%	%
Illiterate	3.71	1.98	1.04	9.32	5.62	3.78
Non-graduate	2.91	2.55	3.07	2.54	3.84	4.66
Primary School	50.16	44.53	31.97	28.69	31.26	25.37
Middle School	12.39	14.95	19.58	8.01	9.39	13.90
High School	17.46	16.26	12.99	25.44	19.07	10.96
Vocational High School	3.03	8.08	12.30	5.01	8.06	9.33
University	10.34	11.75	19.05	21.00	22.76	32.00
Cohort Dummies	%	%	%	%	%	%
15-24	18.55	18.59	16.36	31.37	37.69	23.32
25-34	34.18	33.47	32.12	32.95	30.82	34.38
35-44	31.16	30.81	28.94	26.85	22.17	27.99
45-54	12.42	14.37	17.64	6.78	8.13	11.75
55-64	3.68	2.76	4.94	2.05	1.18	2.57
% work for Public	41.40	26.81	20.26	42.45	26.98	23.74
% live in Urban (3)	85.22	89.51	78.17	87.23	92.31	83.82
# of observations	12936	5719	5868	2834	1353	2144

Source: Authors computations for the 1994 Household Income and Budget Survey and 2002, 2006, 2010 Household Budget Surveys. 2010 prices

(1)In the Household budget survey, sampling weight is given only for the households. For converting household weight into individual weight, household sampling weight is multiplied by the number of adults in the household. Mean real hourly wage and quantile values are calculated by taking into consideration of individual weight.

(2) Mean real hourly wage without using sampling weight according to years is as follows: 5.43 for men, 4.41 for women in 1994; 5.18 for men, 4.38 for women; 5.99 for men, 5.83 for women in 2011. The percentile values are in the Appendix.

(3) Without imposing any constraint to the surveys, 69.58% of household in 1994, 84.68% of household in 2002, 69.21% of household in 2008, 69.30% of household in 2011 live in urban areas.

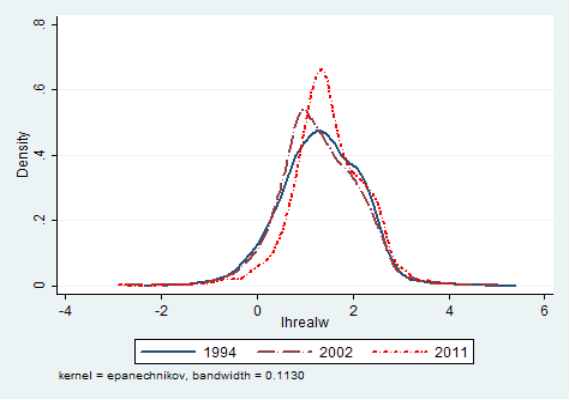

Figure 1: Kernel Density Estimates of Log Real Hourly Wage, Men, 1994-2011

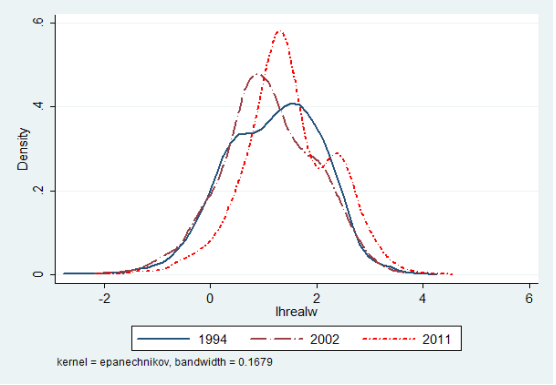

Figure 2: Kernel Density Estimates of Log Real Hourly Wage, Women, 1994-2011

Source: Author calculations from Household Budget Survey, 1994, 2002, 2011

Mean real hourly wage for women has first decreased in 2002 and increased in 2011. In 2008 and 2011, wage increase in the lower half of the distribution is very clear in the figure 1. Also in 2011 wage increase in the upper half of the distribution for women is more distinct than men's wage distribution. The numbers in the table 1 also verifies this statement. Standard deviation in women's wage distribution is larger than men's wage distribution and is getting bigger when the mean hourly wage is larger.

The log wage differential between 90^{th} to 50^{th} percentiles for women has decreased to 1.17 in 2002 and kept stable in 2011. Furthermore, the log wage differential between 90 and 10 percentiles also decreased to 2.06 in 2011 from 2.30 in 1994. The log wage differential between median and 10^{th} percentile has also declined to 0.89. As in the case of men's wage distribution, wage differential between median and 10^{th} has declined throughout this period.

Educational attainment among workers, either male or female workers, has increased substantially during the period. The share of male employees having primary or less education attainment decreased from 56.78% in 1994 to 36.08%, while for female employees, a decrease in this share is somewhat smaller (6.74%) than male counterparts. However, the share of university graduates among male workers increased to 19.05%. This share is even higher among the women workers as it increased to 32% in 2011. An increase in the share of university graduates among the total employment is not unexpected considering the fact that university graduates have increased dramatically during the period. While the share of high school graduates decreased, the workers having vocational high school degree has increased considerably among male workers. Besides, the share of middle school graduates has also increased by 7.2% among males, 5.9% among females. This is highly likely the result of compulsory education policy which triggers the total years of schooling among the workers since the end of the 1990s.

In table 2 and 3 mean real wages by educational attainment for male and female workers are presented. In 1994 and 2002, the higher the education level leads to the higher the real wage earnings for men, while in 2011, the male primary school graduates have higher wage compared to the male secondary school graduates. However, for women, the workers having primary school degree earn more than the workers having middle school level for all years. For the rest of the education categories, male mean real hourly wage has increased as they moved into higher educational attainment level. For women, only in 2011, female mean real hourly wage for the workers having high school degree is less than female having vocational high school degree. Mean male wage for the university graduates is at the highest level in 1994, but for female workers having university degree, the wage has followed an upward trend.

In addition, table 1 interestingly shows that the share of young male workers (15-44) has declined within time, but this does not case for the female workers. The share of public sector in total employment has predictably decreased, while the urban ratio unexpectedly decreased during the period. This could be the result of sampling design. Without imposing any constraint to the surveys, 69.58% of households in 1994, 84.68% of households in 2002, 69.30% of households in 2011 live in urban areas.

In the next section, the relation between wage inequality and education, and the other human capital variables like age and experience is elaborately analyzed by using quantile regression analysis. Following the Tansel and Bodur (2012) study, the male wage inequality between 1994, 2002, and 2011 are analyzed by using quantile regression analysis and OLS. The continuous data from 1990s are not available in Turkey. Therefore, quantile regression method is chosen for clarifying the differences of 1990s from 2000s in terms of wage distribution.

Table 2: Mean Real Hourly Wage by Educational Level, Men, TL

Level Of Education	Mean Real Hourly Wage		
	1994	2002	2011
Illiterate	3.152	2.367	2.793
Non-graduate	3.884	2.083	3.329
Primary School	4.114	3.747	4.369
Middle Level School	4.707	4.062	3.856
High School	5.873	5.515	5.280
Vocational High School	6.181	5.793	5.510
University	11.376	10.932	11.045
Total	5.141	4.850	5.4

Source: Author calculations from HHBS survey. 2010 prices and sampling weight is used.

Table 3: Mean Real Hourly Wage by Educational Level, Women, TL

Level Of Education	Mean Real Hourly Wage		
	1994	2002	2011
Illiterate	2.078	1.488	2.390
Non-graduate	2.442	2.507	2.644
Primary School	2.415	2.300	3.261
Middle Level School	3.075	2.698	2.913
High School	4.059	3.718	5.032
Vocational High School	5.088	3.822	4.359
University	8.541	8.403	10.246
Total	3.950	3.906	5.240

Source: Author calculations from HHBS survey. 2010 prices and sampling weight is used.

4. The Empirical Model

The standard linear regression analysis is formed as a relationship between regressors and response variable based on the conditional mean function $E\ (y/x)$. However, as Hao and Naiman (2007) suggested, this analysis has shortcomings as: first, the focus on non-central locations is out of the scope in OLS analysis, where the researches of income inequality are basically interested in. The second one is that OLS is very responsive to the outliers and conditional mean can be improper in measuring central location. Finally," it is quite natural to go beyond location and scale effects of predictor variables on the response and ask how changes in the predictor variables affect the underlying shape of the distribution of the response" (Hao and Naiman, 2007: 2) Then quantile regression modeling is introduced by Koenker and Basset (1978) and allows to use "conditional quantiles as predictors" (Hao and Naiman, 2007: 3)

In this framework, the minimization problem is not formed as in the case of OLS as $\sum(y - \hat{\beta}x)^2$. Rather quantile regression analysis minimizes the absolute sum of deviations with respect to the

given quantile. Therefore, the minimization problem for the given ($\emptyset_{th}$) quantile, $0 < \emptyset < 1$, is formed by the following equation (Koenker and Basset, 1978, p.38).

$$Min_{b \in R^K} \sum_{i \in \{i: y \geq x_i b\}} \emptyset |y_i - x_i b| + \sum_{t \in \{t: y \geq x_t b\}} (1 - \emptyset)|y - x_t b| \quad (33)$$

Assuming that $y_t : t = 1, \ldots, T y_t : t = 1, \ldots, T$ is a random sample on a random variable Y having F distribution function; x_t K×1 vector of regressors. Then, $y_t = X_t \beta_\theta + u_{\theta t}$ can be reformulated as $Quant_\theta (y_t / x_t) = X_t \beta_\theta$ by assuming that $Quant_\theta (u_{\theta t} / x_t) = 0$ (Buchinsky, 1998: 94). The minimization problem in equation (33) is solved by linear programming method. In this analysis, bootstrap errors with 400 hundred repetitions are used in order to eliminate the problems arising from heteroscedasticity.

The empirical model is mostly inspired by Mincer (1974) who formed the famous human capital earnings function and its extension form which Tansel and Bodur (2012) suggested. However, the years the study covers and discussing the effects of union membership is different from Tansel and Bodur (2012) analysis.

The empirical specification can be formulated as follows:

$$lnw_i = \beta_0 + \beta_1 Ed_i + \beta_2 Exp_i + \beta_3 Exp_i^2 + \beta_4 A_i + \beta_5 P_i + \beta_6 FS_i + \beta_7 R_i + \beta_8 CB_i + u_i \quad (34)$$

Since quantile regression model will be employed in the analysis, then the empirical model can be rewritten as:

$$Quant_\theta (lnW_t / X_t) = X_t \beta_\theta \qquad \{X_t : Ed_i, Exp_i, A_i, P_i, FS_i, R_i, CB_i\}$$

Where Ed_i stands for schooling [3], Exp_i denotes experience, A_i stands for age dummies and categorized as 15-24, 25-34, 35-44, 45-54, 55-64 and the reference category is 15-24. P_i refers to public [4]/ private sector dummies, private is the reference category. FS_i denotes firm size composed of three categories as firms having less than 10 employee, 10-25 employee and more than 25 employee, the reference category is less than 10 employee. R_i represents geographical location and rural [5] is taken as reference category (Tansel and Bodur, 2012: 110). CB_i stands for the collective bargaining status of the firm. No collective bargaining status is taken as the reference

3 For calculating the years of schooling, 0, 2, 5, 8, 11, 15, and 17 values are assigned for illiterates, read and write only, primary school, middle school and basic education, high school, university, and post university graduates respectively. (Tansel and Bodur, 2012: 121).

4 In1994, the status of the company is categorized into 2 as public and private, while in 2002, 2008 and 2011, the categories of the status of the company are private, public and State Owned Enterprises (SOS). SOS is put into public categories in this analysis.

5 Rural area is a settlement area whose population is less than 20.000.

category. The same wage equation is estimated by using educational dummies as illiterate, no-graduate, primary, secondary, middle, high school, vocational high school and university instead of years of schooling. Illiterate is the reference category (Tansel and Bodur, 2012: 110).

In this analysis, only male wage earners are taken into account, in order to eliminate the possible composition effects that could be arising from the fluctuated labor force participation rates of women during the period. Main focus of this study is only to see the evolution of wage inequality since 1990s and the analysis of male wage inequality is very common in the literature (Acemoglu, 2002), (Tansel and Bodur, 2012), (Martins and Pereira, 2004). Therefore, the following OLS and quantile estimation results are only for male wage earners for the years 1994, 2002, and 2011.

5. Results

Estimation results are presented in table 4. Basically, 10^{th}, 50^{th} and 90^{th} quantiles are selected to analyze the effects of explanatory variables on high, middle and low tails of the wage distribution. The effects of education, age, firm size, status of the firm, residence and union membership are discussed as follows:

5.1. The Effect of Education on Log Real Hourly Wage

The effects of education on log real hourly wage are firstly estimated by using years of schooling which can be found in table 4. By taking years of schooling as an explanatory variable, it is assumed that "the return for an additional year of schooling is constant across educational levels" (Tansel and Bodur, 2012: 112.). The results in table 4 show that years of schooling is positive and significant at 1% for all years. Coefficient of equality across different quantiles cannot be rejected especially, between 90^{th} and 10^{th} quantiles in 1994, 50^{th} and 10^{th} quantiles in 2002 and 2011. (Test Results of the Coefficient Equality for the estimations in 1994, 2002 and 2011 are presented in Appendix)

Table 5 presents the OLS and quantile regression results by the level of education. This allows analyzing "returns to schooling to differ at each level of education" (Tansel and Bodur, 2012: 112). In 1994, all education categories are positive and statistically significant almost at 1%, except no-graduate category significant at 5% at quantile 90. In 2002 and 2011, all categories, except no-graduate, are statistically significant and positive at all different quantiles. Even no-graduate category is significant at 90^{th} and 10^{th} quantiles in 2011.

The rate of return on different quantiles shows that schooling does not provide the same return across the wage distribution. In table 6, it is observed that 90-10 spread is larger than 90-50 spread in 2002 and 2011, but the spread is decreasing within time. However, the coefficient equality cannot be rejected for the education categories except university level. In 1994, the largest contribution to within wage inequality is high school. But for the other years, due to not rejection

of coefficient equality, it is ambiguous. Therefore, which group makes the largest contribution to the within wage inequality in 2002 and 2011 cannot be determined.

The effects of education change over time. Median return increases for all categories except university and vocational high school categories from 1994 to 2002; decreases for high school, vocational high school and university categories from 1994 to 2011. On the other hand, table 6 shows that within wage inequality has increased for 90-50 spreads for the 10 year periods. Median effects might somehow offset the latter effect from 1994 to 2011. Which group has experienced the largest increase in 90-10, 90-50 and 50-10 spread is ambiguous due to the fact that coefficient equality is not rejected for the education categories other than university. However, it is fair to say that at the university level, the spread is getting larger when comparing to two decades. Tansel and Bodur (2012) suggested three factors which might affect the larger increase in the spread at the university level as: Firstly, as the number of new universities increased, the quality of the universities, because of inadequate physical condition, might have been decreased. Secondly, the new graduates might be donated with the ability which is not high priced in the labor market. That is, instead of technical sciences, which are valued more in the labor market, the new graduates could be graduated from other disciplines which are low-priced in the market. Thirdly, with the establishment of new universities, the university graduates with less ability compared to 1990s could enter the labor market (Tansel and Bodur, 2012: 115). The other possible explanation would be the role of technology which could replace the repetitive tasks because of the development of high-quality softwares and computers which Goos, Manning and Salomon (2014) describe it as a routine biased technical change (RBTC). The demand for the university graduates performing some certain tasks and occupations which are repetitive and routine in nature could decrease and therefore, within inequality among the university graduates could increase.

Table 4: OLS and Quantile Regression Results, 1994, 2002 and 2011

1994				
Variable	**OLS**	**Q10**	**Q50**	**Q90**
Schooling	.082***	.087***	.074***	.084***
	(0.003)	(0.004)	(0.003)	(0.004)
Experience	.069***	.084***	.065***	.061***
	(0.003)	(0.005)	(0.004)	(0.008)
Expsquare	-.001***	-.001***	-.001***	-.001***
	(0.000)	(0.000)	(0.000)	(0.000)
Cohort 25-34	.121***	.106**	.126***	.119**
	(0.027)	(0.041)	(0.030)	(0.053)
Cohort 35-44	-0.019	-0.048	.0057	-0.048
	(0.042)	(0.066)	(0.050)	(0.079)
Cohort 45-54	-.168***	-.188**	0.107	-.208*
	(0.059)	(0.093)	(0.072)	(0.106)
Cohort 55-64	-.344***	-.380***	-.211**	-.517***
	(0.085)	(0.147)	(0.098)	(0.166)
Public	.333***	.417***	.386***	.181***
	(0.015)	(0.024)	(0.020)	(0.025)
F 10-25	.124***	.178***	.101***	.098***

	(0.016)	(0.024)	(0.020)	(0.029)
F>25	.280***	.292***	.273***	.280***
	(0.015)	(0.022)	(0.017)	(0.026)
Urban	0.025	0.025	.041**	-0.020
	(0.016)	(0.025)	(0.018)	(0.027)
Cons	-.537***	-1.448***	-.476***	.331***
	(0.040)	(0.060)	(0.047)	(0.087)
Observations	12924	12924	12924	12924
R squared	0.432			
2002				
Variable	**OLS**	**Q10**	**Q50**	**Q90**
Schooling	.091***	.078***	.0842***	.100***
	(0.004)	(0.007)	(0.004)	(0.007)
Experience	.061***	.0708***	.054***	.052***
	(0.005)	(0.009)	(0.005)	(0.008)
Expsquare	-.001***	-.001***	-.001***	-.004**
	(0.000)	(0.000)	(0.000)	(0.000)
Cohort 25-34	.092**	0.068	.090***	.124**
	(0.037)	(0.081)	(0.034)	(0.057)
Cohort 35-44	-0.061	-0.111	-0.061	-0.009
	0.061	(0.127)	0.060	0.092
Cohort 45-54	-.186**	-0.167	-.206**	-0.204
	0.085	(0.158)	0.091	0.140
Cohort 55-64	-0.200	-0.110	-.228*	-.357*
	0.126	(0.229)	0.136	0.206
Public	.359***	.480***	.409***	.210***
	0.023	(0.033)	0.031	0.037
F 10-25	.170***	.164***	.145***	.165***
	0.024	(0.041)	0.025	0.044
F>25	.366***	.433***	.346***	.321***
	0.019	(0.039)	0.019	0.036
Urban	.090***	.174***	.085***	0.011
	0.027	(0.045)	0.029	0.050
Cons	-.615***	-1.369***	-.498***	0.128
	0.062	(0.098)	0.067	0.100
Observations	5719	5719	5719	5719
R squared	0.438			
2011				
Variable	**OLS**	**Q10**	**Q50**	**Q90**
Schooling	.0813***	.069***	.070***	.097***
	(0.003)	(0.006)	(0.003)	(0.005)
Experience	.054***	.053***	.048***	.045***
	(0.004)	(0.008)	(0.004)	(0.006)
Expsquare	-.001***	-.001***	-.001***	-.001***
	(0.001)	(0.000)	(0.000)	(0.000)
Cohort 25-34	.121***	.262***	.108***	.165***
	(0.031)	(0.077)	(0.031)	(0.051)
Cohort 35-44	0.019	0.179	-0.005	0.114
	(0.051)	(0.116)	(0.049)	(0.086)

Cohort 45-54	-0.037	0.183	-0.089	0.081
	(0.070)	(0.146)	(0.071)	(0.132)
Cohort 55-64	-0.048	0.201	-0.125	0.049
	(0.101)	0.196	(0.093)	(0.208)
Public	.446***	.530***	.538***	.247***
	(0.020)	0.036	(0.021)	(0.038)
F 10-25	.187***	.298***	.149***	.122***
	(0.021)	0.043	(0.021)	(0.032)
F>25	.316***	.480***	.263***	.172***
	(0.016)	0.037	(0.016)	(0.028)
Urban	.130***	.149***	.108***	.095***
	(0.017)	0.037	(0.017)	(0.029)
Cons	-.262***	-.939***	-0.040	.335***
	(0.049)	0.089	(0.055)	(0.075)
Observations	5868	5868	5868	5868
R squared	0.500			

Notes: Significance * p<.1; **p<.05; *** p<.01. Standard errors in parenthesis, robust standard errors in OLS estimation, bootstrap with 400 repetitions in quantile regression estimates. Tests of coefficient of equality between quantiles are found to be in Appendix.

Table 5: OLS and Quantile Regression Results by Level of Education, 1994, 2002, 2011

Variable	OLS	Q10	Q50	Q90
1994				
No-graduate	.213***	.220***	.193***	.312**
	(0.045)	0.084	0.047	0.123
Primary	.284***	.291***	.240***	.421***
	0.034	0.071	0.030	0.076
Middle	.417***	.412***	.332***	.544***
	0.039	0.078	0.037	0.083
High	.704***	.723***	.582***	.865***
	0.042	0.078	0.042	0.085
Vchigh	.838***	.874***	.786***	.899***
	0.049	0.082	0.052	0.088
University	1.218***	1.278***	1.087***	1.324***
	0.048	0.085	0.047	0.093
2002				
No-graduate	0.078	.285**	.085	0.127
	0.079	0.141	0.092	0.158
Primary	.384***	.566***	.368***	.500***
	0.065	0.117	0.079	0.115
Middle	.529***	.702***	.480***	.675***
	0.070	0.120	0.083	0.129
High	.749***	.864***	.696***	.942***
	0.073	0.126	0.090	0.142
Vchigh	.867***	.949***	.808***	1.025***
	0.076	0.132	0.092	0.141
University	1.278***	1.336***	1.170***	1.506***

	0.080	0.139	0.097	0.165
2011				
No-graduate	.236***	0.205	.204**	.410***
	(0.075)	(0.154)	(0.095)	(0.148)
Primary	.296***	.346***	.323***	.3842***
	(0.064)	(0.133)	(0.078)	(0.116)
Middle	.427***	.434***	.417***	.600***
	(0.067)	(0.138)	(0.080)	(0.127)
High	.584***	.640***	.557***	.733***
	(0.069)	(0.142)	(0.082)	(0.129)
Vchigh	.627***	.670***	.630***	.794***
	(0.070)	(0.145)	(0.081)	(0.127)
University	1.095***	1.041***	.999***	1.470***
	(0.074)	(0.146)	(0.087)	(0.141)

Source: Author estimates from Household Budget Survey.

Notes: Significance * p<.1; **p<.05; *** p<.01. Standard errors in parenthesis, robust standard errors in OLS estimation, bootstrap with 400 repetitions in quantile regression estimates. Tests of coefficient of equality between quantiles are found to be in Appendix. Slight differences occurred in two estimations, especially in cohort dummies and urban dummies, therefore only the education dummies are presented. The rest of the estimations are found to be in Appendix.

Table 6: Impact of the Covariates on Measures of Dispersion, 1994, 2002 and 2011

	1994			**2002**			**2011**		
	q90-q50	**q90-q10**	**q50-q10**	**q90-q50**	**q90-q10**	**q50-q10**	**q90-q50**	**q90-q10**	**q50-q10**
Years of schooling	1.041	-	-1.303	1.623	2.210	-	2.759	2.788	-
Experience	-	2.299	0.443	-	-	-	-	-	-
Experience Sq	-	0.063	0.035	-	-0.039	-0.063	-	-	-
Cohort 25-34	-	-	-	\	-	-	-	-	-15.491
Cohort 35-44	\	\	\	\	\	\	\	\	\
Cohort 45-54	\	\	\	\	\	\	\	\	\
Cohort 55-64	-	-	-	\	\	\	\	\	\
Public	-20.538	-23.576	-	-19.859	-26.967	-7.107	-29.131	-28.341	-
F 10-25	-	-8.067	-7.703	-	-	-	-	-17.551	-14.913
F>25	-	-	-	-	-11.213	-8.660	-9.074	-30.752	-21.678
Urban	\	-	-	\	\	-8.901	-	-	-
Education Categories									
No-graduate	-	-	-	\	\	\	-	\	\
Primary	18.068	-	-	-	-	-	-	-	-
Middle	21.186	-	-	-	-	-	-	-	-
High	28.247	-	-	-	-	-	-	-	-
Vchigh	-	-	-	-	-	-	-	-	-
University	23.707	-	-19.148	33.649	-	-	47.075	42.936	-

Source: Author's calculations from table 4 and 5

Notes: Response variable is in log form, so the coefficients are multiplied by 100. (-) denotes not rejection of coefficient equality. (/) denotes insignificance of the coefficient terms. Therefore, the related cells are not computed.

Table 7: Per Year Returns to Schooling by Education Level, 1994, 2002 and 2011

Variable	OLS	Q10	Q50	Q90
1994				
No-graduate	10.67	11.01	9.64	15.58
Primary	2.36	2.35	1.58	3.65
Middle	4.42	4.03	3.06	4.10
High	9.56	10.37	8.33	10.69
Vchigh	14.05	15.40	15.11	11.84
University	9.49	10.12	7.53	10.62
University	12.86	13.89	12.62	11.48
2002				
No-graduate	3.91	14.27	4.25[a]	6.36[a]
Primary	10.18	9.35	9.44	12.43
Middle	4.83	4.54	3.72	5.82
High	7.33	5.40	7.20	8.90
Vchigh	11.28	8.23	10.94	11.67
University	10.26	9.68	9.04	12.04
University	13.23	11.80	11.85	14.11
2011				
No-graduate	11.80	10.24[a]	10.20	20.51
Primary	2.01	4.71	3.95	-0.87
Middle	4.37	2.94	3.16	7.19
High	5.03	6.58	4.46	4.27
Vchigh	6.39	7.54	6.81	6.22
University*	11.71	9.28	9.24	16.90
University	12.77	10.03	11.07	18.41

Source: Author's calculations from table 5.

Notes: [a] denotes insignificance of the related coefficients. * denotes return from vocational high school.

Table 7 presents per year returns to schooling [6] by education level. The highest return for all three years is provided by the university level, except in 1994, the highest return is achieved by vocational high school level. In 2011, the higher the years of schooling leads to the higher the return, even almost every quantile, except 90th quantile. The return to university declines from 1994 to 2011; this could happen because of an increase in the supply of university graduates during the period, therefore, an increase in the supply of the university graduates might lead to a

6 "Per year returns to each level of education is computed as the difference between any successive schooling coefficients divided by the number of years separating the two education categories" (Bircan, 2005: 62-63). For each education level, the calculations are presented as follows: no-graduate per year return= no-graduate coefficient/2; primary school per year return = (primary school coefficient – no-graduate coefficient)/3; middle school per year return = (middle school coefficient – primary school coefficient)/3 ; high school per year return = (high school coefficient – middle school coefficient)/3 (In 2005, the duration of high school extended to 4 years, therefore in 2011, high school graduates at the age of 18 and 19 constitutes 12% of male employees having high school graduates. Therefore, in 2011, the nominator is divided by 3.12.); vocational high school per year return = (vocational high school coefficient – middle school coefficient)/3; university* per year return = (university coefficient – vocational high school coefficient)/4; university per year return = (university coefficient –high school coefficient)/4.

decrease in the return for schooling for this category. Return at the vocational high school level is higher than regular high school for all years.

5.2. The Effect of Other Variables on Log Real Hourly Wage

As can be seen in table 4, experience variable is significant and positive as expected for all years. How experience affects the wage inequality for the years 2002 and 2011 is not clear since the coefficient of equality cannot be rejected for experience for those years. When looking at the estimates for 1994, at the 10^{th} quantile, the additional year of experience leads to higher return comparing to 90^{th} and 50^{th} quantile. Then, it would not be wrong to say that experience is the factor that leads to decline inequality in 1994.

Cohort dummies are statistically significant only for the 25-34 age group for all three years. Only for younger cohort, in 2011, the lower tail of the wage distribution gets less compared to median. On the other hand, the effects of age still need more elaboration and further studies in terms of wage inequality.

Public dummy is positive and significant at all quantiles for all years. Table 6 shows the log dispersion of public dummy and reflects that public sector leads to decline in wage inequality for all years. The size of the company is also positive and significant for all years. The size of the company affects the wage distribution in way the larger the firms the higher the return a worker can earn for all three years. Urban dummy is basically significant and positive in 2002 and 2011, but its effect on log wage spread is unclear.

Table 8: OLS and Quantile Regression Estimates of Wage Equation with Union Membership, 2002

Variable	OLS	Q10	Q25	Q50	Q75	Q90
Schooling	.092***	.072***	.086***	.089***	.090***	.099***
	(0.004)	(0.007)	(0.005)	(0.003)	(0.004)	(0.007)
Experience	.061***	.066***	.065***	.057***	.048***	.051***
	(0.005)	(0.009)	(0.005)	(0.005)	(0.006)	(0.009)
Expsquare	-.0007***	-.001***	-.0008***	-.001***	-.001***	-.001**
	(0.000)	(0.00)	(0.000)	(0.000)	(0.000)	(0.000)
Union	.275***	.223***	.257***	.288***	.331***	.276***
	(0.023)	(0.032)	(0.030)	(0.026)	(0.029)	(0.037)
Cohort 25-34	.089**	.119*	0.037	.077**	.134***	.140**
	(0.037)	(0.071)	(0.043)	(0.034)	(0.039)	(0.057)
Cohort 35-44	-0.067	-0.025	-.175***	-.105*	-0.001	0.037
	(0.060)	(0.116)	(0.067)	(0.056)	(0.064)	(0.098)
Cohort 45-54	-.184**	-0.049	-.278***	-.240***	-0.133	-0.138
	(0.084)	(0.155)	(0.089)	(0.077)	(0.090)	(0.150)
Cohort 55-64	-0.166	0.042	-.297**	-.235**	-0.176	-0.136
	(0.124)	(0.229)	(0.132)	(0.109)	(0.150)	(0.234)

Public	.282***	.428***	.374***	.310***	.238***	.155***
	(0.024)	(0.031)	(0.026)	(0.027)	(0.030)	0.036
F 10-25	.172***	.169***	.152***	.147***	.110***	.175***
	(0.024)	(0.040)	(0.026)	(0.024)	(0.030)	0.048
F>25	.333***	.415***	.362***	.331***	.272***	.270***
	(0.019)	(0.039)	(0.021)	(0.020)	(0.024)	0.035
Urban	.077***	.153***	.120***	.052*	0.032	0.041
	(0.026)	(0.046)	(0.031)	(0.027)	(0.037)	0.044
Cons	-.607***	-1.27***	-.966***	-.523***	-0.109	0.137
	(0.061)	(0.101)	(0.074)	(0.060)	(0.075)	0.105
Observations	5719	5719	5719	5719	5719	5719
R squared	0.448					

Notes: Significance * p<.1; **p<.05; *** p<.01. Standard errors in parenthesis, robust standard errors in OLS estimation, bootstrap with 400 repetitions in quantile regression estimates.

Table 9: OLS and Quantile Regression Estimates of Wage Equation with Union Membership, 2011

Variable	OLS	Q10	Q25	Q50	Q75	Q90
Schooling	.080***	.070***	.066***	.067***	.086***	.097***
	(0.003)	(0.005)	(0.004)	(0.003)	(0.003)	(0.005)
Experience	.0528***	.052***	.050***	.045***	.044***	.045***
	(0.004)	(0.007)	(0.004)	(0.004)	(0.004)	(0.006)
Expsquare	-.001***	-.001***	-.001***	-.001***	-.001***	-.001***
	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)
Union	.170***	.3203***	.181***	.131***	.099***	.117***
	(0.018)	(0.038)	(0.031)	(0.018)	(0.025)	(0.041)
Cohort 25-34	.126***	.239***	.109***	.116***	.136***	.165***
	(0.031)	(0.074)	(0.039)	(0.031)	(0.035)	(0.052)
Cohort 35-44	0.026	0.133	0.008	0.013	0.072	0.111
	(0.051)	(0.108)	(0.064)	(0.051)	(0.059)	(0.086)
Cohort 45-54	-0.036	0.127	-0.039	-0.071	0.001	0.083
	(0.069)	(0.142)	(0.085)	(0.071)	(0.078)	(0.131)
Cohort 55-64	-0.042	0.114	-0.071	-0.124	-0.004	0.052
	(0.100)	(0.199)	(0.121)	(0.098)	(0.119)	(0.192)
Public	.386***	.383***	.491***	.499***	.350***	.196***
	(0.021)	(0.038)	(0.036)	(0.022)	(0.023)	(0.038)
F 10-25	.183***	.292***	.208***	.136***	.152***	.122***
	(0.021)	(0.041)	(0.022)	(0.019)	(0.024)	(0.033)
F>25	.304***	.462***	.350***	.248***	.207***	.174***
	(0.016)	(0.040)	(0.021)	(0.015)	(0.018)	(0.028)
Urban	.129***	.130***	.140***	.113***	.109***	.097***
	(0.017)	(0.033)	(0.021)	(0.017)	(0.017)	(0.029)
Cons	-.244***	-.905***	-.394***	-0.001	.145***	.333***

	(0.048)	(0.082)	(0.056)	(0.055)	(0.054)	(0.077)
Observations	5868	5868	5868	5868	5868	5868
R squared	0.516					

Notes: Significance * p<.1; **p<.05; *** p<.01. Standard errors in parenthesis, robust standard errors in OLS estimation, bootstrap with 400 repetitions in quantile regression estimates.

5.3. The Effect of Union Membership on Log Real Hourly Wage

In Turkey, OECD statistics reflect that trade union density has declined from 32.9 in 1994 to 25.1 in 2002 and further decreased to 7.8 in 2011 (OECD, 2017). Therefore, the unions have lost huge power throughout the period. The results in table 8 and 9 showed that being a union member provided positive returns in 2002 and 2011. In 2002, the coefficient of equality is not rejected between 75^{th} and 10^{th} quantiles; the return is getting larger moving into higher tails of the wage distribution. On the other hand, in 2011, the highest return of being a union membership is achieved at the lower tails of the distribution. & and Duman (2016) analyzed the effects of unionization on the wages in Turkey by using Oaxaca Decomposition method with HHBS dataset for the years 2002 and 2011. The authors concluded that being a union membership alters depending on the sector, either working in the public or private sector, and unionization effect is higher in the private sector.

6. Conclusion

The paper investigates the evolution of wage inequality from 1994s to 2011 and the findings showed that total wage inequality first decreased in 2002 and rebounded in 2011. The effects of education are compatible with the existing literature which emphasized the role of education on the wage distribution. Within wage inequality among university category has increased for 90-50 spreads for the successive almost 10 year periods. There are various reasons that could lead to this phenomenon. One would be the technology which can lead to eliminate some tasks and decrease the relative demand for some certain occupations in Turkey. Therefore, further studies regarding this phenomenon are needed. The return to university declines from 1994 to 2011; this could be a result of a sudden increase in the supply of university graduates during the period. The return of working in a larger firm is higher than working in smaller ones. Deuninozation plays significant role in lowering wage inequalities. In 2002, the return is getting larger moving into higher tails of the wage distribution, while in 2011, the highest return of being a union membership is achieved at the lower tails of the distribution. The effects of deunization on wage distribution needs more elaborate analysis and further studies are recommended on this subject.

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Appendix

In 1994, the survey constitutes 26.256 households and 119.685 people. Since 2002, the survey has been launched annually with a smaller sample size. The household size in 2002, 2011 is 9600, 9918 respectively and 40675, 37121 people have been interviewed in those years. For the following years, till 2012, this information is available. The data contains 1 digit ISIC Rev.3 in 1994, 1 digit NACE Rev.1 in 2002 and 2008, 1 digit NACE Rev.2 in 2011; 1 digit ISCO 68 in 1994 and 1 digit ISCO88 in 2002, 2008, 2011. Up to 2012, monthly wage and weekly working hours of the both regular job and second-job is available, except in 1994 which only covers monthly wage of the regular and second-job, but not weekly working fours for the additional job. Therefore, apart from the study by Tansel and Bodur (2012), income from the second job holders is not included into the analysis for further years. Since 2012, the annual wages which also include income from the additional job are available and regular income and income from second hand job are not separable, while weekly working hours are only available for regular job. In this context, it is impossible to calculate hourly wage for the main job and thus, empirical analysis can be done only for the years 1994 to 2011. HHBS data is used for the years 1994, 2002 and 2011 in this analysis to see the changes in wage distribution since 1990s. In 1990s unstable economic environment characterizes Turkish economy. While after 2001, when one of the biggest crisis occurred in Turkey, the economy has experienced rather stable economic growth, then again hit by world crisis in 2008 and started to recover since 2012. Therefore, 1994, 2002 and 2011 years are especially selected to see the changes in wage inequality between the two decades. The data constitutes 15770, 7072, 8012 observations in 1994, 2002, 2011 respectively.

Table A1: Wage Distribution of Male and Female Wage Earners
(Hourly Wage)

Percentile	q5	q10	q25	q50	q75	q90	q95	q99
Male 1994	0.97	1.36	2.27	3.89	7.02	10.90	13.63	26.69
Female 1994	0.68	0.91	1.51	3.15	5.95	9.45	11.65	19.54
Male 2002	1.00	1.39	2.18	3.46	6.38	10.30	13.19	24.72
Female 2002	0.69	0.93	1.70	2.85	5.58	9.71	12.63	20.38
Male 2007	1.41	1.84	2.65	3.87	6.59	10.10	12.34	21.92
Female 2007	0.74	1.23	2.09	3.23	5.72	9.63	11.85	17.78
Male 2011	1.46	1.96	2.95	4.37	7.37	12.01	14.67	26.07
Female 2011	1.36	1.87	2.86	4.09	6.55	10.91	13.65	22.47

Source: Author calculations from HHBS.

Table A2: Test Results of the Coefficient Equality for the estimations in 1994, 2002 and 2011

1994			
Variable	**test [q90=q50]**	**test [q90=q10]**	**test [q50=q10]**
Years of schooling	5.87**	0.19	8.11***
Experience	0.35	6.48***	11.66***
Experience Sq	3.42*	49.06***	11.53***
Cohort 25-34	0.02	0.05	0.2
Cohort 35-44	0.47	0	0.66
Cohort 45-54	1	0.02	0.76
Cohort 55-64	3.18	0.37	1.31
Public	63.42***	49.06***	1.35
F 10-25	0.02	5.35**	9.21***
F>25	0.07	0.11	0.57
Urban	5.25**	1.76	0.42
Education categories			
Nograduate	1.12	0.46	0.1
Primary	5.62**	1.62	0.51
Middle	5.29**	0.96	0.98
High	10.57***	1.5	3.07*
Vchigh	1.51	0.05	1.08
University	5.69**	0.12	4.72**
2002			
Variable	**test [q90=q50]**	**test [q90=q10]**	**test [q50=q10]**
Years of schooling	5.68**	5.48**	0.78
Experience	0.05	2.15	2.96
Experience Sq	2.39	7.47***	5.05**
Cohort 25-34	0.33	0.33	0.08
Cohort 35-44	0.27	0.43	0.17
Cohort 45-54	0	0.03	0.06
Cohort 55-64	0.33	0.62	0.29
Public	24.91***	33.95***	3.84**
F 10-25	0.23	0	0.22
F>25	0.51	5.64**	5.95***
Urban	2.61	6.54***	3.98**
Education categories			
Nograduate	0.07	0.66	2.01

Primary	1.11	0.19	2.71*
Middle	2.08	0.03	3.12*
High	2.69	0.19	1.66
Vchigh	2.32	0.19	1.07
University	3.91**	0.73	1.38
Union*	0.09	1.25	3.38*
2011			
Variable	**test [q90=q50]**	**test [q90=q10]**	**test [q50=q10]**
Years of schooling	29.25***	15.58***	0
Experience	0.33	0.81	0.37
Experience Sq	0.92	3.14*	2.15
Cohort 25-34	1.35	1.25	4.63**
Cohort 35-44	2.02	0.25	3.02*
Cohort 45-54	1.86	0.33	3.99**
Cohort 55-64	0.83	0.33	2.94*
Public	73.53***	32.88***	0.05
F 10-25	0.72	11.77***	12.17***
F>25	12.9***	50.42***	34.99***
Urban	0.19	1.48	1.36
Education categories			
Nograduate	2.11	1.01	0
Primary	0.27	0.05	0.03
Middle	2.29	0.87	0.02
High	2.02	0.25	0.34
Vchigh	1.71	0.43	0.08
University	11.83***	4.67**	0.08
Union*	0.12	13.91***	27.32***

Source: Author's estimates and tests from Household Budget Survey.

Notes: After simultaneous quantile regression bootstrap with 400 SEs, coefficient equality tests are applied. Then F values are to be seen in the table.