INEQUALITY IN THE WAGES OF MALE WAGE EARNERS IN TURKEY
1994-2002: A QUANTILE REGRESSION ANALYSIS*

by

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Abstract: This paper investigates the wage inequality in male wages with respect to the differences in ability and educational levels by estimating Mincerian wage equations and employing Quantile Regression technique. The analysis is carried out using the 1994 and 2002 Household Income and Expenditure survey of the State Institute of Statistics. The study concludes that wage inequality exists across the education levels and within the same educational level after controlling for various firm, industry and personal traits in both 1994 and 2002. It is also observed that there occurred a striking decline in educational returns in 2002 compared to 1994. The findings indicate that the effect of education on earnings is not uniform across the ability distribution. Returns are higher at the lower end of wage distribution for the secondary school graduates while for the university graduates highest returns are obtained at the highest end of the ability distribution. This implies that a demand shift for more skilled labor will increase wage inequality. Education and ability are found to be complements at the university level while they are found to be supplements at the secondary level. There is evidence that the public sector premium is not evenly distributed in both 1994 and 2002. Those who are in the lower tail of the wage distribution receive higher wage premium compared to the ones in the higher end of the wage distribution. Urban employment lessened the wage differentials among the urban employees across the wage distribution. The study also indicates that wage inequality between the least able and the most able became more pronounced in 2002 compared to 1994.

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1. Introduction

Turkey is among the countries where the distribution of income is quite far from equality. In 1994, the households whose incomes made up the bottom 20 percent of income distribution scale received only 4.9 percent of total income produced in Turkey whereas the top 20 percent income group received 54.9 percent of total income. These numbers slightly changed in 2002 in favor of those in the lower income groups compared to the top income category. The households placed at the first, second, third and fourth quartiles of income scale, each quartile constituting the 20 percent of income scale, acquired 5.3 (4.9), 9.8 (8.6), 14.0 (12.6), and 20.8 (19.0) of total income respectively in 2002 (1994). The fraction of total income consumed by the fifth income quartile, on the other hand, went down from 54.9 in 1994 to 50.1 in 2002. However, this, by no means, altered the rooted structure of highly skewed and unequal income distribution.

1994 and 2002 Income distribution surveys conducted by the State Institute of Statistics of Turkey report the income distribution by the source of income. In 1994, the wage earners’ incomes constituted 28.3 percent of total income while they made up the 38.7 percent of total income in 2002. This was probably due to the increase in the number of those who worked as wage earners, the report emphasized. It is extremely difficult, if not impossible, for one to quantify the sources of income inequality for the entire population in a country. Nevertheless, one can detect the elements causing variations in the wages of those who make their living by their labor.

Wage earners constitute the highest fraction of non-agricultural workers in Turkey. Nearly 70 percent of non-agricultural workers were wage earners in 1994. The same percentage went up to 75 percent in 2002. Although the percentage of employees in the total employment (the other categories are self-employed and unpaid family workers) lags behind the OECD countries (the OECD average is approximately 90 percent) it is similar to the rates in Mexico, Italy, Greece and Korea. The percentage of employees in agricultural and non-agricultural sectors together is much lower in Turkey compared to the other OECD countries; in 2002 the percentage of employees in both sectors was around 50 percent. In the OECD countries, the fraction of wage earners in non-agricultural employment and the fraction of wage earners in agricultural and non-agricultural employment are not very different from each other. The gap between the two fractions in Turkey reveals the high number of unpaid family workers in the agricultural sector.

This study intends to explain the sources of inequality in the earnings of male wage earners using wage determination equations. Mincerian earnings equations provide a firm starting point to wage determination. Years of education and experience are considered to be the two crucial factors that determine the earnings of an individual in the labor market. Estimation of Mincerian earnings function by OLS method allows us to find out the impact of years of schooling and experience on the one’s earnings. In other words, parameter estimates on these explanatory variables informs us about how the labor market values education and experience. The parameter estimates reflect the prices of these two observable factors that are assumed to contribute to one’s productive capacity most. It is
always possible to add other observable factors to these equations to find out their effects on wages. However, earnings determination involves more than observed characteristics of an individual. Ability of an individual might be critical to his/her earnings. Ability can not easily be measured. On the other hand, one can explore the effect of ability of an individual on his/her labor market earnings by employing Quantile Regression (QR) analysis. This method of estimation lets one to quantify the returns to observable characteristics of an individual at different points of ability distribution. The researcher, thus, can tell something about the effect of one’s ability on his/her earnings by looking at the differences in the returns to various observable factors at particular points of wage distribution. This analysis is quite informative especially when the main concern is inequality in wages. QR analysis is a technique by which the wage inequality can be decomposed into one’s observable and unobservable characteristics.

In this paper, we seek to provide evidence whether education and other personal and firm attributes contribute to wage inequality. Public employment, location of residence, the existence or absence of collective bargaining power, firm size and industry in which the worker is employed are often cited among the factors that caused wage inequality. Then it would be interesting to pose the question whether these factors in addition to educational attainment contribute to wage inequality both between the groups and within the groups. In other words, a public employee may obtain a positive wage premium over a private sector employee but how equally this positive wage premium, among the public workers, is distributed across the wage distribution is another question. In short, we seek to find evidence whether there are between and within wage inequalities caused by the level of educational attainment and other employer and employee traits.

On the other hand, it is also recognized that the Turkish labor market is not overwhelmingly dominated by any of these factors, namely, large firms, abundance of skilled labor, collective bargaining power. However, public employment has been traditionally large in the country. It is also found that a positive urban wage premium and a positive firm size premium exist and inter-industry differentials are also present (Tunalı et al., 2003). But how these premiums spread across the wage distribution is unexplored. Turkey went through several deep economic crises over the last decade and employment dropped considerably. The annual rate of unemployment stayed anywhere between 6 percent and 10.5 percent from 1994 to 2003 (State Institute of Statistics, 2004). Employment in manufacturing industry is notoriously shrunk since the early 1980s. We use Household Income and Expenditure Surveys collected by the State Institute of Statistics of Turkey in 1994 and 2002 for this study. Data from these surveys tell that real hourly wages of male workers in Turkey declined by about 2.5 percent from 1994 to 2002. On the other hand, educational attainment of male wage earners increased by about 25 percent at the tertiary level between the two periods under study. This brings to mind that many university graduates were unemployed and some more were employed in the jobs requiring less skill than they gained at school. Skill redundancy is expected to occur in a country
where there are a growing number of university graduates in the face of declining employment in general and drop in the skill demand in particular.

This study investigates the earnings differentials of male wage earners in Turkey. Earnings differentials among the wage earners with different education levels are considerable. However, wage differentials do not only result from educational differences. There are other factors that affect the one’s wage level such as the industry in which the worker is employed, whether he works for the public or private sector, years of experience and whether the person lives in an urban or rural area. After controlling all of these factors, we tested whether the ability and education level differences significantly contributes to wage inequality among the male wage earners in Turkey employing the Quantile Regression technique. For this purpose, we used 1994 and 2002 Income and Expenditure Surveys conducted by the State Institute of Statistics of Turkey. The results indicated that returns to education at each education level decreased considerably from 1994 to 2002. For instance, a high school or university graduate received higher returns per year of high school or university education in 1994 compared to a high school or university graduate in 2002. This fall in educational returns indicates that the recent economic downturns in the Turkish Economy led to a decline in the market value of the skilled labor in Turkey. This finding highlights that the recent economic crises were so severe that even the best educated experienced important losses. In 2002, the returns to education gap between wage earners with the same level of education positioned at the lowest and highest end of wage distribution increased. Therefore, we conclude that the within wage inequality increased from 1994 to 2002. This finding implies that in the case of an increase in the demand for the able and university educated the wage inequality will be worsened at the expense of the less able and less than university educated. However, the results for 1994 and 2002 indicated that there is a supplementary relationship between the ability and education at the lower end of ability distribution for secondary school graduates. This means that secondary education returns compensates for the low ability in a sense. Thus, we conclude that extending educational opportunities for the least able is important to prevent the wage inequality to worsen.

Another important finding of this study is that public employment mitigates the wage differentials among the different ability groups. However, the cease in recruitments to the public sector and prevailing dismissals in the private sector after the November 2000 and February 2001 economic crises seem to be major factors that caused a decrease in educational returns and an increase wage inequality in 2002. Urban workers are found to be better compensated compared to their observationally equivalent counterparts living in rural areas. Thus, we also conclude that urban employment contributes to wage equality positively. Interestingly, most industries pay a higher wage premium for the least able workers in 1994. Particularly, mining, manufacturing, construction, electric water and gas, finance and transportation industries better compensates the workers at lowest quantile compared to the workers at the upper quantiles. In 2002, industry coefficients for most of the industries are statistically insignificant. For the industries of which the quantile coefficients are
statistically significant, mining, manufacturing, construction, wage premium differences between the lowest and highest quantiles disappeared except for the electric, water and gas industry. In electric water and gas industry we observe a higher wage premium for the workers at the highest quantile.

2. Literature Review

There is relatively small number of studies concentrating on wage inequality in this context. The existing studies come from a variety of developed and developing countries. While studies from developed countries provide over time evidence due to availability of data (Buchinsky, 1994; 1998, Juhn et al., 1993; Gosling et al 2002) the evidence from developing countries mainly come from one-year cross-sectional data sets from household surveys (see Falaris, 2003 for Panama; Girman and Kedir, 2003 for Ethiopia; Mwabu and Schultz, 1996 for South Africa).

Buchinsky (1994; 1998) and Juhn et al. (1993) report that the incremental return to schooling increased in the 1970s and 1980s in the united states for male wage earners. They point out that this increase was not evenly distributed across the wage distribution. While the return increased with the level of education, the return within the same education and experience groups differed significantly at distinct points of ability distribution. Juhn et al., (1993) noted that

Wages for the least skilled, as measured by the tenth percentile of the wage distribution, fell by about five percent, and wages for the most skilled, as measured by the ninetieth percentile of the wage distribution, increased by about forty percent.

Buchinsky (1993) also found that wage inequality increased over time. He also argued that the returns to education are higher at the higher quantiles. Their findings are important in that they interpret wage inequality not solely in terms of the dispersion in ability distribution but rather in terms of observable productivity variables. Juhn et al. state that this increase in the return mainly come from the shift of the labor demand towards more skilled labor. This demand shift, on the other hand, benefited those with higher education and higher ability, in which case the two are complements, compared to those with higher education and less ability.

A series of studies from European countries (Machado and Mata, 2001 for Portugal; Hartog, Preiera, and Vieira, 2001 for Portugal, Martins and Periera, 2001 for 16 European countries) conclude that at the higher quantiles of wage distribution the returns to education are higher. The only exception comes from evidence from Austria. (Ferstere and Winter-Ebmer, 2003). Although they found that the return increases linearly with the quantile numbers, the returns tend to fall over time for the tertiary and high school graduates. Mwabu and Schultz (1996) used quantile regression to investigate whether there is a monotonic increase in returns to schooling in quantiles. They found that the returns increase as one goes up through the wage distribution for African white male at tertiary level. Evidence from Ethiopia (Girman and Kedir, 2003) suggests that schooling is more valuable for the less able. Mwabu
and Schultz (1996) also find evidence from South Africa in compliance with the finding from Ethiopia. Returns to education were higher at the lower deciles for the secondary school graduate African males. These findings imply that, as argued by Mwabu and Schultz (1996), schooling and ability were complements at the secondary level for the less able individuals. Then their immediate conclusion is that the expansion of education for the less able would increase the private returns to schooling.

3. The Model

Classical Regression analysis defines a particular relationship between the dependent variable and the independent variables. The association between the two variables is such that there are values of dependent variable whose mean correspond to a given value of the explanatory variable. What underlies this relationship is the assumption about the distribution of values of the dependent variable below and above the mean; they are assumed to be normally distributed. The whole point of OLS estimation is, then, to find an estimate of the mean value of dependent variable (Y) for given values of independent variable (X). The regression line is fitted to estimate the average points of Y for given Xs. Thus, the coefficients from OLS estimation give the effect of a unit change in X on the average (estimated) value of Y. However, the change in the mean value of Y resulting from a unit change in X may not characterize the effect on Y at different points of its distribution. At some points of conditional distribution of Y the effect might be more (less) important compared to some other parts.

To know how the conditional distribution of Y depends on X at particular segments of the conditional distribution of Y might be of primary interest in some cases rather than how the conditional mean of Y respond to a change in X. Quantile regression analysis allows us to pose such a question. Koenker and Basset (1978) introduced a technique to estimate such quantile functions. They have shown that a particular quantile, \( \theta \)th quantile, can be defined as solution to the following minimization problem:

\[
\text{Min} \left( \sum_{i \in y_i \geq b} \theta |y_i - x_i b| + \sum_{i \in \{y_i < b\}} |\theta - y_i / x_i b| \right)
\]  

(1)

This minimization problem is nothing but the minimization of asymmetrically weighted absolute residuals (Koenker and Hallock, 2001). OLS minimizes the sum of squared residuals giving more weight to more scattered observations. The minimization of absolute residuals, on the other hand, reduces the sensitivity of estimates to extreme observations giving them differing weights. In the OLS, the scattered observations receive more weight compared to residuals close to (around) the mean value. In the QR framework, positive and negative residuals have asymmetric weights. (Koenker and Hallock, 2001). Just as the OLS model is formalized as \( y = a + b x + u \), the QR model can be written as
Where $Q_y(\theta|\mathbf{x})$ denotes the conditional quantile of $y$. The distribution of $u_\theta$, $F_u(\cdot)$ is unknown (Buchinsky, 1998) but it is assumed that it satisfies the quantile restriction $\text{Quant}_\theta(0|\mathbf{x}) = 0$.

At each particular quantile, both the intercept and the slope coefficients are allowed to vary with individual heterogeneity. Consider $b_i = b + u_i$. Using QR we capture both the location shift and the variation in the slope parameter at each quantile. The coefficient for each quantile is the derivative of the dependent variable in the $\theta$th conditional quantile with respect to a unit change in the explanatory variable.

Since the ability and education (or other variables) may be correlated, the errors in the conditional quantiles may not be homoscedastic. Heteroscedastic residuals in the quantiles would cause the standard errors to be biased. We avoid this possibility by employing bootstrap estimation of the standard errors with 20 repetitions.

4. Empirical Specification

The basic human capital model is extended to control for a number of variables that relate to the level of earnings. The log-linear earnings function we estimated by OLS and QR is specified as follow:

$$
\ln(w_i) = a_0 + a_1 Edu_i + a_2 Exp_i + a_3 Exp_i^2 + \beta_1 C_i + \beta_2 P_i + \beta_3 U_i + \beta_4 F_i + \beta_5 I_i + u_i
$$

Where $w$ is the real hourly wage, Edu. stands for years of schooling, Exp. is the years of experience, Exp.$^2$ is the squared experience term. The upper case letters represent a set of qualitative variables. C stands for cohort dummies, P is the public employment dummy variable, U is a location dummy indicating whether the person lives in rural or urban areas. F represents the firm size dummy and I stands for various industry dummies. In a second specification we included educational level dummies instead of years of schooling. The subscript $i$ refers to observations and $u$ is the familiar disturbance term.

Education variable is simply the years that each level of schooling takes to complete. It takes the value of five for primary school graduates and eight for the middle school graduates and 11 for high school and vocational high school graduates and 15 for the university graduates and 17 for above the four year-university level. For those who read and write but did not have any formal education the variable takes the value of two and zero for illiterates. Experience variable is the potential market experience, defined as age minus years of schooling minus six.

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1 Individuals who completed 8 years basic education after the 1997 educational reform are grouped with middle school graduates.
In addition to human capital variables we included a set of binary variables to control for cohort effects, the sector of employment (public versus private), firm size, and location. Industry effects are also controlled for. The public sector dummy is defined to include employees in the State Owned Enterprises (SOE) and employees in public administration. In 1994 38 percent of working males were employed by the public sector 18 percent of which belonged to SOEs. In 2002, the percentage of public employment for males was 23 and SOE employment constituted only 3 percent of total employment. There was a significant drop in SOE employment in 2002 due to privatization. In Turkey, wages in SOEs are relatively higher than average. Majority of SOEs have unions and they have strong bargaining power. Public employment dropped from 20 percent in 1994 to 18 percent in 2002.

The urban dummy takes the value of 1 if the individual lives in an urban area and 0 if he or she is a rural resident. Cohort dummy has two categories. The first category accounts for the individuals between the ages 24 and 45, and the second cohort dummy is for those older than 45 years old. The base category is 15-24 age cohort. A firm size dummy is employed with two categories. The comparison category is the firms with less than 10 employees. The first firm size dummy takes on a value of 1 if the number of employees in the firm is between 10 and 25. The second dummy takes account of the firms with more than 25 employees. 16 industries were identified in the Household Income and Expenditure Surveys for both years. There was only one person working for international organizations in 1994 and 2002 data sets. We deleted these observations from both data sets. Then, we ended up with 15 industries. Agriculture is the comparison group.

5. Data

We used Household Income and Expenditure Surveys conducted by the State Statistics Institute of Turkey in 1994 and 2002. 1994 survey was held from January 1st to December 31st including 26,256 households. The survey covered all geographical regions throughout Turkey. The geographical regions were split up into two layers considering rural urban division. Rural areas were defined as those with less than twenty thousand population. By this definition, there are 62 urban areas and 174 rural areas in Turkey. Each month 522 different urban households and 666 rural households were interviewed in seven regions. In order to minimize the effects of exogenous shocks such as recently experienced earthquakes and the financial and economic crisis, from 2002 onward SIS decided to carry out the Household Income and Expenditure Surveys every year with a smaller scale. The 2002 Income and Expenditure Survey was held between January 1st and December 31st interviewing 650 urban and 150 rural households each month. Over the 12 months period 9,600 households were included in the survey.
The 1994 survey consisted of 119,685 individuals and the 2002 survey included 40,675 individuals. The surveys gathered a rich information set on the demographic and socio-economic characteristics of individuals. In this study, only the wage earner males between the ages 15 to 65 are considered. This would also enable comparison with other studies from a range of developed and developing countries. The male wage earners who did not work in the survey month and/or did not have positive income for that month were deleted. The regular salaried workers and the workers who work for compensation on a daily or weekly basis are defined as wage earners. The 2002 survey also includes the apprentices who worked for a pay within the survey month. They were a small proportion of the wage earner males.

The sample consisted of 13,182 and 5,866 wage earner males in 1994 and 2002 respectively. In the 1994 survey although the person was asked whether he or she holds a second job and his earnings from this activity but was not asked about the hours of work in the second job. Therefore, in 1994 we were unable to calculate the hourly wage rate for the wage earners who hold a second job. Thus, second job holders are excluded from the 1994 data. They were included in the 2002 data since the information set is complete. In 2002 data set there were 6 observations who reported more than 140 weekly working hours for both jobs and 12 observations who reported zero incomes although they reported that they worked in that month and they were wage earners. These observations were deleted and a total of 5,848 observations were reached.

Monthly incomes of wage earners included their salaries from the main job and in-kind payments. For the year 2002, the monthly cash and in-kind payments from the second job were added to the monthly earnings of wage earners who held a second job. The nominal monthly figures were deflated using the monthly consumer price index with 1987 as the base year. The monthly CPI figures were available on rural-urban division basis for seven regions and 19 selected cities. The monthly earnings of the survey population from rural regions were deflated using rural monthly CPI and the earnings of the survey population from urban areas were deflated using urban CPI for seven geographical regions and the incomes of those from the 19 selected cities in urban areas were deflated by the monthly CPI for these cities. Monthly earnings are then divided by 4.3 to reach the weekly earnings. The weekly real earnings are divided by the weekly hours worked to reach the real hourly earnings. The natural logarithm of real hourly earnings is used throughout the analysis.

Both years were peculiar in terms of economic indicators. In April 1994, there was a severe devaluation that caused the monthly rate of inflation to skyrocket and GNP to decrease by 6.1 percent. The year 2002 was also a poor year in terms of economic performance due to the November 2000 and February 2001 crisis. The real GNP contracted by 9.4 percent in 2002. (SIS, 2004). This was an unprecedented GNP contraction in the history of the Republic.
6. Wage Inequality and Education

Table 1 presents the main findings relating to earnings and education levels of male wage earners in 1994 and 2002. The mean hourly earnings were above the median earnings in both years. Mean real hourly wage of male wage earners has declined by 2.4 percent from 1994 to 2002 while its standard deviation increased by 10.8 percent. This indicates that the real wages plunged while the spread became larger. The log wage dispersion between the 90th and 10th quantiles is 2.12 in 1994. The same number is 1.46 for the United States in 1988 and 1.49 for Portugal in 1994. The log wage differential between the lowest and highest deciles declined by 8 percent from 2.12 in 1994 to 2.08 in 2002 (see Table 1). The differential between the natural logarithm of wages in the median and the 10th percentile was 1.08 in 1994 and 1.10 in 2002. The log wage differential between the median and the 10th quantiles went down by 9 percent from 1994 to 2002. It seems that wage inequality was lowered from 1994 to 2002. However, wage inequality between the higher quantiles (90th and 75th and 90th and 50th) increased slightly.

Table 1 indicates that educational composition of male wage earners changed considerably from 1994 to 2002. The percentage of illiterate male workers dropped almost 50 percent from 1994 to 2002. The percentages of those who read and write and of primary school graduates also declined by, 14.5 percent and 12.7 percent respectively. While the percentages of male workers with lower educational attainment dropped dramatically from 1994 to 2002, the share of male wage earners with higher levels of educational attainment increased during the period under study except for the high school level. In 1994, only 9.3 percent of male wage earners were university graduates. In 2002 the same number increased to 12 percent. A striking change in the educational attainment of male workers, however, occurred in the vocational high school category. The share of vocational high school graduates increased by about 169 percent from 1994 to 2002. Another interesting finding is the decline in the share of high school graduates and the increase in the share of middle school graduates. The decline for high school graduates was 5.2 percent while the increase in the middle school category was 20 percent. This was due to the increase in the years of basic education (eight-year basic education graduates were grouped with primary school graduates).

Figure 1 makes these changes more visible in the educational attainments of male workers from 1994 to 2002. Although only a small proportion of male workers had no formal education (illiterates and those who read and write together) the primary school graduates still constitute the highest proportion of male workers in both periods. These changes in the educational profiles of male wage earners took place when the older generations with lower levels of education exit from the payroll positions and the younger generations with higher levels of schooling enter to the labor force.

In Table 2, it is clearly observed that the mean real hourly earnings of male wage earners increase as the level of education completed increase in both years. However, the mean real hourly earnings...
wage declined at each schooling level in 2002 compared to 1994. Wage inequality between the levels of education existed. From the OLS results in Tables 5 and 6, it is seen that the return to education was higher at higher levels of education. Does the return to education at lower and upper parts of the wage distribution differ within the educational groups? This is the main question we seek to answer in the next section.

7. Results

7.1 The Effect of Education on Wages

First, the log earnings regressions; both OLS and quantile regressions, are estimated assuming that labor market return for an extra year in school do not vary across the educational categories. In other words, the returns to schooling coefficients are restricted to be the same at each school level. For both years, the coefficients on the years of schooling were statistically significant in the OLS and quantile regressions. For the quantile regressions, tests of equal coefficients on years of schooling across the specified quantiles were rejected in both 1994 and 2002. The test of parameter equality for the quantile regression is also an implicit test of homoscedasticity in the regression quantiles. The results are displayed in Tables 3 and 4. The first thing to note is that the pay off per year of schooling remained almost unchanged from 1994 to 2002 both in the mean regression and in each quantile. However, returns to an additional year of schooling declined at lower quantiles while they increased at higher quantiles in 2002 compared to 1994. The market return for education at the 10th quantile decreased from 7.8 percent in 1994 to 6.7 percent in 2002 while it increased at the 90th quantile from 8 percent in 1994 to 9 percent in 2002. In the middle quantiles, returns to schooling remained nearly unchanged between the two periods under study. For both years, the least able, as measured by the 10th percentile, benefited from schooling more compared to the ones in the second lowest quantile of wage distribution, the 25th quantile.

In 2002, the contribution of schooling to wage inequality increased. A worker at the lowest end of wage distribution was rewarded 36 percent less for staying one more year at school than a worker located at the highest end of the wage distribution, the coefficients being .067 and .091 respectively. At the middle quantiles, however, returns to an additional year of schooling were lower, around 7 percent at 25th, 50th, and 75th quantiles. The earnings regressions allowing the coefficients of returns to schooling to differ at each level of education controlling for the same personal and firm traits as in the first specification are estimated. The results are demonstrated in Table 5 and 6 for 1994 and 2002 respectively. The use of QR mechanism requires that some individuals in the top deciles of wage distribution have low education while some other in the lowest deciles have higher levels of educational attainment. The data satisfy this requirement except for the non-graduate category in 2002; neither OLS nor QR coefficients are statistically significant for the non-graduates.
The school level dummies are employed in OLS and quantile regressions to see the effect of level of schooling completed on earnings. In a QR framework, employing educational level dummies allows one to assess whether the workers within the same educational category experience the same annual returns across the wage scale. The results are displayed in Tables 5 and 6. The OLS regression results indicate that as the level of education increases the returns to schooling also increase. However, for each school level, incremental rate of return declined from 1994 to 2002.

The calculated annual returns at each school level are presented in Table 7. The findings from quantile regression results for 1994 can be summarized as follows. In the non-graduate category a male worker positioned around the 10th quantile of the wage distribution received 5.8 percent returns to schooling while a worker at the top decile received 12.4 percent returns to schooling. At the primary level, returns to schooling for workers in the 90th quantile were higher than the returns to schooling for workers at successive lower quantiles. For the middle school category, returns to schooling were highest for the workers in the 10th quantile, namely 4.6 percent while at the successive upper quantiles returns to per year of middle school education remain almost at the same level. The same pattern in returns to high school education is observed. High school graduates positioned around the lowest quantile received the highest returns. Vocational high school graduates in the lowest end of wage distribution received the same returns to their level of schooling as their observationally equivalent counterparts located around the top quantile of the wage distribution. The findings show that secondary schooling (middle school, high school, and vocational high school) reduced the wage dispersion in 1994 in Turkey.

At the university level, the annual rate of return to university education increase linearly in quantiles. Workers positioned around the top quantile of wage distribution received consistently higher returns for his/her university education than the workers at the successive lower quantiles.

The returns to schooling are higher for the university graduates holding highly paying jobs. Primary schooling is also more valuable for those who earn more. While primary and university education contributed positively to wage inequality secondary education reduced the wage inequality. Annual returns to secondary education were higher at the lowest quantile compared to those at the highest quantile. At the secondary level ability and schooling are substitutes. The less able the person is the highest the returns to schooling are at the secondary level (Mwabu and Schultz, 1996).

The results for the year 2002 can be summarized as follows. Returns to schooling coefficients on non-graduate category turned out to have a minus sign and became statistically insignificant in the mean regression. The coefficient was also no longer statistically significant at the specified quantiles. At the primary level, annual returns increased linearly in quantiles. 3.6 percent returns to schooling

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3 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. For instance, per year return to university education is calculated as the difference between the return coefficients on the university and high school level dummies divided by four.
from the OLS specification was an average of differing returns over the range of quantiles starting from 3.1 percent at the 10th quantile and, which increased to 6.84 percent at the top quantile.

Annual returns to middle school graduates at the 10th quantile exceeded the returns to middle school graduates at the 25th and 50th quantiles. Returns to schooling for high school graduates at the 10th quantile exceeded those in the 25th, 50th, and 75th quantiles. Once again the secondary schooling benefited the less able more. Unlike in 1994, returns to schooling per year at vocational level increased linearly in successive quantiles. In 2002, the impact of returns to schooling on wage dispersion has become more pronounced at the university level compared to its impact in 1994. The absolute spread in annual returns for university education was 4.2 percent between the 10th and 90th quantiles in 1994 while it increased to 6.1 percent in 2002.

In general, annual returns to schooling declined at each level of schooling. No educational group experienced an increase in returns for staying an extra year in school. On the other hand, university graduates experienced the slightest fall in returns from 14 percent in 1994 to 13.1 percent in 2002, a decline of 6.4 percent. However, this fall was not evenly distributed across the quantiles. For a worker at the lowest tail of the wage distribution, annual returns to university education declined by 25 percent while this decline was only 4 percent for a worker at the highest tail of wage distribution. University graduates with high paying jobs were better protected against the fall in general level of wages. The wage gap between the low-skilled and high-skilled workers remained the same on average between two periods.

7.2 The Effect of Experience on Wages

The test of parameter equality for experience variable across quantiles was rejected in both 1994 and 2002. The OLS regression results indicate that returns to experience declined on average from 1994 to 2002 (See Tables 3 and 4). Return to an additional year of market experience was lower in 2002. However, a worker at the lowest tail of wage distribution obtained the highest wage premium in both years. Across the wage distribution, among the observationally identical workers, the least productive worker receives the highest returns to an additional year of potential labor market experience in both 1994 and 2002. However, returns to experience dropped considerably from 1994 to 2002. Returns to experience lowered as one goes up in the wage distribution.

7.3 The Effect of Public Employment on Wages

Workers employed in the public sector received 47 percent wage premium on average over their otherwise equal counterparts in the private sector in both years. See Tables 3 and 4. A public employee at the lowest quantile was compensated 120 percent more than his otherwise identical fellow worker at the top quantile. Public premium was the highest at the lowest quantile and becomes less pronounced as one goes up the higher quantiles. The pattern across the
quantiles is the same in 1994 and 2002 except that a worker at the 25th quantile obtains a higher wage premium than a worker at the other quantiles in 2002. Our results indicate that public employment protected the less able in both years and, thus mitigated the wage dispersion.

7.4 The Effect of Urban Employment on Wages

On average, a worker living in urban areas obtained a wage premium of 17 percent over his counterpart living in rural areas in 1994. However, the wage premium for urban male workers declined considerably in 2002. The test of equality in the quantile coefficients is rejected. Living in an urban area protected the workers with low paying jobs mitigating the wage dispersion. An urban worker at the lowest quantile received a wage premium 82 percent higher than a worker at the top quantile. In 2002, urban employment penalized the workers at the highest end of wage distribution while wage premium were only slightly different than in 1994.

7.5 Industry Effects

The distribution of mean real hourly wages and the percentages of workers in each industry are displayed in Table 8. It is observed that manufacturing, construction, whole sale and retail trade, and social and community services industries were the largest industries in terms of their employment capacity in 1994 and in 2002, each of which employed more than 10 percent of male workers. In 1994, the highest mean hourly earnings were in the electric, water and gas industry. The second highest mean real hourly earnings were in the education sector, followed by the finance sector. The ordering of sectors in terms of mean real hourly wages obtained by its employees was totally altered in 2002. The finance industry was placed at the top and followed by the mining industry and the education sector took the third place.

Tables 8 and 9 indicate the firm effects in 1994 and 2002 respectively. In 1994, out of 14 industries only the coefficients on seven industry dummies were statistically significant across most of the quantiles. The workers in mining, manufacturing, construction, electric water and gas, hotels and restaurants, transportation and finance sectors received a positive wage premium at the lowest quantile compared to the upper quantiles. Thus, these industries can be interpreted as egalitarian industries.

In 2002, only four industries’ coefficients were statistically significant across most of the quantiles. Contrary to the industry effects in 1994, we do not observe a considerably higher wage premium in mining, manufacturing, construction and electric water and gas industries for the least able workers. The effect of being employed in the electric industry on wages is more pronounced at the two highest quantiles, 75th and 90th quantiles. Thus, this industry contributes to the wage inequality boosting the wages of the most able workers.
8. Conclusions

The results indicate that both between and within wage inequality resulting from educational attainment differences existed in 1994 and 2002. More explicitly, a university graduate obtained earnings consistently above a high school graduate and a middle school graduate and a primary school graduate. Earnings for high school graduates were, in return, above the earnings for middle school graduates and so on. This is the between wage inequality in terms of education groups. Wage inequality within educational categories is also present in 1994 and 2002 in Turkey. Although the schooling coefficients at distinct quantiles were not significantly different from each other at the secondary level (middle school, high school, and vocational high school) in both years, the returns at each quantile for the university graduates were significantly different from each other in 1994. In 2002, the returns at the university level were significantly different at the tenth and ninetieth deciles. At the primary level, the coefficients at the 25th quartile and 90th decile were significantly different from each other in 1994 and 2002. At the university level, the most able workers, placed around the 90th percentile of wage distribution, received higher returns to their education compared to the least able workers, around the 10th decile of wage distribution. The Turkish data supports the general finding that education and ability were complements at tertiary level. The school premium for university graduates is not evenly distributed across the ability distribution. Those who are more able and who have university diplomas are able to increase the wage gap between themselves and their less able counterparts. In other words, university education increases earnings but not uniformly across the ability distribution. This finding is in compliance with the findings from other studies (Buchinsky, 1994; Mwabu and Schultz, 1996; Falaris, 2003). From this finding we can hypothesize that in case of a demand shift for the more skilled labor, wage inequality would enormously increase. Machoda and Mata (2001) present evidence from Portugal in line with this supposition. They state that after the European Union involvement of the country the skilled labor enjoyed significant wage increases because of increasing demand from foreign investments. The more able with higher levels of education, however, enjoyed this increase in wages more.

In general, public employees earn by about 47 percent more than their fellow workers in the private sector in 1994 and 2002. Public premium is not evenly distributed across the wage distribution. Among the public employees, the ones positioned around the lower tail of wage distribution (10th, 25th and 50th quantiles) receive higher public wage premium compared to ones in the higher end of wage distribution. In any case, public employment is more beneficial for both those with higher ability and those with lower ability than being employed in the private sector. In addition, the public sector employment mitigates the wage differentials among the public employees paying higher wage premium to those with lower wages. Falaris (2003) found that public employment penalized the most able workers paying them a negative wage premium in Panama.

Urban employment provided a positive wage premium in both years. However, the premium dropped considerably from 17 percent in 1994 to 9.7 percent in 2002. The urban employment wage
premium was not evenly distributed across the quantiles. In both years, the urban premium was higher for the less able. In 2002, the coefficients on the urban dummy at the 75th and 90th quantiles were not statistically significant. In both years, urban employment lessened the wage differentials among the urban employees across the wage distribution.

The results of the study indicate that the returns to education declined on average and at distinct points of wage distribution from 1994 to 2002. Reduction in skill prices in 2002 suggests that Turkish labor market responded to the economic downturns in recent years lowering the wages of the skilled workers. The price of experience human capital also decreased between the two years. Although private returns to schooling declined at each school level, the difference between the returns to schooling at the two opposite ends of wage scale within the same education category increased in 2002. Therefore, overall wage inequality was exacerbated from 1994 to 2002. While education and ability are found to be complementary at the university level, they are found to be supplementary at the secondary level suggesting the expansion of educational opportunities in favor of the least able.
Table 1: Descriptive Statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>1994</th>
<th>2002</th>
<th>Change%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean</strong></td>
<td>781.26</td>
<td>762.65</td>
<td>-2.38%</td>
</tr>
<tr>
<td><strong>Standard Deviation</strong></td>
<td>975.55</td>
<td>1094.11</td>
<td></td>
</tr>
<tr>
<td><strong>Real Monthly Wage</strong></td>
<td>136732.30</td>
<td>141863.50</td>
<td>3.75%</td>
</tr>
<tr>
<td><strong>Standard Deviation</strong></td>
<td>108882.20</td>
<td>129746.10</td>
<td></td>
</tr>
<tr>
<td><strong>Hours Worked Per Week</strong></td>
<td>49.00</td>
<td>52.00</td>
<td></td>
</tr>
<tr>
<td><strong>Standard Deviation</strong></td>
<td>15.30</td>
<td>16.50</td>
<td></td>
</tr>
<tr>
<td><strong>Real Hourly Wage</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private</td>
<td>563.87</td>
<td>606.70</td>
<td>7.60%</td>
</tr>
<tr>
<td>std</td>
<td>809.75</td>
<td>1033.12</td>
<td></td>
</tr>
<tr>
<td>Public</td>
<td>1128.97</td>
<td>1197.39</td>
<td>6.06%</td>
</tr>
<tr>
<td>std</td>
<td>1108.53</td>
<td>1141.36</td>
<td></td>
</tr>
<tr>
<td><strong>Real Hourly Wage Quantiles</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>q10</td>
<td>186.54</td>
<td>195.95</td>
<td>5.04%</td>
</tr>
<tr>
<td>q25</td>
<td>304.84</td>
<td>310.30</td>
<td>1.79%</td>
</tr>
<tr>
<td>q50</td>
<td>524.80</td>
<td>500.63</td>
<td>-4.61%</td>
</tr>
<tr>
<td>q75</td>
<td>968.06</td>
<td>916.90</td>
<td>-5.28%</td>
</tr>
<tr>
<td>q90</td>
<td>1548.98</td>
<td>1499.02</td>
<td>-3.23%</td>
</tr>
<tr>
<td><strong>Log Dispersion</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>lnq90-lnq75</td>
<td>0.47</td>
<td>0.49</td>
<td>0.02%</td>
</tr>
<tr>
<td>lnq90-lnq50</td>
<td>1.08</td>
<td>1.097</td>
<td>0.01%</td>
</tr>
<tr>
<td>lnq75-lnq10</td>
<td>2.12</td>
<td>2.03</td>
<td>-0.08%</td>
</tr>
<tr>
<td>lnq75-lnq50</td>
<td>0.61</td>
<td>0.61</td>
<td>0</td>
</tr>
<tr>
<td>lnq75-lnq25</td>
<td>1.16</td>
<td>1.08</td>
<td>-0.08%</td>
</tr>
<tr>
<td>lnq50-lnq10</td>
<td>1.03</td>
<td>0.94</td>
<td>-0.09%</td>
</tr>
<tr>
<td>lnq50-lnq25</td>
<td>0.54</td>
<td>0.48</td>
<td>-0.06%</td>
</tr>
<tr>
<td><strong>Variables</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ln Real Hourly Wage</td>
<td>6.28</td>
<td>6.26</td>
<td>-0.02%</td>
</tr>
<tr>
<td>Years of Schooling</td>
<td>7.22</td>
<td>7.82</td>
<td>8.31%</td>
</tr>
<tr>
<td>Years of Experience</td>
<td>20.42</td>
<td>20.45</td>
<td>0.15%</td>
</tr>
<tr>
<td>Years of Experience Sq.</td>
<td>545.04</td>
<td>536.83</td>
<td>-1.50%</td>
</tr>
<tr>
<td>Educational Dummies</td>
<td>%</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>Illiterate</td>
<td>3.99</td>
<td>2.05</td>
<td>-48.62%</td>
</tr>
<tr>
<td>Non-graduate</td>
<td>3.10</td>
<td>2.65</td>
<td>-14.52%</td>
</tr>
<tr>
<td>Primary School</td>
<td>50.99</td>
<td>44.48</td>
<td>-12.77%</td>
</tr>
<tr>
<td>Middle School</td>
<td>12.46</td>
<td>14.91</td>
<td>19.66%</td>
</tr>
<tr>
<td>High School</td>
<td>17.18</td>
<td>16.28</td>
<td>-5.24%</td>
</tr>
<tr>
<td>Vocational High School</td>
<td>2.97</td>
<td>8.00</td>
<td>169.36%</td>
</tr>
<tr>
<td>University</td>
<td>9.29</td>
<td>11.61</td>
<td>24.97%</td>
</tr>
<tr>
<td>Public Sector</td>
<td>38.47</td>
<td>26.39</td>
<td>-31.40%</td>
</tr>
<tr>
<td>Urban Area</td>
<td>82.57</td>
<td>89.62</td>
<td>8.54%</td>
</tr>
<tr>
<td>Firm Size*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 10 workers</td>
<td>15.82</td>
<td>38.52</td>
<td>143.49%</td>
</tr>
<tr>
<td>Between 10 and 24</td>
<td>6.42</td>
<td>19.02</td>
<td>196.26%</td>
</tr>
<tr>
<td>More than 24 workers</td>
<td>14.29</td>
<td>42.47</td>
<td>197.20%</td>
</tr>
</tbody>
</table>

*63.47 percent of male wage earners did not report the firm size in 1994. In 2002 there were no missing observations.
Figure 1: Percentages of Male Wage Earners By Level of schooling in 1994 and 2002.

Table 2: Mean Hourly Real Wages of Male Wage Earners in TL by Education Level, 1994-2002.

<table>
<thead>
<tr>
<th>Level of Education</th>
<th>Mean Hourly Real Wage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1994</td>
</tr>
<tr>
<td>Illiterate</td>
<td>486.55</td>
</tr>
<tr>
<td></td>
<td>(4)</td>
</tr>
<tr>
<td>Non-graduate</td>
<td>575.16</td>
</tr>
<tr>
<td></td>
<td>(3.10)</td>
</tr>
<tr>
<td>Primary School</td>
<td>639.23</td>
</tr>
<tr>
<td></td>
<td>(51)</td>
</tr>
<tr>
<td>Middle School</td>
<td>702.08</td>
</tr>
<tr>
<td></td>
<td>(12.5)</td>
</tr>
<tr>
<td>High School</td>
<td>895.60</td>
</tr>
<tr>
<td></td>
<td>(17.2)</td>
</tr>
<tr>
<td>Vocational High School</td>
<td>1064.44</td>
</tr>
<tr>
<td></td>
<td>(3)</td>
</tr>
<tr>
<td>University</td>
<td>1559.88</td>
</tr>
<tr>
<td></td>
<td>(9.3)</td>
</tr>
<tr>
<td>Total</td>
<td>781.25</td>
</tr>
<tr>
<td></td>
<td>(100.00)</td>
</tr>
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</table>
Table 3: OLS and Quantile Regression Estimates of Log Earnings on a set of Worker and Firm Attributes, 1994

<table>
<thead>
<tr>
<th></th>
<th>1994 OLS</th>
<th>q10</th>
<th>q25</th>
<th>q50</th>
<th>q75</th>
<th>q90</th>
</tr>
</thead>
<tbody>
<tr>
<td>Years of Sch</td>
<td>0.077</td>
<td>0.078</td>
<td>0.069</td>
<td>0.07</td>
<td>0.075</td>
<td>0.081</td>
</tr>
<tr>
<td>(34.68)***</td>
<td>(21.82)***</td>
<td>(33.69)***</td>
<td>(29.01)***</td>
<td>(27.50)***</td>
<td>(15.53)***</td>
<td></td>
</tr>
<tr>
<td>Experience</td>
<td>0.062</td>
<td>0.075</td>
<td>0.061</td>
<td>0.056</td>
<td>0.054</td>
<td>0.057</td>
</tr>
<tr>
<td>(25.15)***</td>
<td>(26.04)***</td>
<td>(25.09)***</td>
<td>(19.40)***</td>
<td>(20.28)***</td>
<td>(9.01)***</td>
<td></td>
</tr>
<tr>
<td>Experience S</td>
<td>-0.001</td>
<td>-0.001</td>
<td>-0.001</td>
<td>-0.001</td>
<td>-0.001</td>
<td>-0.001</td>
</tr>
<tr>
<td>(20.40)***</td>
<td>(19.14)***</td>
<td>(20.37)***</td>
<td>(12.83)***</td>
<td>(15.43)***</td>
<td>(6.41)***</td>
<td></td>
</tr>
<tr>
<td>Cohort 25-44</td>
<td>0.196</td>
<td>0.195</td>
<td>0.199</td>
<td>0.182</td>
<td>0.195</td>
<td>0.176</td>
</tr>
<tr>
<td>(8.41)***</td>
<td>(5.60)***</td>
<td>(7.15)***</td>
<td>(6.82)***</td>
<td>(7.34)***</td>
<td>(3.30)***</td>
<td></td>
</tr>
<tr>
<td>Cohort 45-65</td>
<td>0.097</td>
<td>0.118</td>
<td>0.133</td>
<td>0.104</td>
<td>0.154</td>
<td>0.1</td>
</tr>
<tr>
<td>(2.52)***</td>
<td>(1.88)*</td>
<td>(2.86)***</td>
<td>(2.18)**</td>
<td>(3.43)***</td>
<td>-1.27</td>
<td></td>
</tr>
<tr>
<td>Public Emp.</td>
<td>0.473</td>
<td>0.604</td>
<td>0.586</td>
<td>0.576</td>
<td>0.479</td>
<td>0.276</td>
</tr>
<tr>
<td>(26.70)***</td>
<td>(22.88)***</td>
<td>(25.18)***</td>
<td>(29.95)***</td>
<td>(22.55)***</td>
<td>(9.44)***</td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>0.173</td>
<td>0.184</td>
<td>0.193</td>
<td>0.178</td>
<td>0.147</td>
<td>0.101</td>
</tr>
<tr>
<td>(11.37)***</td>
<td>(9.30)***</td>
<td>(13.01)***</td>
<td>(10.26)***</td>
<td>(9.80)***</td>
<td>(4.79)***</td>
<td></td>
</tr>
<tr>
<td>Firm Size</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 and 25</td>
<td>-0.027</td>
<td>0.02</td>
<td>-0.025</td>
<td>-0.069</td>
<td>-0.07</td>
<td>-0.043</td>
</tr>
<tr>
<td>-1.19</td>
<td>-0.7</td>
<td>-1.05</td>
<td>(2.93)***</td>
<td>(2.99)***</td>
<td>-0.94</td>
<td></td>
</tr>
<tr>
<td>More than 25</td>
<td>0.063</td>
<td>0.035</td>
<td>0.061</td>
<td>0.08</td>
<td>0.062</td>
<td>0.081</td>
</tr>
<tr>
<td>(3.84)***</td>
<td>(2.82)***</td>
<td>(4.48)***</td>
<td>(2.91)***</td>
<td>(2.60)***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>4.728</td>
<td>3.754</td>
<td>4.345</td>
<td>4.826</td>
<td>5.192</td>
<td>5.632</td>
</tr>
<tr>
<td>(95.70)***</td>
<td>(39.57)***</td>
<td>(81.24)***</td>
<td>(90.18)***</td>
<td>(90.73)***</td>
<td>(41.93)***</td>
<td></td>
</tr>
<tr>
<td>Observations</td>
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<td>13181</td>
<td>13181</td>
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<tr>
<td>R-squared</td>
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<td></td>
</tr>
</tbody>
</table>

* t statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
Table 4: OLS and Quantile Regression Estimates of Log Earnings on a set of Worker and Firm Attributes, 2002

<table>
<thead>
<tr>
<th></th>
<th>OLS</th>
<th>q10</th>
<th>q25</th>
<th>q50</th>
<th>q75</th>
<th>q90</th>
</tr>
</thead>
<tbody>
<tr>
<td>Years of Sch</td>
<td>0.076</td>
<td>0.087</td>
<td>0.062</td>
<td>0.07</td>
<td>0.08</td>
<td>0.091</td>
</tr>
<tr>
<td></td>
<td>(23.94)***</td>
<td>(13.90)***</td>
<td>(16.32)***</td>
<td>(24.55)***</td>
<td>(17.54)***</td>
<td>(13.54)***</td>
</tr>
<tr>
<td>Experience</td>
<td>0.044</td>
<td>0.057</td>
<td>0.044</td>
<td>0.042</td>
<td>0.045</td>
<td>0.045</td>
</tr>
<tr>
<td></td>
<td>(11.99)***</td>
<td>(7.70)***</td>
<td>(9.40)***</td>
<td>(9.13)***</td>
<td>(8.10)***</td>
<td>(5.47)***</td>
</tr>
<tr>
<td>Experience S</td>
<td>-0.001</td>
<td>-0.001</td>
<td>-0.001</td>
<td>-0.001</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>(8.54)***</td>
<td>(6.57)***</td>
<td>(7.79)***</td>
<td>(6.97)***</td>
<td>(5.64)***</td>
<td>(2.93)***</td>
</tr>
<tr>
<td>Cohort 25-44</td>
<td>0.165</td>
<td>0.158</td>
<td>0.14</td>
<td>0.16</td>
<td>0.152</td>
<td>0.129</td>
</tr>
<tr>
<td></td>
<td>(4.83)***</td>
<td>(2.81)***</td>
<td>(4.29)***</td>
<td>(4.82)***</td>
<td>(3.59)***</td>
<td>(2.01)***</td>
</tr>
<tr>
<td>Cohort 45-65</td>
<td>0.104</td>
<td>0.136</td>
<td>0.136</td>
<td>0.11</td>
<td>0.097</td>
<td>0.006</td>
</tr>
<tr>
<td></td>
<td>(1.91)*</td>
<td>(1.83)*</td>
<td>(2.82)***</td>
<td>(2.05)**</td>
<td>-1.82</td>
<td>-0.86</td>
</tr>
<tr>
<td>Public Emp.</td>
<td>0.473</td>
<td>0.583</td>
<td>0.624</td>
<td>0.534</td>
<td>0.433</td>
<td>0.267</td>
</tr>
<tr>
<td></td>
<td>(14.57)***</td>
<td>(13.11)***</td>
<td>(19.77)***</td>
<td>(15.08)***</td>
<td>(10.32)***</td>
<td>(4.40)***</td>
</tr>
<tr>
<td>Urban</td>
<td>0.097</td>
<td>0.184</td>
<td>0.187</td>
<td>0.139</td>
<td>0.045</td>
<td>-0.044</td>
</tr>
<tr>
<td></td>
<td>(3.45)***</td>
<td>(3.83)***</td>
<td>(6.05)***</td>
<td>(4.48)***</td>
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<td>(5.52)***</td>
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<td>(13.55)***</td>
<td>(10.28)***</td>
<td>(10.92)***</td>
<td>(7.79)***</td>
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<td>(24.18)***</td>
<td>(46.40)***</td>
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<td>(49.15)***</td>
<td>(31.93)***</td>
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* significant at 10%; ** significant at 5%; *** significant at 1%
### Table 5 The Impact of Schooling on Log Earnings by Educational Categories, 1994

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<th>Year</th>
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<th>q25</th>
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<th>q75</th>
<th>q90</th>
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<tr>
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<td>(3.24)***</td>
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<td>(1.99)***</td>
<td>(2.27)***</td>
<td>(2.82)***</td>
<td>(3.00)***</td>
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<tr>
<td>Primary S.</td>
<td>0.219</td>
<td>0.194</td>
<td>0.217</td>
<td>0.18</td>
<td>0.255</td>
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</tr>
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<td>(6.81)***</td>
<td>(2.07)***</td>
<td>(4.74)***</td>
<td>(4.97)***</td>
<td>(6.52)***</td>
<td>(4.06)***</td>
</tr>
<tr>
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<td>0.332</td>
<td>0.306</td>
<td>0.281</td>
<td>0.363</td>
<td>0.403</td>
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<tr>
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<td>(3.69)***</td>
<td>(6.39)***</td>
<td>(6.20)***</td>
<td>(6.56)***</td>
<td>(4.51)***</td>
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<td>(11.40)***</td>
<td>(7.53)***</td>
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<td>(8.47)***</td>
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<td>1.084</td>
<td>1.057</td>
<td>1.086</td>
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<td>1.308</td>
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<td>(11.58)***</td>
<td>(26.33)***</td>
<td>(23.05)***</td>
<td>(31.95)***</td>
<td>(21.73)***</td>
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### Table 6: The Impact of Schooling on Log Earnings by Educational Categories, 2002

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<th>q75</th>
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<tr>
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<tr>
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<td>0.185</td>
<td>0.208</td>
<td>0.342</td>
</tr>
<tr>
<td></td>
<td>(2.98)***</td>
<td>-0.91</td>
<td>(2.29)***</td>
<td>(3.58)***</td>
<td>(3.08)***</td>
<td>(1.66)***</td>
</tr>
<tr>
<td>Middle Sch.</td>
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<td>0.248</td>
<td>0.273</td>
<td>0.259</td>
<td>0.338</td>
<td>0.477</td>
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<td>(4.23)***</td>
<td>-1.45</td>
<td>(3.17)***</td>
<td>(4.60)***</td>
<td>(4.08)***</td>
<td>(2.28)***</td>
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<td>0.436</td>
<td>0.545</td>
<td>0.708</td>
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<td>(7.36)***</td>
<td>(2.73)***</td>
<td>(5.13)***</td>
<td>(7.41)***</td>
<td>(6.34)***</td>
<td>(3.13)***</td>
</tr>
<tr>
<td>Vocational</td>
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<td>0.498</td>
<td>0.509</td>
<td>0.548</td>
<td>0.644</td>
<td>0.803</td>
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<td></td>
<td>(6.15)***</td>
<td>12.89)***</td>
<td>(5.82)***</td>
<td>(8.87)***</td>
<td>(7.56)***</td>
<td>(3.48)***</td>
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<tr>
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<td>0.9</td>
<td>0.952</td>
<td>1.071</td>
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<td>(5.18)***</td>
<td>(8.79)***</td>
<td>(11.86)***</td>
<td>(10.00)***</td>
<td>(5.49)***</td>
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Table 7: Returns to Schooling per Year by School Level, 1994-2002

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<th>q75</th>
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<td>5.9</td>
<td>5.9</td>
<td>7.3</td>
<td>12.4</td>
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<tr>
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<td>4.4</td>
<td>3.4</td>
<td>4.3</td>
<td>3.6</td>
<td>5.1</td>
<td>6.04</td>
</tr>
<tr>
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<td>4.1</td>
<td>4.6</td>
<td>3</td>
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<td>7.5</td>
<td>8</td>
<td>8</td>
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<td>13.9</td>
<td>13.7</td>
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<td>14</td>
<td>15</td>
<td>16.6</td>
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<td>8.5</td>
<td>9.5</td>
<td>9.4</td>
<td>10.6</td>
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<td>Non-graduate</td>
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<td>0.9</td>
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<td>3.8</td>
<td>3.7</td>
<td>4.2</td>
<td>6.84</td>
</tr>
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<td>3.2</td>
<td>2.8</td>
<td>2.5</td>
<td>4.3</td>
<td>4.5</td>
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<td>7</td>
<td>5.9</td>
<td>5.9</td>
<td>6.9</td>
<td>7.7</td>
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<td>9.6</td>
<td>10.2</td>
<td>10.9</td>
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<td>9.9</td>
<td>11.6</td>
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<td>8.8</td>
<td>9.8</td>
<td>10.1</td>
<td>10.7</td>
<td>13.6</td>
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*Annual return above the vocational high school level.
Calculated using Tables 5 and 6.
### Table 8 Mean Hourly Wage by Industries, 1994-2002

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<td>(2.26)</td>
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<tr>
<td></td>
<td>(2.42)</td>
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<tr>
<td>Manufacturing</td>
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</tr>
<tr>
<td></td>
<td>(25.45)</td>
<td>(26.01)</td>
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<tr>
<td>Construction</td>
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<td>573.69</td>
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<td>Electric, Water &amp; Gas</td>
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<td>(1.02)</td>
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<td>Whole Sale and Retail Trade</td>
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<td>(14.83)</td>
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<td>(5.61)</td>
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<td>(8.55)</td>
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<td>(0.89)</td>
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<td>(19.64)</td>
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<td>(2.65)</td>
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*Percentages of workers in each industry are in parentheses.*
Table 9: Firm Effects, 1994

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<td>(5.87)***</td>
<td>(5.88)***</td>
<td>(2.69)***</td>
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<td>(4.59)***</td>
<td>(3.49)***</td>
<td>(2.71)***</td>
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<tr>
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<td>(3.19)***</td>
<td>(3.08)***</td>
<td>(2.15)***</td>
<td>(2.72)***</td>
<td>(1.91)</td>
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<td>(1.69)***</td>
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<td>(3.65)***</td>
<td>(3.70)***</td>
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<td>(3.76)***</td>
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<tr>
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<td>(4.10)***</td>
<td>(2.90)***</td>
<td>(4.16)***</td>
<td>(3.73)***</td>
<td>(1.94)***</td>
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<td>(1.91)*</td>
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<td>0.104</td>
<td>0.03</td>
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<td>(2.47)***</td>
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<tr>
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<td>(1.26)***</td>
<td>1.2</td>
<td>1.6</td>
<td>0.72</td>
<td>(1.90)*</td>
<td>(2.53)***</td>
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<td>0.372</td>
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<td>(3.30)***</td>
<td>(1.73)***</td>
<td>(3.17)***</td>
<td>(2.00)***</td>
<td>1.27</td>
<td>0.52</td>
</tr>
<tr>
<td>0.204</td>
<td>0.449</td>
<td>0.167</td>
<td>0.123</td>
<td>0.125</td>
<td>0.052</td>
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<tr>
<td>Trade</td>
<td>(3.45)***</td>
<td>(3.30)***</td>
<td>(1.41)***</td>
<td>1.41</td>
<td>1.63</td>
<td>0.47</td>
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### Table 10 Firm Effects, 2002

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<tr>
<th>Industry</th>
<th>OLS</th>
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<th>Q25</th>
<th>Q50</th>
<th>Q75</th>
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<td>0.364</td>
<td>0.303</td>
<td>0.22</td>
<td>0.248</td>
<td>0.326</td>
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<td>(5.32)***</td>
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<td>0.199</td>
<td>0.126</td>
<td>0.112</td>
<td>0.179</td>
<td>0.176</td>
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<tr>
<td>(3.50)***</td>
<td>(3.02)***</td>
<td>(3.38)***</td>
<td>(2.96)***</td>
<td>(1.72)***</td>
<td>(1.81)**</td>
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<td>Construction</td>
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<td>0.272</td>
<td>0.229</td>
<td>0.204</td>
<td>0.235</td>
<td>0.185</td>
</tr>
<tr>
<td>(4.97)***</td>
<td>(4.13)***</td>
<td>(6.39)***</td>
<td>(5.15)***</td>
<td>(4.64)***</td>
<td>(1.74)*</td>
<td></td>
</tr>
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<td>0.219</td>
<td>0.34</td>
<td>0.172</td>
<td>0.311</td>
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<tr>
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<td>(2.77)***</td>
<td>(5.20)***</td>
<td>(4.33)***</td>
<td>(6.94)***</td>
<td>(2.60)***</td>
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<tr>
<td>Hotels Rest.</td>
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<td>-0.156</td>
<td>-0.148</td>
<td>-0.01</td>
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<tr>
<td>(2.22)**</td>
<td>(1.78)*</td>
<td>(3.55)***</td>
<td>(1.29)***</td>
<td>0.17</td>
<td>0.49</td>
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<tr>
<td>Transportation</td>
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<td>0.075</td>
<td>0.007</td>
<td>0.004</td>
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<td>0.49</td>
<td>1.11</td>
<td>0.17</td>
<td>0.09</td>
<td>(1.96)*</td>
<td>(2.11)**</td>
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<td>0.138</td>
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<td>0.158</td>
<td>0.25</td>
<td>0.313</td>
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<tr>
<td>(3.38)***</td>
<td>(1.19)</td>
<td>(1.97)***</td>
<td>(2.80)***</td>
<td>(1.51)***</td>
<td>(1.47)**</td>
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<td>0.264</td>
<td>0.208</td>
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<td>-0.061</td>
<td>-0.063</td>
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<td>-0.188</td>
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<td>-0.063</td>
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<tr>
<td>-0.56</td>
<td>1.56</td>
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<td>0.82</td>
<td>1.05</td>
<td>1.56</td>
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<td>-0.185</td>
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<td>(1.90)***</td>
<td>(4.06)***</td>
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<td>0.72</td>
<td>(2.74)***</td>
<td>(2.18)**</td>
<td>0.12</td>
<td>0.67</td>
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References:


