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Does Education Matter for the Earnings of Young Adults?

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Abstract

In this study, we analyze the relationship between educational attainment and hourly earnings. With large survey data on young adults, our results suggest that there is a significant relationship between earnings and years of schooling, age, sectors of occupation, job tenure, years of experience and gender. Furthermore, having a high school diploma, two- or four-year college degree, master's or doctorate degree leads to changes in earnings. However, these changes are negative. These negative results may occur because employers value work experience much more than a diploma.

Keywords: education, schooling, wage, gender

Introduction

From past to present, male and female workers are faced with different wage payments. Brainerd (2000) states that male workers received higher wages than female workers even in communism, and it affected labor force participation and decreased wages. A common point of many studies is that male workers are favored more than female workers. Generally, the ratio of female/male earnings is less than one. It means that male workers earn more than female workers. Earlier studies indicate that the years of education, occupation, work experience, skills, age, ethnicity and race are the main factors that cause the gender wage gap.

In the 1980s, the labor market witnessed two impressive developments in the U.S. One was the decreasing gap between male and female wages. The second was the increasing inequality level of the U.S. labor market (Blau and Kahn, 1997). Blau and Kahn (1997) also showed that the female/male ratio was approximately 60% and almost consistent during two decades before the ratio was increased in the late 1970s. According to the U.S. Bureau of Labor Statistics 1980 (1992), in 1967 and 1979, the ratio of female/male full time workers' weekly wages was 62.4% but in 1991 this percentage was increased to 74%.

According to Jurajda (2005), there are two main points affecting the wage gap between the genders. First, a raise in the inequality of wage distribution; it is assumed that women's relative wage status at the low levels of wage distribution is getting worse. Second, the rate of employment has dropped; the gender wage gap is reduced because women and low-waged workers are influenced by quitting of their employment.

One of the purposes of this study is to show the existence of the discrimination of different wages with the same qualities, e.g., the same years of education and progress of the decreasing wage differentials between the genders. It is a fact that in the past women had worse working and living conditions and earned less money than men. There was less equality of males and females in the past in comparison to the present years. Thus, it affected the gender wage gap and also the discrimination of having unequal payments. However, people live in a more equal world nowadays, and accordingly, female workers deserve the same quality of living, the same working conditions and surely the same earnings as male workers. Further, we also investigate the determinants for personal earning, i.e., education, parents' education level, job experience, work in a government sector and working in a collective bargaining group.

Literature Review

The wide pay gap between male and female workers has narrowed over the years, and the occupational discrimination between the genders is expected to disappear. The aim of this paper is to point out that female workers earn less money than male workers in the same job with the same qualities. These qualities are: the same years of education, the same skills, experience and job training or age. According to earlier studies, in the previous decades male workers had more chances to earn more money than female workers, showing discrimination. However, year after

year, this situation started to change. Some research general findings show the narrowing wage gap.

There is a positive relationship between educational attainment and the hourly earnings of workers. In the 1960s, having a college degree was not so important in the U.S. According to the U.S. Census Bureau statistics, only 7.7% of the population had a 4-year college degree in 1960; this percentage was increased to 21.3% in 1990 (Rubin, 2003). After finishing college, some students may want to continue their education with a master's or PhD degree to earn higher wages in the future. The quality of the education and experience that women gained has been growing since the 1960s, but the occupational segregation has been continuing to decline. Nevertheless, the U.S. government wanted to reduce the discrimination, which was stabilized in the 1980s (Blau and Kahn, 1997).

According to Doms and Lewis (2007), the gender wage gap has been shrinking for a few decades. Many researchers show the results of a narrowing gender wage gap in the U.S. Their studies also mentioned the dramatically narrowing gap in the 1980s, but after a period, the narrowing speed of the wage gap had slowed down. Female workers benefited from the developing technology having payments equal to male workers. Females started to have more working areas in recent years, such as in companies and offices, so they could find more jobs and also have the same duties as males. As a result, they started to get more equal payments. Having the same degree of education and age, the female and male wage gap was examined from the past to the present, showing that the gap is narrowing year after year. Doms and Lewis (2007) also mentioned that males had more wages than females in the past, but in recent years, wage differences are getting smaller.

The Equal Pay Act of 1963 came into force in the U.S., which was also included in the U.S. federal laws. Based on the Equal Pay Act of 1963, workers should get equal wages for their equal work. In addition to this law, discrimination between male and female workers was forbidden by the Title VII of the Civil Rights Act of 1964. These discriminatory behaviors may be hiring, firing, training or paying different wages based on gender. After 40 years, pay disparities still existed in the American work force in 2003.

In 2003, the Government Accountability Office (formerly General Accounting Office) conducted a study of pay disparities and found that female workers could earn only 79.7% of what male workers get. Before this study, the main factors such as education, occupation, marital status, years of work experience, job tenure, industry, number of working hours, race and time off for child birth were analyzed in the research by Alkadry and Tower (2006). However, the results of this previous study show that female workers earned 80.3% of male workers' earnings in the

U.S. in 1983. Comparing years 1983 and 2003, the pay gap did not show any progress and narrowed in twenty years while it was expected to shrink.

Milgrom et al. (2001) argued that in the U.S., the wage inequality increased in the 1980s, *ceteris paribus*, would worsen the relative position of women. Sicilian and Grossberg (2001) took the data from the National Longitudinal Survey of Youth (NLSY) and found that differences of individuals' qualifications and market conditions explain the 60% pay gap between the genders. Their study also included the ineffectiveness of training on the gender wage gap. In their research, they mentioned the narrowing gender wage gap in the U.S. in the past 20 years. According to Sicilian and Grossberg (2001), women made more investments in human capital compared to men and it is the main reason for the narrowing wage gap. Female workers earn, per hour, 25% lower wages than male workers do. When this percentage is compared with the study of Blau and Ferber (1987), Goldin and Polachek (1987), and Olsen and Sexton (1996), there is less discrimination in gender wages (Sicilian and Grossberg, 2001).

In the 1980s, female workers were faced with difficulties as they were swimming upstream. The increasing rewards to skill influenced female workers. The value of skills showed changes for males and females in those years. But, according to Katz and Murphy (1992) and Blau and Kahn (1997), male workers benefited from the shifts in the demand composition more than female workers with higher levels of labor market skills. However, female workers benefited less than males. This shows that the skill prices of female and male workers changed in a different way.

In the U.S., for many years, females have been working in low-paying and generally female-based jobs because of the female labor market status. Predominant female jobs were service work and administrative supportive work. According to Blau and Kahn (2000), 53% of female workers were working in those jobs in the 1970s; on the contrary, male workers in these fields were only 15%. Looking at the comparison of male and female percentages, it is easily seen that there is a huge difference with respect to gender. Also, females cannot work in high standard positions like males do. Most managers were male in the 1970s. An exceptional situation was observed for women in certain positions such as nurse, dietitian, librarian and kindergarten or elementary school teacher. Nevertheless, wages in those occupations were lower than those in male professional jobs. Women are included in blue-collar occupations. After the 1970s, things started to change. Inequality between males and females decreased, although most of the occupational differences remained the same. Females had not focused on administrative support and service sector jobs. In 1999, the male workers' percentage of these jobs remained constant at 15%, but only 41% of female workers were working

in the same jobs. Yet, more female workers could have managerial positions than before 1999 (Blau and Kahn, 2000). Another fact is that female workers could start to move into predominantly male jobs. Females achieved important progress by joining the white-collar class. These calculations and data are from the Census Bureau or the Current Population Survey.

According to Sicilian and Grossberg (2001), distribution of occupations between the genders and dissimilarities in industry are good indicators explaining the gender wage gap. If there is a traditional division of labor, women are generally less experienced in the labor market than men among family members. It is so because females tend to work in shorter and inconstant jobs so they cannot get enough experience or on-the-job training. Thus, the earnings of male workers are higher than the earnings of female workers. Compared with males, females spend more time doing housework so it may cause a decrease in their labor force effort and their productivity might be reduced. As a result, their wages are lower than those of male workers.

Alkadry and Tower (2006) stated that even though females had equal chances and showed effort equal to that of males, they stayed in lower-echelon positions. Upward mobility might struggle with gender segregation in companies. As a result, females may advance to better and upper-echelon positions in organizations. Many social, cultural and organizational factors still cannot accept females and their upward mobility advantages. Alkadry and Tower (2006) showed that many women were hindered because of domestic restrictions and were not able to advance and have better positions than male workers in a company. Thus, females could get less payment and barely advance in their careers.

Occupational segregation that depends on gender exists all over the world (Blau et al., 1998). In her studies, Bergmann (1971, 1974) showed the occupational segregation by gender and race spreading in the 1970s and the negative results of the wage differences of male-female workers and black-white workers. Occupational segregation by gender has a great influence on the gender wage gap (Blau et al., 1998). According to empirical evidence, occupational segregation explains 12 to 37% of the gender pay gap in the U.S. A historical study shows that in the past century a 30-year time period showed a decrease in the segregation from 1870 to 1990 (Bertaux, 1991). It was convincing and stayed constant for a while with approximately 66–68% until the 1950s (Gross, 1968; Jacobs, 1989). This index started to decrease. A decline of 3.1% in the 1960s and 8.5% in the 1970s was observed over the years. However, it was not certain evidence for continued decreasing segregation in the 1980s. Labor force participation and educational attainment started to increase for women in the 1980s.

In business life, women encounter more barriers than their opposite gender colleagues. Whether females have a chance to advance, obviously they can move up with slower steps to be successful in their careers. These difficulties are the “glass ceiling,” which makes female workers remain in lower-level places. The wide gender pay gap is caused by the segregation of low-level females. The wide gap can be restricted with new laws on equality (Rose and Hartmann, 2004).

Model and Data

The equation below shows the relation between the earnings of the workers and their education, experience, gender, job tenure, working in the government sector, years of schooling, age, ethnicity, collective bargaining group, location of living and gender. This should allow the model to test whether or not years of schooling have an impact on earnings. We estimate the model using the ordinary least squares (OLS), OLS with absorbing by year and clustering by sample id, fixed effects and random effects.

The equation for earnings is as follows:

$$\begin{aligned} \ln Earning_{it} = & \\ & \beta_0 + \beta_1 \ln Age_{it} + \beta_2 Black_{it} + \beta_3 \ln Experience_{it} + \\ & \beta_4 Government_{it} + \beta_5 \ln Tenure_{it} + \\ & \beta_6 Collective\ Bargaining_{it} + \beta_7 \ln Education_{it} + \\ & \beta_8 Urban_{it} + \beta_9 Male_{it} + \varepsilon_{it} \end{aligned} \quad (1)$$

where:

- *Earning* is the current hourly earnings in US dollars,
- *Age* is age,
- *Black* is a dummy variable indicating that the respondent is black (1 if black, 0 if otherwise),
- *Experience* is total out-of-school work experience (years),
- *Government* is a dummy variable indicating that the respondent works for a federal, state, or local government entity (1 if federal, state, or local government entity, 0 if otherwise),
- *Tenure* is tenure (in years) with the current employer,
- *Collective Bargaining* is pay set by collective bargaining (1 if non-collective bargaining, 0 if collective bargaining),
- *Education* is years of schooling (highest grade completed),
- *Urban* is living in an urban area (1 if urban, 0 if otherwise),

- *Male* is the respondent's sex (1 if male, 0 if female), and
- ε represents other omitted influences on earnings, assumed to be well behaved.

We provide descriptive statistics of the variables in Appendix 1. The data set is taken from the National Longitudinal Survey of Youth 1979 (NLSY79). NLSY79 is a panel survey with repeated interviews of a nationally representative sample of young males and females aged 14 to 21 in 1979. From 1979 to 1994 the interviews took place annually. Since 1994, they have been conducted at two-year intervals. The core sample originally consisted of 3,003 males and 3,108 females.

Results

In this section, we briefly present regression results. The above equation (1) is estimated taking all variables for 41,973 observations. When we look at the results, we can see that all of our expectations concerning the sign of the coefficients are realized. Table 1 shows the core regression results. Control variable results are as expected. These results show that as employees are male and age with experience, they earn more. In addition, there are positive effects on earnings if the wage set by collective bargaining and employees work in urban area. However, African Americans and working in the government sector have negative effects on earnings. It is worth mentioning that all the coefficients are statistically significant at the 99% confidence level.

Table 1. Regression results 1

	OLS	OLS with Year Effects	Fixed Effects	Random Effects
Age	0.281*** (0.017)	0.398*** (0.057)	0.398*** (0.025)	0.268*** (0.021)
African American	-0.181*** (0.006)	-0.167*** (0.014)	-0.167*** (0.006)	-0.174*** (0.006)
Experience	0.089*** (0.004)	0.157*** (0.010)	0.157*** (0.005)	0.122*** (0.005)
Government	-0.083*** (0.006)	-0.082*** (0.011)	-0.082*** (0.006)	-0.083*** (0.006)
Tenure	0.065***	0.057***	0.057***	0.062***

	OLS	OLS with Year Effects	Fixed Effects	Random Effects
	(0.002)	(0.003)	(0.002)	(0.002)
Collective Bargaining	0.165***	0.160***	0.160***	0.162***
	(0.005)	(0.010)	(0.005)	(0.005)
Education	0.965***	0.961***	0.961***	0.965***
	(0.012)	(0.029)	(0.012)	(0.012)
Urban	0.121***	0.122***	0.122***	0.122***
	(0.005)	(0.009)	(0.005)	(0.005)
Male	0.199***	0.196***	0.196***	0.198***
	(0.004)	(0.009)	(0.004)	(0.004)
Constant	3.174***	2.678***	2.678***	3.164***
	(0.056)	(0.195)	(0.083)	(0.069)
Observations	41,973	41,973	41,973	41,973
R2	0.379	0.388	0.369	0.378

Notes: Standard error in parentheses. *, ** and *** denote significance at the 10, 5 and 1% level, respectively.

Our parameter of key interest is years of schooling, *Education*, variable. All four different estimation techniques, OLS, OLS with year effect, fixed effects, and random effects, show consistent results. Years of schooling have a statistically and economically significant positive effect on earnings: the coefficient is 0.961 for OLS and fixed effects and 0.965 for random effects. It indicates that an extra year of education causes wages to increase. This finding is in line with our expectations.

Table 2. Regression results 2

Independent Variable	Dependent Variable					
	Earnings			Education		
	(1)	(2)	(3)	(4)	(5)	(6)
Education	128.806***	119.160***	114.279***			
	(1.570)	(1.914)	(1.505)			
Mother's Education		4.130**		0.112***		0.113***
		(1.936)		(0.005)		(0.005)
Father's Education		13.161***		0.105***		0.105***

Independent Variable	Dependent Variable					
	Earnings			Education		
	(1)	(2)	(3)	(4)	(5)	(6)
		(1.472)		(0.004)		(0.004)
Experience			43.594***			
			(0.686)			
Male			274.316***			-0.329***
			(6.849)			(0.019)
Male*Education				-0.007***		
				(0.002)		
Arithmetic Reasoning				0.061***	0.068***	
				(0.001)	(0.001)	
Word Knowledge				0.028***	0.045***	
				(0.002)	(0.002)	
Paragraph				0.030***	0.034***	
Comprehension				(0.002)	(0.002)	
Composite						0.118***
						(0.001)
Constant	-461.048***	-531.636***	-776.514***	4.751***	5.811***	4.917***
	(20.914)	(24.594)	(20.307)	(0.059)	(0.052)	(0.060)
Observation	42,815	38,137	42,815	38,137	42,815	38,137
R2	0.136	0.135	0.243	0.370	0.324	0.375

Notes: Standard error in parentheses. *, ** and *** denote significance at the 10, 5 and 1% level, respectively.

One of the crucial questions of this research is “Does education matter for earnings?” To see the effect of the years of schooling, *Education*, on earnings, we performed regressions of earnings on education, the respondent’s parents’ education, and work experience. From the regression results in Table 2, findings can be summarized as follows (Columns 1, 2 and 3). The positive effect found when analyzing those variables for earnings. Especially, the positive effect between earnings and male are noticeable.

It is well documented through research that there is a positive correlation between educational attainment and cognitive ability. In this study, we examined the relationship of those variables, and Table 2 presents the results (Columns 3, 4 and 5). Between the respondent’s mother’s and father’s years of schooling, it is

clear that the mother's education level has a more significant effect on education than the father's. The regression results show that male and male with education are negative and statistically significant.

We, then, examined the important ability for educational attainment. All the three variables, *Arithmetic Reasoning*, *Word Knowledge*, *Paragraph Comprehension*, are positive and statistically significant for education attainment, especially, numerical ability, *Arithmetic Reasoning*, is more significant on educational achievement. In addition, the composite measure of numerical and verbal ability with mean 50 and standard deviation 10, *Composite*, also have a positive effect on education accomplishment.

Conclusions

In this paper, we evaluate the effect of education on earnings. By using a large survey data set, we focus on the years of school enrollment, age, different occupation sectors, job tenure and having work experience.

Our results suggest that there is a significant relationship between the earnings and years of schooling, age, sectors of occupation, job tenure, years of experience and gender. Also, it is obvious that female and male workers have disparities on their wages. General findings show that the wages of female workers are lower than the wages of male workers in the U.S. Furthermore, having a high school diploma, two- or four-year college degree, master's or PhD degree lead to some changes in earnings. However, these changes are negative. These negative results may occur because employers value work experience much more than a diploma. Actually, the results of the experience show that having extra years of experience leads to higher wages.

In conclusion, the previous studies discussed the gender wage gap in the U.S. and their findings show that the wage gap has been narrowing over the years. In this study, we obtained results similar to those of the other researchers. Other researchers' findings also show how experience and schooling are important determinants to get more equal wages, and it makes the gender wage gap narrow. The results in this study are also similar to their findings.

Appendix 1. Descriptive Statistics

Variable	Obs	Mean	Std.Dev	Min	Max
Earnings	42,815	1229.148	803.6875	250	19832.94
Age	42,815	27.91739	5.510224	16	43
Black	42,815	0.1126941	0.3162223	0	1
Hispanic	42,815	0.0635758	0.2439987	0	1
Experience	42,815	8.07357	5.0357	0	21.942
Private Sector	42,028	0.855168	0.3519356	0	1
Government	41,995	0.1263008	0.332192	0	1
Self-Employment	41,975	0.0191066	0.1369014	0	1
Tenure	42,815	3.61372	3.904548	0.019	24.923
Collective Bargaining	42,798	0.1815272	0.3854589	0	1
Union	24,508	0.1470948	0.3542076	0	1
Education	42,815	13.12201	2.299972	0	20
Mother's Education	40,829	11.59034	2.657879	0	20
Father's Education	39,279	11.84498	3.467962	0	20
Urban	42,815	0.763681	0.4264715	0	2
Male	42,815	0.5618825	0.4961616	0	1

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