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ESTIMATING THE RETURNS TO EDUCATION IN ARGENTINA USING QUANTILE REGRESSION ANALYSIS: 1992-2002[1,2]

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I. Introduction

Argentina has one of the most developed education systems in the Americas. Indicators show that despite the country's uneven economic crisis, school enrollment rates remain high. Educational advances began early in Argentina following the Constitution of 1853. Prominent were the efforts of Domingo Sarmiento, the fourth president of Argentina. Sarmiento set the guidelines for the modern education system in the latter half of the nineteenth century, pushing through reforms that supported school expansion for all citizens. The literacy rate rose from 33 percent in 1869 to nearly 50 percent by the turn of the century.

Average years of schooling of the population are currently 8.5, significantly higher than the regional average of 5.9 years. Argentina also compares well with East and Central Europe and East Asia, where average educational attainment is 8.4 years and 7.6 years (Barro and Lee 2000).

Given this rapid growth in enrollment rates it is critical to consider what has happened to rates of return to schooling. There is a relatively large literature that has focused on estimating returns to schooling in Argentina since the mid-1980s. In 1985, in Buenos Aires, the labor force averaged 11.1 years of schooling and the private rate of return to another year of schooling was 9.2 percent (Kugler and Psacharopoulos 1989). Social rates of return were

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16.7 percent at primary, 6.4 percent at secondary and 7.1 percent at tertiary; and private returns were 30, 9 and 11 percent. In 1989, in urban Argentina the labor force had 9.1 years of schooling and the private rate of return to another year of schooling was 10.3 percent (Psacharopoulos 1994). Social returns were 8.4, 7.1 and 7.6 percent; and private returns were 10.1, 14.2 and 14.9 percent. Returns to schooling for women are slightly higher than for men: in 1985, 9.1 for men and 10.3 percent for women; and in 1989, 10.7 for men and 11.2 percent for women (Psacharopoulos 1994). Returns to schooling are higher for workers in the private sector: 9.6 versus 7.0 percent in 1985; and in 1989, 11.1 versus 8.9 percent. Overall, in the 1980s, the returns to schooling in Argentina are more like an industrial country than the patterns observed in the Latin America region (Kugler and Psacharopoulos 1989).

The returns to schooling in Buenos Aires increased from 10 percent in 1986 to 12.5 percent in 1989 (Pessino 1995). Then they dropped to 9 percent in 1990 and increased again to 10 percent by 1993. Pessino (1995) concludes that returns were higher and increasing during the period of hyperinflation. However, when inflation was brought under control in 1990 returns decreased significantly.

Using a dynamic cohort analysis for Buenos Aires for the period 1980-1999, Margot (2001) shows that workers with secondary incomplete experience rather stable returns, which are on average 12 percent although decreasing in recent years, reaching 10 percent in 1999. Workers with secondary complete experience slightly higher returns - at 13 percent on average for the whole period - but very stable over time and reaching 11 percent in 1999. Workers with complete higher education seem to be experiencing increasing returns, especially in recent years, reaching 23 percent in 1999. Others also document an increasing trend over the long term going back to 1975 (Cossa 2000).

Clearly the returns to education are high and increasing in Argentina. Does this trend mask significant differences across the distribution? Are some workers receiving considerably lower returns? Do these differences increase by level of wages earned, thus hiding significant unobserved skill differences?

The typical mean regression models - whereby it is assumed that one additional year of education may only influence the mean of the conditional wage distribution, while other parameters remain unmodified - are not helpful

to explore the potential effects of education on the shape of the wage distribution.

Instead, this paper aims at answering these questions using quantile regression analysis in the estimation of rates of return to education using official household surveys covering urban areas for 1992-2002 period. In doing so we focus on within-education-levels wage inequality. Quantile regressions are particularly useful when it is suspected that various unobserved variables - such as ability - influence parameters of the conditional distribution of the dependent variable other than the mean. Yet, despite its relevance, the examination of rates of return at different quantiles has, so far, received virtually no attention in Argentina. In using a more flexible technique to estimates returns, this paper will depart from previous literature, as it does not only empirically examine the evolution of returns over time, but also investigates whether there are differences in returns across the conditional wage distribution.

The paper is organized as follows: section 2 describes the methodology used to estimate these returns and the empirical model applied. In section 3, data and variables included in the analysis are summarized, while section 4 presents the results. Section 5 concludes.

II. Methodology

As discussed in the Introduction, typical wage equations allow us to estimate the mean effect of education on wages. That is, the rate of return to schooling for the average individual. In other words it is assumed that the return to schooling is common across individuals (see, for example, Card 1999).

However, the average individual may not be of interest for policy purposes. Fortunately it is also possible to estimate the variance in returns around this mean. The quantile regression method estimates the effect of education on wages at different parts of the wage distribution (Buchinsky 1998; Koenker and Hallock 2001). The wage distribution reflects not only education but also unobservable factors, including ability and social skills. Those at the bottom of the wage distribution are liable to have little education but also a lesser endowment of unobservable skills. In other words, the effects of education on earnings may not be independent of these unobservable skills. If the effect of education on earnings is independent of unobservable skills, we should

observe constant returns throughout the wage distribution. Otherwise we should observe a larger effect at the bottom of the wage distribution or at the top; or a larger effect at the top depending on whether education compensates or complements the unobservable skills (Walker and Zhu 2001).

Moreover, if the expansion of education participation has drawn more and more from the lower end of the distribution of unobserved skills, we would expect to see the returns to education at the low end of the distribution fall relative to the top.

In addition to allowing the full characterization of the conditional distribution of the dependent variable the quantile approach has a number of useful features: (a) the linear programming representation of the quantile regression model makes estimation easy; (b) the quantile regression objective function is a weighted sum of absolute deviations, resulting in a robust measure of location, so that the estimated coefficient vector is not sensitive to outlier observation on the dependent variable; and (c) when the error term is non-normal, quantile regression estimates may be more efficient than OLS estimators (Buchinsky 1998).

The quantile regression model (Buchinsky 1994) can be outlined as:

$$lnW_i = X_i\beta_\theta + u_{\theta i},$$

$$X_i\beta_\theta = (\text{Quantile})_\theta(lnw_i|X_i)$$

where Xi is a vector of exogenous variables; βθ is the vector of parameters; (Quantile)θ(lnwi|Xi) is the θth conditional quantile of lnw given X, with $0<\theta<1$. The θth quantile is derived by solving the problem (using linear programming):

$$\underset{\beta\in R^k}{\text{Min}} \Sigma_i \rho_\theta(lnw_i - X_i\beta_\theta),$$

where ρθ(ε) is the check function defined as ρθ(ε) = θε if ε≥0, and ρθ(ε) = (θ-1)ε if ε<0. Standard errors are bootstrap standard errors. The median regression is obtained by setting θ=0.5 and similarly for other quantiles. As θ

is varied from 0 to 1, the entire distribution of the dependent variable, conditional on X, is traced.

We estimate all the effects simultaneously in order to have an estimation of the entire variance-covariance matrix of the estimators by bootstrapping (that is, randomly re-sampling the data). The coefficients remain the same as opposed to estimating each equation separately. We also performed hypothesis tests concerning coefficients both within and across equations to analyze if the effect of schooling is the same at the highest quantile and at the lowest one.

III. Data Source and Description

Data used in this paper come from the household surveys carried out by the National Institute of Statistics and Census (INDEC) twice a year since the 1970s. The survey, known as the Permanent Household Survey (Encuesta Permanente de Hogares or EPH), has incorporated new regions and cities over time in order to have better coverage of urban households. It now reaches approximately 70 percent of the urban population. For comparability reasons, we consider only conglomerates available for all years in the EPH. [4] Earnings functions are estimated for men and women separately. The samples include all workers 14-65 year of age with positive employment earnings.

During the last ten years, average years of education have increased by one entire year for the whole sample (see Annex Table 1). Additionally, the proportion of workers with less than secondary education decreased. Conversely, there was a significant increase in the proportion of workers with tertiary-level qualifications (9.5 percent had higher education in 1992, compared with 16 percent in 2002). These figures show an apparent improvement in human capital levels in Argentina.

In 1992 the levels of schooling were as follows: 30 percent of the labor force had a primary education, 18 percent had complete secondary and 12 percent had complete university. Women were more heavily represented at higher levels of schooling. For example, while 23 percent of men had incomplete secondary and only 17 percent had complete secondary, for women 17 percent had incomplete secondary while 21 percent had complete

[4] The conglomerates considered are the following: La Plata, Santa Fe, Parana, Comodoro Rivadavia, Neuquen, Jujuy, Rio Gallegos, Salta, San Luis, Santa Rosa, Tierra del Fuego, Capital and Conurbano Bonaerense.

secondary. At the university level, 9 percent of men had completed this level, compared to 17 percent for women. Women overall had more than one-half years more schooling than men: 10.6 versus 9.8 years. Earnings (log real hourly wage rate adjusted by the Consumer Price Index), however, were lower for women, at 7 percent less per hour worked.

By 2002 the levels of schooling were as follows: 23 percent of the labor force had a primary education, 19 percent had complete secondary and 17 percent had complete university. Again, women were more heavily represented at higher levels of schooling. For example, while 23 percent of men had incomplete secondary and 18 percent had complete secondary, for women 15 percent had incomplete secondary while 20 percent had complete secondary. At the university level, 13 percent of men had completed this level, compared to 23 percent for women. Women overall had almost one full year more schooling than men: 11.4 versus 10.5 years. That is, women increased their schooling by almost one year, while men increased by only 0.7 years. Earnings, however, were even lower for women, at 13 percent less per hour worked.

Overall schooling in the labor force increased to 10.9 years in 2002, from 10.1 years in 1992. That is an increase of almost one year in a ten year period. The proportion with university complete increased by almost 50 percent, while the proportion with university incomplete went up by 37 percent. The proportion with secondary complete went up only 2 percent. The proportion with secondary incomplete and primary declined.

Workers with incomplete secondary do not earn significantly more than those with complete primary education. A complete secondary education appears to be necessary before earnings rise significantly. There also appears to be a significant premium attached to completing university education.

IV. Results

Traditional basic earnings functions using OLS were estimated for men and women samples in different years (see Table 1 OLS column). Overall, the returns to schooling increased over time. The returns to schooling increased while the economy grew (during the early 1990s), when the economy contracted (mid-1990s), and during the severe economic crisis (1999-2002) (see Giovagnoli et al., 2005 for an estimated model using dummy variables for

different educational levels)[5]. There was a significant increase from 1993 to 1994, and again from 1999 to 2000, with some stability in the last three years.

The estimate of the rate of return to schooling in 2002 is 12.0 percent for men and 10.8 percent for women. These figures increased since 1992, when the rates of returns were 9.1 percent and 8.1 percent. The returns to all levels of education are much higher for men than for women. The coefficient on general experience did not change for men (4.6 percent) and experienced a slight increase for women (3.4 percent to 3.7 percent). As human capital theory suggests, the sign of the estimated coefficients for experience and experience-squared are of the correct sign. All these coefficients are statistically significant at the 1 percent level. The F-statistics for the significance of the joint regressors are higher than 119.

Quantile Regression Results

The estimates of the rate of return to education at different point of the conditional wage distribution provide evidence of significant differences in returns at the upper and lower level of the income distribution are large (see Figure 1 and Table 1).

[5] The authors show that significant changes in the returns to schooling were registered by level. At the start of the period, primary education exhibited the highest returns. Five years later, the returns to primary decreased, only to recover again in the latter years. The returns to secondary incomplete have decreased, while the returns to secondary have remained remarkably stable. The returns to higher education, both university complete and incomplete have increased substantially, with university now exhibiting the highest returns. Correcting for selection produces somewhat higher returns for females, but still lower than returns to males.

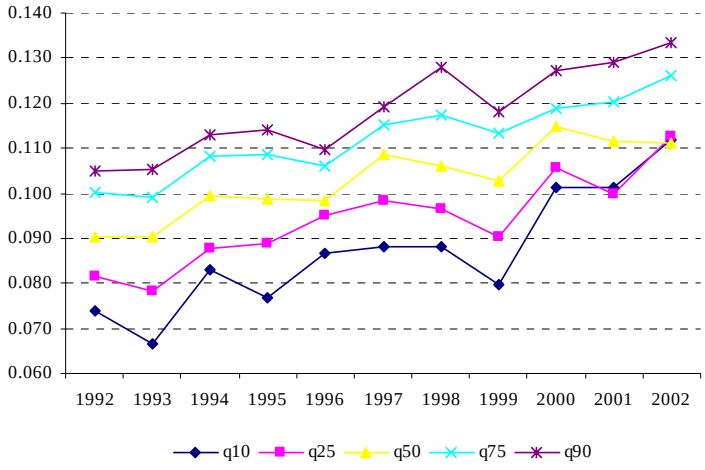
Table 1. Quantile Regressions, Returns to Schooling (%) by Sex (1992-2002)

	Men						Women					
Year	OLS	q10	q25	q50	q75	q90	OLS	q10	q25	q50	q75	q90
1992	9.1	7.4	8.2	9.0	10.0	10.5	8.1	8.5	7.8	8.1	7.7	8.0
	47.9	27.8	38.3	45.0	39.1	27.2	32.5	16.8	29.6	23.1	20.3	15.5
1993	9.0	6.7	7.8	9.0	9.9	10.5	8.5	8.2	8.4	8.7	8.6	8.5
	49.6	16.8	33.6	69.9	44.9	43.3	36.1	19.6	29.1	40.7	28.0	24.2
1994	10.0	8.3	8.8	9.9	10.8	11.3	9.1	9.0	8.9	9.4	9.0	9.1
	55.4	30.0	46.7	44.5	57.7	38.5	39.3	22.7	23.5	24.2	25.6	24.5
1995	9.8	7.7	8.9	9.9	10.9	11.4	9.4	9.6	9.4	9.6	9.3	9.1
	51.6	25.2	32.8	40.3	43.4	41.0	38.1	14.6	24.4	22.7	19.2	20.0
1996	10.0	8.7	9.5	9.8	10.6	11.0	9.8	10.9	10.6	9.6	8.8	9.4
	50.1	36.6	29.6	41.6	49.1	31.0	38.4	22.9	33.2	34.4	29.8	23.0
1997	10.7	8.8	9.8	10.9	11.5	11.9	10.2	11.1	10.0	10.4	10.1	9.4
	55.2	20.6	38.9	54.1	39.6	29.9	40.6	26.1	41.6	38.6	32.9	15.9
1998	10.9	8.8	9.6	10.6	11.7	12.8	10.4	11.7	11.0	10.5	10.5	10.1
	54.0	20.8	25.8	39.2	47.1	34.6	32.1	19.5	32.1	38.3	37.3	28.4
1999	10.3	8.0	9.0	10.3	11.3	11.8	10.5	11.6	10.9	10.5	10.6	9.5
	46.2	14.7	21.6	27.2	31.1	26.9	38.7	19.6	24.1	27.2	27.7	25.3
2000	11.4	10.1	10.6	11.5	11.9	12.7	11.5	13.3	11.9	11.6	11.4	10.0
	47.9	22.5	36.9	44.8	41.4	37.0	39.1	16.7	31.7	38.8	46.8	36.4
2001	11.4	10.1	10.0	11.2	12	12.9	11.8	14.0	12.6	11.5	11.3	10.9
	45.0	21.1	20.1	38.1	36.7	33.2	37.9	19.3	25.9	36.7	31.4	26.7
2002	12.0	11.2	11.3	11.1	12.6	13.3	10.8	11.0	9.6	10.9	11.6	11.1
	43.1	17.6	28.0	33.1	35.6	63.3	34.6	12.6	15.6	31.4	35.3	20.3

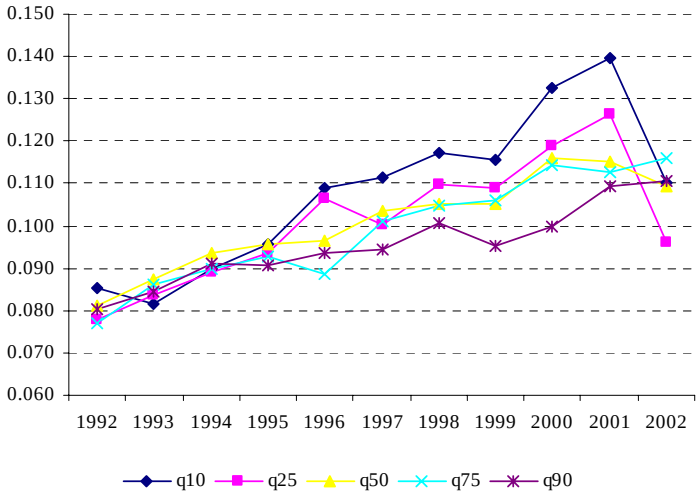
Note: t-values are given in the second line below each parameter estimate.
Source: Own calculations based on EPH

Figure 1. Return to Schooling along Time by Quantile

For Males

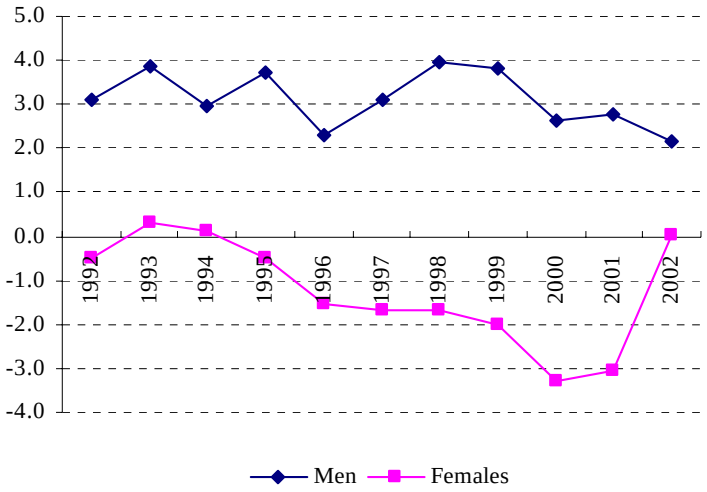


For Females



The inspection of Figure 2 shows that, over time, despite the year analyzed, men in higher quantiles of the distribution have higher returns to schooling compared to those who are in the lower quantiles.

Figure 2. Quantiles Gap (q90-q10) by Gender (1992-2002)



While for men the gap is always positive, showing that the returns are higher as one goes from the lower to the higher end of the distribution, the case for women is the opposite. Returns are higher at the lowest quantile than in the highest quantile. However, the effect of one year of education at quantile 90 versus quantile 10 is the same at the beginning of the 1990s and in 2002.

For men, returns are higher towards the upper levels, thus signifying complementarity between education and observables. In the first instance, this may imply that raising the level of schooling for everyone will generally increase the inequality of earnings. However, the returns at the lower levels increase over time, and the gap between returns at the top and bottom has narrowed, thus leading us to reject the idea that expansion has brought more lower ability individuals into the system and reduced the returns. On the contrary, education is becoming a better investment at the lower ends of the distribution.

For women, returns are highest at the bottom end of the distribution, implying that education is to a great extent a substitute for unobserved ability. The returns at the lower ends of the distribution increased over time, narrowing the gap between the top and bottom.

In most other countries increasing returns with quantiles have been observed: Austria, Denmark, Finland, France, Ireland, Italy, Kenya, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, United States and Uruguay (Martins and Pereira 2004; Fersterer and Winter-Ebmer 2003; Wambugu 2002; Gonzalez and Miles 2001). Only for China (Knight and Song 2003), Germany and Greece (Martins and Pereira 2004), and Mexico (Patrinos and Metzger 2004; Zamudio 2001) is the returns-quantiles profile negative. The returns-quantile profile is also negative in the case of primary education in Panama (Falaris 2003), for Africans in South Africa (Mwabu and Schultz 1996), and females in Venezuela (Patrinos and Sakellariou 2005). Also, Brazil presents a slight U-pattern as the returns dip slightly from the 10th to the 25th quantile (Arabsheibani, Carneiro and Henley 2003). Furthermore, Denny and O'Sullivan (2004), using a flexible interaction between ability and education, find that education is a substitute for ability, meaning that education has a remedial role for those not endowed with high ability.

V. Conclusions

The returns to schooling in urban Argentina increased over a ten-year period, 1992 to 2002. The overall rate of return to an additional year of schooling increased from 8.6 percent in 1992 to 11.4 percent in 2002. Returns to schooling increased as real wages decreased. In fact, returns continued to rise even during times of severe economic crisis. This finding could be related to human capital theory, in that a disequilibrium situation causes an increase in the rewards for schooling (see, for example, Schultz 1961).

The quantile regression analysis shows that men in higher quantiles have higher returns to schooling compared to those in the lower quantiles. For women returns are highest at the lowest quantile. Results for men imply that further investments in education, all else being equal, would contribute to increased inequality. However, efforts to improve the quality of education and invest more in those with fewer unobserved skills and lower ability - that is, compensatory education - could reverse this trend.

Given the implication of increased inequality as a result of expanding education, a research priority would be to find out how improving the quality of education for the less skilled would affect earnings inequality. The data for such an analysis would be challenging, given that most labor force and household data sets including only years of schooling (quantity) and labor market outcomes, while data sets with test scores (quality) do not typically include labor market outcomes since they are usually only done for existing students. Still, research could take advantage of regional differences in school quality and relate this to the returns to schooling over time.

Another research priority would be to find out what specific interventions raise school quality - that is, test scores - for the less skilled students in Argentina. This would help make compensatory education in Argentina more effective. Moreover, equalizing test scores across the distribution could help promote equity.

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Annex Table 1. Means and Standard Deviations of Samples

		All		Men		Women	
	Variable	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
1992	Primary incomplete	0.09	0.28	0.09	0.29	0.08	0.27
	Primary complete	0.30	0.46	0.32	0.47	0.26	0.44
	Secondary incomplete	0.21	0.41	0.23	0.42	0.17	0.38
	Secondary complete	0.18	0.39	0.17	0.37	0.21	0.41
	University incomplete	0.10	0.30	0.10	0.29	0.11	0.31
	University complete	0.12	0.32	0.09	0.28	0.17	0.37
	Years of education	10.07	3.77	9.79	3.71	10.55	3.83
	Experience	20.77	13.53	21.30	13.63	19.88	13.33
	Experience-squared	614.57	648.86	639.28	665.41	572.90	617.75
	Real hourly wage	4.10	4.28	4.21	4.38	3.92	4.09
	Log real hourly wage	1.15	0.67	1.17	0.68	1.13	0.64
	N	15,693		9,910		5,783	
1993	Primary incomplete	0.09	0.29	0.10	0.30	0.08	0.28
	Primary complete	0.27	0.45	0.30	0.46	0.23	0.42
	Secondary incomplete	0.21	0.41	0.24	0.42	0.18	0.38
	Secondary complete	0.19	0.39	0.17	0.38	0.21	0.41
	University incomplete	0.11	0.32	0.11	0.31	0.12	0.32
	University complete	0.12	0.33	0.09	0.28	0.18	0.38
	Years of education	10.19	3.83	9.87	3.76	10.74	3.89
	Experience	20.89	13.43	21.18	13.47	20.39	13.33
	Experience-squared	616.74	640.73	630.19	653.86	593.62	616.88
	Real hourly wage	4.22	4.11	4.35	4.43	4.01	3.49
	Log real hourly wage	1.18	0.69	1.19	0.71	1.16	0.67
	N	16,726		10,485		6,241	
1994	Primary incomplete	0.08	0.27	0.08	0.27	0.08	0.27
	Primary complete	0.30	0.46	0.33	0.47	0.24	0.43
	Secondary incomplete	0.21	0.40	0.24	0.42	0.16	0.36
	Secondary complete	0.19	0.40	0.17	0.38	0.23	0.42
	University incomplete	0.10	0.30	0.09	0.29	0.11	0.31
	University complete	0.12	0.33	0.09	0.28	0.18	0.39
	Years of education	10.17	3.76	9.83	3.64	10.75	3.89
	Experience	20.77	13.29	21.35	13.29	19.77	13.22
	Experience-squared	607.96	633.12	632.34	642.03	565.61	615.11
	Real hourly wage	4.74	4.49	4.74	4.52	4.74	4.45
	Log real hourly wage	1.29	0.69	1.29	0.69	1.30	0.69
	N	16,363		10,206		6,157	

cont'd

Annex Table 1 (cont'd). Means and Standard Deviations of Samples

		All		Men		Woman	
	Variable	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
1995	Primary incomplete	0.08	0.27	0.08	0.28	0.07	0.26
	Primary complete	0.29	0.45	0.31	0.46	0.24	0.43
	Secondary incomplete	0.20	0.40	0.22	0.42	0.15	0.36
	Secondary complete	0.19	0.39	0.17	0.37	0.22	0.41
	University incomplete	0.12	0.32	0.12	0.32	0.12	0.33
	University complete	0.13	0.34	0.09	0.29	0.19	0.39
	Years of education	10.32	3.82	9.98	3.74	10.86	3.89
	Experience	20.64	13.23	21.30	13.25	19.57	13.13
	Experience-squared	601.17	632.80	629.34	644.49	555.21	610.51
	Real hourly wage	4.49	4.53	4.57	4.96	4.36	3.72
	Log real hourly wage	1.21	0.73	1.21	0.74	1.22	0.72
	N	16,148		10,061		6,087	
1996	Primary incomplete	0.08	0.27	0.08	0.27	0.07	0.26
	Primary complete	0.28	0.45	0.30	0.46	0.23	0.42
	Secondary incomplete	0.20	0.40	0.23	0.42	0.16	0.36
	Secondary complete	0.19	0.40	0.18	0.39	0.22	0.41
	University incomplete	0.11	0.32	0.11	0.31	0.13	0.33
	University complete	0.14	0.35	0.11	0.31	0.19	0.40
	Years of education	10.46	3.85	10.14	3.76	10.98	3.95
	Experience	20.75	13.32	21.39	13.30	19.70	13.28
	Experience-squared	608.07	643.31	634.19	653.98	564.48	622.70
	Real hourly wage	4.41	5.52	4.37	4.69	4.47	6.68
	Log real hourly wage	1.18	0.74	1.17	0.74	1.19	0.75
	N	15,338		9,513		5,825	
1997	Primary incomplete	0.08	0.27	0.08	0.27	0.08	0.26
	Primary complete	0.26	0.44	0.29	0.45	0.22	0.41
	Secondary incomplete	0.20	0.40	0.23	0.42	0.16	0.37
	Secondary complete	0.18	0.39	0.18	0.38	0.19	0.39
	University incomplete	0.13	0.33	0.12	0.32	0.14	0.35
	University complete	0.14	0.35	0.10	0.30	0.22	0.41
	Years of education	10.54	3.89	10.17	3.76	11.15	4.02
	Experience	20.94	13.60	21.20	13.48	20.52	13.78
	Experience-squared	623.30	661.31	631.16	661.12	610.69	661.48
	Real hourly wage	4.36	4.93	4.37	5.32	4.34	4.23
	Log real hourly wage	1.18	0.74	1.17	0.74	1.19	0.74
	N	15,775		9,639		6,136	

cont'd

Annex Table 1 (cont'd): Means and Standard Deviations of Samples

		All		Men		Woman	
	Variable	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
1998	Primary incomplete	0.07	0.25	0.07	0.26	0.06	0.24
	Primary complete	0.26	0.44	0.28	0.45	0.22	0.42
	Secondary incomplete	0.21	0.41	0.24	0.43	0.17	0.38
	Secondary complete	0.17	0.38	0.17	0.38	0.18	0.38
	University incomplete	0.13	0.33	0.12	0.32	0.14	0.35
	University complete	0.16	0.36	0.12	0.32	0.22	0.41
	Years of education	10.64	3.87	10.30	3.79	11.18	3.92
	Experience	20.72	13.30	21.09	13.06	20.14	13.64
	Experience-squared	606.12	635.38	615.43	631.53	591.55	641.13
	Real hourly wage	4.60	4.94	4.70	5.26	4.45	4.38
	Log real hourly wage	1.21	0.76	1.22	0.76	1.20	0.75
	N	14,915		9,048		5,867	
1999	Primary incomplete	0.07	0.25	0.07	0.26	0.07	0.25
	Primary complete	0.24	0.43	0.28	0.45	0.19	0.39
	Secondary incomplete	0.21	0.40	0.23	0.42	0.17	0.37
	Secondary complete	0.20	0.40	0.19	0.39	0.20	0.40
	University incomplete	0.13	0.34	0.12	0.33	0.15	0.36
	University complete	0.15	0.36	0.10	0.30	0.22	0.41
	Years of education	10.72	3.82	10.29	3.69	11.35	3.91
	Experience	20.66	13.32	21.28	13.19	19.76	13.46
	Experience-squared	604.30	635.82	627.04	639.57	571.55	629.00
	Real hourly wage	4.38	4.39	4.40	4.59	4.34	4.07
	Log real hourly wage	1.18	0.75	1.17	0.75	1.19	0.75
	N	13,040		7,802		5,238	
2000	Primary incomplete	0.07	0.25	0.06	0.25	0.07	0.25
	Primary complete	0.24	0.43	0.27	0.44	0.20	0.40
	Secondary incomplete	0.20	0.40	0.24	0.43	0.15	0.36
	Secondary complete	0.19	0.40	0.19	0.39	0.20	0.40
	University incomplete	0.13	0.34	0.12	0.32	0.15	0.36
	University complete	0.16	0.37	0.12	0.32	0.23	0.42
	Years of education	10.82	3.82	10.43	3.70	11.39	3.92
	Experience	20.69	13.30	20.95	13.04	20.33	13.67
	Experience-squared	605.17	643.02	608.79	634.68	599.92	654.94
	Real hourly wage	4.41	4.54	4.43	4.68	4.37	4.33
	Log real hourly wage	1.16	0.78	1.15	0.79	1.18	0.78
	N	12,056		7,105		4,951	

cont'd

Annex Table 1 (cont'd): Means and Standard Deviations of Samples

		All		Men		Woman	
	Variable	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
2001	Primary incomplete	0.07	0.25	0.07	0.25	0.06	0.25
	Primary complete	0.24	0.43	0.27	0.44	0.20	0.40
	Secondary incomplete	0.19	0.39	0.21	0.41	0.15	0.36
	Secondary complete	0.20	0.40	0.20	0.40	0.19	0.39
	University incomplete	0.14	0.35	0.13	0.33	0.16	0.37
	University complete	0.17	0.38	0.12	0.33	0.24	0.43
	Years of education	10.91	3.85	10.51	3.75	11.49	3.93
	Experience	21.05	13.36	21.36	13.15	20.62	13.66
	Experience-squared	621.89	644.23	629.01	637.09	611.65	654.31
	Real hourly wage	4.45	4.75	4.50	5.09	4.38	4.21
	Log real hourly wage	1.15	0.82	1.14	0.82	1.16	0.82
	N	11,337		6,693		4,644	
2002	Primary incomplete	0.08	0.26	0.08	0.27	0.07	0.25
	Primary complete	0.23	0.42	0.25	0.43	0.20	0.40
	Secondary incomplete	0.19	0.40	0.23	0.42	0.15	0.36
	Secondary complete	0.19	0.39	0.18	0.39	0.20	0.40
	University incomplete	0.14	0.35	0.13	0.34	0.15	0.36
	University complete	0.17	0.38	0.13	0.34	0.23	0.42
	Years of education	10.88	3.92	10.52	3.88	11.36	3.92
	Experience	21.28	13.26	21.76	13.22	20.63	13.29
	Experience-squared	628.50	642.35	648.34	649.91	602.04	631.24
	Real hourly wage	3.14	4.05	3.33	4.79	2.90	2.75
	Log real hourly wage	0.78	0.83	0.79	0.86	0.76	0.78
	N	9,675		5,504		4,171	

Source: EPH

ESTIMATING THE RETURNS TO EDUCATION IN ARGENTINA USING QUANTILE REGRESSION ANALYSIS: 1992-2002

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RESUMEN

Clasificación JEL: I21, J31.

Una gran cantidad de estudios ha intentando estimar el retorno promedio a educarse examinando el efecto que tiene un año adicional de educación sobre la esperanza condicional de salarios. Trabajos internacionales recientes sugieren que en varios países incrementos en los años de educación pueden resultar en cualquier efecto sobre la distribución condicional de salarios, y no solo el de incrementar la media. Es por esto que este trabajo examina dicho fenómeno para el caso de Argentina a lo largo de un periodo de diez años. Se estiman los retornos a educarse en diferentes partes de la distribución condicional de salarios utilizando el método de regresión por cuantiles. Se analiza la posible existencia de retornos heterogéneos individuales y se encuentra que: a lo largo del tiempo, mientras los hombres tienen retornos educativos mayores cuanto mas arriba se encuentren en la distribución, las mujeres que experimentan los mayores retornos están ubicadas en los cuantiles mas bajos, obteniendo mayores beneficios por educarse. Estos resultados tienen implicancias potenciales para la expansión de las oportunidades educativas en Argentina.

Palabras claves: Retornos a la educación, salarios, regresiones cuantílicas.

SUMMARY

JEL Classification: I21, J31.

There are countless estimates of the average returns to education which looks at the effect of an additional year of schooling on the conditional mean distribution of salaries. Recent international works suggest that there are variations from the average return to education across the population. That is why in this paper we examine this possibility for the case of Argentina over a ten year period. We estimate returns to schooling at different quantiles of the conditional distribution of wages using quantile regression method. We test whether there is individual heterogeneity in returns to education and find that: over time, while males have higher returns to schooling at the higher quantile, women's returns are highest at the lowest quantile. The evidence is suggesting that while lower ability women may benefit more from schooling the reverse is true for men. Our findings have potential implications for the expansion of educational opportunities in Argentina.

Keywords: Returns to schooling, wages, quantile regressions.