“Visión de Futuro” Año 8, Nº1 Volumen Nº15, Enero - Junio 2011
URL de la Revista: www.fce.unam.edu.ar/revistacientifica/
URL del Documento http://revistacientifica.fce.unam.edu.ar/index.php?option=com_content&view=article&id=232&Itemid=56
ISSN 1668 – 8708
Fecha de recepción: 30/11/10
Fecha de aprobación definitiva: 06/03/11

EDUCATIONAL ACHIEVEMENT IN NORTHEASTERN ARGENTINA RECENT AND CURRENT STRUCTURE

Rodrigo A. Fernández

Universidad Nacional de Misiones

Facultad de Ciencias Económicas

Ruta Nacional Nº 12, Km 7 ½, (C.P. 3304)

Miguel Lanús, Misiones, Argentina

E-mail: rafernandez@fce.unam.edu.ar

SUMMARY

This paper estimates the private returns on investment in education. Annual rates of return were estimated for the conglomerates in northeastern Argentina (NEA) between the third term of 2003 and third term of 2009, using the basis of micro-data from the Permanent Household Survey (EPH). In yield estimation were proposed models for men and women to correct the sample bias problems evidenced in their low participation in the Economically Active Population (PEA). The results show a higher return to education for men than for women, a different yield in the agglomerate Posadas above average of NEA, a high penalty function in the informal economy sector (black work) a direct relationship between company size and yields of men at the same time would bring report less volatility in its temporal evolution.

KEY WORDS: Human Capital Theory; Educational Achievement; Mincer Equation; Sampling Bias.

INTRODUCTION

One of the traditional ways of approaching the study of the relationship between education and economy is trying to establish how education contributes to the welfare of people, either due to their increasing ability to acquire a greater amount of material goods, either going beyond the monetary sphere and considering improving the capabilities of the person, whether even due to the impact that education has on the whole economy, for example in terms of increased growth rates. For some time, these and other alternative explanations were discussed in economics in the so-called Human Capital Theory, which was consolidated as a specific field of economics to the 1960's.

Since the approach linking education with the ability to acquire more goods can be considered to work Schooling, Experience and Earnings Jacob Mincer published in 1974 as one of the seminal contributions to the study of the relationship between income, education and experience. Since this work is a systematized treatment of these variables under the approach called Mincer equation, which considers the decision to obtain additional education levels similar to an investment decision like any other, and which arises from the comparison of expected profits net of the cost of additional education, compared to the gains expected by the less educated. In this paper we adopt this approach in order to quantify the benefits of higher education, focusing the analysis on the urban areas of northeastern Argentina, Posadas, Resistencia, Chaco and Formosa, during the period 2003 to 2009.

Recent studies in Argentina Economy Literature

Notably, the study of the relationship between income and education is not new in Argentina, one of the early works in the country is Del Rey et. al. (1978), published in the Annals of the Association Argentina of Political Economy (AAEP), in this work the performance of higher education was estimated in the specific case of the accountants of the province of

Salta. However, it should be noted that they have not properly used Mincerian approach for determining the performance. It will be only in Ferrá & Claramunt (1984), who specifically applying Mincer Equation with a very basic specification in the explanatory variables including age and educational attainment and find that private returns to education had a rate of between 8 % and 19%, using data and Household Survey 1980, to agglomerate the Greater Mendoza.

From these early estimations of yields, there has been progress in both theoretical developments as in econometric and empirical implementation field. These developments can be followed in the series of works that are regularly published in the annals of the AAEP, being fundamental contributions in Peace (1992) and Peace (1993) who conducted econometric estimates in both studies, using the basic model of Equation Expanded Mincer, which in addition to using traditional variables such as education and potential experience includes other explanatory variables such as gender, geographic location, and characteristics of the productive sector.

More recently, Peace (2007) identifies a significant difference according to defined occupational insert mode depending on the complexity of the task at work, a distinction of being included in the model would imply an overestimation of educational performance, and then Peace (2009), analyzes the salaries of the urban centers of Argentina relieving EPH in the period 1995 to 2003 and compares the returns to education in cities across the country is some uniformity in all with an average rate of 6% for men and 4.7% for women, including in the model postulated a series of refinements aimed at eliminating bias and specification bias by sample type.

DEVELOPMENT

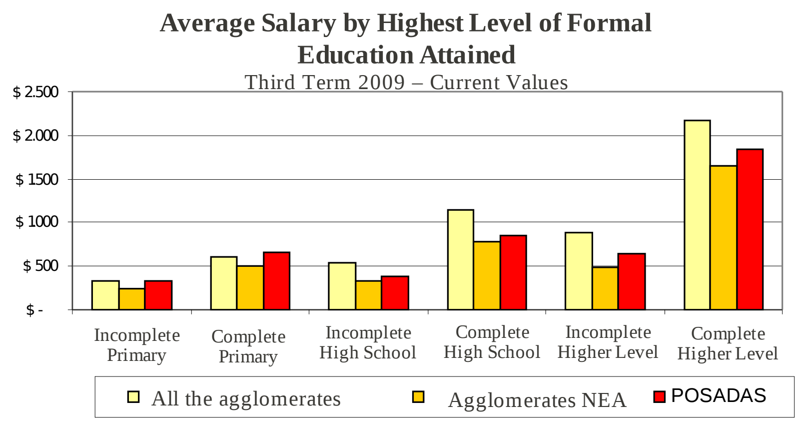
This paper adopts the approach of the extended Mincer equation and are estimated earnings functions under different specifications for models seeking to incorporate new strategies for treatment appropriate to bias specification and sample type, following as far as possible the methodological precautions presented successively in Peace (1992), Peace (1993), Peace (2007) and Paz (2009).

In the following work will be presented some stylized facts relating to income, education level and experience, then characterizes the theoretical model that relates the income level of education and experience, then details the results and work closes with the conclusions.

Some stylized facts

Chart 1 shows the relationship between wages and education levels, as appears from the information of the Permanent Household Survey for the third quarter of 2009. Wages were evaluated in three different geographical levels, taking the average for the 31 clusters surveyed by the PHS, the four clusters of the NEA (Resistencia, Corrientes, Formosa and Posadas) and the values of the agglomerate Posadas. The graph shows the relationship between the average monthly salary and educational attainment, as can be seen that the average wage levels and Higher Secondary Incomplete do not differ significantly from the average levels of Elementary and Secondary Comprehensive respectively, regularly maintained in the three geographical levels indicated.

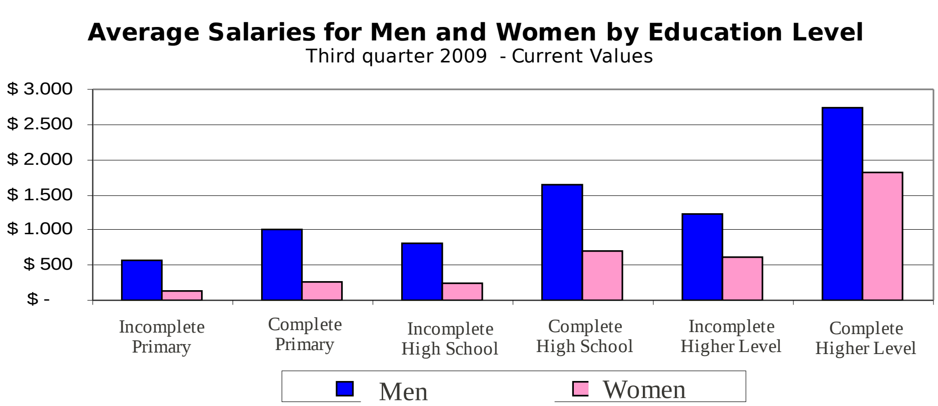
Figure 1: Average Salary by Highest Level of Formal Education Attained



Source: Author's calculations based on EPH-INDEC Information

In addition to wage differentials attributable to education, literature that analyzes the labor market wage gaps have been identified according to sex of the person. For example, the average pay gap between men and women, according to Di Pasquale and Atucha Actis (2003), in the case of Argentina in 2003 stood at 14% for all workers and 13% for employees. Figure 2 examines the relationship between wages of men and women breaking down the analysis by level of educational attainment. There can be seen that this empirical regularity, the salaries of men older than the women stood in 2009, but also that this regularity holds for all levels of education.

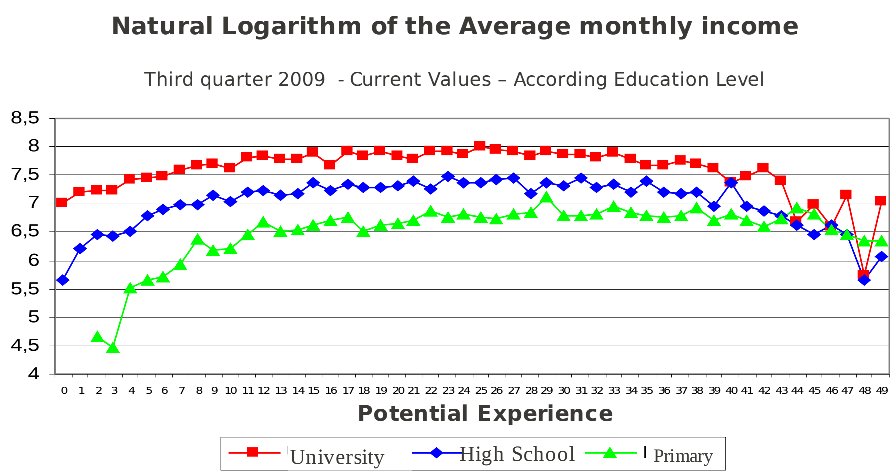
Figure 2: Average Salaries for Men and Women by Education Level



Source: Author's calculations based on EPH-INDEC Information

Graph 3 shows the natural logarithm of the average monthly income by age of the person, which allows you to set about the relationship between wages earned and the experience of the worker. As can be seen at all three levels of education, to start the relationship is positive which indicates that the salary increases as workers increase their experience, overcome after 20 to 25 years of potential income tends to fall for all levels of education. As clarified in Rupert et. all, (1996), about the relationship between wages, education and experience, should be clear from the differences in wage curves, the effects of experience must be adequately separated from those of education, to avoid bias in the measurement of income to education.

Figure 3: Natural Logarithm of the average monthly income



Source: Author's calculations based on EPH-INDEC Information

One aspect not considered in international studies is the effect of work in black or unregistered work, where employers avoid paying social security contributions and other labor taxes, in determining the salary of employees or employees as employees. As was seen in the work, the pay gap between registered and unregistered employees is greater than 50% in almost all sectors of economic activity.

The theoretical and model specification

The model used for the analysis of income, educational attainment and work experience, falls within the so-called Human Capital Theory and is based on Mincer (1974). There he considers education, both for the years of schooling (educational attainment in primary, secondary or university) and training in the workplace or post-school education as an investment in human capital and the modeling of decision the optimal level of education a person is presented as a maximization problem in comparing the present value of earnings for each additional year of education to the revenue which would result if education does not make any (investment) in addition.

The conventional way of specifying a revenue model empirically related to the educational and work experience, and at the same time allowing capturing the effect of declining investment in time, using the revenue function in a quadratic term on experience such as:

$$y_{i,t} = \alpha_0 + \alpha_1 ESC_{i,t} + \alpha_2 EXP_{i,t} + \alpha_3 \left(EXP_{i,t}\right)^2 + \gamma Z_{i,t} + \varepsilon_{i,t}$$

In the above expression $y_{i,t}$ is the natural logarithm of income, ESC number of years of formal schooling, EXP number of years of work experience, Z represents a vector of explanatory variables which commonly include gender, place of residence, type of company where you work and other observable characteristics of workers. Finally $\varepsilon_{i,t}$ is the error term that captures both the unobservable characteristics of workers as possible measurement errors. This equation is then estimated by Ordinary Least Squares (OLS), and the values of the coefficients allow obtaining rates of return to education.

It should be noted that this work be considered theoretical to obtain each level of schooling, and do not include corrections over time that actually takes the person to acquire that level. The values adopted in the study are: 7 years for primary education, 12 years for secondary education and 18 years for higher education.

Modeling the effect of level of education on income

One of the core variables of the model of Mincer's schooling or the highest level of education achieved, in the model is called variable ESC, which is the traditional way of introducing education using a variable scale on which are expressed years of schooling of people. As a result of this form of specification of the model gets a continuously variable rate for each additional year of formal schooling.

While the general premise, the higher education increased revenue that arises from model is validated by empirical estimates, how to incorporate the schooling models also can introduce bias specification, particularly if not properly differentiate the possession of university degree possession of graduate degrees, which would overestimate the performance of higher education by introducing a bias towards accepting the original hypothesis.

As shown in the section of stylized facts, comparing wages between those with complete and incomplete studies, it appears that the wages of incomplete higher education do not differ significantly from a high school diploma and the same can be concluded by comparing incomplete secondary with complete primary, so that this makes the model the returns to education with a variable of years of education will be an overestimation of the yields for cases in which people fail to complete the educational level, in other words theyh do not get the title of the corresponding level. In this case the variable ESC can be replaced by a vector ESC qualitative variables which indicate academic achievement and achieved the highest authority, for example: high school diploma, college degree, high school dropout, and so on. As it relieves the EPH INDEC. This specification has the advantage of capturing the discrete jumps in revenue from people when they reach a degree. In developing the models took into account this particularity and was replaced by a vector variable ESC containing qualitative variables that describe the highest level reached, and that using information from the EPH take the following form:

$$ESC = \left(SININS, PRINC, PRICOM, SECIN, SUPIN, SUPCOM\right)$$

In order of appearance in the vector, the variables correspond to the categories: no education, incomplete primary, complete primary and incomplete secondary, incomplete higher, Superior Complete, inclusion of Complete Secondary level, taken as a reference level is a econometric requirement to avoid perfect multi-co linearity and implies that other levels of educational performance are obtained compared to baseline. Note that this column is vector premultiplied by a row vector containing the coefficients of each of these variables and replace the original rate α_1 .

Modeling the effect of experience on income

The way of modeling experience imposes certain restrictions on the particular way in which the investment in education declines over time and will determine in this way the concave shape of the income to the extent that increasing age of the person. Speaking of concave shape of the income you are referring to the stylized fact under which the income increases in the first 20 to 25 years of work, and then tend to decrease.

The specification of the experience originally adopted by Mincer (1974) and most of the work of literature is to consider the potential experience of people, which arises from assuming that the experience begins at the time formal schooling ends, so that experience can be obtained as the difference between the person's age and years of schooling, a figure that must be deducted which represents the beginning of formal schooling in young children, this is the approach in this work.

Modeling factors influencing the level of income

In addition to the variables relating to level of education and experience, we included a set of variables to capture structural differences in a sample that includes as the PHS, urban

"Visión de Futuro" Año 8, Nº1 Volumen Nº15, Enero - Junio 2011

areas across the country. In general, we included variables to distinguish: a) employment in respect of employment in formal black (EMPINF); b) employment in the public sector (SECPUB); c) the mode of work as employees on other forms Pattern (pattern) and Self (CTAPIA); d) the establishment's industry; e) urban area to which the data Posadas, Corrientes (AGLOCOR), Formosa (AGLOFOR) and Resistance (AGLORES); f) type of activity performed in the establishment, from unskilled workers to professionals (LABOPRO), with technical qualification (LABTEC) and operational qualification (LABOPE); g) the size of the establishment by the number of employees with 5 or fewer workers, and two additional levels, facilities with 6 to 40 employees (NTRAB2) and more than 40 employees (NTRAB3); h) in the case of women added an additional variable that discriminated marital status (married or in couples) of single (MUJERENP).

Sample bias correction

To obtain the rate of return to education, consistent and reliable, it is necessary that the data used in the model are representative of the total population, and there is a match between observed wages and reservation wages of workers in both revenues are estimated for employed workers who can actually report income.

The analysis of the socio-demographic indicators made by the INDEC appears that the activity rate reported for the male population of the 31 clusters surveyed in the PHS between 14 and 29 was 58.6% and the rate for females was of 40.1%, this gap widens even more for the age range of 30 to 64 years, while the activity rate for men is 93.1% while for the case of women reaches 64.6%.

Declining participation in the labor market, both male and female, ranging in age from 18 to 30 years, is associated with the continuing process of study, since the focus of the Human Capital Theory is understood as half of human capital accumulation and has a direct effect on the setting of the reservation wage of workers (higher wages for greater investment in education). This phenomenon makes it necessary to limit the lower limit of the age of the sample, given that between 18 and 25 years there will be a proportion of the population which does not participate actively in the labor market while they are pursuing their higher studies, is taken as the limit below the age of 25 years.

An estimate of the rates, for clusters of less than 500,000, showed a decline in the participation rate once the age of 50 years, a phenomenon related to the increased incidence of retirement for people, regardless of sex. For this reason, according to Peace (2009) adopted the criterion of the sample is bounded above by setting an upper limit the age of 54 years.

Moreover, the gap between labor force participation of men and women is independent of age and evidence that women would be giving up or conditioning its participation in the labor market so that it is compatible with the housework, which from a historical perspective makes the definition and distribution of family roles and spaces between men and women, which is common in studies analyzing the labor market in terms of a segmented labor market structure. In terms of economic theory, this decision implies an implicit valuation of housework or shadow wage of those activities, which determine the participation of women in the labor market, and in view of the statistics to be considered for working women as representative of the total population is inadequate and enter a kind of bias that the econometric literature is called selective clipping.

As clarified in Greene (2003), truncation occurs when the sample surveyed is only part of the total population, and discusses the example of studies on levels based on those with incomes above the poverty level line, in which case you could not use this information to draw conclusions regarding the total population. As clarified in Heckman (1979), sample selection bias can arise in two ways: one by the very choice of individuals in the sample, and another due to decisions of researchers or interviewers. In this particular case, the clipping should not be a feature of the survey, but originates in the very decision of women not to engage both rented at market wage would be lower than their reservation wage.

Estimate the yields of women without making the correction of this problem would be to introduce sample selection bias, in particular an overestimation of the performance of female education. To correct this problem by Greene (2003) proposes two alternatives, which allow the estimation of model parameters of sample selection or Inverse Mills Ratio (IMR): maximum likelihood estimation or a two-stage approach proposed in the work of Heckman (1979).

Of the two alternatives, the most commonly used in the empirical literature, and also used in this work is that of Heckman (1979), which is introduced into the equation to estimate a correction of female earnings weighted by the probability of participation in the economically active population of women. This procedure, following the methodology of the author, is to estimate by maximum likelihood model of female participation, and introduce these parameters in the estimation of income or education Mincer equations, which could be estimated by ordinary least squares; strategy used in this work.

Characterization of information

The data used in this work correspond to the information that comes from their own questionnaires Household Survey, conducted by the National Institute of Statistics and Census (INDEC) in 31 urban areas of Argentina, for all quarters, ranging from the third quarter of 2003 to the third quarter of 2009, only available at the time of completion of work.

In defining the study sample was taken the approach used in Peace (2009), so it is limited to the study of a population of adults between 25 and 54 years of age, as this is the group which verifies the highest rate of activity. Separate estimates were made for each year and in turn developed alternative models by gender, sample: 1360 men and 1050 women for 2003 men and 2306 women, 2804 to 2004, 2879 men and 2354 women for 2005, 3689 men and 2850 for 2006 women, 3081 men and 2318 women for 2007, 4065 men and 3131 women for 2008, 3093 men and 2207 women in 2009.

For analysis of female participation in the economically active population was developed a routine for obtaining the number of children per household, so that this variable could be incorporated into the model. It Was also considered relevant the marital status of women (concubine or wife), as a condition of the decision to participate in the labor market.

Results

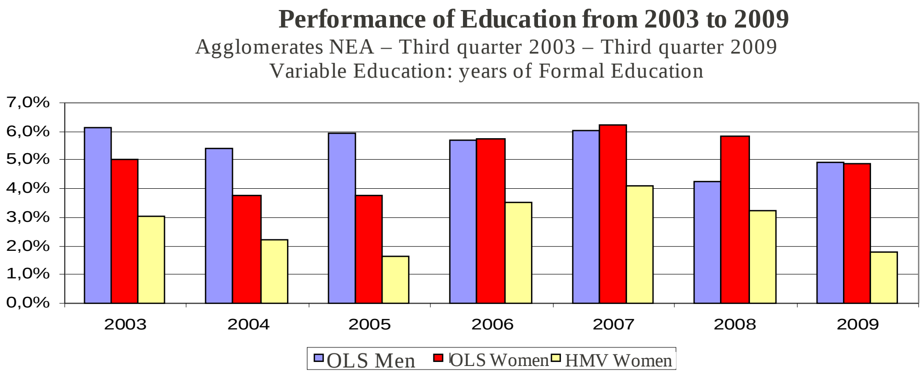
This paper focuses on the analysis of the information on the evolution of returns to education from 2003 until the third quarter of 2009, being the latest available at the time of the job. It intends to contribute in identifying the differences between the mean values of the returns to education for every urban area of the NEA. Here are the results:

Rates similar to other studies

The first record in Argentina's economic literature on the application of the Mincer equation to estimate returns to education can be traced to the mid 1980, when Ferrer & Claramunt (1984), returning the natural logarithm of income over schooling and experience, estimate that private returns to education had a rate of 8% and 19%, using data and Household Survey 1980, the agglomerate Gran Mendoza. Another estimate applied to the City of Cordoba can be found in Gertel et. al. (1987), who estimates that the average yield of formal education is 9%, and also found a higher yield of male workers than women with equivalent levels of training. More recent studies, as Fiszbein et al. (2005) estimates based features Mincer equation for the period 1992 to 2002 and found average rates of return between 8.6% and 11.4%, with values slightly higher for men compared with women. While in a study dedicated to establishing regional differences, Paz (2009) for the period 1995 to 2003, an average rate of male workers of 6% for the whole country, with a slightly lower rate for the region NEA 5.4%, while women show a yield of 4.5% for all of Argentina, and 4.2% by the NEA region.

Graph 4 shows that as a result of the research rates were similar to studies with rates close to 6% for males and lower returns for women, quite close to those found in Peace (2009), with a slight tendency down in the last two years about what happened between 2003 and 2007.

Figure 4: Performance of Education from 2003 to 2009



Source: Author's calculations based on EPH-INDEC Information

Graph 4 shows two estimates for women, an estimate shows that during the period 2006 to 2008 the performance of women would have exceeded that of men, and a corrected estimate in which values are obtained consistently lower for women compared of males should be remembered that previously had discussed the effect of Sampling bias and the theory predicts an overestimation of performance as would be observed while running the same model for men than for women.

A similar incident was reported in Peace (2007), who stated that the application of models with the basic variables of the Mincer equation results showed improved performance in women, a phenomenon that is deleted when you specify a model which included dimension of complexity of the task.

Table 1 shows, for each of the years covered by the study period 2003 to 2009, the coefficients and statistics obtained by using the model that uses education in terms of years of study, additionally p-Value incorporate it possible to assess the individual significance of the parameter obtained in the model, where low-value p-value indicates that all performance parameters are significant at 1%.

Table 1: Statistics for the variable EDUCATION

Statistics for the variable EDUCATION							
	Model with Education per year - Men MCO						
Variable	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
ESC	0.0615	0.0542	0.0594	0.0569	0.0602	0.0424	0.0492
P-Value	-0.0065	-0.0042	-0.0040	-0.0034	-0.0040	-0.0033	-0.0037
	Model with Education per year - Women MCO						
Variable	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
ESC	0.0500	0.0376	0.0378	0.0576	0.0625	0.0585	0.0485
P-Value	-0.0072	-0.0046	-0.0049	-0.0043	-0.0048	-0.0041	-0.0049
	Model with Education per year - Women MCO						
Variable	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
ESC	0.0303	0.0222	0.0165	0.0354	0.0410	0.0322	0.0179
P-Value	-0.0078	-0.0050	-0.0052	-0.0048	-0.0054	-0.0046	-0.0056

Source: Author's calculations based on EPH-INDEC Information

In this research, as specified above, performed the traditional least squares estimates, but in the case of models applied to the performance of women there was a sampling bias correction to adequately capture the phenomenon of the sexual division of labor, with which in the reproductive age, many women leave the labor market temporarily and will focus primarily on education of children and housework.

Note that the specification of the corrected model for women obtained the expected results, while the presence of children at home tended to negatively affect women's participation in the labor market. A second result in the equation of women's participation in the labor market is the direct relationship between the total family income (the expected positive sign) and participation in the EAP, which supports the hypothesis that housework would raise the reservation wage of women. The results of this modification, which allows correction of sampling bias in the case of women shown in Table 2, which describes the variables, used in the equation that model female participation in the labor market depending on their age and the number of children.

Table 2: Statistics for the Sample Bias Correction

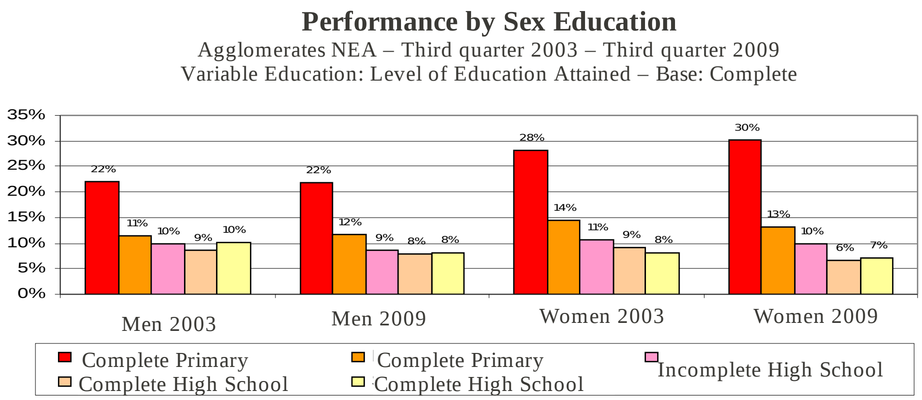
Statistics for the Sample Bias Correction							
	Model with Education per year– Women HMV						
Variable	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
EDAD	0.1149	0.1795	0.2040	0.2222	0.1954	0.1742	0.1479
p-Value	-0.0307	-0.0224	-0.0218	-0.0202	-0.0220	-0.0189	-0.0214
EDAD2	-0.0014	-0.0022	-0.0025	-0.0027	-0.0023	-0.0021	-0.0017
p-Value	-0.0004	-0.0003	-0.0003	-0.0003	-0.0003	-0.0002	-0.0003
ITF	0.0003	0.0002	0.0003	0.0002	0.0001	0.0002	0.0001
p-Value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
KIDS (0 to 6)	-0.0086	-0.0161	-0.1119	-0.0755	-0.0253	-0.0161	-0.0447
p-Value	-0.0982	-0.0548	-0.0510	-0.0619	-0.0512	-0.0362	-0.0504
KIDS (6 to 18)	-0.0379	-0.0803	-0.0646	-0.0220	-0.0154	-0.0653	-0.0772
p-Value	-0.0258	-0.0225	-0.0240	-0.0267	-0.0258	-0.0239	-0.0255

Source: Author's calculations based on EPH-INDEC Information

Table 2 shows that the model used for women's participation is quite robust, and with the exception of 2003, the coefficients show low p-Value. Deserves a special coefficient of the variable number of children 0 to 6 years (KIDS (0 to 6)), that just in 2003 is itself very low and it is remarkably low statistical significance of their being only significant at 10% but in the limit (p-Value = 0.0982), which could indicate that the 2002 economic crisis have had a strong impact on families that would have forced the mothers of minor children to join the labor market, a phenomenon that disappears after 2004.

While the estimated rate of return per year can give the idea of a linear relationship between formal education and performance, we proceeded to estimate the returns to education using the highest educational level attained as an explanatory variable. In Figure 5, there is another conventional result in the literature, evidence of a declining rate of return on the increase as years of education.

Figure 5: Performance by Sex Education



Source: Author's calculations based on EPH-INDEC Information

By analyzing Figure 5, it is interesting that in 2003, while still dominant in the labor market outcomes of the 2002 economic crisis; it appears to the case of males increased performance levels over the level Superior Complete Incomplete. This result, even when it contradicts the usual assumption of diminishing returns would be consistent with the evidence found in Pessino (1995) on the consequences of technological change operated during the period of convertibility, which would have meant an increase in physical capital intensity and human. These new technologies have led companies to replace their skill levels in business schools increase the demand for skilled labor and reducing that of unskilled labor, so in the context still close to the period of crisis, the greater appreciation of the skilled jobs , better adapted to new technology, would operate as an element of protection against unemployment of more skilled workers and against deterioration of the income of these workers.

For a more detailed modeling of education in terms of highest educational level attained, Table 3 presents the coefficients and statistics associated to the variable levels of primary education, incomplete secondary, incomplete higher and tertiary degree. From Table 3 highlights that the use of these variables in the models is adequate, while the significance of the parameter estimates given by the p-value never exceeds 0.1 which implies that at least the statistics obtained are significant at 10%. It should be noted that the extent of work not presented, statistics from the rest of the variables used in the model of educational levels, though as a general rule, the indicators of the variables did not differ greatly from those obtained with the model of education in terms of years of study.

Table 3: Statistics for the Sample Bias Correction

Statistics for the variable: Education Level							
	Model with Education per year – Men MCO						
Variable	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
PRICOM	-0.2235	-0.2184	-0.2525	-0.2372	-0.2190	-0.1514	-0.1945
p-Value	-0.0614	-0.0388	-0.0362	-0.0314	-0.0361	-0.0296	-0.0336
SECINC	-0.0558	-0.1700	-0.1661	-0.1620	-0.0886	-0.0886	-0.1925
p-Value	-0.0612	-0.0395	-0.0376	-0.0327	-0.0366	-0.0288	-0.0335
SUPINC	0.2322	0.0813	-0.1129	0.1280	0.2308	0.2001	0.1430
P-Value	-0.0773	-0.0465	-0.0451	-0.0376	-0.0426	-0.0356	-0.0395
SUPCOM	0.5940	0.4731	0.4463	0.4553	0.5014	0.3792	0.3646
p-Value	-0.0733	-0.0478	-0.0437	-0.0371	-0.0431	-0.0354	-0.0381
Model with Education per year - Women MCO							
Variable	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
PRICOM	-0.1019	-0.1472	-0.1137	-0.2694	-0.2079	-0.1981	-0.2399
p-Value	-0.0702	-0.0454	-0.0451	-0.0415	-0.0471	-0.0395	-0.0465
SECINC	-0.0648	-0.0935	-0.0823	-0.2426	-0.1243	-0.1386	-0.1621
p-Value	-0.0698	-0.0453	-0.0448	-0.0420	-0.0462	-0.0384	-0.0461
SUPINC	0.3049	0.1714	0.0863	0.1097	0.2256	0.1838	0.0000
P-Value	-0.0868	-0.0513	-0.0505	-0.0433	-0.0487	-0.0391	-0.0485
SUPCOM	0.4746	0.3248	0.3927	0.4234	0.4317	0.04331	0.3675
p-Value	-0.0724	-0.0470	-0.0467	-0.0422	-0.0437	-0.0359	-0.0431
Model with Education per year – Women HMV							
Variable	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
PRICOM	0.0057	-0.0767	-0.0293	-0.1659	-0.1087	-0.0677	-0.0834
p-Value	-0.0694	-0.0455	-0.0446	-0.0421	-0.0480	-0.0397	-0.0472
SECINC	0.0040	-0.0574	-0.0361	-0.1860	-0.0652	-0.0627	-0.0630
p-Value	-0.0675	-0.0447	-0.0436	-0.0414	-0.0462	-0.0376	-0.0454
SUPINC	0.2765	0.1262	0.0298	0.0541	0.1666	0.1257	-0.0690
P-Value	-0.0857	-0.0514	-0.0502	-0.0432	-0.0489	-0.0391	-0.0481
SUPCOM	0.3826	0.2268	0.2532	0.3013	0.3117	0.3022	0.2279
p-Value	-0.0727	-0.0480	-0.0478	-0.0433	-0.0460	-0.0374	-0.0447

Source: Author's calculations based on EPH-INDEC Information

Additional clarification, the coefficient estimates in Table 3 can not be directly interpreted as returns, in the case of using the vector of qualitative variables to obtain yields for each level, you must perform the following calculation:

$$TRE_{NE}=\frac{e^{\alpha_{NE}}}{t_{NE}}$$

Where TRE_{NE} the rate of returns to education for the educational level attained NE, "e" is the mathematical constant which represents the base of natural logarithms, α_{NE} the coefficient of the respective educational level, and t_{NE} is the time measured in years to reach This level of education.

The Return of Experience

In the models constructed in this research found evidence that a greater appreciation of the experience of men with an average rate of 2% per year of experience, while in the case of women in least squares models and had a slightly higher rate to 1%, the introduction of sample bias correction implies a yield of close to zero experience and an unexpected positive sign in the quadratic term, as shown in Table 4.

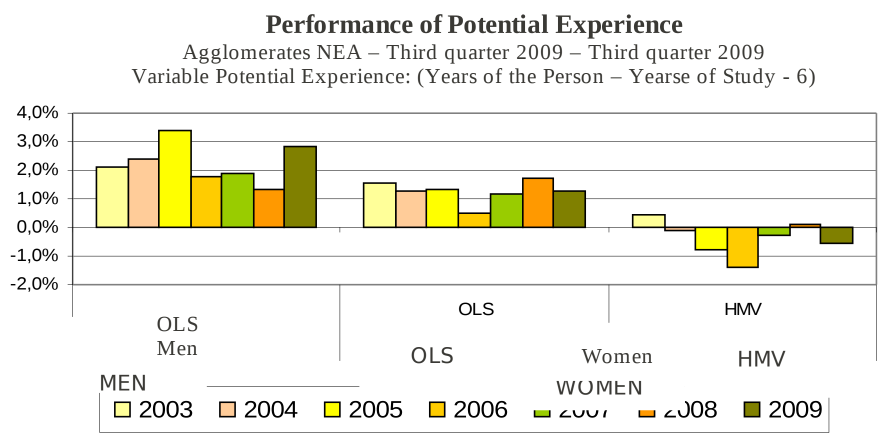
Table 4: Statistics for the potential experience variable

Statistics for the variable **POTENTIAL EXPERIENCE**							
	Model with Education per year - Men MCO						
Variable	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
EXP	0.0213	0.0237	0.0340	0.0176	0.0188	0.0131	0.0283
p-Value	-0.0096	-0.0057	-0.0054	-0.0046	-0.0051	-0.0043	-0.0049
EXPˆ2	-0.0002	-0.0002	-0.0005	-0.0002	-0.0002	-0.0001	-0.0004
p-Value	-0.0002	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001
	Model with Education per year – Women MCO						
Variable	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
EXP	0.0158	0.0130	0.0134	0.0050	0.0116	0.0172	0.0130
p-Value	-0.0089	-0.0055	-0.0057	-0.0050	-0.0054	-0.0046	-0.0056
EXPˆ2	-0.0001	-0.0002	-0.0002	0.0000	-0.0001	-0.0003	-0.0002
p-Value	-0.0002	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001
	Model with Education per year – Women HMV						
Variable	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
EXP	0.0044	-0.0011	-0.0080	-0.0137	-0.0026	0.0010	-0.0055
p-Value	-0.0092	-0.0057	-0.0059	-0.0053	-0.0057	-0.0048	-0.0059
EXPˆ2	0.0001	0.0001	0.0002	0.0004	0.0002	0.0000	0.0001
p-Value	-0.0002	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001

Source: Author's calculations based on EPH-INDEC Information

The way to interpret the performance of the experiment is carried out in Figure 6, showing the evolution of the performance potential experience for men and women. The graph shows that when the correction model, as participation in the labor market for women implies that women's performance is practically no experience, this finding may indicate the need to redefine the concept of Potential Experience for women, whose data should be net of the past few years outside of work, hypotheses to be explored in later work.

Figure 6: Performance of Potential Experience

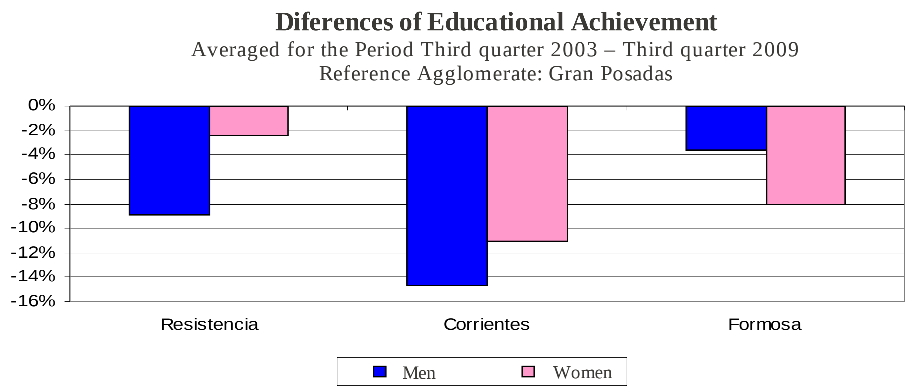


Source: Author's calculations based on EPH-INDEC Information

Differences in returns from agglomeration

The model included variables to capture geographic differences in rates of educational achievement, adopting as reference to agglomerate the city of Posadas. Graph 7 shows that both Resistencia as Corrientes and Formosa presented for the period under review a lower average yield of education, and in turn there are regional differences in rates of return by gender, in the case for males the smallest difference is observed in Formosa, and in the case of women in resistance, while currents shows the largest differences in both cases.

Figure 7: Differences of Educational Achievement



Source: Author's calculations based on EPH-INDEC Information

CONCLUSION

In this paper we have estimated the private returns to investment in education through continuous models were estimated annual rates of return for the conglomerates in the northeastern Argentina (NEA) between the third quarter of 2003 and third quarter of 2009, using the basis of micro-data from the Permanent Survey of Households (EPH).

The proposed yield estimation models for men and women, how to correct in the latter sample bias problems, evidenced in their low participation in the Economically Active Population (PEA). Even estimates were made with the rates of return are entering education as the highest level of educational attainment, which shows that schooling would be subject to diminishing returns.

The results show a higher return to education for men than for women, a difference in the agglomerate yield above average Posadas of NEA, a high penalty function in the informal economy (black work) a direct relationship between company size and yields of the men at the same time would bring less volatility in its temporal evolution.

BIBLIOGRAPHY

Please refer to articles Spanish bibliography.