9. EDUCATION IN ROMANIA - HOW MUCH IS IT WORTH?

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Abstract

This paper aims at estimating the impact of education on individual earnings through the econometric modeling of secondary data, for the year 2009 in Romania. The national representative sample used includes 16,570 statistical observations. Surprisingly, the largest impact on Romania's income is determined by gender. Male income (log) is 26.58% higher than that of females, although data shows, that, on average, women in the sample have more years of education than men. This shows a highly discriminatory phenomenon, which can be solved probably by educational and awareness raising programs, aimed at combating gender-based (wage) discrimination. As regards to the importance of education as a determinant of earnings, we conclude that it is a key determinant of individual income. If in 1995 the coefficient of the variable "years of education" was -0.0019 and in 2000 0.0061, in 2009 it was, according to this study, 0.081652. It shows that in Romania the importance of education has increased, and consequently, the importance of people's knowledge and skills in their wage level, has soared too, which, in turn, may be an indicator of the transformation of Romania into a knowledge based society.

Keywords: wages differential, education, gender discrimination, Mincer

JEL Classification: J31, J7, C5

I. Introduction

This paper aims at estimating the impact of education on individual earnings by econometric modeling of secondary data, for the year 2009.

The estimation is based on the use of an *earnings function and the Mincerian model*. Founder of the human capital theory, Mincer (1974) showed that the log of earnings is linearly related to the number of years of schooling of an individual. "The coefficient on schooling in a regression of log earnings on years of schooling is often called a rate of return. In fact, it is a price of schooling from a hedonic market wage equation. It is a

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growth rate of market earnings with years of schooling and not an internal rate of return measure, except under stringent conditions" (Heckman, Lochner, Todd, 2005, pp.4). There are two important conditions for the slope of this relationship to be interpreted as the rate of return to investment in schooling: a) the only cost of attending an additional year of schooling is the opportunity cost; and b) the proportional increase in earnings caused by this additional schooling is constant over the lifetime. The accomplishment of these conditions resulted in the famous Mincerian wage equation: $\ln W_i = \beta_0 + \beta_1 S_1 + \beta_2 X_i + \beta_3 X_i^2 + \varepsilon_i$, where: $\ln W_i$ is the natural log of the wage for the individual i, S_i represents the years of education, X_i - the experience, and X_i^2 – the squared experience.

This Mincerian equation has been estimated for most countries using OLS, *the results ranging from 0.05 to 0.15, generally being higher for female than male* (Krueger, A. B., Lindhal, M., 2001, pp.4). Unfortunately, there are just two similar estimations for the case of Romania. The first is "*Wage discrimination in Romania - Evolution and explanations*", by Pauna, C., (2009) and the second is "*Public Sector Pay and Inequality in Romania"*, Mihaescu, F., Voinea, L., (2009), a study which is not yet published in Romania. Pauna (2009) concludes that an additional year of education has a coefficient of 0.0469 for men, 0.0409 for women and 0.0061 for all the sample[2], for the year 2000.

A recent estimation of the structure of wages also uses the *quantile regression decomposition technique*. "The linear quantile egression (Q R) estimator is an increasingly important empirical tool, allowing researchers to fit parsimonious models to an entire conditional distribution. Part of the appeal of quantile regression derives from a natural parallel with conventional ordinary least squares (OLS) or mean regression. Just as OLS regression coefficients offer convenient summary statistics for conditional expectation functions, quantile regression coefficients can be used to make easily interpreted statements about conditional distributions. Moreover, unlike OLS coefficients, QR estimates capture changes in distribution shape and spread, as well as changes in location" (Angrist, Chernozhukov, Fernandez-Val, 2006, pp. 539). Estimations of Angrist, Chernozhukov, Fernandez-Val (2006), Blaise Melly (2005), Poterba and Rueben (1995), etc. use quntile regression tecnique. Despite this, OLS techniques are being used in this article.

Estimates of the profitability of investment in human capital have emerged since the 60's, motivated by the intent of explaining the processes of growth, development, the determinants of income distribution and the behavior of students as investors and consumers of education.

As stated in Krueger, A. B., Lindhal, M., (2001, p.5), the current literature is focused on answering questions like the influence of unobserved ability and its influence on earnings, education as a signal of ability (idea that founded the signalling theory), social returns to education, etc.

[2] *Pauna (2009) uses a nationally representative sample estimating an earnings function for the years 1995 and 2000.*

The results of empiric reserach reveal that primary education, women and countries with the lowest per capita income have the highes rates of return of education.

Findings in this area are important because they have implications for educational policy matters, specially for concentrating future investment in education and allocative decisions, oriented to areas that more private and social return bring.

George Psacharopoulus and Harry Anthony Patrinos (2002) compiled the average rate of return of an additional year of schoolling, presented in the table bellow:

Table 1

The Average Rate of Return of an Additional Year of Schooling

Countries according to their income $-	Level of education years	The Internal Rate of Return on Education %
High income countries	9.4	7.4
Medium income countries	7.6	10.7
Low income countries	7.6	10.9

Source: Psacharopoulus, G., Patrinos, A., P., Returns to Investment in Education. A Further Update, (2002), pp. 18

Psacharopoulos and Patrinos (2004) report a RRIE (based on the discount method, different from that used in this study) for a large sample of countries, including non-OECD countries, with a value of 11.6% for higher education in OECD countries. Blöndal et al. (2002) calculated RRIE for higher education in the late '90s for 10 countries and reached values between 7.5% (Italy) to 18.5% (UK). The data sources and methodologies in discussion are relatively different, which makes comparisons difficult but, at least partially, we may use these values as orientative for comparison purposes. De la Fuente and Jimeno (2005), which work is based on the study of Boarini & Strauss (OECD, 2007) estimate a RRIE between 4,28% (Sweden) and 12% (United Kingdom), with an average of 8,8% for EU-15.

2. Material and Methods

At methodological level, I have closely followed the Minicerian model. The source of data was Romania's official *Household Budget Survey (HBS) in 2009*, the most recent survey available at the time of this research, developed in October 2010 - January 2011[3]. An important feature of a database built on a sample is its representativeness. The HBS is calibrated on the structure of the latest census of the population, thus being representative at national level.

I chose to specify a *linear regression*, using OLS technique, r*egressing individual incomes on a number of explanatory variables available, including the level of education*. *The dependent variable* is thus the logarithm of the *net income* or *received income* (lnVEN). I have included only the revenues directly related to or determined by

[3] In Romania, since 2001, the Household Budget Survey (HBS) has became a continuous survey, being the main tool for assessing public expenditure and revenue.

education[4] and eliminated some incomes that were not directly related to education. In the very common situation when a person declared several sources of income, these were pooled resulting in that person's total income.

From the primary database I have eliminated those persons who reported the following employment status: unemployed, retired, student, housewife, another (old, pre-school, dependents, etc.). This decision was taken because these categories do not produce active labor market incomes that could be directly associated with education.

The list of explanatory or independent variables that compose the revenue function to be estimated is presented bellow:

1. *Years of education* - the number of school years was estimated on the basis of the response to question 11 from the Household Questionnaire (HQ) of the ABF 2009, namely "the last level of education of the highest grade completed". School starting age was considered to be seven years.

A limitation of this approach is that one year of education is not "homogeneous" in the sense that it has a different impact on the labor market depending on the level of education to which it refers. In other words, it is difficult to compare one year of primary education with one year of doctoral studies and the revenues produced by these. However, I have chosen this approach because it is the most widely used in Romanian and foreign studies, which will allow partial comparability with the results of these studies. For a detailed analysis of the limitations on using the years of education in similar studies, see Ion, I. (2011), "Measuring human capital– A scientific utopia?".

2. *Experience on the labor market* - this variable was defined using the following formula:

Experience = Age - Number of years of schooling – school starting age

The age was estimated by the formula: 2009 (year of completion of the survey) - year of birth.

3. *Gender* - dummy variable, in the sample there are 9,500 observations for men (57.33%) and 7,070 for women (42.67%).

4. *Nationality* - according to the HBS 2009, nationality could have been: Romanian, Hungarian, Rroma or other. To simplify the estimates, I have re-grouped the answers into two categories, namely one variable which takes on value 1 for Romanian nationality and 0 for "other nationalities". Other nationality citizens than Romanians had a weight of 9.22% in the total sample, mostly being Hungarians.

5. *Marital status* - according to the HBS 2009, the following answers were available: married (a), cohabiting (b), divorced (c), widowed (d), single (e), separated (f). To simplify the estimates, I have transformed the answers into a dummy variable that

[4] The types of income included were: income from wage work; income from agriculture, income from independent non-agricultural activities, from practicing a trade;) income from liberal professions and incomes from intellectual property rights; unofficial money received from employers. Incomes excluded were: income from property, revenue from the sale of household assets, other financial income, income from social benefits, loans and credits taken.

takes on the value 1 for married and cohabiting individuals and 0 for the rest (who basically do not declare the involvement in a couple relationship). Only 27.76% belong to this last category.

6. *Ownership* of employer– a variable answering the question "what is the ownership of your employer?". For simplicity, I have re-grouped the answers into: a) the state sector (taking on the value 1) and b) other forms of employer's property (taking on the value 0), which incorporates the private sector, mix enterprises, cooperatives, etc. In the sample, 14.26% of the respondents worked for the State, the rest being employed in other types of sectors.

7. *Activity* - the activity of the respondent or the industry in which he works. During 2001-2009, the Household Budget Survey used CAEN rev. 1. The manufacturing industry was omitted in the econometric processing (named in the econometric modeling DACIV3).

8. *The region of development* – denominates the Romanian region of development, where DREG1 - North-East, DREG2 – South-East, DREG3 - South-Muntenia, DREG4 - South-West Oltenia, DREG5 – West, DREG6 - North-West, DREG7-Centre, DREG8 Bucharest-Ilfov. The Bucharest-Ilfov region was omitted from the econometric processing.

9. *Area of residence* - dummy variable , where 1 means urban and 0 means rural areas.

10. *Squared experience* - this variable has been suggested by Pauna's study (2009) and other similar research; it shows what is the experience in the labour market that maximizes revenues.

There were *16,570 statistical observations* in the database used. *The hypothesis tested* in this study are the following:

H1: There is a statistically significant regression relationship between *the level of education* and income levels, according to which education has a positive impact on individual revenues.

H2: There are statistically significant wage differences between *females and males* for the same level of education.

H3: There are statistically significant wage differences between *females and males* based on marital status.

H4: There are statistically significant wage differences based on the *employer's ownership*.

H5: There are statistically significant wage differences based on *nationality*.

H6: Revenues are influenced not only by level of education and other variables mentioned above, but also by the industry in which individuals work; there are differences in wages explained by working in one *industry* or another.

H7: There are statistically significant salary differences between *females and males* according to the *characteristics of local labor market*, expressed by belonging to either a rural or an urban region of development.

To test these hypotheses, we chose to run a linear multiple cross-sectional regression based on the ordinary least squares estimation technique (OLS), using a specialized software.

The common form of the Mincerian regression is:

$$W_i = \beta_0 + \beta_1 S_i + \beta_2 X_i + \beta_3 X_j + \varepsilon_i$$

where:

W_i – is the log wage for individual "i "

S_i – years of schooling

ε_i – residual value

X_i, X_j– other factors that influence income different from the years of schooling

Methodologically, X_i-X_j are measurable personal and human capital characteristics, such as gender, experience, nationality, marital status, plus variables indicating labor market characteristics. In this case, two variables are used as proxies to capture various attributes of the labor market: the region of development and the urban – rural dichotomy. We also include among X_i-X_j a variable reflecting the particular conditions of an industry, by including in the model: a) the industry in which the respondent works; and b) the form of property of the employer. In the model I also use the independent variable "squared experience", in order to show that revenues depend on experience up to a certain point, and then they start to decrease as it grows.

3. Results and Discussion

I first apply the Mincerian model using a limited number of variables, under the name of the "limited Mincerian model". It is based on running the next regression:

$$ln(Income) = \beta_1 + \beta_2 * Experience + \beta_3 * Maritalstatus + \beta_4 * Yearseducation + \beta_5 * Experience^2$$

The results are the following:

Table 2

The Mincerian Income Function in 2009

Variable	Total Sample			Males			Females		
	Coefficient	t-Statistic	Prob.	Coefficient	t- Statistic	Prob.	Coefficient	t -statistic	Prob.
Experience	0.022913	16.08059	0.0000	0.015248	7.590817	0.0000	0.028868	15.25886	0.0000
Marital Status	0.101498	9.321803	0.0000	0.241512	15.78866	0.0000	-0.049927	-3.361877	0.0008
Years of education	0.112970	74.06602	0.0000	0.107939	54.24132	0.0000	0.130083	56.44608	0.0000
Experience^2	0.000419	15.14543	0.0000	-0.000295	-7.735602	0.0000	-0.000551	-14 .55058	0.0000
C	5.100679	203.7783	0.0000	5.250406	163.1066	0.0000	4.821025	124. 7963	0.0000
The coefficient of determination	0.288039			0.292651			0.371493		

Source: Author's computation, obtained by processing the data in Eviews.

Based on these data, it is clear that *experience, education and marital status affect differently incomes*; the coefficients obtained are statistically significant (p <0.005).

In this model, *the greatest influence on incomes is exerted by education.* The years of education coefficient quantifies the increase in the logarithm of income due to an additional year of schooling. *In Romania, an additional year of education increases the logarithm of revenues by 11.29% for the total sample, 10.79% for males and 13% for*

females. The differences between usual coefficients obtained for samples of males and females in our country indicates that an additional year of education benefits more women than men; in other words, the positive impact on wages is higher for women than for men.

The education coefficient obtained for the sample, 11.29%, can be partially compared to the rate of return to investment in education (RRIE) in the reference work of Mincer, 1974, which is 10.7% (Pauna, 2009, pp. 15). The comparison with the data reported by Psacharopoulus and Patrinos in *Returns to Investment in Education. A Further Update*, (2002), in Table 1, shows that o*ne additional year of education (estimated for the year 2009) increases the average income in Romania more than in other countries*, regardless of their income class, which shows that the labor market in Romania rewards education relatively higher than the European average.

Marital status is also crucial to a person's income, according to the results obtained. For married men, income (log) increase by 24.15% if married, while for married women, it decreases to 4.99%. *This may be a serious signal of a significant discrimination of women in the labor market.*

The coefficient of squared experience helps us to determine in how many years revenues begin to have a negative contribution to the income of a person, or how many years of experience maximize revenue. In this "limited" Mincerian model the variable was introduced in the model to make a comparison with the results obtained by Pauna (2009), as shown bellow (Pauna uses the same „limited Mincerian model", i.e., the results are fully comparable).

Table 3

Mincerian Functions of Earnings for the Years 1995, 2000 and 2009

	1995 (according to Pauna, 2009)			2000 (according to Pauna, 2009)			2009 (author results)		
	Coefficients			Coefficients			Coefficients		
Variable/ Sample	Males	Females	Total sample	Males	Females	Total sample	Males	Females	Total sample
Experience	0.019419	0.014923	0.004496	0.029032	0.031016	-0.00198	0.015248	0.028868	0.022913
Marital status	0.093917	0.01821	0.075706	0.163853	-0.01847	0.182327	0.241512	-0.049927	0.101498
Years of education	0.059572	0.071893	-0.01232	0.083016	0.097562	-0.01455	0.107939	0.130083	0.112970
Experience^2	-0.00029	-0.00012	-0.00017	-0.00049	-0.00046	-2.9E-05	-0.000295	-0.000551	-0.000419
C	11.33883	11.02592	0.31291	13.14214	12.79941	0.34273	5.250406	4.821025	5.100679

*Source: Author's computation, by processing Eviews data, for year 2009 and * Pauna, C., (2009) „Wage discrimination in Romania - Evolution and explanations".*

The coefficient of the variable "years of education" was negative in 1995 and 2000, which shows a contradiction with the fundamentals of the Mincerian model. In 2010, both for males and females, it is positive, showing an increase in the period of 14 years, between 1995 and 2009.

For the males sample, it increased from 5.75% in 1995 to 8.30% in 2000 and to 10.79% in 2009. For the females sample, the coefficient is 7.18% in 1995, 9.75% in 2000 and, after nine years, 13.08%. *This development shows that in Romania the*

labor market increased its rewards to education, by increasing the impact of education on earnings.

But not all trends are positive. Comparing 2009 results with those obtained by Pauna (2009) for the years 1995 and 2000, *we find that gender discrimination not only not improved, but rather worsened*. Pauna (2009) shows that married men receive 10% higher wages (log) than unmarried men 1995. *In 2000, this difference increased to 16% and in 2009, according to my analysis, it was 24.15%.* This indicates, in my opinion, *an increasing labor market discrimination of women, which is based on a static and discriminatory perception of civil status for the two genders.*

The results obtained by running the "limited" Mincerian model, using a limited number of variables, confirms the research hypotheses H1, H2 and H3.

But the model does not fully explain individual incomes; the coefficient of determination does not exceed 37%, either for sub-samples or for the entire sample. This low value of the coefficient of determination is explained by the fact that there are other factors that determine revenue. They will be used in an "extended" Mincerian model, and they are: nationality, type of ownership, area of residence, activity (industry) and the region of development.

By running a similar regression, the results obtained by Eviews processing are presented in the Appendix, Table 5.

In this "extended" Mincerian model, *the importance of the variable "years of education" remains high, the corresponding coefficient being 8.16%.* However, as expected, it is lower than in the "limited" model (11.29%).

The coefficient of the variable *"experience in labor market"* is also lower than previously, i.e. 0.018593.

The coefficient of *nationality*, although statistically significant, has a small value (5.4%), in other words, the Romanian nationality increases logarithmic revenues by 5.4%.

Individuals *married or cohabiting* also benefit from their *marital status*, their (log) income increasing by 6.59%, in comparison with the revenue of divorced or widowed persons.

Additional earnings are recorded for *State* employees, too, the coefficient of the dummy variable "ownership of employer", being positive and having a value of 0.058604. This result highlights a current topic of debate in Romania, i.e. *the wages of civil servants and public employees*. The payment of the salaries of civil servants and public employees increased from 4.8 in 2004 to 8.6% of Gross Domestic Product (GDP) in 2008 and almost 9% in the recession year 2009. The Romanian public sector employs about 30% of the workforce in Romania, the cost of these wages representing approximately 20% of total budget expenditures. Although this may seem reasonable at a first glance, compared to the more developed European economies, it is not sustainable for a developing country like Romania. These types of figures are difficult to support in a developing economy, especially if it is not done in agreement with the productivity evolution, which is a sensitive issue in Romania, being much below European average productivity. Payment differences between the public and

the private systems are important because they affect wage levels of the private environment, through differences in terms of nominal wages.

One explanation for a higher wage level within the state sector is that it employs more skilled workforce. The data in the sample shows that, in the state sector, 34.58% of the respondents have 12 years of education (812 observations) and 25.73% have 16 years of education. By comparison, in the private sector, only 33.77% have 12 years of education (4790 observations) and only 13.71% have 16 years of education. These differences may explain, in part, the different wage levels.

Surprisingly, the largest impact is determined by the person's gender. According to the results obtained, men's income (log) is 26.58% higher than that of women, although data shows, that, on average, women in the sample have more years of education than men.

Concerning the coefficient of the variable "*experience squared*", it can be used to calculate the number of years of experience that maximizes the income of a person, based on the idea that there is a function f(x) of the number of years of experience in which" x "maximizes individual's income, as follows:

$$f(x) = (coefficientExperience * x) - (coefficientExperience^2 * x^2)$$

An extreme point of this function (in this case, the maximum) is obtained by derivation.

Thus, $\frac{F'(X)}{\partial X} = 0 \Rightarrow X = \frac{Coefficient\_regression\_experience}{2 * Coefficient\_regression\_experience\_square}$

It results that $x = \frac{0.018593}{2 * 0.000294} = 31.62$ years, which represents *the number of years that maximizes individual income*. In other words, *31.62 years of experience in the labor market "generate" the maximum income for an individual*. Pauna (2009, pp. 15) indicates that, in 1995 and 2000, in Romania, the coefficient of squared experience shows a maximum effect at an employment experience of 30 years, which is very similar to the value calculated in this study.

In terms of *industry coefficients*, we observe that, except for the industry "Real estate, renting and service activities", all the coefficients of the remaining industries (the manufacturing is omitted) are statistically significant, for p<0.005. They are shown in Table 4

Table 4

Industry Regression Coefficients

Industry	Regression Coefficient	Prob.
Activities of extraterritorial organizations and bodies	0.365307	0.0135
Mining	0.334141	0.0000
Financial, banking, insurance activities	0.205051	0.0000
Electricity, gas and water	0.163743	0.0338
Public administration and defense, social security insurance	0.11941	0.0000
Education	0.078527	0.0001

Industry	Regression Coefficient	Prob.
Health and social care	0.063617	0.0014
Transport, storage and communications	0.045034	0.0060
Constructions	0.030775	0.0338
Wholesale and retail trade, repair of motor vehicles, hotels and restaurants	-0.03982	0.0017
Other services, social and personal	-0.04649	0.0150
Activities of staff employed in households	-0.55199	0.0000
Agriculture, hunting, forestry, fishing and fish farming	-0.62542	0.0000

Source: Author's computation, by processing the data in Eviews.

Agriculture, hunting, forestry, fishing and fish farming, along with the activities of the personnel working in households, and wholesale and retail trade, repair of motor vehicles, hotels and restaurants have negative coefficients, which means that the log wage is 62.54%, 55.19% and 3.98%, respectively, lower than the (log) wage in the manufacturing industry.

Compared to the average wage in manufacturing, all industries show positive coefficients. In the first place, the sector of organizations and extraterritorial bodies, with a regression coefficient of 0.365307, is consistent with the fact that this industry pays the highest net average wage; it is followed by the mining and banking industries.

Regarding the coefficients of the *development regions*, they are negative, as they are estimated in comparison with the Bucharest-Ilfov Region, the richest one in the country, with the capital in Bucharest. The North-Eastern Region has the lowest coefficient (-0.326052), followed by South-West Oltenia (-0.304597); the Central Region has the highest coefficient (-0.153073); all the results confirm historical development paths already well known.

The variable "*environment*" has a positive coefficient (0.126950), statistically significant, which confirms that *people of urban areas earn more than those in rural areas*. This is important, indicating *major differences in the purchasing power and lifestyle across Romanian regions.*

The coefficient of determination of the extended "Mincerian" model is 0.479356, which shows that almost half of the variation in wages is determined by the explanatory factors of the model. The remaining factors that could explain the wage differences explained by other factors, as social and family background characteristics, or personal features such as ambition, native intelligence, etc.

From the dynamics point of view, the methodology used allows for a comparison with the main findings of Pauna (2009), based on the study "Wage discrimination in Romania - Evolution and explanations " (2009), summarized in the Appendix,Table 6.

Regarding the evolution of the coefficient of variable "years of education", we noticed that it was -0.0019 in 1995, 0.0061 in 2000 and 0.081652 in 2009. As we do not have sufficient data from the study of Pauna to explain a negative coefficient of education in 1995, we only notice that its value increased from 1995 in 2009, an additional year of education increasingly bringing more value to the level of income.

The coefficient of "marital status" was 0.0512 in 1995, 0.1357 in 2000 and 0.065946 in 2009, showing a diminishing discrimination between 1995 and 2009 on the labour market.

The coefficients of the "developing regions" cannot be compared since the study "Wage Discrimination in Romania - Evolution and explanations" (2009), Pauna omits the North-East Region, and not Bucharest-Ilfov, as in this research.

Pauna's study included also the number of inhabitants of cities and occupation of respondents, however it does not take into account the area of residence (urban / rural). Also, Pauna (2009) managed differently nationality and ownership of the employer, so these results cannot be compared directly for these variables.

4. Conclusions

This study addresses the estimation of the impact of education on individual earnings through the econometric modeling of secondary data. The research results confirm the main hypothesis established.

The representativeness of the sample, associated with the fact that there are just two other similar studies in Romania, gives to this study added value.

The study is not without *limitations,* which have two sources: a) the nature of available data; and b) the methodology used. Regarding the nature of the data available, they do not include other important factors which determine wages, as *native individual skills, IQ level, ambition, social and family environment*, etc. As regards the methodology used, the most sensitive aspect is the use of years of education. As a major advantages, this form of measuring education is a clear and easy form of estimating education; it allows us to regress the log of earnings on a series of variables. In addition, the use of years of education allows international comparisons with data obtained in other studies. A disadvantage is the fact that formal education is not the only way to accumulate human capital, it could be done through health or family education. In other words, human capital is obtained both through formal and informal education. The first type is attested by diplomas, meanwhile the second is not, being obtained through personal efforts outside the formal system, sometimes simply interacting with the society. Therefore, it is not formally certified. Consequently, the stock of capital which is produced by informal education is difficult to estimate, and the total stock of human capital used in empirical research is underestimated, as it probably happens in our case too. Another disadvantage of using years of education is that we assume they are homogenous, when in fact, the years of education vary with the level of education (primary, secondary, university, etc.) and also with the quality of schooling.

Based on these results, there are statistically significant salary differences between women and men for the same level of education, marital status, ownership of the employer and nationality.

Income levels are influenced not only by education levels and other variables mentioned above, but also by the industry in which persons work. The results also indicate that there are statistically significant wage differences between women and

men according to the characteristics of the local labor market, depending on the area of residence (rural or urban) and the region of development.

In the "extended" Mincerian model, on which we build our conclusions - as it has a higher complexity and a better coefficient of determination - *the factor that has the greatest influence on income is gender, the gender coefficient being 0.265880.* It shows a highly discriminatory phenomenon, which can be solved probably by educational and awareness programs, aimed at combating gender-based (wage) discrimination. In Romania, anti-discrimination laws exist, which shows that this problem exists in the Romanian employers' practice and attitude. For them, professional training programs and awareness raisings campaigns of reducing discriminatory barriers may be useful.

Other salient policy recommendation, based on the results above, is the need to moderate income differences among regions and urban and rural areas. These differences are generated by differences in the general level of development, but they jeopardize growth and social cohesion.

Also, it is clear that some industries pay better than others, which has two consequences. First, they will increasingly attract more employees, which means that their number will decrease in areas such as agriculture, constructions, manufacturing, wholesale and retail trade, repair of motor vehicles, motorcycles and personal and household goods, hotels and restaurants as well as others that offer lower wages compared to the "leading" industries. On the other hand, the migration of people to those industries that pay better, requires specialization in these areas. This means a possible increase in the interest of the future graduates in these areas, institutions and occupations such as diplomacy, senior officials in European and international structures, transport, storage, communications, financial systems, banking, insurance, mining and energy industry including public administration and education. All these needs may have effects on the socio-occupational structure of the Romanian society.

As regards the importance of education as a determinant of earnings, we conclude that it is a key determinant of individual income. If in 1995 the coefficient of the variable "years of education" was -0.0019 and in 2000 0.0061, while in 2009 it was 0.081652 according to this study. This shows that in Romania the importance of education has increased, and consequently, the importance of people's knowledge and skills in their wage level, which, in turn, could be an indicator of the increasing transformation of Romania into a knowledge based society.

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Appendix

Table 5

The Earnings Function for 2009

Dependent variable: LNVEN				
Method: least squares Sample: (adjusted): 116570				
Variable	Coefficient	Standard Error	t-Statistic	Prob.
Experience	0.018593	0.001235	15.05336	0.0000
Nationality	0.057462	0.014441	3.979092	0.0001
Marital status (married)	0.065946	0.009402	7.014359	0.0000
Years of education	0.081652	0.001537	53.13795	0.0000
Ownership of employer(state)	0.058604	0.012677	4.622829	0.0000
Gender (male)	0.265880	0.008429	31.54391	0.0000
Experience^2	-0.000294	2.41E-05	-12.21643	0.0000
INDUSTRY (the manufacturing industry is omitted)				
Agriculture, hunting, forestry, fishing and fish farming	-0.625424	0.014588	-42.87371	0.0000
Mining	0.334141	0.034469	9.693903	0.0000
Electricity, gas and water	0.163743	0.027165	6.027630	0.0000
Constructions	0.030775	0.014502	2.122140	0.0338
Wholesale and retail trade, repair of motor vehicles, hotels and restaurants	-0.039816	0.012689	-3.137922	0.0017
Transport, storage and communications	0.045034	0.016378	2.749701	0.0060
Financial, banking, insurance activities	0.205051	0.029942	6.848284	0.0000
Real estate, renting and business activities	-0.037249	0.033139	-1.124014	0.2610
Public administration and defence	0.119410	0.017850	6.689456	0.0000
Education	0.078527	0.020422	3.845307	0.0001
Health and social care	0.063617	0.019930	3.191958	0.0014
Other service activities, social and personal	-0.046488	0.019103	-2.433539	0.0150
Activities of staff employed in private households	-0.551994	0.050257	-10.98340	0.0000
Activities of extraterritorial organizations and bodies	0.365307	0.147811	2.471440	0.0135
REGION (The Bucharest – Ilfov Region is omitted, taken as reference)				
North-East	-0.326052	0.016651	-19.58126	0.0000
South-East	-0.232293	0.016702	-13.90830	0.0000
South-Muntenia	-0.200465	0.016207	-12.36884	0.0000
SouthWest-Oltenia	-0.304597	0.017809	-17.10383	0.0000
West	-0.163912	0.017590	-9.318681	0.0000
North-West	-0.198424	0.016414	-12.08847	0.0000
Centre	-0.153073	0.016541	-9.254029	0.0000
Residence Environment	0.126950	0.009166	13.85015	0.0000
C	5.459321	0.030355	179.8485	0.0000
R-squared	0.479356	Mean dependent var		6.667614
Adjusted R-squared	0.478437	S.D. dependent var		0.676031
S.E. of regression	0.488225	Akaike info criterion		1.405739
Sum squared resid	3917.266	Schwarz criterion		1.419786
Log likelihood	-11542.04	F-statistic		521.7501
Durbin-Watson stat	1.689688	Prob(F-statistic)		0.000000

Source: Author's computation, by processing the data in Eviews.

Table 6

The Earnings Functions for the Years 2009, 2000 and 1995

	2009		2000		1995	
Variable	Coefficient	t-Statistic	Coefficient	t-Statistic	Coefficient	t-Statistic
Experience	0.018593	15.05336	- 0.0002	-0.08	0.0066	2.84
Nationality	0.057462	3.979092	-	-	-	-
Marital status (married)	0.065946	7.014359	0.1357	6.85	0.0512	3.11
Years of education	0.081652	53.13795	0.0061	1.26	-0.0019	-0.55
Ownership of employer (state)	0.058604	4.622829	-		-	-
Gender (male)	0.265880	31.54391	-	-	-	-
Experience^2	-0.000294	-12.21643	0.0000	0.34	-0.0002	-3.28
INDUSTRY (the manufacturing industry is omitted, by reference)						
Agriculture, hunting, forestry, fishing and fish farming	-0.625424	-42.87371	0.0688	-1.40	-0.0078	-0.23
Mining	0.334141	9.693903	0.1850	3.05	0.2265	5.17
Electricity, gas and water	0.163743	6.027630	0.0075	0.17	0.0434	1.21
Constructions	0.030775	2.122140	0.0298	0.70	-0.0421	-1.43
Wholesale and retail trade, repair of motor vehicles, hotels and restaurants	-0.039816	-3.137922	0.0129	0.42	0.0707	2.44
Transport, storage and communications	0.045034	2.749701	-0.1123	-3.43	-0.0483	-1.82
Financial, banking, insurance activities	0.205051	6.848284	-0.1430	-2.40	-0.0604	-1.22
Real estate, renting and service activities	-0.037249	-1.124014	-0.1430	-2.40	-0.1181	-1.56
Public administration and defense, social security insurance	0.119410	6.689456	0.1355	3.40	0.1327	4.03
Education	0.078527	3.845307	-0.0826	-2.08	-0.0144	-0.47
Health and social care	0.063617	3.191958	-0.0724	-1.69	-0.0904	-2.54
Other services, social and personal	-0.046488	-2.433539	0.0118	0.34	0.0575	1.84
Activities of staff employed in private households	-0.551994	-10.98340	-0.2473	-0.86	0.0550	0.33
Activities of extraterritorial organizations and bodies	0.365307	2.471440	-0.2976	-0.63	0.1087	0.53
REGION (The Bucharest – Ilfov Region is the one omitted, taken as reference)						
North-East	-0.326052	-19.58126			-	-
South-East	-0.232293	-13.90830	0.0756	2.66	0.0634	2.72
South-Muntenia	-0.200465	-12.36884	0.0475	1.68	0.0289	1.21
South West-Oltenia	-0.304597	-17.10383	0.0875	3.03	0.0357	1.43
West	-0.163912	-9.318681	0.0582	1.93	0.0616	2.41
North-West	-0.198424	-12.08847	0.0196	0.68	0.0241	0.99
Centre	-0.153073	-9.254029	-	-	0.0171 -	0.72
Environment						
Environment	0.126950	13.85015	-	-	-	-
C	5.459321	179.8485	0.1008	1.44	0.1474	2.75
R-squared	0.479356		-		-	

Source: Author's computation, by processing data in Eviews for the year 2009 and Pauna, C., „Wage discrimination in Romania - Evolution and explanations" (2009), pp.17-20.