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**Recent Dynamics of Returns to Education in
Transition Countries**

**Tom Coupé
Hanna Vakhitova**

Kyiv School of Economics and Kyiv Economics Institute

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Recent Dynamics of Returns to Education in Transition Countries

Tom Coupé and Hanna Vakhitova*

Kyiv School of Economics and Kyiv Economics Institute

Abstract: This study provides recent estimates of returns to education in transition countries, investigating how the economic boom in the region has affected these returns. We find that transition countries continue to have relatively low returns to education and that the economic boom did not lead to a clear change in these returns. A more detailed investigation for one specific country, Ukraine, confirms these results.

Keywords: returns to education, transition countries

JEL Classifications: J24, J31, P2, P3, P5

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I. Introduction

There is a large literature on the returns to education in transition countries and how these returns have changed over time (see for example Flabbi et al, 2008 and Fleisher et al., 2005). The literature so far, however, mainly consists of studies that use data from the 1990s and the early 2000s and very few results for transition countries are available for years later than 2002. In this note, we provide more recent estimates of the returns to education covering the recent period of economic growth in the transition countries (up to the 2008 financial crash). To the extent this growth was skill-biased we would expect in an increase of returns to education over this period¹. We provide a cross-country comparison of the recent dynamics of the returns to education using the data from the 2007 wave of the International Social Survey Program (ISSP), which contains individual information about earnings and education in about 30 countries²³ In addition, we use a more detailed data set to look at the dynamics in the returns to education in Ukraine, the transition country which has consistently been found to have among the lowest returns to education.

The existing literature has found significant differences in returns to education across countries, differences that have remained relatively constant over the last 15-20 years. In the early 2000s the education wage premium in transition countries varied from 10-12 percent for China and Hungary to 4.0 percent for Ukraine. While in most transition countries, the returns have showed small increases over time, returns in Ukraine have barely moved. Table I in the Appendix gives an overview of returns to education studies that focus on transition countries and the estimates they found.

Our analysis of the recent ISSP data confirms many of the findings of the prior literature. Following the basic specification in Flabbi et al. (2008), we first run a regression controlling for

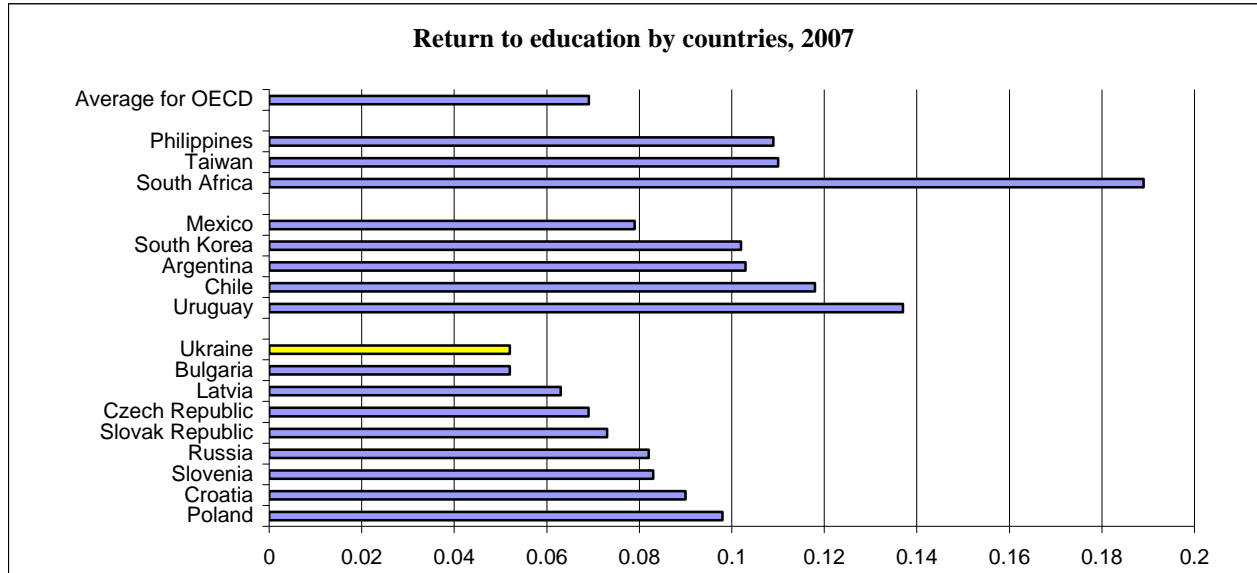
¹ In a similar vein, McGuinness et al, 2008, investigate how the economic boom in Ireland has changed returns to education there.

²Flabbi, Paternostro, and Tiongson (2008) use earlier waves of the same survey program .

³ Ukraine was added to the list of ISSP countries in the 2008 wave and we use these 2008 data for Ukraine (the 2008 ISSP data for other countries are not available yet). As the field work for the 2007 wave was done in the period 2006-2008 and the field work for the Ukraine survey of the 2008 wave in 2008, we are able to provide comparisons using the same data source and methodology and similar time period.

potential experience and gender. Based on this regression, the estimated return to a year of schooling in 2007 in transition countries varies between a low 5.2 percent in Ukraine to a high of about 10 % in Poland (see Figure 1). Returns in non-transition countries are relatively low compared to developing countries in the ISSP sample, and on average not unlike OECD countries.

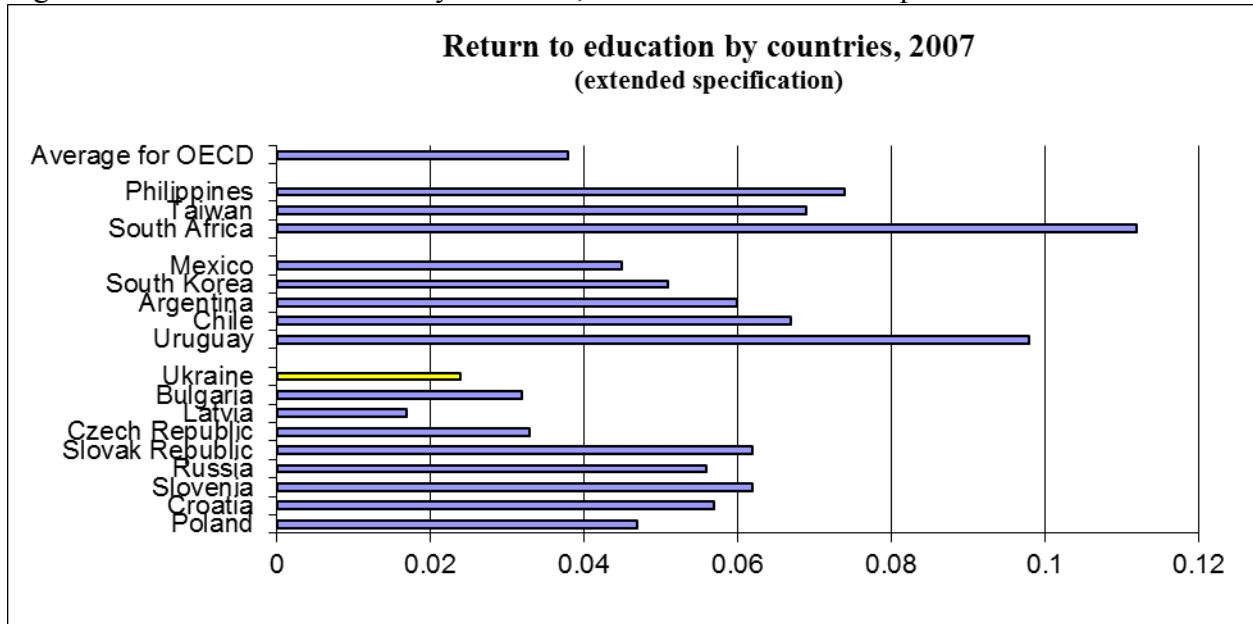
Figure 1 – Returns to education by countries, 2007 wave – basic specification



Note: Coefficients of the years of schooling variable in earning regressions. Dependent variables are monthly earnings. Specification includes: potential experience (linear and squared), dummy for gender. Source: Ukraine – ISSP 2008, all other countries – ISSP 2007.

In figure 2 below we also report the results of a more extended specification which additionally includes dummies for living in urban areas, marital status, controls for occupation particularities (major occupation groups, public employee, working full-time, member of a trade union), controls for current family (number of members, dummy for spouse working full-time). Adding these controls reduces the estimated returns, with Latvia showing insignificant returns to education and Slovakia and Slovenia having the highest returns at about 6 percent.

Figure 2 – Returns to education by countries, 2007 wave – extended specification



Note: Coefficients of the years of schooling variable in earning regressions. Dependent variables are monthly earnings. This specification includes more controls as explained in the text. Source: Ukraine – ISSP 2008, all other countries – ISSP 2007.

Next we turn to table I which gives the dynamics of the returns to education using the basic specification with a small number of controls.

Table 1 – dynamics of returns, basic specification

Country / Basic specification	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2007
Bulgaria		0.047	0.052				0.053		0.05	0.049		0.072	0.052
Czech				0.036	0.044	0.07	0.076		0.054		0.087	0.066	0.069
Latvia					0.067	0.047		0.053	0.086	0.065	0.08	0.078	0.063
Poland	0.06	0.071	0.081	0.08	0.079	0.07	0.065	0.081	0.079		0.092	0.106	0.098
Russia	0.028	0.038	0.043	0.054	0.083	0.065	0.072		0.084	0.083	0.084	0.074	0.082
Slovakia				0.061				0.066	0.059			0.061	0.073
Slovenia	0.063	0.058	0.088		0.095	0.117	0.099	0.089		0.081		0.082	0.083
Ukraine 2008													0.052

Note: Coefficients of the years of schooling variable in earning regressions with few controls as specified in the text. Source: Estimates for 1991-2002 are from Flabbi et al. (2008); estimates for 2007 and for Ukraine are by the authors.

Based on this basic specification, we find that little has changed during the 2000s. We see a decrease in returns in Bulgaria, Latvia and Poland, and an increase in the Czech Republic, Russia, Slovakia and Slovenia. Both increases and decreases are small in size however.

Table 2 gives the dynamics based on the extended specification. Returns in Bulgaria, Latvia, Poland and also the Czech Republic show declines, while returns in Slovenia, Slovakia and Russia increased⁴.

Table 2 – dynamics of returns, extended specification

Country / Extended specification	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2007
Bulgaria		0.034	0.036				0.035		0.036	0.028		0.057	0.032
Czech				0.028	0.033	0.048	0.066		0.03		0.063	0.034	0.033
Latvia					0.043	0.028		0.03	0.05	0.039	0.057	0.025	0.017
Poland	0.055	0.059			0.041	0.063	0.053	0.068	0.028		0.071		0.047
Russia	0.03	0.014		0.041	0.06	0.03	0.046		0.068	0.056	0.041		0.056
Slovak									0.028			0.029	0.062
Slovenia	0.048	0.045	0.049		0.077	0.077	0.056	0.042		0.057		0.04	0.062
Ukraine 2008													0.024

Note: Coefficients of the years of schooling variable in earning regressions with many controls as specified in the text. Source: Estimates for 1991-2002 are from Flabbi et al. (2008); estimates for 2007 and for Ukraine are by the authors.

Overall, the dynamics in returns to education in the period 2002-2007 do not suggest that the economic boom that took place in that period in the countries under consideration affected people with different amounts of education in different ways. Returns to education increased slightly in some countries and decreased slightly in others, but overall returns to education remained relatively moderate.

II. Focus on Ukraine

We next use a more comprehensive dataset on Ukraine to provide a more detailed view on the recent dynamics of the returns to education. Previous papers which have estimated the returns to

⁴ Table 2a in the appendix has also a ‘balanced’ specification which is the basic specification but only for those individuals for whom a complete set of data is available and are thus included in the sample used for the extended specification.

education for Ukraine include Lechenko (2001), Herasym (2004) and Gorodnichenko and Peter (2005)

Gorodnichenko and Peter (2005) provide a comprehensive study on the returns to education in Ukraine using the retrospective part of the 2003 Ukrainian Longitudinal Monitoring Survey (ULMS). Their estimates for 1997, 1998, 2000 and 2002 show a stable return of about 4% for each year of education. In this study, we use the same set of control variables they suggest, to provide estimates for 2003 and 2007, using the 2003 and 2007 waves of the ULMS. Because the questions on education in 2007 were somewhat different from those in 2003, it is impossible however to provide a perfect comparison (see discussion below)⁵.

We use, consistent with Gorodnichenko and Peter (2005, denoted as G&P hereafter), the following variables: as dependent variable, we use the log of the monthly wage in the main job. We use the ‘last’ wage after December 2002 for 2003 and the ‘last’ wage after December 2006 for 2007 – the questionnaires were completed in April-May 2003 and throughout the year in 2007. As explicative variables we use

- A dummy for gender (women take a value of 1)
- A dummy for residence in the capital (residents of Kyiv take a value of 1)
- dummies reflecting the size of the company, with the smallest companies with less than 10 employees being the benchmark
- A dummy for privately owned companies and a dummy for foreign owned companies
- Age and age squared, to capture differences in experience. Experience is typically defined as age minus years of education minus 6. As we explain below, it is hard to find good proxies for the total years of education, so we mainly use age rather than experience.
- Tenure and tenure squared reflecting the number of years in the firm
- We also include dummies for the month during which the interview was taken, a dummy for missing values of ownership status, and a dummy for missing values of firm size.

⁵ Moreover, the ULMS 2003 was a random survey of the Ukrainian population while the ULMS 2007 followed people from the ULMS 2003, adding only new people if they belonged to the households that were included in the 2003 survey.

Our main explicative variable of interest, education, can be proxied in different ways. G & P (2005) compute years of education based on the highest degree a respondent claims to have obtained. In contrast to the ULMS 2003, the ULMS 2007 however does not have such question and hence it is impossible to repeat the exact specification of G&P.

The ULMS 2003 and 2007, however, do have the following education questions in common

- whether or not one has completed secondary education
- how many years one studied at vocational colleges (PTU)
- how many years one studied at professional colleges (Technicum)
- how many years one studied at academic institutions.

Together these questions give a reasonably complete picture of the educational track in Ukraine and hence our first regression uses these 4 variables to compute the returns to education in Ukraine and compare 2003 and 2007. Table 3 gives the results of regressing the logarithm of the monthly salary on these 4 variables and the abovementioned control variables.

Table 3 – Returns to education in Ukraine, 2003 and 2007

	2003		2007	
	(1)	(2)	(3)	(4)
Secondary Degree	0.055** (2.00)	0.03 (1.17)	-0.002 (-0.04)	0.013 (0.48)
Years of Vocational Education	0.026** (2.23)	0.01 (1.05)	-0.014 (-1.15)	0.001 (0.12)
Years of Professional Education	0.044*** (5.88)	0.022*** (3.15)	-0.00 (-0.01)	0.013** (2.06)
Years of Academic Education	0.058*** (10.97)	0.031*** (7.20)	0.056*** (8.68)	0.049*** (11.01)
Age	0.029*** (4.61)	0.018*** (3.16)	0.045*** (7.56)	0.030*** (6.75)
Age Squared	-0.000*** (-5.25)	-0.000*** (-3.45)	-0.001*** (-8.66)	-0.000*** (-7.68)
Female	-0.322*** (-14.44)	-0.272*** (-14.44)	-0.358*** (-14.71)	-0.328*** (-18.01)
Capital	0.288*** (7.50)	0.171*** (4.97)	0.331*** (6.80)	0.326*** (7.34)
Tenure	0.007* (1.77)	-0.0000 (-0.13)	0.011*** (2.68)	0.007** (2.32)
Tenure Squared	-0.000* (-1.82)	0.0000 (0.15)	0.0000 (-1.30)	0.0000 (-1.09)
Private	0.173*** (4.14)	0.113*** (3.11)	0.200*** (4.38)	0.188*** (5.38)
Foreign Owned	0.205*** (3.21)	0.104** (2.05)	0.135** (2.33)	0.062 (1.14)

Firm with 10 to 50 Employees	0.03 (0.76)	-0.112*** (-3.10)	-0.033 (-0.88)	-0.084*** (-2.72)
Firm with 50 to 100 Employees	0.071* (1.68)	-0.111*** (-2.78)	0.021 (0.51)	-0.085** (-2.47)
Firm with 100 to 500 Employees	0.137*** (3.39)	-0.04 (-1.12)	0.052 (1.37)	-0.03 (-0.97)
Firm with 500 to 1000 Employees	0.267*** (5.81)	-0.05 (-1.02)	0.119** (2.18)	-0.019 (-0.45)
Firm with more than 1000 Employees	0.388*** (9.40)	0.111*** (2.92)	0.212*** (4.28)	0.120*** (3.45)
R ² Adjusted	0.17	0.15	0.154	0.208
Number of Observations	3558	2332	3179	2786

Dependent variable is the log of the monthly wage. Additional controls for the month during which the interview was taken, for missing values of ownership status, and for missing values of firm size. Columns (1) and (3) give results for the full sample. Columns (2) and (4) give results for sample of people earning more than the minimum wage. Robust standard errors are reported.

The first column shows that in 2003, having a secondary education increased one's monthly wage by about 5.5%. Each year of education at a vocational school increased one's monthly wage by 2.6%, compared to 4.4% for professional education and 5.8% for academic education. In 2007 (column 3), however, only academic education had a significant return of 5.6% per additional year. Other types of education had no effect on one's monthly wage. These numbers confirm the stylized fact of relatively low returns to education in Ukraine and further suggest that little has changed over time.

An explanation of why only academic education seems to be relevant in 2007 is provided by the second and fourth column, which give the result of running a regression including only people who earn more than the minimum wage (185 UAH in 2003, 420 UAH in 2007). While in the 2003 sample, only 2/3rd of the people in the sample were paid more than the official minimum wage, in 2007 about 90% got paid more than the official minimum wage. If one restricts the sample to those earning more than the minimum wage, the regressions in 2003 and 2007 show similar results: no effect of secondary education and vocational education but significant effects of professional and academic education. The returns to academic education are somewhat higher in 2007, the returns to professional education are somewhat lower. The fact that in this restricted sample, secondary education and vocational education have no significant effect in 2003, suggest that these types of education were helpful in 2003 in getting some wage but were not really helpful in getting more than the minimum wage. As almost everybody earns more than the minimum wage by 2007, these types of education have no longer an effect.

The control variables have the expected signs: women earn less on average (about 30%), while residents of Kyiv earn more (20-30%). Older people and those having worked for a longer time at the firm have higher wages. Finally, foreign owned and privately owned firms pay higher salaries (10-20%), as do bigger firms.

Using sample weights does not change our main findings. When we split up the sample by gender, we get similar results and find that women have higher returns than men, a differential that has increased somewhat over time.

As a second experiment, we use the ULMS 2003 question on the highest degree one obtained to estimate the returns to years of education for both 2003 and 2007, using only those people that didn't receive a new degree after 2003 (i.e. they had already a higher education degree, and did not get a new vocational, professional or academic degree). In this way, we use the same questions for the same people, only in 2 different years and for a somewhat specific sample of people who have at least secondary education and finished their education before 2003. We transform the obtained degrees into 'adjusted years of education' following the methodology described in G&P, allocating a standard number of years of education to each degree.

Table 4 – Returns to adjusted years of education, 2003 and 2007

	2003			2007		
	Full	men	women	full	men	women
Adjusted Years of Education	0.057*** (7.40)	0.054*** (4.03)	0.059*** (6.45)	0.061*** (7.44)	0.045*** (3.03)	0.074*** (7.83)
Age	0.021** (2.28)	0.007 (0.49)	0.033*** (2.81)	0.049*** (4.54)	0.053*** (3.21)	0.044*** (3.06)
Age Squared	-0.000*** (-2.79)	-0.0000 (-0.88)	-0.000*** (-3.07)	-0.001*** (-5.55)	-0.001*** (-4.05)	-0.001*** (-3.60)
Female	-0.274*** (-8.38)			-0.340*** (-9.68)		
Capital	0.286*** (4.98)	0.281*** (2.87)	0.290*** (3.91)	0.336*** (5.18)	0.337*** (3.01)	0.325*** (4.14)
Tenure	0.005 (0.75)	0.002 (0.27)	0.006 (0.74)	0.009* (1.80)	0.005 (0.61)	0.007 (1.22)
Tenure Squared	0.0000 (-0.98)	0.0000 (-0.54)	0.0000 (-0.79)	0.0000 (-0.58)	0.0000 (0.11)	0.0000 (-0.33)
Private	0.312*** (5.44)	0.297*** (3.41)	0.313*** (4.07)	0.243*** (4.13)	0.355*** (4.28)	0.12 (1.35)
Foreign Owned	0.176* (1.73)	0.045 (0.28)	0.280** (2.40)	0.112 (1.15)	0.077 (0.45)	0.159 (1.45)
Firm with 10 to 50 Employees	0.106** (2.19)	0.017 (0.17)	0.162*** (3.00)	-0.059 (-1.18)	-0.156 (-1.60)	-0.003 (-0.06)
Firm with 50 to 100	0.150***	-0.007	0.268***	0.06	-0.085	0.147***

	2003			2007		
Employees	(2.69)	(-0.06)	(4.46)	(1.16)	(-0.79)	(2.70)
Firm with 100 to 500 Employees	0.249*** (4.56)	0.189* (1.89)	0.280*** (4.14)	0.096* (1.89)	0.015 (0.16)	0.152*** (2.62)
Firm with 500 to 1000 Employees	0.387*** (6.22)	0.386*** (3.61)	0.359*** (4.76)	0.162** (2.06)	0.144 (0.80)	0.165** (2.51)
Firm with more than 1000 Employees	0.527*** (9.08)	0.512*** (4.97)	0.502*** (7.42)	0.219*** (3.06)	0.275** (2.21)	0.145* (1.70)
R ² Adjusted	0.154	0.107	0.145	0.14	0.097	0.131
Number of Observations	1778	745	1033	1857	795	1062

Dependent variable is the log of the monthly wage. Additional controls for the month during which the interview was taken, for missing values of ownership status, and for missing values of firm size. Adjusted years means years based on the typical number of years it takes to reach a specific degree.

Again, we find relatively low returns to education at around 6% per year of (adjusted) education and little change over time. Residents of Kyiv earn more, and foreign owned and bigger firms pay higher salaries. Interestingly, women earn less on average (see the results of the full sample) but their returns on education are higher, especially so in 2007.

Using these adjusted years of education (and our sample that is biased towards higher educated people), we also checked whether the sector of employment influences the returns to education. We distinguish between working in agriculture, industry, services and the social sector, with agriculture being the base category. Note that, in terms of employment numbers in the sample, between 2003 and 2007, we see a relative shift away from agricultural employment.

Table 5 – Returns to education for specific sectors of employment, 2003 and 2007

	2003	2007
Industry Premium	1.268*** (3.19)	0.335*** (4.88)
Services Premium	1.450*** (3.58)	0.234*** (3.13)
Social Sector premium	0.581*** (4.51)	0.127* (1.73)
Returns in the agricultural sector	0.108*** (3.54)	0.051*** (5.02)
Extra returns in industry	-0.064* (-1.87)	0.012* (1.95)
Extra returns in services	-0.076** (-2.24)	0.018*** (3.95)
Extra returns in the social sector	-0.03	0.012**

	(-0.94)	(2.38)
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Dependent variable is the log of the monthly wage. The controls mentioned above have also been included here but are not reported. Adjusted years of education are used here. The omitted category is the agricultural sector.

From table 8, we can see an interesting difference between 2003 and 2007. In 2003, wage was to a large extent determined by the industry where one worked, with wages in the industry and service sectors being more than double the wage in the agricultural sector. In 2007, the wage effect of particular sectors has become much smaller. The returns to education also have become less sector specific: while in 2003 returns to education were substantially bigger in those sectors where the sector premium itself was low (agriculture and social), in 2007 the returns are fairly similar across sectors, with the agricultural sector having somewhat lower returns and the services sector somewhat higher returns.

The ULMS also allows us to investigate to what extent there is a skill mismatch between jobs and education and how this affects returns to education. About two thirds of the respondents in 2003 and 2007 say their job corresponds to the level and field of education, while about 20% of the respondents consider themselves overqualified (table 6).

Table 6 – Job Requirements and Educational Level

	2003	2007
The job requires the same level of education and the same field	63.2	62.5
The job requires a more advanced level of education	4.3	5.7
The job requires a lower level of education	22.1	20.5
The job requires the same level of education, but in a different discipline	10.5	11.3

One possible explanation for the relatively low level of returns to education in Ukraine could be this mismatch between education and jobs. Table 7 looks at this explicitly

Table 7 – Returns and Skills Mismatch

	2003	2007
Premium for Under-Education	0.033 (0.79)	-0.03 (-0.83)
Premium for Over-Education	0.01 (0.52)	-0.03 (-1.52)

Premium for Right Level but Wrong Field	0.036* (1.68)	0.016 (0.67)
Returns to Education if good match	0.049*** (5.15)	0.060*** (5.24)
Extra Returns if Under-Education	-0.134 (-0.28)	0.432 (0.99)
Extra Returns if Over-Education	-0.29 (-1.23)	0.148 (0.63)
Extra Returns for Right Level but Wrong Field	-0.409 (-1.53)	-0.185 (-0.63)

Dependent variable is the log of the monthly wage. The controls mentioned above have also been included here but are not reported. Adjusted years of education are used here. The omitted category is the 'good match' category.

The data suggest however that this mismatch is not the main reason as the (subjective) quality of the match has little or no influence on the level of the wage or on the returns to education.

Note that G&P (2005) find that the difference between Russia and Ukraine in terms of returns is not due to supply factors. They conclude that 'The lower demand for educated labor, more limited labor mobility, higher separation costs, and the larger extent of trade unions in Ukraine are most likely determinants with a potential power to explain the differences in returns to schooling'.

III. Conclusions

In this paper, we provide recent estimates for the returns to education in transition countries, adding estimates for the recent period of economic growth. Despite considerable economic growth in the period 2003-2007, we do not find that education became relatively more valuable over time throughout the region. Instead, we found small increases in some countries and small decreases in other countries. Our more detailed results for Ukraine confirmed overall that the economic growth did not have a major impact on the returns to education. The analysis for Ukraine however does suggest that while in 2003 a secondary degree resulted in a somewhat higher wage, just having secondary education was no longer a differentiating factor in 2007, and only academic education made a difference, possibly because of the fact that less and less people were paid very small wages (i.e. less than the official minimum wage). In addition, sector specific wage premia and differences in sector specific returns to education seem to have declined.

Appendix

Table Ia - Returns to Education in Transition: A Summary of the Literature.

Country	Estimates for entire country	Estimates by gender	Dataset	Reference
Ukraine	2003 - 4.0%			World Bank
	2002 - 4.5% 2000 - 3.7% 1998 - 3.9% 1997 - 3.7% 1991 - 3.9% 1986 - 3.4%		ULMS	Gorodnichenko and Sabirianova Peter (2005)
Russia		For men: 2000 - 6.8% 1998 - 5.1% 1996 - 5.2% 1994 - 5.0% 1992 - 3.4% For women: 2000 - 7.6% 1998 - 7.7% 1996 - 5.6% 1994 - 7.4% 1992 - 3.8%	RLMS	World Bank (2003)

Country	Estimates for entire country	Estimates by gender	Dataset	Reference
	2002 – 9.2% ⁶ 2000 – 9.3% 1998 – 9.1% 1996 – 8.1% 1990 – 3.9% 1985 – 2.8%		RLMS	Gorodnichenko and Sabirianova Peter (2005)
	2002 – 7.4% 2001- 8.4% 2000-8.3% 1999-8.4% 1997-7.2% 1996-6.5% 1995-8.3% 1994-5.4% 1993-4.3% 1992-3.8% 1991-2.8%		International Social Survey Programme (ISSP)	Flabbi, Paternostro, and Tiongson (2008)
	2000 – 8.5% 1998 – 8.4% 1996 – 6.2% 1994 – 7.3%	For men: 2000 – 7% 1998 – 6.4% 1996 – 4.7%	RLMS 1992-2000	Vernon (2002)

⁶ Estimates differ for different studies by these authors.

Country	Estimates for entire country	Estimates by gender	Dataset	Reference
	1992 – 5.2%	1994 – 5.5% 1992 – 5% For women: 2000 – 10.3% 1998 – 10.2% 1996 – 7.7% 1994 – 9.1% 1992 – 5.4%		
	1996 – 7.2% 1995 – 7.5%		RLMS	Psacharopoulos and Patrinos (2004) cited Sabirianova and Nesterova (1998)
		For men: 1995 – 4.2% For women: 1995 – 5.6%	International Social Survey Programme (ISSP)	Harmon, Oosterbeek, and Walker (2003)
	1998 – 11.8% 1996 – 6.6% 1995 – 6.2%			Clark (2003)
Czech Republic	2002 – 6.6%			World Bank
	2002 – 6.6% 2001 – 8.7% 1999 – 5.4%		International Social Survey Programme (ISSP)	Flabbi, Paternostro, and Tiongson (2008)

Country	Estimates for entire country	Estimates by gender	Dataset	Reference
	1997 – 7.6% 1996 – 7.0% 1995 – 4.4% 1994 – 3.6%			
	1997 – 9.0% 1996 – 8.5% 1995 – 8.1%		Employer-based sample of over 400,000 Czech and 125,000 Slovak men	Filer, Jurajda, and Plánovský (1999)
		For men: 2002- 11.1% For women: 2002 – 8.9%	Information System on Average Earnings (ISAE), quarterly national employer survey	Jurajda (2005)
		For men: 1996 – 5.8% 1989 – 2.7%	Survey of 2,284 men from a stratified random sample of households, 1989 and 1996 cross-sectional data	Munich, Svejnar, and Terell (2005)
		For women: 2002 – 6.8% 1996 – 7.1% 1989 – 3.7%	Survey of randomly selected households in 1996 and 2002	Munich, Svejnar, and Terell (2004)
		For men: 1995 –2.9% For women: 1995 – 4.5%	International Social Survey Programme (ISSP)	Harmon, Oosterbeek, and Walker (2003)

Country	Estimates for entire country	Estimates by gender	Dataset	Reference
		For men: 1993 –5.2% For women: 1993 – 5.8%	Data from a multi-country comparative research project entitled "Social Stratification in Eastern Europe 1993"	Chase (1997)
Poland	2005 – over 7% yearly⁷		Households Budget Survey (HBS)	Strawinski (2008)
	2002 – 10.6%		International Social Survey Programme (ISSP)	Flabbi, Paternostro, and Tiongson (2008)
	2001 – 9.2%			
	1999 – 7.9%			
	1998 – 8.1%			
	1997 – 6.5%			
	1996 – 7.0%			
	1995 – 7.9%			
	1994 – 8.0%			
	1993 – 8.1%			
	1992 – 7.1%			
	1991 – 6.0%			
	2000 – 10.6%			World Bank
		For men: 1995 –7.4%	International Social Survey Programme (ISSP)	Harmon, Oosterbeek, and Walker (2003)

⁷ This is not an estimate from the Mincerian equation but from regression for secondary and tertiary education separately

Country	Estimates for entire country	Estimates by gender	Dataset	Reference
		For women: 1995 – 10.3%		
	1996 – 7.3%	For men: 1996 –7.8% For women: 1996 – 6.7%	Labor Force Survey / LSMS type survey	Rutkowski (2001)
Romania	2003 – 4.2%			World Bank
	2000 – 8.5% 1999 – 8.2% 1998 – 7.8% 1997 – 6.9% 1996 – 6.7% 1995 – 6.7% 1995 – 5.9% 1990-93 – 6.4%		Integrated Household Survey (IHS) of the National Institute of Statistics	Andren, Earle and Sapatoru (2005)
China	2005 – 12.1%	For men: 2005 –13.6% For women: 2005 – 9.3%	Data on urban workers from the survey by the China’s Institute of Labour Studies (ILS)	Qian and Smyth (2008)

Country	Estimates for entire country	Estimates by gender	Dataset	Reference
		For men: Pooled data 2004 and 2006 – 8.1% For women: Pooled data 2004 and 2006 – 7.8%	China Health and Nutrition Survey (CHNS) conducted in 2004 and 2006	Cnen and Hamori (2009)
	2001 – 10.2% 2000 – 10.1% 1999 – 9.9% 1998 – 8.1% 1997 – 6.7% 1996 – 6.8% 1995 – 6.7% 1994 – 7.3% 1993 – 5.2% 1992 – 4.7% 1991 – 4.3% 1990 – 4.7% 1989 – 4.6% 1988 – 4.0%		Annual surveys of urban households conducted by China’s National Bureau of Statistics from 1988 through 2001	Zhang et al. (2005)
	2000 – 10.8% ⁸		China Urban Household Investment and Expenditure Survey (CUHIES)	Heckman and Li (2003)

⁸ Estimated from the average treatment effect of four year college attendance being 43% (the annual return is 10.8%)

Country	Estimates for entire country	Estimates by gender	Dataset	Reference
			2000)	
	1995 – 5.4%	For men: 2005 –4.3%	Second wave of the Chinese Household Income Project (CHIP-95)	Li (2002)
		For women: 2005 – 6.9%		
	1993 – 12.2%		1993 Labor Survey by the Ministry of Labor	Psacharopoulos and Patrinos (2004) cited Hossain (1997)
Hungary	2002 – 11.1%			World Bank
	2002 – 11.1%		International Social Survey Programme (ISSP)	Flabbi, Paternostro, and Tiongson (2008)
	2001 – 9.0%			
	1999 – 10.9%			
	1998 – 8.0%			
	1997 – 10.4%			
	1996 – 8.2%			
	1995 – 8.8%			
	1994 – 9.6%			
	1993 – 7.6%			
	1992 – 7.1%			
	1991 – 7.5%			
	1990 – 5.7%			
	1989 – 7.2%			

Country	Estimates for entire country	Estimates by gender	Dataset	Reference
	1988 – 6.0% 1987 – 5.4% 1986 – 5.6%			
	1998 – 11.2% 1995 – 11.2% 1992 – 10.0% 1989 – 8.5% 1986 – 6.4%		Wage and Earnings Survey (WES) of the National Labor Center in Hungary	Campos and Jolliffe (2003)
		For men: 1995 – 7.0% For women: 1995 – 7.2%	International Social Survey Programme (ISSP)	Harmon, Oosterbeek, and Walker (2003)
	2000 – 10.4% 1992 – 9.4(4.0)% ⁹			Varga and Galasi (2002)
Slovenia	2002 – 8.2% 2000 – 8.1% 1998 – 8.9% 1997 – 9.9% 1996 – 11.7% 1995 – 9.5% 1993 – 8.8% 1994 – 5.8%		International Social Survey Programme (ISSP)	Flabbi, Paternostro, and Tiongson (2008)

⁹ Basic and extended specifications (the latter in parenthesis).

Country	Estimates for entire country	Estimates by gender	Dataset	Reference
	1991 – 6.3%			
		For men: 1995-8.9%	International Social Survey Programme (ISSP)	Harmon, Oosterbeek, and Walker (2003)
		For women: 1995 – 11.2%		
Slovak Republic	2002 – 6.1%			World Bank
	2002 – 6.1% 1999 – 5.9% 1998 – 6.6% 1995 – 6.1%		International Social Survey Programme (ISSP)	Flabbi, Paternostro, and Tiongson (2008)
		For men: 1995-5.0%	International Social Survey Programme (ISSP)	Harmon, Oosterbeek, and Walker (2003)
		For women: 1995 – 6.4%		
		For men: 1993-4.9%	Data from a multi-country comparative research project entitled "Social Stratification in Eastern Europe 1993"	Chase (1997)
		For women: 1993 – 5.4%		
Bulgaria	2003 – 6.7%			World Bank
	2002 – 7.2% 2000 – 4.9%		International Social Survey Programme (ISSP)	Flabbi, Paternostro, and Tiongson (2008)

Country	Estimates for entire country	Estimates by gender	Dataset	Reference
	1999 – 5.0% 1997 – 5.3% 1993 – 5.2% 1992 – 4.7%			
		For men: 1995-5.0% For women: 1995 – 6.2%	International Social Survey Programme (ISSP)	Harmon, Oosterbeek, and Walker (2003)
	2001 – 6.5%	For men: 1995-6.2% For women: 1995 – 6.8%	Labor Force Survey / LSMS type survey	Rutkowski (2001)
Latvia	2002 – 7.8%			World Bank
	2002 – 7.8% 2001 – 8.0% 2000 – 6.5% 1999 – 8.6% 1998 – 5.3% 1996 – 4.7% 1995 – 6.7%		International Social Survey Programme (ISSP)	Flabbi, Paternostro, and Tiongson (2008)
Kazakhstan	2001 – 8.1%			World Bank

Country	Estimates for entire country	Estimates by gender	Dataset	Reference
		For men: 2001-8.0% For women: 2001 – 11.5%	2001 Kazakhstan Household Budget Survey (KHBS)	Arabsheibani and Mussurov (2007)
Moldova	2003 – 8.0%			World Bank
Belarus	2002 – 6.9%			World Bank
	2001 –10.7% 1996 –10.1% ¹⁰		1996 and 2001 waves of the Belarusian Household Survey of Incomes and Expenditure (BHSIE)	Pastore and Verashchagina (2006)
Tajikistan	2003 – 4.9%			World Bank
Georgia	2006 – 6.2%	For men: 2006-6.6% For women: 2006 – 7%	Georgian Household Survey conducted between 1997 and 2006 years	Botchorishvili (2007)
	2002 – 0.3%			World Bank
Croatia		For men: 2004 – 6.2% 1996 – 4.9%	Labor Force Survey (LFS) in 1996 and 2004	Vujčić and Šošić (2009)

¹⁰ This is the annual rate of return to tertiary education. Estimates are obtained using the educational qualifications, not the years of schooling.

Country	Estimates for entire country	Estimates by gender	Dataset	Reference
		For women: 2004 – 7.8% 1996 – 5.1%		

Table 2a. Return to a year of education in selected transition countries, 1994-2007

Country / Specification	1994	1995	1996	1997	1998	1999	2000	2001	2002	2007
Bulgaria										
Basic				0.053		0.05	0.049		0.072	0.052
				(0.010)		(0.010)	(0.009)		(0.011)	(0.013)
Basic Balanced				0.055		0.05	0.05		0.074	0.053
				(0.010)		(0.011)	(0.009)		(0.011)	(0.013)
Richer				0.035		0.036	0.028		0.057	0.032
				(0.015)		(0.017)	(0.010)		(0.016)	(0.019)
Czech										
Basic	0.036	0.044	0.07	0.076		0.054		0.087	0.066	0.069
	(0.008)	(0.006)	(0.007)	(0.008)		(0.006)		(0.009)	(0.010)	(0.012)
Basic Balanced	0.042	0.042	0.07	0.082		0.051		0.086	0.062	0.069
	(0.007)	(0.006)	(0.008)	(0.008)		(0.006)		(0.009)	(0.010)	(0.012)

Country / Specification	1994	1995	1996	1997	1998	1999	2000	2001	2002	2007
Richer	0.028	0.033	0.048	0.066		0.03		0.063	0.034	0.033
	(0.008)	(0.008)	(0.009)	(0.009)		(0.007)		(0.011)	(0.011)	(0.012)
Latvia										
Basic		0.067	0.047		0.053	0.086	0.065	0.08	0.078	0.063
		(0.010)	(0.008)		(0.010)	(0.010)	(0.009)	(0.009)	(0.011)	(0.011)
Basic Balanced		0.068	0.046		0.052	0.08	0.063	0.083	0.075	0.063
		(0.010)	(0.008)		(0.010)	(0.010)	(0.010)	(0.009)	(0.012)	(0.011)
Richer		0.043	0.028		0.03	0.05	0.039	0.057	0.025	0.017
		(0.012)	(0.009)		(0.013)	(0.014)	(0.015)	(0.010)	(0.013)	(0.013)
Poland										
Basic	0.08	0.079	0.07	0.065	0.081	0.079		0.092	0.106	0.098
	(0.008)	(0.008)	(0.009)	(0.009)	(0.010)	(0.010)		(0.010)	(0.011)	(0.010)
Basic Balanced		0.079	0.07	0.064	0.081	0.079		0.09		0.098
		(0.008)	(0.009)	(0.009)	(0.010)	(0.010)		(0.010)		(0.010)
Richer		0.041	0.063	0.053	0.068	0.028		0.071		0.047
		(0.010)	(0.011)	(0.014)	(0.012)	(0.012)		(0.015)		(0.016)
Russia										
Basic	0.054	0.083	0.065	0.072		0.084	0.083	0.084	0.074	0.082
	(0.008)	(0.011)	(0.010)	(0.011)		(0.012)	(0.011)	(0.011)	(0.013)	(0.009)
Basic	0.054	0.084	0.065	0.066		0.091	0.081	0.081		0.082

Country / Specification	1994	1995	1996	1997	1998	1999	2000	2001	2002	2007
Balanced										
	(0.009)	(0.011)	(0.011)	(0.011)		(0.013)	(0.011)	(0.011)		(0.009)
Richer	0.041	0.06	0.03	0.046		0.068	0.056	0.041		0.056
	(0.010)	(0.013)	(0.014)	(0.012)		(0.015)	(0.013)	(0.012)		(0.010)
Slovak										
Basic	0.061				0.066	0.059			0.061	0.073
	(0.007)				(0.007)	(0.006)			(0.007)	(0.010)
Basic Balanced						0.058			0.06	0.073
						(0.006)			(0.007)	(0.010)
Richer						0.028			0.029	0.062
						(0.008)			(0.007)	(0.010)
Slovenia										
Basic		0.095	0.117	0.099	0.089		0.081		0.082	0.083
		(0.008)	(0.007)	(0.009)	(0.007)		(0.007)		(0.009)	(0.009)
Basic Balanced		0.098	0.113	0.093	0.089		0.082		0.075	0.083
		(0.008)	(0.008)	(0.009)	(0.007)		(0.007)		(0.009)	(0.009)
Richer		0.077	0.077	0.056	0.042		0.057		0.04	0.062
		(0.012)	(0.011)	(0.012)	(0.010)		(0.009)		(0.009)	(0.013)

Country / Specification	1994	1995	1996	1997	1998	1999	2000	2001	2002	2007
Ukraine										
2008										
Basic										0.052 (0.011)
Basic Balanced										0.049 (0.009)
Richer										0.024 (0.011)

Note: Coefficients of the years of schooling variable in earning regressions. Dependent variables are monthly earnings. Robust standard errors are in parenthesis. Basic specification includes: potential experience (linear and squared), dummies for male. Richer specification includes: previous regressors plus dummies for living in urban areas and married, controls for current job (dummies for occupation, public employee, working full - time, member of a trade union), controls for current family (number of members, dummy for spouse working full - time).

Source: Estimates for 1994-2002 are from Flabbi et al. (2008); estimates for 2007 and for Ukraine are by authors.

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