THE SHEEPSKIN EFFECT IN THE HUNGARIAN LABOUR MARKET 2010-2012: ANALYSIS OF DATA FROM THE HUNGARIAN GRADUATE TRACKING SYSTEM

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Abstract: *The sheepskin effect is a wage increase connected to the attainment of a degree (or credential) in addition to the wage gap connected to the completion of a schooling level (school years, exams passed etc.). This effect is often referred to as a phenomenon supporting the signaling (or screening) hypothesis against human capital theory in the so called 'signaling vs. human capital debate' over the economic role of education. Many empirical studies in many countries have tested (mostly successfully) this hypothesis during the last decades, but it has never been tested in Hungary. Therefore the main goal of the current study is to identify and measure the sheepskin effect in Hungarian higher education based on the country-wide, representative databases of the Hungarian Graduate Career Tracking System (HGCTS). The 2 databases used in the analysis are two HGCTS surveys from the years 2011 and 2012. The first part of the article is a literature review that summarises the results of the existing empirical sheepskin research and highlights their connections to the signaling vs. human capital debate. In the second part, empirical research is carried out based on the HGCTS data. This research has two phases. In the first phase subjective data are analysed (according to the perceived negative effect of not obtaining the degree in time), while in the second, mean differences are tested between net hourly wages of responder groups (1) who have the educational credential and (2) do not have it (even though they have finished all courses and passed all exams at the given educational level). The statistical analysis identified significant wage gaps between graduated responders and those who had not graduated but had passed the state exam (and so had finished all the exams in higher education before graduating) on nearly all levels and in both samples (the only exemption was the post-Bologna master level in the 2011 sample). We can conclude that the existence of the sheepskin effect in the Hungarian higher education has been supported.*

Keywords: Sheepskin effect; labour market; higher education; graduate career tracking

JEL classification: I21; J21

1. Introduction
The aim of the current study is to identify and measure the sheepskin effect in Hungarian higher education based on the country-wide, representative databases of the Hungarian Graduate Career Tracking System (HGCTS). The two databases used in the analysis are 'Frissdiplomások2011', and 'Frissdiplomások2012'.

The expression 'the sheepskin effect' originates from the tradition that in many parts of the world, degree certificates were formerly written on lamb skin (Brown and Sessions, 2004: 96). According to the sheepskin effect hypothesis those who complete all courses in a school or university but do not graduate earn less on the labour market than those who earned the degree. Many empirical studies in many countries have tested this hypothesis, such as those by Layard and Psacharopoulos (1974), Groot and Oostrebeek (1994), Jeager and Page (1996), Crespo and Cortez (2005), van der Meer (2011), and Mora and Muro (2014). The launch of the HGCTS in 2010 established the opportunity to implement such a test in Hungary, too, but only within certain limits (questionnaire items, sample size). Although analysing specific sectors or geographical areas can also be interesting, this paper will analyse the available data only on a general level, focusing on the total population in order to provide a starting point for later studies.

In the second section the definitions of the sheepskin effect will be summarised as well as the basic underlying theories. The third section describes the sample and method of the empirical research, while the fourth presents the results. Conclusions, the limits of the findings and possible future research areas are dealt with in the last chapter.

2. Literature review

An operational definition of the sheepskin effect depends on the available data and methodology. According to what is probably the most commonly used definition, the sheepskin effect is the wage gap between credentialed and non-credentialed employees conditional on their years of schooling (see Belman and Heywood, 1997, among others). Unfortunately, the data required by this definition are sometimes not available. For those cases another definition - used by Hartog (1983) - is more adequate. In his work the sheepskin effect was the wage gap between those who obtained their diploma and those who attended the same level of education but did not obtain the credential. We can summarise these two descriptions of the examined phenomenon as follows: the sheepskin effect is a wage increase connected to the attainment of a degree (credential) above the wage gap connected to the completion of a schooling level (school years, exams passed etc.) without a credential.

The sheepskin effect as defined above is frequently referred to as a phenomenon supporting the signaling (or screening) hypothesis against human capital theory in the so called 'signaling vs. human capital debate' over the economic role of education. Regarding this debate, see among others Brown and Sessions (2004) or Kun (2013). Here we focus only on the role of the sheepskin effect in this debate.

Among others, Layard and Psacharopoulos (1974), Hungerford and Solon (1987), Hartog (1983), Groot and Oostrebeek (1994) and Park (1999) have used the sheepskin effect as a baseline to conduct their signaling vs. human capital research. Unfortunately, this goes against the common versions of both human capital and signaling/screening theories, and could only differentiate particular models. Differences in productivity can be shown when earning a degree, since one has to pass the final exam, write a thesis or face other challenges.

The assumption that having motivation, perseverance and "character" are non-observable, productivity-determining factors indicated by the presence of credentials has been confirmed by an investigation conducted by Arkes (1999).

Layard and Psacharopoulos (1974) approached this problem from another angle, considering the human capital hypothesis. Their starting point was that if education is a signal, the earned credential has significantly higher independent value (compared to school years), than when it is used only for increasing human capital. Thus it can be concluded that when credentials are attained the number of school years may increase wages more quickly than when credentials are not attained. Applying meta-analysis to several empirical studies it has been established that if one does not have any credential,

the return on school years is not significantly less than for those having credentials, which means the signaling/screening hypothesis can be discarded. However, this experience re-occurs in most of the models built on the informational role of education. See, e.g., the study by Riley (1976), where every educational level has the same return. They also argued that the results of Taubman and Wales (1973) – namely that the effect of education on wages decreases over age – supports human capital theory, since its probable explanation is that employers' knowledge of the real productivity of the employee increases, since the employers do not rely on credentials that much. Layard and Psacharopoulos also considered the non-existence of cheaper alternative screening methods as a reason for not signaling. According to them, if education was solely screening, companies would have already developed their own screening/testing methods. This latter argument is very weak, as Wiles (1974) and Stiglitz (1975) both pointed out; ensuring screening possibilities for companies is the external effect of education. Furthermore screening works very well here. In this way, it will always be relatively cheaper to use education as a screening device compared to the quality of information.

The uniqueness of the research by Groot and Oostrebeek (1994) on Dutch data derives from the fact that school years are analysed in more detail here than in the previous studies. They define effective (school) years, repeated years, skipped years, inefficient years and dropout years. The effect of repeated years is negative without screening and neutral in the case of human capital. The effect of dropout years ending without a degree is neutral assuming signaling, while positive in the case of human capital models. Skipped years have a positive effect in the screening model, although they have no effect in the human capital model. Inefficient years (when one reaches a given credential later or with more school types, than the others) have no effect in the case of screening, while in the case of human capital they have, assuming homogeneous resources, otherwise they do not. This categorization has been used to examine two predictions of signaling/screening. According to the first prediction, finishing school earlier indicates better abilities, while the other prediction is the sheepskin hypothesis, which means not having the credential makes school years worthless. Eventually, the screening hypothesis is discarded and the human capital hypothesis supported.

It is not only Arkes (1999), who assumes that both human capital and screening theories can be applied to explain the sheepskin effect. Frazis (2002), for instance, developed both of the models to a certain extent, making them appropriate tools to explain the phenomenon. Two abilities were inserted into the human capital model: constant inner productivity and the ability to acquire human capital. Similar models were applied in Willis and Rosen (1979), Garen (1984) and Frazis (1993). In the meantime, one additional factor has been inserted to the screening theory, too: the uncertainty of the employees concerning their own capabilities.

Crespo and Cortez (2005) have performed a really interesting analysis related to the sheepskin effect. They studied how intense was the effect between 1982 and 2002 in Brazil. According to their results, on the lowest school level the effect disappeared and, apart from the highest level, it decreased significantly on the other levels, as well. However, on the highest level it is still remarkable, although also reduced. the authors explain this by the higher demand from companies for higher educational degrees along with economic development – due to the new technology.

Jaeger and Page (1996) pointed out the different extent of the sheepskin effect (in every qualification higher than a high school certificate) measured by sex and minority, on "high school" and "college" levels. In different demographical groups the effect of various levels was also discrepant. Bitzan (2009) raised a similar question: the sheepskin effect shown in white and in black communities was assessed and compared in the USA labour market. A significant effect appeared in both of the groups, but while among white people

it was stronger on lower levels (college or lower); among black people the effect was the reverse, being stronger on higher levels (graduate degree). It is very similar to the phenomenon Ferrer and Riddell (2008) experienced between Canadian immigrants and non-immigrants. There, the effect of school years and experience was negligible in the case of immigrants, while the credentials earnt there provided much more benefit, compared to those of non-immigrants.

Gulasson (1999) has analysed the results of an American follow-up study that provided data of the same group 6 times between 1972 and 1986. It was found that the sheepskin effect did not appear when an individual worked in a job suitable for his/her credential, but did appear if this was not the case. Probably one of the most exciting research studies in this field is the one by Liu et al. (2013) that concluded there were beneficial health effects from earning a credential (given diseases appear with a lower probability). This supports the assumption that the earned credential is important not only because of the knowledge one can acquire in school, but also because it is able to predict other abilities e.g. health. Other interesting research papers examining the sheepskin effect include (among others): McGuinness (2002), Van der Meer (2011), Denny and Harmon (2001), Silles (2008), El-Hamidi (2006), and Gibson (2000).

3. Sample and method

This article uses two databases of the HGCTS from 2011 and 2012 ('Frissdiplomások 2011' and 'Frissdiplomások2012'). These data are the output of national graduate career tracking surveys regarding Hungarian higher education. Responding was voluntary, thus self-selection bias must be taken into consideration. The database from the 2011 survey contains responders who finished their higher education studies (with graduation or with a state exam only) in 2008 or 2010, while in the 2012 survey the responders' year of graduation or state exam was 2007, 2009 or 2011. The total number of responders was 20,453 in Frissdiplomások2011 (8,943 finished in 2008, 10,533 in 2010, and there was no finishing time data for 976 responders) and 24,890 in Frissdiplomások2012 (2007: 5,184, 2009: 8,333, 2011: 9,500, no data: 1,873). Both surveys contained multiple questionnaire items useful to measure the sheepskin effect: current earnings (in 2011 or in 2012, respectively), the level and area of education, whether the responder obtained the credential or only had a state exam, how long did it take to obtain the credential after the state exam (if it was not immediate), whether the responder felt any disadvantage in not having the credential (if he/she did not have it immediately). Unfortunately, the level and area of education data were far from complete, since these were only collected regarding one of the responder's degrees (HGCTS data collection is organised through higher education institutions and is unaware of multiple graduations).

The particular research definition of the sheepskin effect was adjusted to the possibilities of the databases used, and this also defined the limits of the methodology: it is the wage difference between those obtaining their credential and those who passed their state exam (the very last exam in Hungary before graduating) but who did not graduate (for some reason not connected to courses or exams, such as not having a foreign language certificate).

4. Results

This section will first summarise the subjective data (the perceived effect of the credential), then the more objective data of net earnings will be compared between those who were credentialed and those who were not.

4.1. Subjective data

In this subsection ratios of the subjective data will be summarised regarding the perceived handicap caused by not obtaining the credential in time (right after the state exam has been passed). Responders had to select from 3 options: if they experienced no disadvantage, minor disadvantage or major disadvantage. Table 1 summarises the answers, from which we can conclude the following: in every year and on every level not having the credential led to a perceived minor or major disadvantage in more than 50% of the valid cases.

Table 1: Perceived disadvantage from not obtaining the credential (people; valid%)

Answer option	Educational level and year of the survey							
	BA/BSc		MA/MSc		college		university	
	2011	2012	2011	2012	2011	2012	2011	2012
No disadvantage	270 (32%)	544 (25%)	74 (41%)	147 (44 %)	253 (31%)	380 (30 %)	303 (49%)	558 (37 %)
Minor disadvantage	410 (49%)	927 (43%)	87 (48%)	135 (41 %)	450 (54%)	590 (46 %)	271 (44%)	629 (42 %)
Major disadvantage	158 (19%)	559 (26%)	20 (11%)	51 (15 %)	123 (15%)	307 (24 %)	46 (7%)	319 (21%)
Total responding	838 (100%)	2030 (100%)	181 (100%)	333 (100%)	826 (100%)	1277 (100%)	620 (100%)	1506 (100%)
Not responding	1404	135	181	17	935	47	1128	205

Source: calculated from 'Frissdiplomások2011' and 'Frissdiplomások2012' databases
Note: college = pre-Bologna college level (3-4 years); university = pre-Bologna university level (5+ years)

4.1. The credential wage gap

Table 2 shows net hourly wage data (mean, standard deviation, values of two sample t-test statistics) in HUF from the 2011 survey per educational level and per having or not having a degree. Table 3 contains similar data but from the 2012 survey. In both tables the significance of the mean difference was tested with two independent samples t-statistics.

Table 2: Hourly wage gap between credentialed and non-credentialed employees (2011) (HUF)

Education level	Degree	N	Mean	Standard deviation	t-test
BA/BSc	No	542	0.8965	0.81768	-1.8887*
	Yes	1872	0.9610	0.66146	
Pre-Bologna college	No	482	0.8907	0.70194	-2.5042**
	Yes	2757	1.0054	0.96283	
Pre-Bologna or undivided university	No	351	1.0118	0.66912	-4.1184***
	Yes	3191	1.1732	0.91425	
MSc	No	92	1.0129	0.65569	-1.4081
	Yes	691	1.1336	0.78706	

Source: calculated from database Frissdiplomások2011
Note: N is the number of cases; *** $p ≤ 0.01$; ** $p ≤ 0.05$; * $p ≤ 0.10$

The reader can recognise that on every educational level the degree always leads to a higher mean net hourly wage, although this is significant only on the BA/BSc, pre-Bologna college and pre-Bologna or undivided university levels.

Table 3: Hourly wage gap between credentialed and non-credentialed employees (2012) (HUF)

Education level	Degree	*N*	Mean	Standard deviation	*t*-test
BA/BSc	No	643	0.8222	0.52281	-6.7901***
	Yes	2951	0.9867	0.68965	
Pre-Bologna college	No	602	0.9333	0.67808	-4.9919***
	Yes	3846	1.0867	0.70487	
Pre-Bologna or undivided university	No	319	1.0466	0.74284	-4.8409***
	Yes	4037	1.2612	0.97727	
MSc	No	102	0.8842	0.36669	-5.8487***
	Yes	961	1.1416	0.76829	

Source: calculated from database Frissdiplomások2012
Note: *N* is the number of cases; *** $p \leq 0.01$; ** $p \leq 0.05$; * $p \leq 0.10$

Data from the 2012 survey (just like the one conducted in 2011) revealed a positive contribution of credentials to the net hourly wage, but this time these wage gaps are highly significant ($p \leq 0,01$) for all examined educational levels.

5. Conclusions

The current study examined the existence of the sheepskin effect in Hungarian higher education. In the first part of the article the phenomenon was defined (an adjusted definition was selected to fit the available database), then the place of the sheepskin effect in the signaling vs. human capital debate was briefly described with a literature review (focusing on the empirical works). In the second part two broad-brush examinations of the Hungarian credential wage gap were implemented 1) using a subjective measure of the responders' perceptions and 2) performing independent sample *t*-tests. Both were implemented on the Hungarian Graduate Career Tracking Survey databases from 2011 and 2012. The subjective data showed that more than half of those responders who did not have the credential felt a minor or major disadvantage in every year and on every educational level. The *t*-tests identified significant wage gaps between graduate responders and those ones who were non-graduate but had passed the state exam (and so had finished all the exams in higher education before graduating) on nearly all levels in both samples (the only exception was the post-Bologna master level in the 2011 sample). Based on this, we can conclude that the existence of the sheepskin effect in the Hungarian labour market is confirmed. Nevertheless, it is still unclear how the above mentioned phenomenon is distributed among different sectors of the labour and/or higher education market. Subsequent research should also identify the effect of influencing factors, such as geographical area, background, or labour market experience.

6. Acknowledgements

References

Arkes, J. (1999) What Do Educational Credentials Signal and Why Do Employers Value Credentials? *Economics of Education Review*, Vol. 18., No. 1., pp. 133-141.

Belman, D. and Heywood, J.S. (1997) Sheepskin Effects by Cohort: Implications of Job Matching in a Signaling Model. *Oxford Economic Papers*, Vol. 49., No. 4., pp. 623-637.

Brown, S. and Sessions, J.G. (2004) 'Signaling and screening'. In: Geraint, Johnes – Johnes, Jill (eds.): *International Handbook on the Education of Economics*. Edward Elgar Publishing Limited, Cheltenham – Northampton, pp. 58-100.

Crespo, A. and Cortez, M. (2005) 'The Sheepskin Effects Evolution from 1982 to 2002 in Brazil: The roles of labor supply and demand changes'. Conference paper, XXXIII *Encontro Nacional De Economia*, Anpec, Available: www.anpec.org.br/encontro2005/artigos/A05A167.pdf [28 Febrary 2008]

Denny, K. J. and Harmon, C. P. (2001) Testing for Sheepskin Effects in Earnings Equations: Evidence for Five Countries. *Applied Economics Letters*. Vol. 8., No. 9., pp. 635-637.

El-Hamidi, F. (2006) General or Vocational Schooling? Evidence on School Choice, Returns, and 'Sheepskin' Effects from Egypt 1998. *Journal of Policy Reform,* Vol. 9., No. 2., pp. 157-176.

Ferrer, A. and Riddell, W. C. (2008) Education, Credentials, and Immigrant Earnings. *The Canadian Journal of Economics / Revue canadienne d'Economique*, Vol. 41., No. 1., pp. 186-216.

Frazis, H. (1993) Selection bias and the degree effect. *The Journal of Human Resources*, Vol. 28., No. 3., pp. 538–554.

Frazis, H. (2002) Human capital, signaling, and the pattern of returns to education. *Oxford Economic Letters*, Vol. 54., No. 2., pp. 298-320.

Garen, J. (1984) The Returns to Schooling: A Selectivity Bias Approach with a Continuous Choice Variable. *Econometrica*, Vol. 52., No. 5., pp. 1199-1218.

Gibson, J. (2000) *Time or paper? A Direct Test for Sheepskin Effects in the Returns to Education*. Working paper, Available: www.mngt.waikato.ac.nz/Departments/staff/johng/PDF_Files/WorkingPapers/OBESSheepskin.pdf [23 January 2009]

Groot, W. and Oosterbeek, H. (1994) Earnings Effects of Different Components of Schooling; Human Capital Versus Screening. *The Review of Economics and Statistics*, Vol. 76., No. 2., pp. 317-321.

Gulasson, E. T. (1999) The Stability Pattern of Sheepskin Effects and Its Implications for the Human Capital Theory – Screening Hypothesis Debate. *Eastern Economic Journal*, Vol. 25., No. 2., pp. 141-150.

Hartog, J. (1983) To graduate or not: Does it matter? *Economics Letters*, Vol. 12., No. 2., pp. 193-199.

Hungerford, T. and Solon, G. (1987) Sheepskin Effects in the Returns to Education. *The Review of Economics and Statistics*, Vol. 69., No. 1., pp. 175-177.

Jeager, D. A. and Page, M. E. (1996) Degrees Matter: New Evidence on Sheepskin Effects in the Returns to Education. *Review of Economics & Statistics,* Vol. 78., No. 4., pp. 733-740.

Kun, András István (2013) Oktatási jelzés és szűrés a munkaerőpiacon – az empirikus vizsgálatok tanulságai (Educational Signaling and Screening in the Labour Market – What Can We Learn From the Empirical Literature). *Competitio*, Vol. 12., No. 2., pp. 39-60.

Layard, R. and Psacharopoulos, G. (1974) The Screening Hypothesis and the Returns to Education. *Journal of Political Economy*, Vol. 82., No. 5., pp. 985-998.

Liu, S.Y., Buka, S.L., Kubzansky, L.D., Kawachi, I., Gilman, S.E. and Loucks, E.B. (2013) Sheepskin effects of education in the 10-year Framingham risk of coronary heart disease. *Social science & medicine* (1982), Vol. 80., No. 1., pp. 31-36.

McGuinness, S. (2002) *Graduate over-education as a sheepskin effect: evidence from Northern Ireland*. Working Paper Series No. 70., Northern Ireland Economic Research Centre, Belfast.

Mora, J. J. and Muro, J. (2014) *On the size of sheepskin effects: A meta-analysis*. Universidad de Alcalá Facultad de Ciencias Económicas y Empresariales, Madrid, http://dspace.uah.es/dspace/bitstream/handle/10017/19909/Alcamentos1401.pdf [24 January 2014]

Park, J. H. (1999) Estimation of sheepskin effects using the old and new measures of educational attainment in the Current Population Survey. *Economic Letters*, Vol. 62., No. 2., pp. 237-240.

Riley, J. G. (1976) Information, screening and human capital. *The American Economic Review*, Vol. 66., No. 2., pp. 254-260.

Silles, M. (2008) Sheepskin Effects in the Returns to Education. *Applied Economics Letters,* Vol. 15., No. 3., pp. 217-219.

Stiglitz J. E. (1975) The Theory of "Screening," Education, and the Distribution of Income. *The American Economic Review*, Vol. 65., No. 3., pp. 283-300.

Taubman, P. J. and Wales, T. J. (1973) Higher Education, Mental Ability, and Screening. *The Journal of Political Economy*, Vol. 81., No. 1., pp. 28-55.

Van der Meer, P. H. (2011) Educational credentials and external effects: A test for the Netherlands. *Research in Social Stratification and Mobility*, Vol. 29., No. 1., pp. 107-118.

Wiles, P. (1974) The Correlation between education and earnings: The External-Test-Not-Content hypothesis (ETNC). *Higher Education*, Vol. 3., No. 1., pp. 43-58.

Willis, R. J. and Rosen, S. (1979) Education and Self-Selection. *Journal of Political Economy*, Vol. 87., No. 5., pp. S7-S36.