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Labour market success of non-completer higher education students and higher education degree-holders

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ABSTRACT
This study uses a large, individual-level, linked administrative panel dataset (Admin3) to examine the early labour market success of Hungarian higher education graduates who graduated between 2011 and 214, compared to their peers who graduated with incomplete degrees (only 'absolutorium' and no degree). We focus on the first 36 months of the early labour market careers of the two groups. The analyses provide further evidence for the few studies on the economic value of incomplete diplomas in a European context. The results confirm the role of the diploma signal early in the labour market career. Those without a degree take longer to find a full-time job and earn less than those with a degree at the beginning of their career, and in their first job, they are working at a somewhat lower skill level job than degree holders. There is no difference in the probability of occupational mobility between the two groups, with the likelihood of mobility within a given occupation being slightly lower for those with a degree. The results on wage and skill level changes due to occupational mobility are consistent with the U-shaped theory of occupational mobility.

JEL codes: I23, I26, J01, J24, J62
Keywords: higher education, labour market, drop-outs, human capital, signalling, sheepskin effect

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A felsőoktatást diplomával és diploma nélkül elhagyó hallgatók munkaerő-piaci sikeressége

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ÖSSZEFOGLALÓ

Ez a tanulmány egy nagy, egyéni szintű, összekapcsolt adminisztratív paneladatállomány (Admin3) segítségével vizsgálja a 2011 és 214 között végzett magyar felsőoktatási diplomások korai munkaerő-piaci sikerességét azokhoz képest, akik csak abszolutóriumot szereztek, de oklevelet nem. A két csoport korai munkaerő-piaci pályafutásának első 36 hónapját elemezzük. Az elemzések további bizonyítékkal szolgálnak a hiányos diplomák gazdasági értékével kapcsolatos kevés tanulmányhoz európai kontextusban. Az eredmények megerősítik a diploma jelző funkciójának szerepét a munkaerő-piaci karrier korai szakaszában. A diplomával nem rendelkezőknek hosszabb időbe telik teljes munkaidős állást találni, és kevesebbet keresnek, mint a diplomával rendelkezők a pályafutásuk kezdetén és az első munkahelyükön valamivel alacsonyabb képzettség-igényű munkakörben dolgoznak, mint a diplomával rendelkezők. A két csoport között nincs különbség a foglalkozási mobilitás valószínűségében, a diplomával rendelkezők esetében a mobilitás valószínűsége egy adott foglalkozáson belül valamivel kisebb. A foglalkozási mobilitás miatti bér- és képzettségi szintváltozásokra vonatkozó eredmények összhangban vannak a foglalkozási mobilitás U-alakú elméletével.

JEL kódok: I23, I26, J01, J24, J62
Kulcsszavak: felsőoktatás, munkaerőpiac, lemorzsolódás, emberi tőke, jelzés, szűrés

1. Introduction

A significant proportion of students leave higher education each year without a degree. The expansion of higher education in most countries has increased the share of students leaving higher education without a degree as non-completer over time. Reducing the drop-out rate is a policy objective in many countries to improve the efficiency of public investment in higher education. Nevertheless, an important question is the economic value of an incomplete degree. In other words, whether or not participating in higher education itself increases individuals' labour market prospects, because if it does not, then it can really be seen as a waste of resources for those who leave higher education without a degree and for society but if it does, to leave higher education without a degree can still be a profitable investment.

This is the decades-long debate between the human capital model (Becker, 1962, 1965; Mincer, 1974) and the screening and signalling models (Arrow, 1973; Spence, 1973; Stiglitz, 1975). Human capital theory suggests that time spent in education directly increases students' productivity and that human capital accumulation is in proportion to the time spent in education, which, therefore, increases returns to education in terms of earnings and employment prospects independent of successful graduation. The screening signalling model argues that educational participation does not increase individuals' productivity. Employers use educational certificates as credentials, which signals higher innate productivity because they do not have information on applicants' productivity, so degrees matter for the labour market success of graduates. This is often called the sheepskin effect (Hungerford -Solon, 1987). It follows that there will be differences in the labour market success of degree holders and non-completers, at least at the beginning of their careers, until employers have more accurate information about the employer because it is a negative signal to the employer if someone has not obtained the degree.

For examining the early labour-market success of degree holders and non-completers, our analysis employs data from a very large-scale linked administrative individual-level panel data set, which –among others – contains detailed information on the educational career and educational outcomes of individuals in the sample, their labour market trajectories, and also individual background data, school characteristics, and other contextual characteristics.

Our study contributes to the literature in three ways:

First, we can measure much more accurately those who have not obtained a qualification but have participated in higher education as much as those who have obtained a degree. Most studies about sheepskin effects use imputed data to determine if an individual is a non-completer or not. Typically, they use individuals' years of schooling and their highest completed educational attainment to determine if the individual is a non-completer, which might be biased measures of the actual effects if individuals take different amounts of time to complete a qualification. Other studies rely on the self-reported incidence of drop-out from higher education; however, dropping out can occur at very different times, so the human capital accumulated by the time of dropping out and the time of graduation may differ. In the Hungarian higher education system, there is a so-called 'absolutorium' prerequisite for graduation. Students can advance to the thesis defence and obtain a diploma if they have the absolutorium. The absolutorium states that the student has completed all credits required for the programme curriculum and exam requirements, too. We consider non-completers those who have an absolutorium but not a diploma. Therefore, the accumulation of human capital of the two groups is equal, differing only in that one group has a degree and the other does not. So, our estimates can better separate the impact of the degree from the impact of accumulated human capital on the labour market success of higher education graduates than most previous work. Nevertheless, there still might be differences in the accumulated human capital of the two groups as we have no information on their college grades. In other words, the two groups may have accumulated human capital with different efficiency rates and in spite they have the same number of credits, they still have different accumulated human capital.

Second, we can follow the labour market careers of graduates and non-completers month by month for 3 years after obtaining the absolutorium. We estimate not only wage differences and differences in employment probability between non-completers and degree holders but also differences in job and occupational mobility, wage growth and the frequency and direction of movement between occupations with different skill needs.

Finally, our analyses provide additional evidence for the few studies on the economic value of an incomplete degree in the European context.

The paper is organised as follows. Section 2 gives a short literature review; Section 3 describes the data, variables, and methods and provides descriptive statistics. Section 4 presents empirical on results entry into the labour market. Section 5 contains the analysis of occupational mobility, while Section 6 estimates the consequences of occupational mobility. We discuss and summarise our results in the concluding Section7.

2. Literature review

Several studies have examined the labour market benefits of completed and incomplete higher education in the United States, but fewer studies have examined the question in Europe.

A part of the studies, mainly the earlier ones, have not found any sheepskin effect (e.g. Hungerfold – Solon, 1987). Some studies found that higher education participation is associated with higher earnings and better employment probabilities than a high school degree, even with an incomplete degree. For example, Kane and Rouse (1995) found that both 2-year and 4-year BA degree holders earned no more than those with similar amounts of 2-year or 4-year college credits.

A number of studies found evidence of substantial sheepskin effects in the US. For example, Jaeger and Page (1995) documented the significant effects of BA degrees. Park (1999) documented significant earnings gains for obtaining an associate's and bachelor's degrees. Zeidenberg et al (2015) found that non-completers from community colleges earn less compared with those of award holders, but the deficit varies according to program track. Most papers examined sheepskin effects by estimating models which separately model returns to years of education and the returns to qualifications. In their seminal paper on testing statistical discrimination, Altonji -Pierret (2001) find that employers base initial wages on education (and not unobserved productivity) – an indirect support for sheepskin effects.

For Europe, fewer studies investigate the differences in labour market prospects of higher education non-completers and degree holders. Based on survey data, Davies and Elias (2003) show that while tertiary dropouts have a lower probability of employment than graduates, about half of them move into ‘graduate-track’ type occupations and earn similarly to graduates in the United Kingdom. Silles (2007) also

examined sheepskin effects in the returns to education in the United Kingdom for the period 1985-2003, identifying non-completers as those who do not have a higher education degree conditioning on having the same number of years of continuous education as higher education degree-holders. The results indicated that both time spent in education and educational credentials are important in explaining earnings with higher qualifications always conveying higher earnings, holding years of schooling constant.

Schnepf (2017) made use of data from the 2011 Programme for the International Assessment of Adult Competencies (PIAAC) and investigated 15 European countries. The study estimated the effect of dropout (using self-reported dropout status) on employment status and success of entering prestigious professions and found that, on average, those individuals who attended but dropped out of tertiary education often fare better and never worse in terms of career progression than those who never enrolled. The results showed that, in general, tertiary educated dropouts have similar chances of employment and progressing to professional positions as non-dropouts, with the exception of Germany and Belgium, where dropouts from higher education have lower prospects of obtaining high-level positions in the labour market.

Berlingieri and Bolz (2020) also employed PIAAC 2011 data. They also define dropout from tertiary education based on self-reported status. They found that individuals dropping out from tertiary education earn 8% more than those never enrolling into higher education, but 25% less than tertiary graduates. On average, tertiary dropouts do not have better employment chances than upper secondary graduates, while they have significantly lower employment chances than those graduating from higher education.

3. Data, sample, variables and methods

Data and sample

Our analysis is based on a large linked longitudinal administrative dataset that were compiled from several sources for research purposes by the Databank of the HUN-REN Centre for Economic and Regional Studies. This database is a 50% sample of the Hungarian population (above age 3) in 2003, and contains monthly information between 2003 and 2017. It contains information from the Education Authority

(*Oktatási Hivatal*) about education career, with exact (monthly) dates of attending education institutions, and the dates of obtaining different certificates. Our primary source for labour market data was the National Pension Insurance data, which contains detailed insurance (employment and wage) histories.

We only consider individuals with a pre-degree certificate (absolutorium) stating that all course units have been completed. Specifically, our sample contains those who obtained this certificate between 2011 and 2014. To graduate, they need to write (and defend) their thesis and pass their foreign language certification exams. In effect, this latter requirement was binding for a substantial portion of students, and universities were later allowed to waive this thanks to different governmental decrees.

The 'treated group' are those who graduated immediately (within 3 months) after having passed their pre-degree certificate; we will call these individuals degree holders. The 'control group' are those who still have not graduated (who have not obtained their degree) more than 36 months after their pre-degree certificate. We will call them non-completers. We will analyse the 3 years of this sample's labour market career starting from the month after they obtained their absolutorium (ie. the period when the 'control group' did not obtain their degree).

To simplify the analysis, we only use those who attended a BA degree and did not continue their studies for an MA degree, and those who participated in a so-called unified programme. Since those who were not in full-time training likely started to work prior to enrolling in higher education, we exclude these students from the sample. Finally, we only keep individuals aged 20-29 at the time of their absolutorium. Overall, there were slightly more than 22 thousand individuals in our sample, of whom slightly more than 42 percent did not hold a degree. It is worth noting that 18 thousand individuals in our sample attended BA studies. We repeated the analysis for this restricted sample too, and the results were qualitatively the same.[1]

Variables

Besides essential individual background variables, including gender, age, as well as micro-region of residence, we have a number of variables about the studies of

[1] Please note that we also lost a few individuals due to missing information.

individuals. We include the level of studies (BA versus unified university), the major of studies (15 categories), and also faculty identifiers (180 different faculties).

For labour market outcomes, we are only interested in full-time employees, as (i) the occupation codes of those who are not in employee status are often not reported, and (ii) much of employment is full-time and earnings are more reliable. Variables describing labour market outcomes include standard ones: occupation (four-digit) and wages (monthly FTE equivalent).[2] While the data is available as a monthly panel, we only use quarterly observations. This is primarily to have a sufficiently long interval to be able to measure occupational transitions. In line with this, spells of non-employment which last 3 or more months are excluded from our data. [3] More precisely, we use observations for the month of January, April, July and October of each year.

We also extract variables characterising wage distributions for each occupation and year, including quintiles and medians (based on all full-time employees below age 40). We use quintiles to classify individuals' relative wage position within the given occupation. Finally, we extract the median skill level in each occupation from data on an aptitude test (mathematical and reading competences) taken in 10th grade. Since this data is only available for 2008 onwards, this is calculated for those age 25 and younger in 2017, so small sample sizes occur in a few cases. Thus, we exclude all observations in these occupations, but this affects a minimal number of observations. For all occupation-level measures, we extract the median, as well as five quintiles. Persons in our sample will be categorized into one of these quintiles.

Descriptives

Regarding background characteristics (Table 1), some are associated with holding a degree: women had a higher probability of obtaining a degree. At the same time, non-completers were slightly older at the time of finishing their studies. Those in a BA programme had a markedly lower probability of holding a degree, and in line with this (as law studies and some medicine degrees are not possible at the BA level in Hungary), the major of studies is an important determinant of non-completion. Students

[2] Please note that we exclude outliers in terms of wage: those who earn less than half the minimum wage or more than 20 times the minimum wage.
[3] This is also the case where the individual worked in self-employment, part-time etc.

attended 180 different faculties in our sample, and (similarly to the association between majors of studies) there is a large variation in degree completion rates, ranging from 99 per cent to 7 per cent (even excluding smaller institutions).

Table 1 Descriptives of the sample, by degree status

	Degree		
	0	1	Total
N	9,503 (42.3%)	12,944 (57.7%)	22,447 (100.0%)
Male			
No	5,541 (58.3%)	7,840 (60.6%)	13,381 (59.6%)
Yes	3,962 (41.7%)	5,104 (39.4%)	9,066 (40.4%)
Age (absolutorium)	23.722 (1.820)	23.537 (1.633)	23.615 (1.717)
Level of studies			
BA/BSc	8,625 (90.8%)	9,757 (75.4%)	18,382 (81.9%)
Unified studies	878 (9.2%)	3,187 (24.6%)	4,065 (18.1%)
College major			
Agriculture	634 (6.7%)	557 (4.3%)	1,191 (5.3%)
Classics	816 (8.6%)	1,130 (8.7%)	1,946 (8.7%)
Social sciences	1,053 (11.1%)	947 (7.3%)	2,000 (8.9%)
Informatics	561 (5.9%)	907 (7.0%)	1,468 (6.5%)
Law	167 (1.8%)	368 (2.8%)	535 (2.4%)
Political science	136 (1.4%)	349 (2.7%)	485 (2.2%)
Business/economics	2,693 (28.3%)	2,840 (21.9%)	5,533 (24.6%)
Engineering	1,430 (15.0%)	1,894 (14.6%)	3,324 (14.8%)
Health studies	325 (3.4%)	2,358 (18.2%)	2,683 (12.0%)
Teacher education	547 (5.8%)	747 (5.8%)	1,294 (5.8%)
Sport sciences	203 (2.1%)	170 (1.3%)	373 (1.7%)
Natural sciences	488 (5.1%)	337 (2.6%)	825 (3.7%)
Arts	211 (2.2%)	214 (1.7%)	425 (1.9%)
Crafts & media	239 (2.5%)	126 (1.0%)	365 (1.6%)
Time until first employment			
1-6 months	3,493 (36.8%)	6,644 (51.3%)	10,137 (45.2%)

7-12 months	1,839 (19.4%)	2,235 (17.3%)	4,074 (18.1%)
13-24 months	1,406 (14.8%)	1,109 (8.6%)	2,515 (11.2%)
25- 36 months	664 (7.0%)	464 (3.6%)	1,128 (5.0%)
Never (more than 36)	2,101 (22.1%)	2,492 (19.3%)	4,593 (20.5%)

Method of analysis

We used linear regression models for each of our outcome variables, to keep estimation time limited. We estimate models of the form:

$$Y_{it} = X'_i\beta + Diploma_i\gamma + Faculty_i + Time_t + \varepsilon_{it} \quad (1)$$

The outcome variables are (i) entry into the labour market and starting wages, (ii) occupational mobility and (iii) wage changes. The vector X includes all relevant background and educational characteristics. The key independent variables is Diploma, representing degree holders. The regression also includes fixed effects of college major or faculty. Furthermore, we control for a full set of time (year, quarter) effects. In a few cases, we also include Occupational fixed effects to control for all potential omitted occupation characteristics. To take into account that decisions of the same worker at different times are correlated we cluster standard errors at the individual level.

4. Entry into the labour market

We first examine the effect of holding a degree on entry into the labour market. We start by estimating the probability of securing full-time employment within 3 years after the pre-degree certificate (using a linear probability model). On average, degree holders have a 2.8 per cent lower probability of never having worked over this period. However, a large part of this is due to the differing composition of college majors or faculties across degree holders and non-completers. However, non-completers take significantly longer to secure full-time employment, on average, by 3.2 months; this difference remains significant if we take into account individual and study

characteristics, and the point estimate is 2.2 months (when estimating a Tobit regression to take into account censoring). [4] Again, the most important determinant of time to employment is the college major and faculty.

Table 2 Regression analysis of entry into labour market

	Never employed (Descriptive)	Never employed (Faculty)	First employment (Descriptive)	First employment (Faculty)
Diploma				
	-0.0285***	-0.0169**	-3.2885***	-2.1837***
	(0.0055)	(0.0061)	(0.2330)	(0.2548)
Male				
		-0.0089		-0.4166
		(0.0063)		(0.2614)
Age				
		0.0042*		0.0953
		(0.0018)		(0.0761)
Unified		-0.0596**		-3.5518***
		(0.0190)		(0.7941)
Constant	0.2201***	0.2983***	17.2305***	23.6779***
	(0.0042)	(0.0874)	(0.1781)	(3.6617)
N	22054	22054	22054	22054
adj. R^2	0.001	0.059		

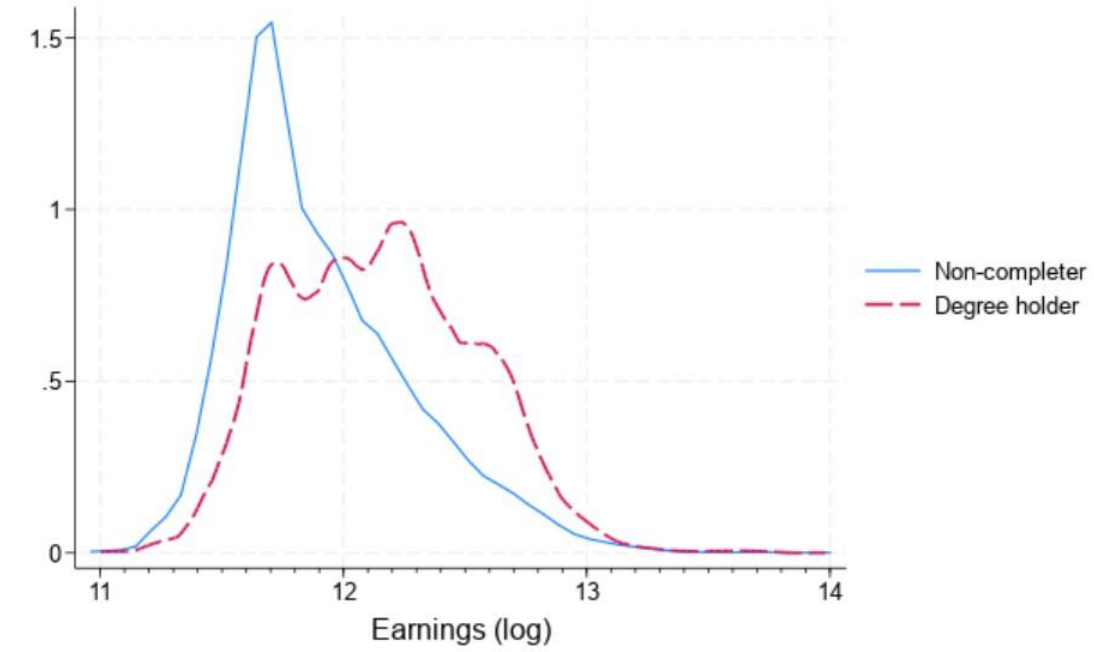
Standard errors in parentheses. Never employed: linear probability model. First employment: months elapsed until first full-time job, Tobit regression. The full model includes Faculty fixed effects.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Not only do non-completers enter more slowly into full-time employment, they also have a markedly different wage distribution, see Figure 1. For non-completers, a significant number of young people (close to 20 percent) earn at the skilled minimum wage, while this occurs much more seldom for degree holders (around 8 percent of the sample).

[4] Indeed, 56 per cent of degree holders found dull-time employment within 6 months after their absolutorium, while only 41 per cent of non-completers found a job quickly.

Figure 1: Distribution of (log) entry wages, by degree status



We next examine starting wages (using linear regressions), and characteristics of the starting job, conditional on having this secured within 1 year after the absolutorium. The raw difference between degree holders and non-completers is pronounced: 26.7 per cent. However, a sizeable portion of this is due to differences in background and educational characteristics taking these into account, the earnings gap is reduced to 16.7 per cent. Even when we account for the differential selection into occupations, degree holders earn 10.2 per cent more than non-completers.[5] Looking at the median skill level of occupations, we also notice a small difference: degree holders were working in occupations with 2.5 per cent higher median skill level than non-completers.

[5] Pease also notice the sizeable gender gap upon entry, amounting to 5 per cent.

Table 3 Regression analysis of (log) entry wages, different specifications

	Descriptive	College major	Faculty	Occupation
Diploma	0.2365***	0.1968***	0.1551***	0.1077***
	(0.0067)	(0.0067)	(0.0068)	(0.0065)
Male		0.0882***	0.0625***	0.0539***
		(0.0073)	(0.0071)	(0.0067)
Age		0.0133***	0.0105***	0.0124***
		(0.0021)	(0.0021)	(0.0019)
Unified		0.2101***	0.1497***	0.1233***
		(0.0142)	(0.0202)	(0.0167)
Constant	11.9084***	11.4735***	11.5663***	11.5709***
	(0.0053)	(0.0512)	(0.0505)	(0.0465)
N	14170	14161	14152	14122
adj. R^2	0.080	0.230	0.291	0.378

Standard errors in parentheses. The models also include time fixed effects.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

5. Occupational mobility

In terms of main variables characterizing occupational mobility, we can find some important differences across degree holders and non-completers, please see Table4. The most marked difference is in absolute and relative wages, as mean wages of degree holders is about 0.3 log points higher. In line with this, their relative wage position within a given occupation is better, as there is a full 10 percentage point difference in the proportion of young people in the bottom quintile of their occupational wage distribution. Finally, degree holders also work in higher paid jobs, as the difference in median occupational wages in 0.2 log points (on average).

Table 4 Descriptives of the employed persons, by degree status

	Degree		
	0	1	Total
N	101,381 (46.7%)	115,739 (53.3%)	217,120 (100.0%)
Changes occupation	0.059 (0.236)	0.051 (0.220)	0.055 (0.227)
Earnings quintile			
1	24,616 (40.7%)	22,548 (30.8%)	47,164 (35.3%)
2	11,498 (19.0%)	16,921 (23.1%)	28,419 (21.3%)
3	10,224 (16.9%)	13,772 (18.8%)	23,996 (18.0%)
4	8,360 (13.8%)	11,626 (15.9%)	19,986 (15.0%)
5	5,726 (9.5%)	8,303 (11.3%)	14,029 (10.5%)
Earnings (log)	11.941 (0.517)	12.235 (0.546)	12.100 (0.553)
Median occup. wages	12.183 (0.375)	12.386 (0.381)	12.294 (0.391)
Median occup. skill	7.418 (0.053)	7.449 (0.045)	7.435 (0.051)

Note: The sample includes all individual – quarter observations when the person was full-time employed.

We estimate quarterly mobility across four-digit occupations using linear probability models. On average, degree holders have a sizeable, 1.4 per centage point lower probability of switching occupations than non-completers. [6] However, much of this difference is due to background and educational characteristics: controlling for college major the difference drops to 0.47 per centage points, and controlling for faculty this further decreases to around 0.37 per centage points. In fact, taking into account wages, which significantly decrease occupational mobility, the difference in mobility probability disappears.

[6] This is a sizeable difference, close to a 25 per cent decrease relative to the baseline 5.8 per cent switching probability.

Table 5 Regression analysis of occupational mobility, different specifications

	Descriptive	College major	Faculty	Add Wages
Diploma	-0.0140***	-0.00479***	-0.00356*	0.000526
	(-10.48)	(-3.32)	(-2.34)	(0.34)
Male		-0.00187	-0.000807	0.00133
		(-1.23)	(-0.53)	(0.85)
Age		-0.000538	-0.000408	-0.000289
		(-1.22)	(-0.91)	(-0.64)
Unified		-0.0182***	-0.0108**	-0.00878*
		(-8.48)	(-3.19)	(-2.57)
Wages (log)				-0.0252***
				(-15.17)
Constant	0.0580***	0.0812***	0.0757***	0.370***
	(52.65)	(7.19)	(6.61)	(16.33)
N	138921	138853	138853	138384

t statistics in parentheses. Standard errors are clustered at the individual level.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

We further examine the relationship between wages and occupational mobility, and test the theory (see Groes – Kircher – Manovskii, 2015) that there is a U-shaped pattern. More precisely, the theory is that *within* a given occupation, individuals at the top of the wage distribution will switch to a higher-paying occupation (are promoted to a more demanding occupation), while those at the bottom of the wage distribution go on to a lower-paying occupation (are demoted to a less demanding occupation). In our first specification, we add the same control variables as previously, and find that when controlling for college major, those in the bottom quintile of wages (in a given occupation) have slightly higher mobility (0.37 per centage points), while those in the top quintile have significantly higher probability (by close to 1 per centage points) than those in the middle of the wage the distribution. However, controlling for faculty, mobility in the bottom quintile is not significant. However, when we add occupational characteristics, specifically median skill level (or median wages) we find that only individuals in the bottom quintile of the (occupation-specific) wage distribution have a higher propensity to switch occupations. Nonetheless, in all these specifications we find that degree holders have slightly lower mobility probability, by around 0.7 per centage points.

Table 6 Regression analysis of occupational mobility, by occupational wage quintiles

	Faculty	Faculty + median skills
Diploma	-0.0044**	0.0059***
	(0.0016)	(0.0017)
Bottom quintile	0.0018	0.0073***
	(0.0021)	(0.0021)
2. quintile	-0.0035	0.0013
	(0.0021)	(0.0021)
4. quintile	0.0031	-0.0012
	(0.0023)	(0.0024)
Top quintile	0.0099***	-0.0004
	(0.0027)	(0.0028)
Male	-0.0014	-0.0002
	(0.0019)	(0.0019)
Age	-0.0005	-0.0004
	(0.0005)	(0.0005)
Median skill		-0.0003***
		(0.0000)
Constant	0.0811***	0.4957***
	(0.0131)	(0.0243)
N	111133	111133
adj. R^2	0.004	0.010

Standard errors in parentheses. Standard errors are clustered at the individual level. The models also include faculty and time fixed effects. Omitted category: 3. quintile .

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

6. Consequences of occupational mobility

Finally, we estimate wage growth regressions, as well as differences in occupational characteristics (median wages and median skills), for those who switched occupations. First, we find that degree holders experience a 3 per cent higher wage growth, and this difference remains even if we control for background characteristics. We also find that while occupation switchers do upgrade both in terms of (median) wages and skill

levels, however, degree holders do not experience any higher growth than non-completers.

Table 7 Regression analysis of changes in (individual) wages, median occupational wages and median occupational skills as a result of occupational mobility

	Wage change	Median wage change	Median skill change
Diploma	0.0253***	0.0009	0.0003
	(0.0076)	(0.0104)	(0.0014)
Male	0.0191*	-0.0004	0.0016
	(0.0084)	(0.0115)	(0.0015)
Age	-0.0030	-0.0021	-0.0005
	(0.0024)	(0.0033)	(0.0005)
Unified	-0.0238	-0.0344	-0.0057
	(0.0380)	(0.0451)	(0.0061)
Constant	0.2459***	0.1728*	0.0246*
	(0.0636)	(0.0850)	(0.0116)
N	6746	6746	6746
adj. R^2	0.001	0.011	0.006

Standard errors in parentheses. Standard errors are clustered at the individual level. Models also include time and faculty fixed effects.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

When we examine wage, occupational median wage and skill level changes as a consequence of occupational mobility as a function of relative wage positions (in the baseline occupation), we find patterns which are consistent with the U-shaped theory of occupational mobility. Those at the bottom of the occupational wage distribution switch to occupations with lower median wages and median skill levels – hence a downgrading. By contrast, those who were in the upper half of the occupational wage distribution upgrade to occupations with higher median wages and higher median skills. However, in terms of individual wages, those in the bottom quintiles experience

large wage increases, while those in the top quintiles experience large wage decreases – a clear signal of mean reversion.[7]

Table 8 Regression analysis of changes in (individual) wages, median occupational wages and median occupational skills, by wage quintile

	Wage change	Wage change (+median skill)	Median wage change	Median skill change
Diploma	0.0405***	0.0670***	-0.0003	0.0002
	(0.0095)	(0.0097)	(0.0101)	(0.0014)
Bottom quintile	0.1975***	0.2148***	-0.1620***	-0.0158***
	(0.0131)	(0.0131)	(0.0151)	(0.0021)
2. quintile	0.0529***	0.0676***	-0.1342***	-0.0112***
	(0.0131)	(0.0129)	(0.0152)	(0.0021)
4. quintile	-0.0921***	-0.1063***	0.0970***	0.0120***
	(0.0136)	(0.0135)	(0.0152)	(0.0021)
Top quintile	-0.2319***	-0.2626***	0.2315***	0.0276***
	(0.0159)	(0.0158)	(0.0162)	(0.0023)
Male	0.0215*	0.0228*	-0.0148	0.0001
	(0.0102)	(0.0102)	(0.0111)	(0.0015)
Age	-0.0032	-0.0031	-0.0040	-0.0007
	(0.0030)	(0.0030)	(0.0032)	(0.0004)
Unified	0.0123	0.0325	-0.0463*	-0.0063*
	(0.0203)	(0.0202)	(0.0222)	(0.0029)
Median skill		-0.0007***		
		(0.0001)		
Constant	0.1876*	1.4170***	0.2687**	0.0333**
	(0.0758)	(0.1234)	(0.0829)	(0.0113)
N	6746	6746	6746	6746
adj. R^2	0.140	0.161	0.098	0.061

Standard errors in parentheses. All models include a set of faculty fixed effects and time fixed effects.

Omitted category: 3. quintile .

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

[7] This pattern also remains when we include not only those who changed occupation, but all individuals. In that specification, we find that those in the bottom two quintiles who were mobile saw their wages rise significantly more than those who did not change occupations. Results available from the authors upon request.

7. Conclusions

We empirically investigated the early careers of those who finished their tertiary education studies without a degree and those who successfully graduated.

Degree holders find stable full-time employment significantly faster than non-completers. We find very sizeable wage differences in starting wages, even within narrow occupations, roughly 11 per cent. This is similar to the wage difference attributed to using foreign languages, as estimated by Csillag et al. (2021). Non-completers have a higher probability of switching occupations, which is partly explained by their lower wages and their propensity to move out of low-skilled occupations. This does not imply, however, that they quickly catch up in terms of wages. Moreover, we find that occupational mobility is, to some extent, consistent with a mismatch theory: those at the bottom of the wage distribution within a given occupation downgrade to lower-paying occupations, while those at the top of the wage distribution upgrade upon switching occupations.

Although we have measured non-completers and degree holders more accurately than most previous work there may still be differences in the accumulated human capital of the two groups (non-completers and degree holders). While these two groups both accumulated the same number of university credits, we have no information on their college grades, thus there might still be differences in the human capital they have accumulated. Furthermore, degree holders likely have better foreign language skills.

In future work, we will extend this analysis to younger cohorts, for whom we will be able to observe their competence test scores (taken in grade 10). This will give us (an imperfect) proxy for ability and hence enable us to distinguish whether sheepskin effects are present.

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