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University graduates in metropolitan and peripheral areas: mobility, occupational choice and outcomes

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Abstract:

This study explores the relationship between mobility patterns, occupational choices and performance outcomes of university graduates from metropolitan and peripheral areas. After statistical matching, we find opposite outcomes for geographically mobile wage earners and entrepreneurs. Graduates from the periphery who stay in the study region to work have an inferior performance outcome compared to those who move to the metropolitan region. This 'penalty' is not present for non-movers in metropolitan areas. Non-mobile entrepreneurs benefit from attachment to their home region, in particular in the periphery. These findings can help direct regional policy aimed at retaining graduates and promoting regional development.

Keywords:

mobility patterns, entrepreneurs, wage earners, coarsened exact matching, Denmark

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INTRODUCTION

University graduates are considered attractive citizens from a regional development perspective. Studies show a relationship between the in-migration of highly educated people and regional innovation activity (Faggian & McCann, 2009a), between the share of the adult population with tertiary education and regional economic growth (Sterlacchini, 2008) as well as between the share of the regional labour force with a bachelor's degree or above and regional income and wealth (Florida et al., 2008).

Highly educated people tend to be more mobile than other groups in the population (Lundholm, 2007) and they are also more likely to move across larger distances, reflecting a more dispersed labour market (Greenwood, 1985; Arntz, 2010). Furthermore, geographical mobility is strongly related to age and life course, with the propensity to move being highest in early adulthood (e.g. Geist & McManus, 2008) and for students, while families are less inclined to migrate (Lundholm, 2007). Accordingly, university graduates' relatively young age, level of education, and status as entrants to the labour market make them a relatively geographically mobile group and therefore subject to influence when it comes to deciding where to live and work.

Regions differ in the extent to which they can attract and retain graduates. Metropolitan and urban areas are more attractive to graduates than less urbanised areas (Bünstorf et al., 2016), and the level of economic activity in general – and the size of the labour market for the highly educated in particular – are important factors influencing the attraction and retention of university students and graduates (Dotti et al., 2013; Krabel & Flöther, 2014; Venhorst et al., 2011).

This paper uses the performance outcomes of university graduates as an expression of regional conditions for – as well as potential benefits from – retaining and attracting university graduates.

Although regional conditions influence mobility decisions, the decision is an individual one, which, in addition to the regional consequences it may have, also has consequences for the graduate. Therefore, the paper focuses on the performance outcomes of graduates with different types of mobility patterns after graduation. We analyse graduates from two types of regions: the metropolitan region around Copenhagen, which is the capital city of Denmark and hosts five universities; and the peripheral region of North Denmark, which hosts one university. The analysis distinguishes between two occupational choices for graduates: becoming wage earners or entrepreneurs. For these two choices, we measure the performance outcomes differently: in terms of wage growth for graduates who become wage earners and firm survival for graduates who become entrepreneurs.

The study is based on Danish registry data for the period 2001–2010. The registry data combines personal data, such as information on gender, age, place of residence, country of origin, type and place of education, grades from qualifying exams for university, employment, income, start-up activity, time of establishment and, if relevant, time of firm closure. The personal data also contains information on family relations, thereby making it possible to control for parental income and level of education. We applied a statistical matching procedure to control for measurable differences in characteristics between graduates who chose to stay in and move away from their study region.

We find that wage-earning graduates from the peripheral region, who stay to work in their study region after graduation, have an inferior performance outcome in terms of wage growth compared to the graduates that move to the metropolitan region. The same kind of 'penalty' for remaining in the study region cannot be found for wage-earning graduates in the metropolitan region. Furthermore, the graduates who move from the periphery to the metropolitan region to work, enjoy

the same benefits of the metropolitan thick labour market in terms of wage growth as graduates from the metropolitan region, who stay in this region to work, i.e. the benefits from finding a job in the metropolitan labour market are not confined by place of study.

The findings for graduates who become entrepreneurs differ from the findings for wage earners. Non-mobile graduate entrepreneurs in the periphery have a superior survival rate compared to graduates who have moved to the region to study, implying that, contrary to what is the case for wage earners, entrepreneurs in the peripheral region benefit from attachment to their home region. Although non-mobile graduate entrepreneurs from the metropolitan region also enjoy benefits from attachment to their home region, this benefit is less significant than the benefit for non-mobile graduate entrepreneurs from the periphery. The results have important implications for regional policy aiming at retaining university graduates, especially in peripheral areas.

BACKGROUND LITERATURE AND HYPOTHESES

There are several examples of universities being established in less-favoured regions with the explicit intention of using the university as a lever of regional economic development (see e.g. Rodrigues et al., 2001; Donnelly & Hyry, 2004; Lazzeretti & Tavoletti, 2005; Guerrero & Evers, 2018). These examples reflect that the role of universities has changed from an idealistic focus on the creation of knowledge towards a more instrumentalist position in society (Charles, 2003), where universities are increasingly perceived as instruments of development. Despite the growing attention that has been paid to universities' 'third mission' activities of reaching out to society, university graduates continue to play a major role as direct sources of the regional impact of universities, most notably as a high-skilled workforce, but also as potential founders of new knowledge-based companies. Several studies document the regional value of a highly educated

population. An analysis of 197 European regions found that the regional share of the adult population with tertiary education – combined with the intensity of R&D expenditures – is the most important factor enhancing regional economic growth, particularly in northern European countries (Sterlacchini, 2008). OECD (2013) found that highly educated people typically earn higher wages and contribute more to economic development than people with lower levels of education.

Not all university graduates stay in their study region after graduation. Metropolitan regions, including national capitals, are generally considered to be magnets for highly educated people. In addition to a general urbanisation trend, university graduates' attraction to metropolitan cities is amplified because of the job opportunities that a large and diverse labour market offers for highly skilled and specialised employees, who value the career opportunities that a 'thick' labour market provides (Ahlin et al., 2014). A thick market for skills improves matching and early career prospects for university graduates, which is reflected in relatively high initial wages, fast wage growth and frequent job switching during the early careers of university graduates moving to urban regions upon graduation (ibid.). Accordingly, studies find that the most important factor determining the outflow of university graduates from a region is the size of the regional labour market for graduates (Venhorst et al., 2011; Krabel & Flöther, 2014).

Although job opportunities are the primary reason for mobility between regions (Hansen & Niedomysl, 2009; Storper & Scott, 2009; Scott, 2010), social attachment to places also plays an important role for mobility decisions. Dahl & Sorensen (2010a, 2010b) found that even though economic factors, such as income, play a role in location choices, these tend to be outweighed by social factors such as proximity to hometowns and places where people have lived before. The existence of an opportunity cost in allowing the social attachment to a place to influence mobility

decisions is supported by Marinelli (2013), who found that Italian graduates who return to their home region after graduation have lower employment rates, earn lower wages and, in general, are less likely to apply the university-acquired knowledge in their jobs compared to graduates with other mobility patterns. However, these specific results may be influenced by the fact that the returning graduates in the Italian study had slightly lower grades than the graduates who stayed in the university region or moved on to another region.

Marinelli's (2013) study indicates that there may be performance-related self-selection into specific mobility patterns. If graduates with a given level of expected performance are more likely to follow a specific type of mobility pattern, it is not the mobility pattern alone that explains the performance outcome of the individual graduate's mobility choice. Venhorst et al. (2010) found little evidence of employers in peripheral regions in the Netherlands being unable to recruit and retain the best graduates. Although the Dutch study found differences in mobility patterns across disciplines, the interregional mobility of graduates is only weakly related to ability as expressed by grades.

Mobility can occur both when entering university and after graduation, and pre-university mobility may have implications for the propensity to leave the university region after graduation as well as for the performance outcomes associated with mobility after graduation. Faggian & McCann (2009b) distinguish between five types of mobility behaviour, which, in addition to looking at regional mobility after graduation, also considers whether a graduate has moved away from his or her home region to go university. According to this typology, there are two types of 'stayers' in a study region. 'University Stayers' move away from their home region to go to university and stay in the study region after graduation. 'Non-migrants' go to university in their home region and stay in this region after graduation. The 'movers' in Faggian & McCann's typology are split into three types.

'Late migrants' go to university in their home region, and move to another region after graduation. 'Repeat migrants' move away from their home region to go to university, and subsequently move to a third region after graduation. 'Return migrants' move away from their home region to go to university, but return to the home region after graduation. We apply a modified version of Faggian & McCann's typology of mobility behaviour in the present analysis. Because the analysis is restricted to two regions, only four types of mobility behaviour are considered: non-mobility (*N*), late mobility (*L*), study region staying (*S*) and return mobility (*R*). Faggian & McCann's 'repeat migrants' category is treated as a variant of late mobility in the present analysis since graduates with these types of mobility behaviour share the characteristic of moving after graduation to a region other than their home region. Table 1 provides an overview of the different types of mobility patterns applied in the analysis. The superscript *P* refers to graduates from the university in the peripheral region, whereas the superscript *M* refers to graduates from a university in the metropolitan region.

Table 1: Overview of types of mobility.

	Graduate from university in the peripheral region		Graduate from university in the metropolitan region	
	Region of work / enterprise start-up			
Region of primary school	Peripheral	Metropolitan	Peripheral	Metropolitan
Peripheral	Non-migrants, N^P	Late, L^P	Return, R^M	Stayer, S^M
Metropolitan	Stayer, S^P	Return, R^P	Late, L^M	Non-migrants, N^M
Neither	Stayer, S^P	Late (repeat), L^P	Late (repeat), L^M	Stayer, S^M

In the following section, we outline separate hypotheses on the relationship between mobility patterns and performance outcomes for university graduates who become wage earners and entrepreneurs, since different types of mechanisms are expected to be at play.

WAGE EARNERS

Based on the above discussion about the advantages of a thick labour market, it is expected that, from a wage performance perspective, it is beneficial for a graduate from a university located in a metropolitan region to stay and work in the study region after graduation, rather than moving to the periphery. This is assumed to be the case regardless of whether the graduate migrated into the metropolitan region to go to university or the metropolis is his or her home region.

Because of the lack of a thick labour market in the periphery, it is expected that it is beneficial for graduates from the university located in the peripheral region to move to the metropolitan region after graduation, rather than staying to work in the periphery.

Hypothesis 1: Among wage earners who are graduates from a university located in the metropolitan region, those who leave the metropolitan region for a job in the peripheral region will have an inferior performance outcome compared to those who stay and work in the metropolitan region. The opposite is observed in the peripheral region.

$$w_i < w_j, i \in [R^M \cup L^M], j \in [N^M \cup S^M] \text{ and } w_k > w_l, k \in [R^P \cup L^P], l \in [N^P \cup S^P]$$

Although it is hypothesised that wage earners who move from the periphery to the metropolitan region will show superior performance compared to graduates that stay and work in the periphery, these newcomers to the metropolitan region are likely to have fewer employment-relevant network relationships in the region compared to graduates that have studied in the region. In a longitudinal

study using British data, Cappellari & Tatsiramos (2015) found that network homophily, i.e. similarity among network members, is likely to improve job matching quality for high-skilled wage earners compared to more heterogeneous networks. In particular, the study found that the quality of networks of non-relatives matters for job matching. This indicates that networks, which can affect employment opportunities in terms of a good skills match, are to a large extent professional and field-specific to the area of study. For university graduates, these types of networks can be established through student jobs, internships or via alumni relations, for example. More opportunities for establishing professional networks that may improve employment opportunities are, again, due to the thickness of the labour market, assumed to be better in the metropolitan region.

Hypothesis 2: Among wage earners with a job in the metropolitan region, those who are graduates from a university in the metropolitan region will have a <u>superior</u> performance outcome to those who are graduates from the university in the peripheral region. A corresponding difference is not observed among wage earners in the peripheral region.

$$w_i > w_j, i \in [N^M \cup S^M], j \in [R^P \cup L^P] \text{ and } w_k = w_l, k \in [N^P \cup S^P], l \in [R^M \cup L^M]$$

Although homogeneous network relationships with non-relatives are emphasised on the job market, there may still be some benefits to wage earners from having heterogeneous social (including family-based) relationships in the metropolitan region's thick labour market. Therefore, it is assumed that a graduate from the university in the periphery, who returns to his or her metropolitan home region to work after graduation, will have better opportunities for a good job match than a graduate from the same university, who is originally from the periphery, but also moves to the metropolitan region to work after graduation. Due to the lack of a thick labour market

in the periphery, a similar benefit is not expected for wage earners in the peripheral region who return to this region after graduating from a university in the metropolitan region.

Hypothesis 3: Among wage earners in the metropolitan region, who are graduates from the university in the peripheral region, those who are originally from the metropolitan region will have a superior performance outcome. A corresponding difference is not observed in the peripheral region.

$$w_i > w_j, i \in [R^P], j \in [L^P] \text{ and } w_k = w_l, k \in [R^M], l \in [L^M]$$

The same line of argument can be applied to wage earners in the metropolitan region who are graduates from a university in this region: combining heterogeneous social relationships established during the upbringing in the metropolitan region with more homogeneous professional relationships established during the time of study may improve the likelihood of a good job match on the thick metropolitan job market relative to primarily having professional relationships in the metropolitan region, which are established during the time of study due to growing up in the peripheral region. The assumption about the lack of similar benefits in the peripheral region also applies here.

Hypothesis 4: Among wage earners in the metropolitan region, who are graduates from a university in the metropolitan region, those who are originally from this region will have a superior performance outcome. A corresponding difference is not observed in the peripheral region.

$$w_i > w_j, i \in [N^M], j \in [S^M] \text{ and } w_k = w_l, k \in [N^P], l \in [S^P]$$

ENTREPRENEURS

Different factors affect the mobility choices of graduates who choose to become wage earners and entrepreneurs, and these choices may be related to the expected outcomes of staying in versus moving away from the study region after graduation. Previous studies have found that entrepreneurs are more inclined to value living close to family and friends compared to wage earners (Dahl & Sorenson, 2009; 2012). Krabel & Flöther (2014) found that graduates involved in entrepreneurial activities are less likely to move away from their university region than wage earners.

While wage earner graduates from a university located in a peripheral region tend to have better job opportunities, including better prospects for earning higher wages, by relocating to a metropolitan region with a thicker labour market, things may look different for graduates who choose to become entrepreneurs. In addition to entrepreneurs having a preference for setting up businesses in their home region (Figueiredo et al., 2002), previous studies show that new firms founded in regions in which the entrepreneurs have lived for a long time tend to survive longer and have higher annual profits and cash flows than businesses founded by entrepreneurs that are new to the region (Dahl & Sorenson, 2009; 2012). Figueiredo et al. (2002) argue that, in addition to assets in the form of social capital connections that cannot easily be replicated outside the home location, entrepreneurs have an accumulated stock of knowledge of their home locations. Information and search costs associated with setting up a business in a non-home region may exceed the potential benefits associated with higher agglomeration economies or better accessibility to input and output markets (ibid.). Sorenson & Stuart (2001) suggest that entrepreneurs rely on network-based strategies for recruiting employees and that access to capital depends on both professional and personal contacts.

Concerning the importance of the type of region for performance, studies have found that social networks are more important for the successful founding of a new venture (Bauernschuster et al., 2010) and surviving the critical first three years (Freire-Gibb & Nielsen, 2014) in less densely populated regions, as social network ties are stronger in these regions. While entrepreneurs in sparsely populated regions benefit from strong social networks, the institutional environment supporting entrepreneurship is more developed in urban areas, making these areas the main focus of entrepreneurship research (Glaeser et al., 2010; Acs et al., 2011). When institutions in support of entrepreneurship are more prevalent in a region, social networks may become less important for realising and running a new venture (Glaeser, 2011). Accordingly, and in line with Figureido et al. (2002), it is expected that, from a firm performance perspective, it is beneficial for graduate entrepreneurs to stay and start their new business in the study region instead of moving to another region. Due to the importance of social networks for entrepreneurial performance in the periphery, this is expected to be particularly important for entrepreneurs who have graduated from the university in the periphery.

Hypothesis 5: Entrepreneurs who found their business in their university region will have a <u>superior</u> performance outcome compared to those who move away from their university region to start their business.

$$w_i > w_j, i \in [N^P \cup S^P], j \in [R^P \cup L^P] \text{ and } w_k > w_l, k \in [N^M \cup S^M], l \in [R^M \cup L^M]$$

The longer time a person has spent in a region, the better their knowledge of the region, and the stronger their network relationships. Therefore, it is assumed that graduate entrepreneurs who have studied in their home region and subsequently started their new venture in the region have advantages over graduate entrepreneurs who have moved to another region to study, and start

their new venture in their university region. Due to the greater importance of social ties for entrepreneurial success in peripheral areas, these advantages may be relatively higher for graduates from the university in the periphery than for graduates from a university in the metropolitan region.

Hypothesis 6: For entrepreneurs who found their business in their university region, those who are originally from this region will have a superior performance outcome compared to those who have moved to this region to study.

$$w_i > w_j, i \in [N^P], j \in [S^P] \text{ and } w_k > w_l, k \in [N^M], l \in [S^M]$$

Although graduates who move to another region to study maintain ties to their original home region, social network ties become weaker over time without frequent contact (Burt, 2000). Therefore, it would be interesting to explore whether entrepreneurs who leave their home region to go to university, then return to their original home region to set up their new venture, are in a less favourable position than entrepreneurs who are graduates from a university in their home region and also set up their new venture in this region. Likewise, it would be interesting to compare entrepreneurs who return to their home region to start a new venture, after graduating from a university in another region, with entrepreneurs who are newcomers to a region. However, these mobility patterns are relatively rare for graduate entrepreneurs and, consequently, the data does not allow the exploration of these particular entrepreneurship behaviours.

DATA AND METHODS

Studies of the geographical mobility of university graduates are often based on extensive surveys among recent graduates (e.g. Faggian & McCann, 2009b; Venhorst et al., 2011; Krabel & Flöther,

2014). The present analysis differs as it uses detailed registry data containing information on the personal, employee and establishment level, including information on start-up activity.

Since the focus of the analysis is a comparison of the effects of mobility for metropolitan and peripheral regions, the data are restricted to individuals who have graduated either from Aalborg University, in the relatively peripheral region of North Denmark, or from one of the universities in the region of Copenhagen or the surrounding region of Zealand.[1] Furthermore, we exclude graduates that found their first job after graduation in any region other than North Denmark and the metropolitan region. This means that if a graduate leaves the metropolitan region after graduation, then he or she must necessarily have gone to North Denmark and vice versa. Figure 1 shows the geographical location of the two regions. North Denmark has a population of 0.58 million inhabitants while this number for the metropolitan region is 2.57 million[2].

[1] Roskilde University, University of Copenhagen, Technical University of Denmark, Copenhagen Business School or IT University of Copenhagen. Some of these universities, as well as Aalborg University in North Denmark Region, have campuses outside their main region. Graduates from these campuses are excluded from the analysis.
[2] https://rn.dk/service/english

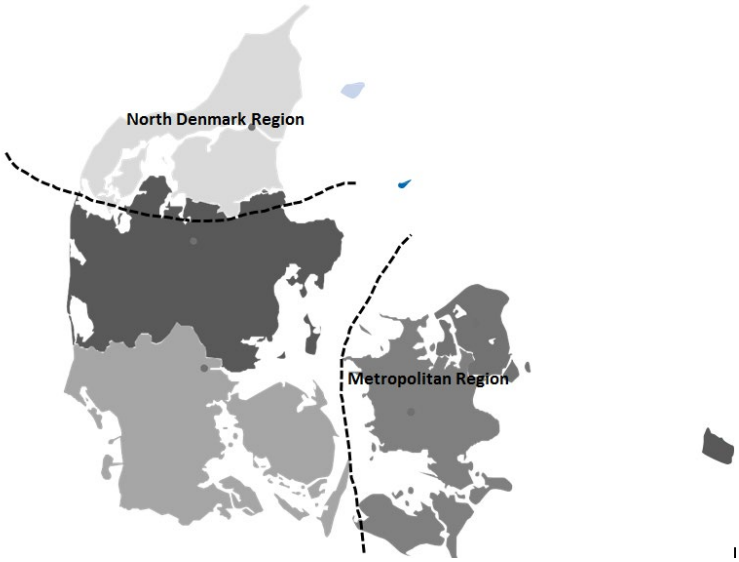

Figure 1: Map of Denmark.

The performance outcomes for wage earners and entrepreneurs are explored separately through regression analysis combined with the statistical matching of individuals who exhibit different mobility behaviours.

Matching is used to pre-process the data and create treatment and control groups that are ideally identical so that the administration of the treatment can be considered random, but in practice this ideal is not attained. In our case, the matching process means creating two groups that differ in terms of mobility patterns while being identical along all dimensions that we are able to measure, so that we can identify the different outcomes associated with the different types of mobility. Matching means eliminating bias by ensuring that the data only contain individuals for whom both types of mobility are relevant alternatives. In the matching process, the emphasis is on including matching variables that, according to the literature, are associated with performance outcomes, including variables that may affect self-selection into a particular type of mobility behaviour.

The applied matching technique is coarsened exact matching (CEM) (Iacus et al., 2012). This is an exact matching method, which means that a treated and an untreated observation are only matched if they are identical across all variables. However, the variables are first coarsened, in the sense that the variables along which observations must be identical are defined in intervals or 'bins'. The exact matching ensures that the data are balanced between the treatment and control groups in terms of the bins. It is possible, however, to criticise the coarsening of the data (i.e. the width of the bins), as this can arguably conceal variation in the same manner that the width of the bars in a histogram conceals variation. CEM is in contrast to the widely applied propensity score matching (PSM), which focuses on pre-processing the data to allow for an accurate estimate of specific interest, such as the 'average treatment effect', while CEM focuses on minimising bias with the drawback that the estimated effect is local (Iacus et al*.,* 2012). We do not consider this a problem since such individuals are also the only individuals for whom the effect of the 'treatment' (i.e. the difference in mobility pattern) is practically relevant. However, the restrictions that we must necessarily place on our observations, cf below, entails that some observations are dropped, and it is thus possible that there are small groups in the labour market that are excluded from the analysis of a specific mobility pattern despite the pattern in question being observed in the group. Our matching is 1:k, meaning that each treated observation is matched to as many untreated observations as possible so that the control group becomes larger than the treatment group. Weights are then used to correct for the inflated control group.

After matching, any difference in outcomes between the treatment and control groups can, in principle, be ascribed to the treatment. However, there may also be factors affecting mobility, which we cannot account for. Examples include unobserved personality traits such as preferences and risk aversion, in as much as these do not correlate with the variables that we are able to include. Even

though matching should make the effect of treatment estimable from comparing means in the treatment and control groups, it is prudent to instead use a regression technique to control for all covariates when estimating the treatment effect (Stuart, 2010). In some cases, the matched dataset is small and some regressors must be excluded because of the few degrees of freedom or lack of variance after matching.

Because we are interested in the different outcomes associated with the different types of mobility, differences in mobility patterns take the role of 'treatment' in the analysis. To define mobility, we apply the categorisation illustrated in Table 1, which distinguishes between the home region of the graduate, which is defined as the region where the graduate finished primary school, the study region and the region of the first job or enterprise start-up .

Each of the hypotheses presented in the previous section, describes the relationship between groups of graduates defined by mobility pattern. Each comparison of outcome requires a separate CEM, where the initial sample is defined by the groups in question and the smaller of the two groups is said to be 'treated'.

WAGE EARNER ANALYSIS

Our starting point is the population of graduates from the universities in the metropolitan region and the peripheral region in the period 2001–2007. We then identify the first job of the graduate and his or her job three years after the first job. Thus, in addition to the 2001–2007 data, we use data until 2010 to compare hourly wages. Our outcome variable is the annualised growth of hourly wage over these three years. Hourly wages are estimated by Statistics Denmark from data on wage income and pension contributions, and whenever the estimate is flagged as relatively uncertain we

exclude the observation.[3] In practice, this means that the first job is defined as the first full-time job, that the first job is often later than the year of graduation, and that graduates that do not have a full-time job three years after the first full-time job are excluded. All wage variables are deflated to the year 2000 values using the consumer price index.

We identify 44,845 graduates from the two regions in the period 2001–2007, who all have a first job no later than 2007. Of these, 30,918 have their first full-time job in the peripheral North Denmark or the metropolitan region and also have a full-time job three years later. However, after removing observations with missing values for the explanatory variables, 22,190 observations can be used for the analysis of the effects of mobility on wages.

Mobility patterns

Hypotheses 1–4 are all double hypotheses, each focusing on a specific mobility difference and whether such mobility differences are associated with different outcomes in the metropolitan and the peripheral region.

Non-mobility is the most frequent pattern in both regions. Only about 10 per cent of the data come from the peripheral North Denmark but for both late and return mobility more than half of the data come from North Denmark, showing that leaving the metropolitan region is a much rarer event than leaving North Denmark. An overview of mobility patterns is available in the supplementary material (Appendix A).

[3] The applied wage measure is unavailable after 2010.

Matching

We use the same variables for matching and as controls in the regressions. These variables are 1) a variable indicating the educational level of the graduate's parents, which takes the value of 1 if at least one of the parents has a university degree and zero otherwise; 2) parents' income defined as the log of the gross annual income of the highest-earning parent in the year of the graduate's first job; 3) a categorical variable in four levels (PhD, Master, Bachelor, Professional Bachelor) for the graduate's level of education; 4) a categorical variable in six levels (humanities, natural-, social-, health-, technical science, other) for the graduate's field of education; 5) log of the graduate's hourly wage in the first year of employment;[4] 6) a gender dummy; 7) a dummy for graduates with a country of origin other than Denmark; 8) industry of the first job (nine industries); 9) the graduate's age in the year of the first job and 10) the average grade from the university qualifying exam.

Results

Table 2 reports the estimated local treatment effects for hypotheses 1–4, which describe the outcome differences associated with different mobility patterns. The full regression results can be seen in the supplemental material (Appendix B).

[4] By including this variable, we control for the nominal wage level being higher in the metropolitan region compared to North Denmark.

Table 2: Summary table of effects of mobility on wage growth.

Hypothesis label	Formal hypothesis	Estimated effect	SE of estimate
H1 Metropolitan	$w_i < w_j, i \in [R^M \cup L^M], j \in [N^M \cup S^M]$	-0.0261***	0.0060
H1 Peripheral	$w_k > w_l, k \in [R^P \cup L^P], l \in [N^P \cup S^P]$	0.0353***	0.0116
H2 Metropolitan	$w_i > w_j, i \in [N^M \cup S^M], j \in [R^P \cup L^P]$	0.0023	0.0052
H2 Peripheral	$w_k = w_l, k \in [N^P \cup S^P], l \in [R^M \cup L^M]$	0.0076	0.0247
H3 Peripheral	$w_i > w_j, i \in [R^P], j \in [L^P]$	0.0711*	0.0378
H3 Metropolitan	$w_k = w_l, k \in [R^M], l \in [L^M]$	0.0912*	0.0378
H4 Metropolitan	$w_i > w_j, i \in [N^M], j \in [S^M]$	0.0031	0.0023
H4 Peripheral	$w_k = w_l, k \in [N^P], l \in [S^P]$	0.0336	0.0240

Note: 'Estimated effect' is the percentage point difference in wage growth from the mobility type of the first group (i or k) relative to the second group (j or l). *: p < .1, **: p < .05, ***: p < .01.

The results show that hypothesis 1 cannot be rejected. Given a graduate's region of study, it matters where the graduate finds a job. If graduating from a university in the metropolitan region, then annual wage growth in the first three years in the first job will be 2.61 percentage points *lower* in a job in the peripheral region, compared to graduates finding their first job in the metropolitan region. The corresponding *gain* for graduates from the peripheral region who leave their study region to find work is a similar 3.53 percentage points.

Hypothesis 2 states that if a graduate finds a job in the metropolitan region, it is better to have also studied there, while the wages of graduates who find a job in the peripheral region are not affected by studying in either the peripheral region or the metropolitan region. We find no wage growth difference in either region, so hypothesis 2 is partially rejected. This means that there does not appear to be a benefit from moving to the metropolitan region to study and cultivate a professional network that can be leveraged when entering the labour market.

Hypothesis 3 says that if a graduate from the peripheral region moves to the metropolitan region for their first job, then the graduate will have higher wage growth if the metropolitan region is also

their initial home region, while the corresponding difference is not observed in the peripheral region. The hypotheses can be partially rejected as we find a positive effect in both cases. That is, if a graduate moves 'home' after studying, then the graduate can expect higher wage growth compared to other graduates making the same move but not originating from the work region. This is presumably because the graduate can exploit the personal network that was built before moving away to study – and, contrary to expectations, this applies not only when the study region is peripheral. The effect is considerable at 7–9 percentage points annual wage growth increase, but it is only statistically significant at the ten per cent level. An important caveat is that the analysis of hypothesis 3 is based on relatively few observations. This is explored further in the robustness tests, cf below.

Finally, hypothesis 4 says that, in the metropolitan region, wage growth will be higher for a graduate originating, studying and finding their first job in the region, compared to those that move there to study and stay to work. This effect should not be observed in the peripheral region. The hypothesis is partially rejected as we find no difference in both cases. This means that while the analysis of hypothesis 3 showed a positive effect of 'moving home' after studying, we do not find a positive effect for remaining in the home region to study. This suggests that any benefits from pre-university social relations are secondary to the benefits of professional and social relationships built while studying.

Robustness

The robustness tests show that the results are generally robust to increasing the sample size by decreasing the number of variables used for matching, and to omitting control variables when estimating the effects. However, leaving out the variables for grades and initial wage level from the

CEM exercise in order to increase the number of observations leads to rejecting H4 Periphery. However, because the two compared groups of graduates now differ according to initial wage levels and grades, the estimate is likely to be biased.

If we compare simple means or relax the requirements for matching, the results are almost identical to the results presented in Table 2, with the exception that the estimated effect for the H3 Periphery hypothesis is now small and insignificant.

Tables presenting the results of the robustness analyses can be found in the supplementary material (Appendix B).

ENTREPRENEURSHIP ANALYSIS

The analysis of entrepreneurship performance follows the same logic as the wage analysis in the previous section, with minor differences due to data availability of the performance measure. Again, we use the Danish register data to identify the population of graduates from the peripheral North Denmark region and the metropolitan region. The data covers the period 2001–2010, i.e. three extra years compared to the wage earner analysis.

Entrepreneurial activity in the graduation year and the three following years is identified through a merger with entrepreneurship registers. In these registers, entrepreneurs are identified as the main founders of active, newly established enterprises. If two or more graduates establish an enterprise together, only one of them is identified as an entrepreneur. To be considered active, an enterprise must have a level of activity corresponding to at least 0.5 full-time equivalent employees as well as an industry-specific minimum turnover. Firms from the public sector, non-profit organizations and government-subsidised enterprises are not included. The performance measure for these entrepreneurs is a binary variable indicating firm survival to the third year after start-up. This is

identified through a merger with firm registers including the full population of firms in Denmark with a minimum of economic activity as identified by Statistics Denmark. This is a standard performance measure used in entrepreneurship analyses since around half of all new ventures in Denmark (Dahl et al., 2009) as well as other countries (Van Praag, 2005) close within three years, and survival is the prerequisite for later growth. The measure for survival is censored since the last available year is 2013, and graduates in the period 2001–2010 have a window of three years to establish a new venture.

As in the wage earner analysis, the treatments of interest are all related to the four different mobility patterns of the graduates. 85,641 graduates are identified in the period 2001–2010 and included in the entrepreneurship analysis, with 10,845 from the peripheral North Denmark region and 74,796 from the metropolitan region. Again, non-mobility is the most frequent mobility pattern in both regions and leaving the metropolitan region is a much rarer event than leaving the peripheral region. The number of graduates included in the entrepreneurship analysis is greater than in the wage earner analysis since three additional cohorts are added (2008–2010), and there is no requirement of full-time employment after graduation or of full-time employment again three years after the first job. On the other hand, the number of entrepreneurs is low: 1,657 and 221 in total for those that graduated in the metropolitan and peripheral region, respectively, with 99.4% and 74.7% of the entrepreneurs founding their venture in the study region. The number of graduates included in the survival analysis is therefore also small. The distribution of the mobility patterns for the population used for the entrepreneurship analysis is shown in the supplementary material (Appendix A).

Matching

The matching variables applied to the full population of graduates across mobility types are identical to those used in the wage earner analysis, except for two variables being dropped due to lack of applicability: industry of employment and hourly wage in the first job. Again, the same variables are used for matching and controls in the regressions.

Results

Table 3 reports the estimated local treatment effects (i.e. effects of different mobility patterns) for hypotheses 5 and 6 based on logit models with three-year survival as the dependent variable (the estimates are marginal effects). The full regression results can be seen in the supplementary material (Appendix C).

Table 3: Summary table of effects of mobility on survival.

Hypothesis label	Formal hypothesis	Estimated effect	SE of estimate
H5 Peripheral	$w_i > w_j, i \in [N^P \cup S^P], j \in [R^P \cup L^P]$	-0.101	0.382
H5 Metropolitan	$w_k > w_l, k \in [N^M \cup S^M], l \in [R^M \cup L^M]$	-0.063	0.320
H6 Peripheral	$w_i > w_j, i \in [N^P], j \in [S^P]$	0.342**	0.144
H6 Metropolitan	$w_k > w_l, k \in [N^M], l \in [S^M]$	0.078*	0.040

Note: 'Estimated effect' is the marginal effect on three-year survival from the mobility type of the first group (i or k) relative to the second group (j or l). *: p < .1, **: p < .05, ***: p < .01.

The results in Table 3 show that Hypothesis 5 is not supported. That is, entrepreneurs who found their venture in their study region are not more likely to survive the critical first three years than those who move away from the region to found their venture. This is true in both the metropolitan and peripheral region.

Hypothesis 6, on the other hand, is fully supported. That is, entrepreneurs who have studied in their home region are more likely to survive with a new venture in this region compared to entrepreneurs that moved to the region to study. The results for the periphery show that non-mobile entrepreneurs are more likely to survive by 34 percentage points compared to entrepreneurial stayers in the region, relative to the baseline of 37.4 per cent surviving the critical first three years. A similar conclusion can be drawn from the results for the metropolitan region, where the same comparison is made, although the results are weaker (lower coefficient and significant at the 10 per cent level). Non-mobile entrepreneurs are 7.8 percentage points more likely to survive compared to entrepreneurial stayers (baseline 42.3 per cent three-year survival rate). In relation to Hypotheses 5 and 6, we expected that the effects could be larger for the peripheral than for the metropolitan region. However, the magnitude of the standard errors clearly indicates that 95% confidence intervals for the estimates are overlapping in Hypothesis 5, so we are not able to determine any differences across the peripheral and the metropolitan region. In Hypothesis 6, the estimate for the peripheral region is more than four times larger than the estimate for the metropolis, but because the coefficients are from two different regressions, we cannot determine whether they are different in a statistical test.

Robustness

The conclusions do not change in two robustness tests, where the first excludes the variable for grades in the matching procedure and as control variable, and the second includes only the treatment variable in the regressions but all variables in the matching procedure. Both robustness tests have the purpose of including more observations in the regressions. Again, these results can be found in the supplementary material (Appendix C).

CONCLUDING DISCUSSION

There is a large policy as well as academic focus on the role of human capital for regional economic development, including what role the regional presence of a university can play for development potential. This paper explores this issue from the perspective of university graduates. The analysis is based on the premise that the performance outcomes of university graduates can be interpreted as indicators of the regional conditions for, and potential benefits from, retaining and attracting graduates.

Using Denmark as the empirical case, two polar regions are analysed in the paper: the metropolitan region around Copenhagen and the peripheral North Denmark region. Furthermore, the analysis distinguishes between two types of occupational choices after graduation: becoming a wage earner or starting up a new venture and becoming an entrepreneur.

For wage earners, the size of the regional labour market for university graduates is expected to outline career opportunities, implying that the 'thicker' the market for specialised skills is, the more likely graduates are to find jobs that match their skills. Thick labour markets also provide better career prospects in terms of obtaining faster wage growth, which may be supported through job switching (Venhorst et al., 2011; Ahlin et al., 2014; Krabel & Flöther, 2014). This suggests that a metropolitan region, compared to a peripheral region, will provide more benefits for university graduates who choose to become wage earners, which should be reflected in the performance outcomes. The empirical findings confirm these expectations. Among wage earners who are graduates from the university located in the peripheral North Denmark region, those relocating to the metropolitan region have a superior performance outcome in terms of wage increases

compared to graduates who choose to stay and work in the periphery after graduation. The opposite result is found for graduates from a university located in the metropolitan region.

Going into more detail with the different mobility patterns, the wage growth premium in the metropolitan compared to the peripheral region applies to all graduates, irrespective of where they studied. The results also show that graduates who move away from their study region to work after graduation experience a wage growth premium if the work region is also their pre-study home region. This implies that there is a benefit from returning to existing social networks. However, the robustness test shows that the result is uncertain if the home region is the metropolitan region, thus indicating that wage earners, similar to what is expected for entrepreneurs, have an advantage from social networks in the periphery. Nonetheless, if a graduate remains in the study region to work, there is no premium if the region is also the home region. In other words, pre-studying social networks are secondary to the professional network and other benefits built up while studying.

Whereas peripheral regions are generally considered to provide unfavourable career development prospects for wage earners, the entrepreneurship literature finds that peripheral regions – although having few institutions supporting entrepreneurship – are characterised by relatively strong social network ties, which are important for the successful founding of a new venture (Bauernschuster et al., 2010) as well as for new venture survival (Freire-Gibb & Nielsen, 2014). This implies that a peripheral region can also be expected to be a favourable place for a university graduate with limited or no work experience to start up a new venture, provided the graduate has strong ties to the region. These expectations are confirmed by the empirical findings. In the peripheral region, graduate entrepreneurs who have studied and started up their new venture in their home region have a superior survival rate compared to graduate entrepreneurs who have moved from the

metropolitan region to the periphery to study and subsequently start their venture in this region. Similar results are found for non-mobile graduate entrepreneurs compared to university stayers in the metropolitan region, although the magnitude is lower. Furthermore, the survival rate of non-mobile graduate entrepreneurs in the periphery is significantly higher than the survival rate of the non-mobile entrepreneurs in the metropolitan region. This is in accordance with previous studies, which suggest that family-based relations, or generally strong ties, are particularly important for entrepreneurial survival in the periphery. In line with this argument, comparing performance based on post-graduate mobility patterns alone does not lead to significant differences, regardless of the type of region: graduate entrepreneurs who start their new venture in their university region do not have a superior survival performance to graduate entrepreneurs who leave their university region to start their new venture.

From a regional policy perspective, the findings have several implications, particularly for peripheral regions. The findings show that the likely individual performance outcome from becoming a wage earner or an entrepreneur is associated with the mobility pattern. When interpreting the individual outcomes as an indicator of the regional conditions for and potential benefits from retaining graduates, the regional conditions for retaining graduates are much better for graduate entrepreneurs than for wage earners in the periphery, but only if the entrepreneurs are originally from the region, and therefore have strong social ties to, and an accumulated stock of knowledge of the region. This speaks in favour of entrepreneurship policy in the periphery focusing on retaining graduates with entrepreneurial aspirations in their home region and, in addition, exploring the possibilities for enhancing network relationships for graduate entrepreneurs from another home region.

Concerning wage earners, the findings clearly reflect the benefit of finding jobs in a thick labour market, and that these benefits can be enjoyed regardless of the study region. This can be explained by better possibilities for finding jobs that match the graduates' specific skills in the thick labour markets of the metropolitan region and thereby better utilisation of these skills. Yet, from a balanced regional development perspective, it would not be recommended to implement policies that aim at increasing the already substantial mobility from the periphery towards metropolitan areas. The results show that studying in a peripheral region does not confer a handicap if the individual moves to the metropolitan region to work after graduation. Thus policies should try to retain students in peripheral universities for the benefits awarded by the presence of the university to the region, such as academic jobs, students' demand for amenities and university-industry collaboration. It may through policy be possible to increase the retainment of some types of graduates in these types of regions. This could be done by supporting the development of labour markets in peripheral regions towards better job matches and possibly also developing 'niches' of thick labour markets in areas of strategic importance to the aspired development path of the region. However, further research, including more qualitatively oriented studies, is needed in order to assess the extent to which it is possible to influence graduates' mobility choices, as well as which types of graduates are most likely to be influenced by such regional development policies. It may also be relevant to carry out similar analyses in different national contexts, e.g. countries where there are lager differences between peripheral and metropolitan regions, also in terms of the quality of education.

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Appendix A: Descriptives, mobility patterns

This supplementary material contains tables with observed mobility patterns, full regression results, as well as tables from the robustness analyses. Supplementary Tables A1 and A2 show the distributions of the mobility patterns in the data.

Table A1: Mobility patterns in the data for wage analysis.

Mobility	Metropolitan	Peripheral	Total
Non-mobility (N)	14,423	972	15,395
Staying (S)	4,845	529	5,374
Late mobility (L)	442	690	1,132
Return mobility (R)	96	193	289
Total	19,806	2,384	22,190

Table A2: Mobility patterns in the data for entrepreneurship analysis.

Mobility	Metropolitan	Peripheral	Total
Non-mobility (N)	56,861	5,527	62,388
Staying (S)	17,485	2,356	19,841
Late mobility (L)	226	2,377	2,603
Return mobility (R)	224	585	809
Total	74,796	10,845	85,641

Appendix B: Wage earner analysis - full regression results and robustness tests

Table B1: Full regression results on effects of mobility on wage growth (background for Table 2 in the paper, which summarises the effects of mobility on wage growth)

	H1 Metro	H1 Periphery	H2 Metro	H2 Periphery	H3 Periphery	H3 Metro	H4 Periphery	H4 Metro
H1 effect	-0.0261***	0.0353***						
	(0.0060)	(0.0116)						
H2 effect			0.0023	0.0076				
			(0.0052)	(0.0247)				
H3 effect					0.0711*	0.0912*		
					(0.0378)	(0.0378)		
H4 effect							0.0336	0.0031
							(0.0240)	(0.0023)
Init. Wage	-0.0013***	-0.0016***	-0.0014***	-0.0027***	-0.0021	-0.0011	-0.0011*	-0.0013***
	(0.0001)	(0.0003)	(0.0001)	(0.0007)	(0.0017)	(0.0012)	(0.0006)	(0.0000)
Parent edu.	0.0142**	-0.0288	-0.0019				0.0559	0.0022
	(0.0067)	(0.0360)	(0.0060)				(0.0775)	(0.0028)
Parent inc.	0.0036	0.0131	0.0074	0.0458	0.3191*	-0.1403*	-0.0577	0.0033
	(0.0068)	(0.0246)	(0.0064)	(0.0546)	(0.1469)	(0.0670)	(0.0450)	(0.0030)
Woman	-0.0292***	-0.0424***	-0.0262***	-0.0117	-0.2235*	-0.1670	-0.0053	-0.0235***
	(0.0056)	(0.0144)	(0.0048)	(0.0300)	(0.1032)	(0.0901)	(0.0454)	(0.0024)
Foreign born	-0.0045							0.0035
	(0.0394)							(0.0193)
Age	0.0005	-0.0113**	0.0010	-0.0035	-0.0368	-0.1008*	-0.0190*	0.0000
	(0.0011)	(0.0046)	(0.0013)	(0.0092)	(0.0311)	(0.0462)	(0.0102)	(0.0006)
Grades	0.0010***	0.0001	0.0004	0.0024	0.0165	-0.0041	0.0006	0.0006***
	(0.0004)	(0.0010)	(0.0004)	(0.0023)	(0.0094)	(0.0101)	(0.0025)	(0.0002)
Observations	1433	378	2350	118	23	14	203	7678
R2	0.228	0.165	0.172	0.217	0.559	0.832	0.147	0.179

Note: OLS regressions with wage growth as dependent variable. Robust standard errors in parentheses. Models also include dummies for education field, education level and industry of first job. In some cases, the CEM returns a sample with no variation over one or more covariate, which are then excluded from the regression. E.g. in most cases there are no foreign born that can be matched. * p < 0.1, ** p < 0.05, *** p < 0.01.

Robustness tests

As can be seen in Supplementary Table B1, there are only 23 observations for H3 Periphery and 14 for H3 Metro, of which 10 and 6 are 'treated', respectively (not shown). By leaving out the variables for grades and initial wage level from the CEM exercise, we can increase the number of observations to 273 and 98, respectively (see Supplementary Table B2). The increase from 14 to 98 observations does not affect the result for H3 Metro but the increase from 23 to 273 observations means that H3 Periphery should be rejected as no wage growth difference is found in the regression. This exercise can also increase the number of observations available for the remaining hypotheses, but the only change in results is that H4 Periphery must be rejected, as the estimate becomes positive and significant at ten per cent. The increase in observations is in this case from 203 to 825. However, in this case, the two compared groups of graduates differ according to initial wage levels and grades, and, accordingly, the estimate is likely to be biased.

There is in principle no effect of using controls in the regressions if CEM results in a balanced dataset, and the comparison of group means should then suffice. In our case, such a comparison provides results almost identical to the results presented in Table 2 in the main paper, with the exception that the estimated effect for the H3 Periphery hypothesis is now small and insignificant (see summary Table B3). All in all, the robustness tests show that the results are generally robust except for H3 Periphery, which must be rejected if we compare simple means or relax the requirements for matching. The result for H4 Periphery is also sensitive to relaxing the CEM, likely because bias is introduced as the initial estimate is based on more than 200 observations.

Table B2: Alternative analysis where grades and initial wage are excluded from the CEM.

	H1 Metro	H1 Periphery	H2 Metro	H2 Periphery	H3 Periphery	H3 Metro	H4 Periphery	H4 Metro
H1 effect	-0.0127**	0.0256***						
	(0.0056)	(0.0052)						
H2 effect			-0.0013	0.0022				
			(0.0037)	(0.0082)				
H3 effect					-0.0020	0.0342*		
					(0.0087)	(0.0196)		
H4 effect							0.0160*	0.0001
							(0.0090)	(0.0021)
Init. Wage	-0.0012***	-0.0018***	-0.0013***	-0.0013***	-0.0019***	-0.0019***	-0.0020***	-0.0012***
	(0.0000)	(0.0001)	(0.0000)	(0.0001)	(0.0001)	(0.0003)	(0.0001)	(0.0000)
Parent edu.	0.0001	-0.0109	-0.0005	-0.0066	-0.0030	-0.0378	-0.0003	-0.0008
	(0.0036)	(0.0082)	(0.0030)	(0.0139)	(0.0144)	(0.0479)	(0.0191)	(0.0023)
Parent inc.	0.0079**	0.0087	-0.0013	0.0127	0.0184	-0.0113	-0.0077	0.0072***
	(0.0035)	(0.0080)	(0.0027)	(0.0115)	(0.0164)	(0.0306)	(0.0128)	(0.0023)
Woman	-0.0244***	-0.0209***	-0.0230***	-0.0282***	-0.0305***	-0.0307	-0.0097	-0.0265***
	(0.0030)	(0.0057)	(0.0023)	(0.0082)	(0.0101)	(0.0255)	(0.0114)	(0.0020)
Foreign born	0.0424***		0.0175				-0.0348	-0.0074
	(0.0134)		(0.0217)				(0.0848)	(0.0138)
Age	0.0016***	0.0012	-0.0002	0.0028	0.0000	0.0061	-0.0053*	-0.0009**
	(0.0005)	(0.0015)	(0.0005)	(0.0018)	(0.0031)	(0.0064)	(0.0029)	(0.0004)
Grades	0.0015***	0.0005	0.0005***	-0.0004	0.0017***	0.0026*	0.0001	0.0004***
	(0.0002)	(0.0004)	(0.0001)	(0.0005)	(0.0006)	(0.0014)	(0.0006)	(0.0001)
Observations	7719	1491	8707	830	273	98	825	15476
R2	0.157	0.325	0.200	0.204	0.533	0.447	0.245	0.184

OLS regressions with wage growth as dependent variable. Robust standard errors in parentheses. Models also include dummies for education field, education level and industry of first job. In some cases, the CEM returns a sample with no variation over one or more covariate, which are then excluded from the regression. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table B3: Alternative results where no control variables are used in the regressions.

	H1 Metro	H1 Periphery	H2 Metro	H2 Periphery	H3 Periphery	H3 Metro	H4 Periphery	H4 Metro
H1 effect	-0.0256***	0.0343***						
	(0.0067)	(0.0122)						
H2 effect			0.0019	-0.0030				
			(0.0057)	(0.0256)				
H3 effect					0.0665	0.0954*		
					(0.0394)	(0.0498)		
H4 effect							0.0336	0.0031
							(0.0247)	(0.0025)
Observations	1433	378	2350	118	23	14	203	7678
R2	0.010	0.020	0.000	0.000	0.119	0.234	0.009	0.000

OLS regressions with wage growth as dependent variable. Robust standard errors in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01

Appendix C: Entrepreneurship analysis - full regression results and robustness tests

Table C1: Full regression results on effects of mobility on entrepreneurial survival (background for Table 3 in the paper, which summarises the effects of mobility on survival).

	H5 Peripheral	H5 Metropolitan	H6 Peripheral	H6 Metropolitan
H5 effect	-0.101	-0.063		
	(0.382)	(0.320)		
H6 effect			0.342**	0.078*
			(0.144)	(0.040)
Parent education	-0.083		0.410*	-0.022
	(0.516)		(0.233)	(0.040)
Parent income	-0.000	-0.000	-0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Women	-0.222	0.580***	-0.061	-0.144***
	(1.302)	(0.162)	(0.208)	(0.037)
Foreign born				-0.034
				(0.156)
Age	-0.028	-0.210	0.029	0.002
	(0.123)	(0.170)	(0.037)	(0.006)
Grades	0.001	-0.032	-0.003	0.001
	(0.011)	(0.074)	(0.013)	(0.002)
Baseline	0.401	0.637	0.374	0.423
Log-likelihood	-43.006	-11.002	-29.159	-571.349
Chi-squared	18.888	4.719	15.086	29.629
Pseudo-R-squared	0.180	0.177	0.206	0.025
Observations	83	19	58	878

Note: Marginal effects from logit models with three-year survival as dependent variable. Robust standard errors in parentheses. Models also include dummies for education field and education level. In some cases, the CEM returns a sample with no variation over one or more covariate, which are then excluded from the regression. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Robustness tests

Supplementary Tables C2 and C3 show the results of the robustness tests for the entrepreneurs. Please note than the results shown in Summary Table 7 are for analyses where grades are excluded both from the CEM and as a control variable in order to increase the number of observations as much as possible.

The two robustness tests do not change the results presented in Table 3 in the paper.

Table C2: Alternative entrepreneurial analysis where grades are excluded from the CEM and as control variable.

	H5 Peripheral	H5 Metropolitan	H6 Peripheral	H6 Metropolitan
H5 effect	0.086	-0.182		
	(0.113)	(0.204)		
H6 effect			0.405***	0.060*
			(0.105)	(0.034)
Parent edu	-0.018		0.169	-0.017
	(0.145)		(0.191)	(0.034)
Parent inc.	-0.000	-0.000*	-0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Women	-0.155	0.117	-0.111	-0.147***
	(0.109)	(0.195)	(0.128)	(0.032)
Foreign born				-0.050
				(0.076)
Age	0.004	-0.098*	-0.006	-0.002
	(0.018)	(0.054)	(0.020)	(0.004)
Baseline	0.454	0.400	0.454	0.415
Log-likelihood	-76.210	-80.125	-57.115	-804.280
Chi-squared	22.426	8.005	25.140	34.376
Pseudo-R-squared	0.128	0.048	0.180	0.021
Observations	134	122	100	1211

Note: Marginal effects from logit models with three-year survival as dependent variable. Robust standard errors in parentheses. Models also include dummies for education field and education level. In some cases, the CEM returns a sample with no variation over one or more covariate, which are then excluded from the regression. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table C3: Alternative results where no control variables are used in the regressions (but all variables in the CEM).

	H5 Peripheral	H5 Metropolitan	H6 Peripheral	H6 Metropolitan
H5 effect	-0.014	-0.059		
	(0.109)	(0.222)		
H6 effect			0.453***	0.070**
			(0.108)	(0.035)
Baseline	0.461	0.547	0.519	0.419
Log-likelihood	-68.901	-16.497	-46.184	-717.809
Chi-squared	0.016	0.070	13.274	3.828
Pseudo-R-squared	0.000	0.002	0.126	0.003
Observations	105	24	81	1086

Note: Marginal effects from logit models with three-year survival as dependent variable. Robust standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.