

Ejermo, Olof

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## Locked into the ivory tower? Mobility and entrepreneurship among Swedish academics

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# Locked into the ivory tower?

Mobility and entrepreneurship among Swedish academics<sup>1</sup>

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Olof Ejermo<sup>2</sup>

## Abstract

Even though European research universities have become more active in commercialization efforts in recent decades, they have been claimed to lack the entrepreneurial dynamism of their American counterparts. Sweden differs from the majority of European countries by an unusually high intensity in trade, and by firms investing usually much in business research and development. Recently, its university system has been found to be as productive in patenting as the American in terms of share of patents where academics are involved. Yet, Sweden shares a common feature of many European economies which is that levels of entrepreneurship are much lower than in the American economy. This paper contributes to this discussion by providing new evidence on how academics in Sweden interact with the rest of the economy. This is done by examining mobility of individuals to other firms and by looking at whether they move to start-ups using register data on Swedish individuals. In particular, labour mobility has in recent years been pointed out to be an important mechanism behind knowledge spillovers and the extent that academics move to other sectors, and individuals move to this sector, is therefore of great interest to policy makers. In addition, new firms are venues where new ideas can be transformed into economic results. The economy is divided into five sectors and a comparison is made on data from 2000-2001 and 2004-2005. The variation in mobility and entrepreneurship among individuals is further examined for patterns in how and if individual characteristics can account for mobility and entrepreneurship levels.

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<sup>2</sup> CIRCLE (Centre for Innovation, Research and Competence in the Learning Economy), Lund University, P.O. Box 117, SE-22100 Lund, Sweden, olof.ejermo@circle.lu.se

It is found that the level of mobility and entrepreneurship is the lowest in the academic sector. The individual characteristics most influential on the decision to change job is the level of education, defined either as any type of post-gymnasium education or alternatively as PhD education. Although people in academia also tend to move more often and/or be more entrepreneurial with higher education these effects are not strong enough to raise the level substantially.

Taken together, despite popular rethoric that academics should contribute to “third mission” activities, scientific norms tends to rule in academia leaving them less mobile and entrepreneurial than in all other sectors.

# 1 Introduction

Even though European research universities have become more active in commercialization efforts in recent decades, they have been claimed to lack the entrepreneurial dynamism of their American counterparts. It has been labeled as a European paradox (Dosi et al., 2006) that Europe, despite its massive investments into the higher education system (Soete, 2005) and seeming superiority in terms of number of graduates, has not been able to achieve the same rates of technology development as the US. The European phenomenon is coupled with lower investments in research and development.

Sweden differs from the majority of European countries by an unusually high intensity in trade, and by firms investing usually much in business research and development. As in many countries a paradox has been formulated. The Swedish paradox version states in short that the country underperforms in terms of innovation despite large business R&D.<sup>3</sup> While it is clear that high-tech exports (Edquist and McKelvey, 1998), high-tech production (Braunerhjelm, 1998) and innovativeness based on CIS-data (Bitard et al., 2008) is relatively low *domestically*, it is not clear if this is an innovation systems failure (Lundvall, 1992, Edquist, 1997) as Swedish businesses are highly internationalized and this may simply be a facet of statistics recording: R&D takes place domestically, while production is placed abroad.

Another aspect, which is high on the research agenda concerns the level of entrepreneurship and the willingness to engage in entrepreneurship which is *the lowest* in Sweden out of 40 countries, according to the Global Entrepreneurship Monitor. Sweden shares the feature of low levels of entrepreneurship with other European economies in contrast to the American economy. In particular, a debate has arisen regarding the role of academia in the Swedish system. Goldfarb and Henreksson (2003) pointed to large differences between the Swedish and the American university

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<sup>3</sup> See Ejermo and Kander (2009) for a recent survey of the Swedish paradox and Kander et al. (2007) for a critical remark.

systems, the American being much more 'bottom-up' with a higher freedom to decide their own rules concerning responses to teaching of market signals, and responses to commercialization capabilities. The latter has been highly influenced by the so-called Bayh-Dole act of 1983, which allocates default ownership rights to inventions to universities. According to Goldfarb and Henreksson (2003), this has the possibility to align incentives between university academics/inventors and university bodies. The Swedish system, giving default ownership to the academic individual according to the professor's privilege {Foray, 2010 #877} is nevertheless quite flexible, as academics have the possibility to enter collaboration with firms *and* universities, defining terms of ownership prior to the engagement into research activities.

Recently, very interesting results published in Lissoni et al. {, 2008 #499} use the inventor field of patents registered at the European Patent Office matched to employee records done in a comparable manner with Sweden, France and Italy, which is then compared to results from the United States. This study finds that the Swedish university system is as productive in patenting as the American in terms of share of patents where academics are involved, which suggests that this formal channel for interaction between business and academia may not constitute a major problem despite differences in institutional structure.

This paper instead focuses on a different channel namely on interaction of academics in Sweden with the rest of the economy. This is done by examining mobility of individuals to other firms and by looking at whether they move to start-ups using register data on Swedish individuals.

Labour mobility has in recent years been pointed out to be an important mechanism behind knowledge spillovers and the extent that academics move to other sectors, and individuals move to this sector, is therefore of great interest to policy makers. In addition, new firms are venues where new ideas can be transformed into economic results. Individual data are a very rich source of data and has as far this author knows only been used in one earlier study Delmar et al. (2005) study

academics with at least three years of university education in natural sciences, technology and medicine. Such individuals do run businesses to a higher extent than others, but this is entirely due to higher incidence among those with medicine education.

This paper uses register data with a different idea in mind: it investigates the entire economy at two points in time in 2000-2001 and in 2004-2005. By dividing the economy into six sectors: primary, manufacturing, services, public and academia, patterns with respect to entrepreneurship and mobility are compared both over sectors and time. Individual factors are controlled for in regression analyses to shed further light on differences with respect to mobility and entrepreneurship.

## 2 Data

The paper uses a large scale database covering all individuals 16 years and above. In the Swedish case this implies roughly 7,000,000 observations on individuals each year including their workplace, their municipality and individuals characteristics. Variables used to explain mobility and entrepreneurship include the level of income and type, the level of education, age, sex and region of residence. The database covers the period 1985-2005, from which two pairs of years were chosen: a) 2000-01 and b) 2004-05. The economy was divided in five sectors: *primary sectors* (agriculture, forestry, mining), *manufacturing*, *services*, *public sector* and *academia*. There is also a small sector for where the branch code is undefined. Most academic institutions are in Sweden part of the public sector, but are for this paper considered as separate from it. The academic sector is relatively stable for these two year-pairs, and relevant variables are almost identical. The two pair of years was chosen to facilitate comparison over time and examine the stability of results. Due to the high level of detail of the database, individuals can be easily discerned, requiring this paper not to publish data that are confidential or can be used to identify firms or individuals.

Defining the academic sector is not trivial. The basis for delimiting the academic sector comes from mainly two documents. The Swedish National Agency for Higher Education (2009) provides a list of

universities and university colleges, including changes of organizational status since the 1990s. Statistics Sweden (2001, 2005) furthermore provides data on number of employees by academic institution, which was helpful in certain cases to delimit the sector. A number of mainly smaller institutions were excluded from analysis. There were practical reasons for this. First, a few smaller institutions mainly located in Stockholm were excluded as they were difficult to separate from firms of similar size and with similar types of activities. These smaller institutions are mainly active in the arts, music, theology and sports. The exclusion of them makes sense as several do not have PhD educations and can therefore be of a different qualitative character than other academic institutions. As they are small in comparison to major academic institutions in Sweden, this should not make much of a difference to the results. Another issue concerns separating university colleges and university hospitals related to the health sector. Both types of institutions have some PhD students, but are applied in character. Eventually, all university hospitals were discarded from academia and put into the public sector. In fact, all institutions excluded from the academic sector were put into the public sector.

The number of employees per academic institutions were checked against data published in Statistics Sweden (2001, 2005) to examine whether the figures seemed accurate and to gauge developments in number of employees. Although Statistics Sweden (2001, 2005) reports data regarding full time equivalents and the database uses people, the publication is nevertheless informative. Some academic institutions exhibit growth rates at 40% from 2000-2004. Some of these fast-growers have changed status from University college to University in the 1990s (Växjö, Örebro and Karlstad) or are recently founded (Malmö), while others grow much as a result of higher growth rates for smaller institutions (e.g. Södertörn, Kalmar, Gävle, Kristianstad, Stockholm School of Economics). Larger universities such as the universities in Uppsala, Lund, Gothenburg, Linköping, Umeå and Karolinska Institutet, tend to grow at rates of 5-20% in terms of number of employees during the period. Four smaller institutions were excluded as they have changed organizational status and could not be

tracked over time. These changes concerned less than 500 employees and affect less than 0.4% of employees in the academic sector. Therefore a very consistent set of academic institutions is used for both 2000-01 and 2004-05. Table 1 shows the academic institutions constituting the sample.

< TABLE 1 ABOUT HERE >

## 2.1 Descriptive statistics

The datasets on individuals comprise about 7 million observations from each of the years 2000, 2001, 2004 and 2005. The basic premise of this paper is to compare mobility and entrepreneurship patterns across sectors. Hence only persons employed in both 2000 and 2001, or alternatively in both 2004 and 2005 were included. Further exclusions were based on individuals with occupational status as without employment based on several variables in either year (dummy for unemployed, variable indicating occupational status, variable indicating work type). Individuals classified as being in defense services in either pair of year were excluded as they cannot be considered as part of the labor force. For similar reasons individuals subject to early retirement (*förtidspension*) in either year or individuals classified as students were excluded. In the end, roughly 3 million observations on individuals are available from each year pair (2000-01/2004-05). Table 1 provides mean values for the data under study in this paper, by sector and in total for 2000-2001. Most values are similar for 2004-2005 and are hence not reported, but with important exceptions for mobility and entrepreneurship, see below.

As can be seen from Table 2, most individuals working in both 2000 and 2001 work in the services sector, 45%, followed by the public sector at 27%, and manufacturing at 21%. Mobility and entrepreneurship are central variables for this paper. Mobility is defined as if an individual has changed to a job with a different company number (*organisationsnummer*). The system of these numbers is not unequivocal towards showing a different firm, since some firms do change company number. However, the academic sector as defined in this paper is stable and measurement problems may should not be too serious in the aggregate. On average, 12.4% of individuals moved to a



different job from 2000 to 2001 and notably a lower rate of 9.7% from 2004 to 2005. Mobility is the highest in the services sector (16.5%, 2000-01 and 13.4%, 2004-05) and lowest among academics, 6.8% (4.2%, 2004-05). The mobility rate among academic is similar to that of the public sector at 7% (6.2%, 2004-05). Because of the problems of company id numbers, newly registered company numbers can hardly be used as a reliable definition for entrepreneurship. Instead, I defined the dummy *Dent* for an individual as value 1 an individual moved to a firm in 2001 when the start date of that firm was in 2000 and similarly for 2005 when the start date was in 2004. The use of the year before was made because start-up date was not available for 2005, and to make for a consistent comparison.<sup>4</sup> But it also makes somewhat sense as an individual could start a side-activity prior to definitely leaving his or her job . The level of entrepreneurship only at 3.2% seems to confirm notions of low entrepreneurship in general. Entrepreneurship again is the highest among service employees with 4.1%. Among public employees and academia the rates are the lowest. But while public employees boost a rate of 2.2%, academics are at only 0.4%. Similarly in 2004-05 rates are lower: 2.5% move to a newly started firm. Service sector employees move to newly started businesses at the rate of 3.4%, while the share is 1.7% among public employees and a mere 0.1% among staff in academia. With regards to the other variables, the dummy variables *female* and *Swedish* are self explanatory, as is *age*. The gender distribution is quite uneven among sectors as 74% of employees in the public sector are women, 67% are women among academics. In primary sectors and manufacturing, only 19 and 24 % are women. Almost all employees are Swedish in all sectors. With regards to income, the highest average income levels (*Total income*) are found in academia, manufacturing and service sectors at 260-270 thousand SEK. In 2004 the same sectors have the highest average income ranging from 290-310 thousand SEK. The highest average levels are recorded in academia. In primary and unclassified sectors, income is much lower at about 170 thousand SEK (185-200 KSEK in 2004), while public sector employees in 2000 had an intermediate position with income levels at about 220 KSEK (260 KSEK in 2004) .

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<sup>4</sup> For entrepreneurship 2000-2001 using the start date 2001 made little changes in results.

< TABLE 2 ABOUT HERE >

< TABLE 3 ABOUT HERE >

< TABLE 4 ABOUT HERE >

With regards to the share of income coming from the own business, it is the highest among unclassified and primary sectors at almost 50%. This should come as no surprise since employees in primary sectors often run their own businesses such as being farmers, forest entrepreneurs etc. In the other sectors, only in services does this share reach a substantial number at 6.6%. It is noteworthy, however, that the share of income from businesses is only at 0.4% in academia and similarly 0.7% in the public sector. Many academics have some freedom to increase their incomes by consultancy work as allowed by their employers. The data suggest that few take this opportunity or at least earn very little from it, which is interesting. Could this be because there are lacking opportunities or because incentives are much towards meriting scientifically? The share of income originating from unemployment benefits (*Unempl, share*) ranges across sectors from 2 to 5%. Turning to education level, two dummy variables were defined. *Highly educated* takes the value 1 if a person has any form of higher education degree, excluding PhD. *PhD educated* takes the value 1 if the person has a PhD education. Unsurprisingly, the education level is the highest in academia with an almost 50% share of individuals with higher education, and 16% have a PhD. The education level is also high in the public sector with a similar rate of educated, but with a very small share of PhDs. Actually, the rate of PhD:s is small (< 1%) in *all* sectors outside academia. The lowest education level is in primary sectors with about 12% highly educated. In the other sectors the rate is about 20-30%. Finally two variables describing place of residence were defined. *Dmetro* takes the value 1 if a person resided in one of the municipalities Stockholm, Gothenburg or Malmö in 2000. *Dresid* takes the value 1 if the municipality was a residential one. This defines if the person lived in one of Sweden's

21 county capitals. If *Dmetro* is one, *Dresid* also takes the value one as the three largest are also residential cities. These variables are intended to capture greater job and entrepreneurial possibilities that exist in major cities. It can clearly be seen from the data that the share of individuals in *Dmetro* and *Dresid* are the lowest in the primary sector, which is not surprising given that these activities have a rural character. This may further explain to some extent how individuals from this group may survive on much lower average income, since price levels are lower in the countryside and there are other survival mechanisms than registered income.

Table 3 shows patterns of mobility within and between sectors from 2000 to 2001, patterns are similar 2004-2005. Clearly, many individuals move to firms within the same sector. However, the service sector due to its generally large size attracts many workers from all other sectors. Services are in advanced economies trend wise the fastest-growing sector. The patterns of academic movers seem to differ from the others as the primary recipient of academics is outside its own: to the public sector. Furthermore, there are very few people percentagewise moving *to* academia if they are already employed in a different sector in 2000. The data on mobility, entrepreneurship and sector of origin and destination seem to suggest that the academic sector is somewhat of an oddity in the sense that mobility rates to and from this sectors are low. Moreover, academics tend to start fewer businesses than other employees. Data therefore suggest that academics to some extent are in an 'ivory tower'. It is possible, though, that mobility is affected by special characteristics of individuals of the academic sector. We therefore turn to regression analysis to examine in detail how these affect mobility rates.

Table 4 shows Probit estimations of the probability of moving from 2000 to 2001 and of the probability of entrepreneurship. The same set of regressions for 2004-2005 is shown in Table 5. In addition to the variables presented before, interaction dummies between sector and the two education dummies were created, to test whether the level of education has a different effect depending on sector. Also, include dummies for sectors and a dummy for employment in a full

university as opposed to university college were included. This dummy pertains to universities formed before 1990. The service sector, being the one with most employees is treated as the base sector. Income and the share of income from business and unemployment is clearly endogenous to the choice of moving and to the choice of entrepreneurship. Therefore IV probit models are conducted with the variables *female*, *age* and *Swedish* as instruments for these income variables. Clearly, the estimates are affected by this estimation procedure. A Wald test for exogeneity clearly rejects Probit in favor of IV probit estimations for both time periods. Therefore, I only report the IV results below. All variables are significant, which happens partially because of the extremely large number of observations.

Quite interestingly, the results differ substantially from 2000-2001 compared with 2004-2005. The Swedish growth in GDP/capita was similar for the two year-pairs (roughly 3.4% in current prices), but mobility and entrepreneurship as defined previously was much lower in 2004-2005. In 2000-01 an individual residing in one of the largest municipalities had a much higher probability of moving or starting a new firm. In the latter period, there is no such effect. In addition, mobility was lower in residential cities which include the largest cities. This means that lower opportunities for getting a new job and to start a firm were especially prevalent in major cities.

Being highly educated generally strongly raises mobility *and* entrepreneurship and even more so for PhD educated for 2000-2001. Interestingly, there is no general education effect for 2004-05. The decline in possibilities seems to hit the educated. Dummies for sectors reveal that base levels of mobility and entrepreneurship are the highest in primary sector. This could be explained by the fact that individuals here are more entrepreneurial in general due to the nature of the sector with many small businesses. Services are the second most mobile and entrepreneurial, mobility and entrepreneurship is third most common among manufacturing employees. Public employees rank forth and academics are the least mobile and entrepreneurial of all employed. The only sector effect changes are that entrepreneurship is not significantly different from the service baseline in the

primary and public sector in 2004-05. The dummy for full university indicate an even lower mobility and entrepreneurship among those employed in full universities, suggesting that these employees are farther from business life than smaller, less renowned university employees. Total income has a negative effect on mobility and entrepreneurship after instrumentation in 2000-01, but not in 2004-05. A higher income makes individuals more risk-averse in the sense of less mobility and less entrepreneurial. Surprisingly the same holds for unemployment benefits as a share of income in 2000-01, but not in 2004-05. It could be that an individual with some share of unemployment benefits is less attractive on the labor market and has fewer abilities to change job, or is less creative in creating job opportunities. The effects of education vary across sectors. In primary sectors, the net effect of a higher education degree in primary sectors is negative, meaning that employees here with higher education are *less* mobile and *less* entrepreneurial. This effect is even stronger for those with a PhD in 2000-01, but is not significant for 2004-05. It is possible that those with higher education are so few in this sector that they are in high demand within the sector, meaning that they find ample job opportunities at their workplace and are therefore less mobile, or simply that they have changed career track entirely. Among manufacturing employees is the positive education effect stronger than for the baseline for mobility, but is negative for entrepreneurship. The net effect of education is still positive. PhDs here are even more mobile in 2000-01, but are not more entrepreneurial than service sector PhDs. Among public employees, those with higher education have the same mobility as in services. Entrepreneurship is lower in 2000-01, but higher than services in 2004-05. Interestingly, public sector PhDs are more entrepreneurial than those in services in both periods. Academics have the highest higher education differential effect of all sectors with regards to mobility and for periods, although the average mobility among academics is the lowest. The higher education effect is for academics strong enough to lift these individuals to on par with the rate of the public sector, but is still much lower than the other sectors. With regard to entrepreneurship, there is a positive and

significant effect in 2000-01 but not in 2004-05. PhDs lift mobility and entrepreneurship in 2000-01 but not in 2004-05 in academia.

### **3 Concluding discussion**

This paper tries to shed light on data on mobility and entrepreneurship among Swedish employees. It is clear that the academic sector shares some traits common with the public sector. There is a low mobility and low tendencies of entrepreneurship among academics in general. In fact, the lowest rates are recorded among academics, and especially among those employed at full universities. It seems likely that these institutions offer relatively stable job opportunities and its employees may therefore be reluctant to move. The career track is clearly within academia. Income rates are also fairly high in the academic sector which probably holds back willingness to change job and search for opportunities outside the sector. Higher education fosters mobility in general in different sectors, with the exception of primary sectors. This is to some extent the case with PhDs in the primary sector. All the differential effect of education is the strongest among academics, the overall low rate of mobility and entrepreneurship hold down these tendencies also among its highly educated. Data on share of income from businesses further indicate a very low share among academics.

Presumably, Swedish academics and in particular PhDs are strongly driven by scientific goals rather than entrepreneurial ones. In all the results of this paper suggests strongly that the academic sector as a whole does not contribute to strong interaction effects, neither from the sector nor to the sector and especially not to if you are employed in other sectors. Academics, when moving, go primarily to the public sector and not to businesses. The results therefore indicate that entrepreneurship and mobility is not prevalent phenomena in academia. This does not exclude the possibility that academics contribute through other channels: they may contribute to value creation by acting as consultants, but this does not seem to contribute to higher income. The results in this paper rather suggest that academics are in fact to some extent in an ivory tower in Sweden.

## 4 Tables

**Table 1.** Included and excluded academic institutions . Footnotes describe changes over time.

<i>Academic institution<sup>a</sup></i>	<i>Employees<sup>b</sup></i>	<i>In sample</i>	<i>Academic institution<sup>a</sup></i>	<i>Employees<sup>b</sup></i>	<i>In sample</i>
Uppsala universitet	5 489	Yes	Södertörns högskola	531	Yes
Lunds universitet	6 665	Yes	Chalmers tekniska högskola	2 818	Yes
Göteborgs universitet	5 009	Yes	Handelshögskolan i Stockholm	245	Yes
Stockholms universitet	4 098	Yes	Internationella	433 <sup>c</sup>	Yes
Umeå universitet	3 663	Yes	Handelshögskolan i Jönköping	433 <sup>c</sup>	Yes
Linköpings universitet	3 327	Yes	Tekniska högskolan i Jönköping	433 <sup>c</sup>	Yes
Karolinska institutet	3 925	Yes	Högskolan för Lärarutbildning och kommunikation	433 <sup>c</sup>	Yes
Kungl. Tekniska högskolan	3 442	Yes	Ericastiftelsen	8	No
Luleå tekniska universitet	1 458	Yes	Gammelkroppa skogsskola	16	No
Sveriges lantbruksuniversitet	3 481	Yes	Johannelunds teologiska högskola.	16	No
Karlstads universitet	900	Yes	Teologiska Högskolan, Stockholm	18	No
Växjö universitet	721	Yes	Örebro Teologiska Högskola	13	No
Örebro universitet	887	Yes	Ersta Sköndal Högskola	51	No
Mitthögskolan	1 133	Yes	Danshögskolan	66	No
Högskolan i Kalmar	620	Yes	Dramatiska institutet	72	No
Blekinge tekniska högskola	441	Yes	Konstfack	165	No
Malmö högskola	1 022	Yes	Kungl. Konsthögskolan	63	No
Försvärshögskolan	314	Yes	Kungl. Musikhögskolan i Stockholm	253	No
Högskolan i Borås	530	Yes	Operahögskolan i Stockholm	22	No
Högskolan Dalarna	565	Yes	Teaterhögskolan i Stockholm	40	No
Högskolan i Gävle	569	Yes	Stockholms Musikpedagogiska Institut	13	No
Högskolan på Gotland	107	Yes	Beckmans designhögskola	16	No
Högskolan i Halmstad	455	Yes	Hälsohögskolan i Jönköping	158	No
Högskolan Kristianstad	414	Yes	Röda Korsets högskola	37	No
Högskolan i Skövde	397	Yes	Sophiahemmet Högskola	36	No
Högskolan Trollhättan Uddevalla	373	Yes	Lärarhögskolan i Sthlm	578	Yes
Mälardalens högskola	827	Yes	Institutet för rymdfysik	105	No
			Musikhögskolan Ingesund	46	No

(a) = Name of institution in 2000, (b) = Employees in 2000 according to Statistics Sweden (2001), (c) = all three schools together.

**Table 2.** Summary statistics by sector, variable means.

<i>Sector in 2000</i>	<i>Obs</i>	<i>Move 00-01</i>	<i>Entr 00-01</i>	<i>Female</i>	<i>Age</i>	<i>Swedish</i>	<i>Total income</i>
Unclassified	52 677	14%	3,2%	46%	45,443	94%	173 453
Primary	63 447	8%	2,4%	19%	45,643	99%	172 761
Manufacturing	612 120	12%	3,1%	24%	41,441	95%	266 273
Services	1 340 257	17%	4,1%	35%	41,578	96%	260 500
Public	804 051	7%	2,2%	74%	45,031	97%	223 409
Academia	76 014	7%	0,4%	67%	46,403	95%	268 685
<i>Total</i>	2 948 566	12%	3,2%	44%	42,772	96%	248 352

<i>Sector in 2000</i>	<i>Business, share</i>	<i>Unempl, share</i>	<i>Highly educated</i>	<i>PhD educated</i>	<i>Metro</i>	<i>Residence</i>
Unclassified	49%	4,0%	29%	0,6%	29%	40%
Primary	47%	2,1%	12%	0,2%	2%	17%
Manufacturing	2%	2,8%	19%	0,7%	15%	29%
Services	7%	2,9%	25%	0,5%	32%	49%
Public	1%	5,1%	48%	0,8%	18%	39%
Academia	0%	4,0%	48%	16,9%	30%	56%
<i>Total</i>	5%	3,5%	31%	1,0%	24%	42%

**Table 3.** Mobility between sectors. Percentage number shows as share of all movers within that sector in 2000.

<i>Sector in 2001</i>							
<i>Sector in 2000</i>	<i>0</i>	<i>Primary</i>	<i>Manufacturing</i>	<i>Services</i>	<i>Public</i>	<i>Academia</i>	<i>Total</i>
<i>0</i>	336 (4%)	255 (3%)	776 (10%)	4 024 (54%)	1 958 (26%)	131 (2%)	7 480 (100%)
<i>Primary</i>	287 (6%)	1 690 (33%)	654 (13%)	1 866 (37%)	553 (11%)	23 (0%)	5 073 (100%)
<i>Manufacturing</i>	685 (1%)	544 (1%)	42 675 (60%)	24 495 (34%)	2 776 (4%)	237 (0%)	71 412 (100%)
<i>Services</i>	3 646 (2%)	1 406 (1%)	18 943 (9%)	180 410 (82%)	14 869 (7%)	1 252 (1%)	220 526 (100%)
<i>Public</i>	1 750 (3%)	495 (1%)	2 314 (4%)	15 166 (27%)	34 479 (61%)	2 052 (4%)	56 256 (100%)
<i>Academia</i>	140 (3%)	35 (1%)	362 (7%)	1 507 (29%)	2 429 (47%)	679 (13%)	5 152 (100%)
<i>Total</i>	6 844 (2%)	4 425 (1%)	65 724 (18%)	227 468 (62%)	57 064 (16%)	4 374 (1%)	365 899 (100%)



**Table 4.** Probit estimations for mobility and entrepreneurship, 2000-2001.

MARGINAL EFFECTS	(1) Mobility	(2) IV mobility	(3) Entrepr	(4) IV entrepr
Metro municipality	0.040*** (61.20)	0.458*** (21.71)	0.013*** (33.99)	0.362*** (22.60)
Residential municipality	1.452e-03*** (2.78)	-0.250*** (-28.94)	-6.693e-03*** (-23.89)	-0.216*** (-31.81)
Highly educated	0.024*** (39.71)	1.013*** (16.62)	0.009*** (27.88)	0.776*** (16.68)
PhD educated	0.060*** (13.39)	2.456*** (18.68)	0.013*** (5.37)	1.644*** (16.50)
Primary sector	-0.034*** (-26.19)	5.483*** (64.78)	-0.013*** (-22.83)	2.914*** (38.19)
Manuf sector	-0.041*** (-85.34)	-1.284*** (-70.07)	-0.003*** (-12.31)	-0.532*** (-37.76)
Public sector	-0.092*** (-184.70)	-1.853*** (-90.67)	-0.017*** (-58.94)	-0.915*** (-56.44)
Academic sector	-0.090*** (-91.90)	-2.174*** (-54.16)	-0.031*** (-108.21)	-1.914*** (-34.91)
Full university	8.730e-03*** (2.59)	-0.356*** (-7.51)	1.269e-02*** (3.23)	-0.114** (-2.16)
Total income	-2.171e-08*** (-17.50)	-1.244e-05*** (-20.74)	7.203e-09*** (16.06)	-0.000*** (-17.70)
Business income, share of total	-0.098*** (-91.45)	-17.248*** (-67.85)	0.007*** (14.34)	-9.645*** (-41.94)
Unempl benefits, income share	0.045*** (29.81)	-25.429*** (-23.94)	-0.006*** (-6.54)	-17.004*** (-20.76)
Primary, high edu	-2.009e-03 (-0.49)	-2.458*** (-33.05)	5.209e-03** (2.18)	-1.395*** (-23.24)
Primary, PhD	-0.007 (-0.29)	-4.305*** (-10.29)	0.011 (0.66)	-2.231*** (-7.01)
Manuf, high edu	0.028*** (21.60)	0.386*** (20.37)	-0.011*** (-24.81)	-0.075*** (-5.05)
Manuf, PhD	0.035*** (5.23)	0.729*** (7.32)	-0.018*** (-11.30)	-0.010 (-0.12)
Public, high edu	3.214e-03*** (3.14)	-0.036 (-1.32)	-1.161e-03** (-2.27)	-0.116*** (-5.62)
Public, PhD	0.008 (1.43)	0.771*** (8.80)	0.057*** (10.46)	0.992*** (15.42)
Academic, high edu	0.030*** (7.94)	0.346*** (8.01)	0.019*** (3.56)	0.309*** (5.26)
Academic, PhD	0.001 (0.10)	0.301*** (3.58)	0.010 (1.62)	0.310*** (3.56)
Observations	2,948,566	2,948,566	2,862,393	2,862,393
Pseudo R-squared	0.0338		0.0168	

Table displays marginal effects evaluated at means of variables. z-statistics in parentheses

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

**Table 5.** Probit estimations for mobility and entrepreneurship, 2004-2005.

MARGINAL EFFECTS	(1) Mobility	(2) IV mobility	(3) Entrepr	(4) IV entrepr
Metro municipality	0.019*** (33.53)	0.255 (0.99)	0.005*** (17.02)	-0.128 (-0.79)
Residential municipality	-1.628e-03*** (-3.57)	-0.293*** (-2.94)	4.843e-04** (2.06)	-0.011 (-0.18)
Highly educated	0.010*** (18.75)	0.235 (0.38)	-0.000 (-0.04)	-0.586 (-1.61)
PhD educated	0.019*** (5.62)	0.590 (0.47)	-0.008*** (-6.58)	-1.247* (-1.72)
Primary sector	-0.035*** (-36.67)	3.882*** (4.10)	-0.007*** (-14.70)	0.548 (0.82)
Manuf sector	-0.050*** (-123.82)	-1.262*** (-5.54)	-0.011*** (-53.88)	-0.367** (-2.52)
Public sector	-0.064*** (-143.86)	-1.422*** (-3.96)	-0.013*** (-57.83)	-0.292 (-1.34)
Academic sector	-0.083*** (-124.07)	-2.065*** (-3.74)	-0.024*** (-110.72)	-1.162*** (-3.57)
Full university	1.852e-02*** (5.36)	-0.044 (-0.17)	8.263e-03* (1.82)	0.274 (1.50)
Total income	-3.664e-08*** (-36.26)	-4.215e-06 (-0.63)	1.274e-09*** (2.77)	0.000 (1.40)
Business income, share of total	-0.000*** (-3.76)	-12.340*** (-3.05)	0.000 (1.42)	-0.697 (-0.26)
Unempl benefits, income share	-0.000*** (-2.58)	-10.311 (-0.90)	0.000 (0.75)	8.437 (1.24)
Primary, high edu	9.272e-03** (2.53)	-1.736** (-2.29)	7.995e-04 (0.43)	0.007 (0.01)
Primary, PhD	0.011 (0.45)	-2.701 (-1.03)	0.008 (0.49)	-0.150 (-0.10)
Manuf, high edu	0.017*** (14.37)	0.395* (1.76)	-0.004*** (-7.27)	-0.136 (-1.14)
Manuf, PhD	0.002 (0.36)	0.541 (0.62)	-0.011*** (-4.81)	-0.736 (-1.49)
Public, high edu	-2.041e-03** (-2.42)	0.126 (0.93)	-6.543e-04 (-1.54)	0.167** (1.97)
Public, PhD	0.038*** (6.78)	0.887 (1.10)	-0.009*** (-4.59)	-0.602 (-1.32)
Academic, high edu	0.060*** (12.50)	0.568* (1.91)	0.003 (0.87)	0.070 (0.44)
Academic, PhD	0.072*** (9.31)	0.823 (1.54)	0.004 (0.60)	-0.016 (-0.05)
Observations	3,015,016	3,015,016	2,945,836	2945836
Pseudo R-squared	0.0241		0.0176	

Table displays marginal effects evaluated at means of variables. z-statistics in parentheses

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

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