Migrant STEM Entrepreneurs

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Abstract

STEM workers are considered to be key drivers for economic growth in the developed world. Migrant workers play an increasing role in the supply of this occupational category. We study the universe of STEM workers in the Swedish economy over the period 2003-2015 and find that migrants are less likely to form their own business, but those who are entrepreneurs earn income at least as large as that of their native-born counterparts. While the income differential for labor migrants may be partially explained by self-selection, the estimated effect is not significantly different between natives and refugee migrants.

Keywords: STEM, migration, entrepreneurship, income, panel data
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1 Introduction

Self-employed migrant entrepreneurs and migrant scientists and engineers have both received considerable attention in the literature, which is often case-study oriented and includes Lofstrom, Bates & Parker (2014), Fairlie et al. (2012), Green, Liu, Ostrovsky & Picot (2016), Akee, Jaeger & Tatsiramos (2013), Saxenian (2002). A much smaller literature takes a different approach and exploits surveys or representative samples to quantify the broader contribution of highly skilled migrant entrepreneurs to job creation, technological progress and productivity growth: see for instance Kerr (2013), Kerr & Kerr (2018), Beckers & Blumberg (2013), Brown, Earle, Kim & Lee (2018). Our paper belongs to the latter category of studies on migrant entrepreneurs.

The objective of our paper is to explore and explain firm formation by migrants with a STEM background, defined as university education in physics and chemistry, mathematics and statistics, biology, engineering and IT, or a professional background as a technician or IT operator. We provide a strong empirical contribution to the literature on global migrants by examining the entire population of foreign-born STEM entrepreneurs in one of the most R&D intensive OECD economies. Uniquely, the study distinguishes between (i) labor migrants and refugee migrants, (ii) individuals migrating within the common European labor market, (iii) migrants with high–skilled and low–skilled STEM backgrounds,[1] and (iv) entrepreneurs' gender. The analysis is restricted to entrepreneurs within the private sector in firm's with two or more employees.

In our empirical analysis, we first evaluate the differences in the propensity to form a firm between migrant and native-born owners, controlling for a set of individual characteristics consisting of marital status, preschool children, age, oc-

[1]The classification is based on the entrepreneur's occupational code in official Swedish statistics. High-skilled entrepreneurs are those in a profession that requires theoretical knowledge from university education. This is described as "high-skill STEM". In cases where the entrepreneur is a professional or technician lacking a university degree, we use the term "low-skill STEM".

cupation, experience, type of education and place of living as well as time effects. We then estimate the relative income for migrant and native-born entrepreneurs compared with regular employment using the same set of controls.

The data are comprised of annual observations on more than 400,000 STEM individuals in Sweden over the period 2003–2015, of whom 13% are entrepreneurs. The share of entrepreneurs among the STEM population is about twice as high among the native-born compared to migrants.

The regression results show that STEM migrants are less likely to become an entrepreneur than the native-born. We also document significant differences between the three groups of foreign-born individuals in the analysis. Non-European labor migrants have the largest likelihood to become entrepreneurs, while refugee migrants are more likely to form a business than European labor market migrants. The marginal income effect relative to STEM employment is -1.8% for the native-born forming a venture in high–skilled fields, and -0.9% if the firm is in low–skilled fields. The alternative marginal income is -3.4% for native females and -1.2% for native males.

We document that the effect of entrepreneurship on income, relative to employment, is larger for male migrants than for native-born males. This is also the case for European male migrants and for non–European males engaged in high-skill STEM entrepreneurship. The results for male refugee migrants are not significantly different from native-born males in high–skilled nor low–skilled fields. We find no differences in female migrants' relative income compared to that of native-born entrepreneurs in either low-skilled or high-skilled areas of the economy.

Our main finding is that STEM migrants are less likely to form their own business than are native-born STEM professionals. However, conditional on becoming an entrepreneur, their income is always at least as high as that of their native-born counterparts.

The rest of the paper is organized as follows. Section 2 reviews prior research on STEM migrants and migrant entrepreneurship. Section 3 describes the data and reports preliminary evidence from descriptive statistics. Section 4 outlines the formal approach to compare native-born and migrant entrepreneurship. Section 5 contains logit and fixed effects results. Section 6 concludes by briefly considering policy implications of our findings and discussing the design of further studies on skilled global entrepreneurs.

2 Previous literature

There is a voluminous literature on the impact of immigration in the labor market. This research mainly focuses on how native-born workers are affected in terms of jobs and wages. One of referred example is the influx of Mariel boatlift migrants from Cuba in the 1980s, analyzed as a supply shock to the Miami labor market: e.g., (Card 1990, Borjas 2017).

More recently, there is a growing stream of studies considering whether skilled migrants can mitigate the problem faced by many OECD countries experiencing a shortage of skilled workers in science and engineering. The vast majority of this research studies migrant scientists and engineers as employees. Only a small fraction of this literature links skilled migrants to entrepreneurship, and these studies almost all focus on migrant entrepreneurs in the U.S. high–tech sector. High-tech entrepreneurs linked to the STEM profession are assumed to have a key role in the creation and adoption of scientific and technological innovation (Peri & Sparber 2009). The theoretical underpinning for this assumption can be found in literature on competitiveness, productivity and growth that links entrepreneurship to factors such as innovation (Grossman & Helpman 1990, Romer 1990), opportunity (Shane & Venkataraman 2000) and risk (Sarasvathy, Simon, Lave et al. 1998).

There are arguments favoring the hypothesis that migrant entrepreneurs may have advantages compare to native-born counterparts, such as recognizing different opportunities (Florida 2006), being more likely to export or engage in international operations (Wang & Liu 2015), representing a self-selected group due to personality traits (Akee et al. 2013, Hunt & Gauthier-Loiselle 2010, Kerr & Lincoln 2010), or having group-level advantages from joint selection into entrepreneurship for migrants from a country or ethnicity (Kerr & Mandorff 2015). In contrast, there are also counter-arguments emphasizing issues such as cultural differences and language barriers (Borjas, Grogger & Hanson 2008), being less embedded in networks and social institutions which facilitates recruitment and informal transfer of knowledge and access to financial capital (Fairlie et al. 2012).

Examining differences in job-creating innovation behavior between migrant- and native-owned firms in the U.S. high-tech sector, Brown et al. (2018) confirm the self-selection hypothesis that migrant entrepreneurs with a background in science, engineering, and high-tech have distinct motivations for starting businesses as compared to the native-born. This is reflected in a higher propensity to engage in R&D and innovation and to file for patents. The authors find higher rates of innovation in migrant-owned firms for 24 of 26 different indicators studied.

Using the same data as Brown et al. (2018), the U.S. Survey of Business Owners (SBO), and linked to a longitudinal database, Kerr & Kerr (2018) quantify the economic importance of a broader set—beyond the STEM population—of migrant entrepreneurs in terms of firm formation and job creation. They find that migrants create a disproportionately larger share of new firms than the native-born, but create fewer jobs on average. Much of the latter finding is explained by the industry and the geographic location of firms. In agreement with prior literature, Kerr & Kerr (2018) document a disproportionately large industrial concentration of migrant-owned startups. About half of the new ventures were in the accommodation and food services, retail trade, and professional and technical services

sectors.

Many studies find, similar to Vandor & Franke (2016), that migrants are more entrepreneurial than host country nationals. However, to evaluate the broader economic impact of migrant entrepreneurship, necessity–based entrepreneurship should be separated from opportunity-based firm formation. Despite the widely held perception of the importance of both skilled migration and high-tech entrepreneurship in developed countries such as the OECD, there are few quantitative studies on well-educated migrant entrepreneurship for countries other than the U.S.

3 Data and descriptive evidence

We use restricted-access Swedish administrative employer-employee register data compiled by several different data sources, including LISA (Longitudinal integration database for health insurance and labor market studies), RAKS (Register-based activity statistics) and STATIV (Longitudinal database for integration studies). These data are provided by Statistics Sweden for the period 2003–2015. This time period is the longest possible time series with consistent data for the purpose of this study. Starting with data for all workers and all firms in Sweden, we have limited our focus to the private sector and the STEM-qualified population, consisting of uniquely identified individuals with a university education in physics and chemistry, mathematics and statistics, biology, engineering and IT, or those having a professional background as a technician or IT operator. These professions correspond to almost 10% of all individuals in the Swedish private sector.

The unit of observation in our data is the person-year. We can classify individuals as STEM using the codes of the SSYK scheme (see Table 1). STEM occupations are further designated as high-skill STEM, which generally require theo-

retical knowledge from a university course, or low-skill STEM, with professional qualifications.

In the empirical analysis we consider STEM individuals as entrepreneurs is he or she has a business with at least two employees including the entrepreneur. Table 2 reports statistics for the STEM population as employed and entrepreneurs. The upper panel shows statistics for the four key groups in the analysis: Native-born, Non-EU migrants (labor market/economic migration), EU migrants (labor market/economic migration), and Refugee (forced) migrants. On average for the period 2003–2015, 11.9% of the STEM population are entrepreneurs. The corresponding figures for labor market migrants from Non-EU regions and EU regions are 6.4% and 5.2% respectively. The average fraction of STEM refugees that form a business during the period is 5.7%. The other panels in the Table show that the proportion of STEM entrepreneurs increases with age, they are largely neutral to the level of education, and that entrepreneurship is lowest in the metropolitan regions.

Figure 1 shows the development of the proportion of entrepreneurs by gender in the period 2003–2015. It is noteworthy that the proportion of entrepreneurs is increasing among refugee migrants, but not for other migrants, and that the difference in entrepreneurship between males and females is greater among the native-born than among migrants.

Table 3 reveals summary statistics for normalized STEM income, defined as the ratio of monthly earnings to median monthly wage earnings. The table shows that STEM individuals have a higher income as entrepreneurs compared those who are employed. This applies to both males and females, as well as to individuals in both high-skill and low-skill STEM categories across all four groups of STEM professionals, with the exception of male and low–skill STEM immigrants from the EU-region. For these two categories, in average entrepreneurship means a lower income than employment.

4 Empirical Approach

The empirical results are presented in Tables 4, 5 and 6 and organized as follows. First we estimate the propensity to be an entrepreneur in Table 4, while Table 5 reports difference-in-differences (DiD) estimates on normalized wages. The total effect on wages for combinations of gender and skill level from the DiD model are given in Table 6.

We model the likelihood that an individual reports earnings from entrepreneurial activities by using a binomial logit model

$$Pr(d_{it}) = \gamma_0 + \gamma x_{it} + \lambda_t + \varepsilon_{it}, \qquad i, \ldots, N, \;\; t = 1, \ldots, T \tag{1}$$

where $d_{it} \in \{0, 1\}$ is a binary indicator for entrepreneurial activity and λ_t are year effects.

To analyse how entrepreneurial activity affects the earnings of an individual, we employ a difference-in-differences approach. The model is specified as follows

$$y_{it} = \beta_0 + \beta x_{it} + \rho d_{it} + \mu_i + \eta_t + \epsilon_{it} \tag{2}$$

where y_{it} denotes the total income of an individual: wage earnings, income from entrepreneurial activities and social benefits, but excluding dividend income. μ_i is an individual effect and η_t is a year effect. As we include the dummy variable d_{it} in a fixed effects panel model, this is equivalent to a difference-in-differences approach where d_{it} denotes the post-treatment effect for those individuals with entrepreneurial activity.

The controls that are included in x are gender, age, location, educational background, experience and squared experience. In further specifications we introduce

$$y_{it} = \beta_0 + \beta x_{it} + \rho_k d_{it} \times immicat_{ki} + \mu_i + \eta_t + \epsilon_{it} \tag{3}$$

where $immicat_k$ denotes the three migration categories (labor non-EU, labor EU, refugee). This allows us to determine the treatment effect of entrepreneurial activities separately for the various groups, where the native-born are the reference group.

Finally, we stratify the sample into those with a high-skill STEM background, generally requiring a university education, and low-skill STEM, requiring professional qualifications. Equation (3) is then estimated separately for both groups.

5 Econometric results

Descriptive statistics presented in Section 3 showed that entrepreneurship is twice as common among native-born STEM individuals compared to STEM migrants. This difference is evident in the estimates of Equation (2) presented in Table 4, with controls for gender, marital status, age, experience, geography, education, lagged wage level, occupation and year dummies. With the native-born as a reference category, we see that the predicted probabilities for labor migrants from within the EU, outside the EU, and for refugee migrants are negative and highly significant.

We note that females are less likely to form a business, all else equal, while the opposite applies to married individuals. The level of lagged wage earnings is negatively associated with entrepreneurship. The higher is employment income relative to the median, the lower is the likelihood of choosing entrepreneurship in the next period. The propensity to be a STEM entrepreneur increases with age, experience and education and is higher for those living in less densely populated regions.

Our second set of empirical results considers total earnings that comprises of both wages and entrepreneurial income. Table 5 reports separate results for high-skilled and low skilled STEM professionals separately by gender. Using a

difference-in differences approach, the point estimates for entrepreneurship are negative across all four columns, but the key focus of the study are the 12 interaction variables between entrepreneurship and migrant status. Interestingly, they suggest that migrant STEM entrepreneurs always earn an income at least as large as that of their native-born counterparts. While the results for labor migrants may be partially explained by self-selection, forced (refugee) migrants don't earn not significantly lower incomes than native-born entrepreneurs.

For high-skilled male Non-EU migrants, entrepreneurship income is higher than that of natives, with no distinguishing effect for low-skilled or female migrants born outside Europe. Among EU migrants, wage income from entrepreneurship is larger than that of the native-born for both skill categories and for males. No differences are evident between earnings of native-born female entrepreneurs and their counterparts from the EU. The estimates for refugee migrants are not significantly different from those of the native-born in any of the models.

Turning to the controls, there is an inverse U-shaped relationship between income and age for high–skilled entrepreneurs with a peak in ages 30-40. In contrast, the income effect has a U-shape for the other three categories of entrepreneurs, with positive wage effects relative to employment for entrepreneurs younger than 30–35 and older than 60. Entrepreneurial income is positively associated with experience, location in metropolitan areas and with the level of education.

Table 6 considers normalized wage earnings of females and males with different classification of their STEM skill. The key findings are similar to those of Table 5. The wage income for migrant entrepreneurs are always at least as large for EU migrants compared to their native-born counterparts. The estimated effects of the control variables are similar to those displayed in Table 5.

6 Conclusions

The majority of international labor migrants live within OECD countries, which also host millions of refugee migrants. Many developed countries have recently experienced a significant increase in migration, with roughly equal numbers of males and females. Migrants are also bringing significant human capital to their host countries. More than one in four migrants in the G20 has a tertiary level of education, implying that migrants have become increasingly important for developed economies facing the demographic pressures of an aging population and shrinking workforce. Migrants accounted for about half of the increase in the workforce in the United States and more than two thirds in Europe over the past decade.

As many developed countries are facing labor shortages in businesses that require specialized knowledge in science and technology, international migrants are increasingly recognized as a potential source of high-tech job recruitment and as entrepreneurs starting high-tech businesses. This paper studies migrant STEM entrepreneurs and considers both labor market migrants and refugee migrants. The former can broadly be characterized as self–selected and the latter as randomly selected. We also observe the gender of both groups, and distinguish between those arriving from other EU nations and those from other parts of the world. Prior studies document that foreign-born individuals are more likely to start companies than are the native-born. To a large extent, this entrepreneurship is dominated by self-employment and necessity-driven firm formation rather than opportunity-motivated business ideas.

There is relatively little research that quantifies the behavior of highly skilled migrant entrepreneurs vis-à-vis their native-born counterparts due to lack of comprehensive data or representative large samples. To fill this gap, our study explores data that cover the entire STEM population in Sweden over the period 2003–2015, observed as both employees and entrepreneurs. To summarize our

key findings from the descriptive statistics, we find that the fraction of entrepreneurs is only half as large among migrants compare to natives, and the gap increases over time. However, entrepreneurship increases among refugee migrants and reaches similar levels as other migrants by the end of the period.

Our empirical analysis reveals that migrants have a lower probability to form a business relative to native-born scientists, technicians, engineers and mathematicians. But we also document differences between the three categories of migrants. Individuals entering Sweden as refugees are more likely to be entrepreneurs than EU labor migrants, but less likely than Non–EU labor migrants. Applying a difference–in–differences approach, we show that migrants forming a business have equal or higher predicted total earnings than native-born entrepreneurs. This finding also holds when we separately consider both high–skill and low–skill STEM entrepreneurs by gender.

From a policy perspective, our study contributes to an increased understanding of the importance of migrant entrepreneurs in STEM sectors of the economy, which are widely held to be a driver of welfare and growth in developed countries. Importantly, we document that refugee entrepreneurs are as productive as other STEM entrepreneurs when we use total earnings as a proxy for their productivity.

There are several important directions future research can take. Our study provides evidence that firms started by STEM migrants are at least as productive as firms formed by native-born Swedes. But the study also shows that migrants are less likely than the native-born to form a business, and by adding information on financial conditions, one could learn more about potential obstacles. Another area for research is to consider both survival and growth rates of the entrepreneurial firms founded by migrants.

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A Tables

Table 1: Definition of STEM occupations, SSYK codes

SSYK code	Description
2014–2015	SSYK 2012 (ISCO-08)
211	Physics and Chemistry (university)
212	Mathematics and Statistics (university)
213	Biology (university)
214	Engineering (university)
251	IT (university)
311	Technician (professional)
351	IT operation (professional)
2003–2013	SSYK 1996 (ISCO 88)
211	Physics and Chemistry (university)
212	Mathematics and Statistics (university)
213	IT (university)
214	Engineering (university)
311	Technician and Engineer (professional)

Notes: There was a change of occupational classification system in 2014. University means that the occupation requires theoretical knowledge which a person usually acquires from a university education.

Table 2: Fraction of Entrepreneurs and Employees (%)

Variable	Employed	Entrepreneur	Total
Migration status			
native-born	88.11	11.89	100.0
non-EU migrants	93.64	6.36	100.0
EU migrants	94.75	5.25	100.0
refugee migrants	94.25	5.75	100.0
Age			
≤ 29	95.57	4.43	100.0
30 - 34	91.97	8.03	100.0
35 - 39	90.4	9.58	100.0
40 - 49	88.42	11.58	100.0
50 - 59	85.85	14.15	100.0
≥ 60	73.08	26.92	100.0
Education			
primary	89.40	10.60	100.0
secondary	87.57	12.43	100.0
tertiary	88.72	11.28	100.0
Bachelor	90.04	9.96	100.0
Master	88.47	11.53	100.0
doctoral	87.17	12.83	100.0
Region			
metro/city	90.67	9.33	100.0
dense close city	87.92	12.08	100.0
rural close city	81.86	18.14	100.0
dense remote	85.08	14.92	100.0
rural remote	78.54	21.46	100.0
Total	88.49	11.51	100.0
Observations	6,664,972	874,648	7,539,620

Table 3: Mean and standard deviation (in parentheses) of normalized total earnings for STEM employees and entrepreneurs

	all	native-born	non-EU labor	EU labor	refugee
male employee	1.11	1.12	1.03	1.11	0.96
	(0.45)	(0.45)	(0.51	(0.50)	(0.45
male entrepreneur	1.17	1.17	1.09	1.05	1.02
´	(0.43)	(0.42)	(0.49)	(0.50)	(0.47)
female employee	0.95	0.96	0.94	0.90	0.87
	(0.42)	(0.41)	(0.45)	(0.45)	(0.39)
female entrepreneur	1.01	1.01	1.03	0.99	0.95
	(0.42)	(0.42)	(0.46)	(0.51)	(0.44)
low-skill employee	0.98	0.99	0.93	1.04	0.86
	(0.37)	(0.37)	(0.41)	(0.47	(0.35)
low-skill entrepreneur	1.05	1.05	0.95	0.91	0.90
	(0.36)	(0.36)	(0.42)	(0.48	(0.39
high-skill employee	1.26	1.27	1.13	1.14	1.15
	(0.43)	(0.42)	(0.47)	(0.46)	(0.40)
high-skill entrepreneur	1.28	1.28	1.21	1.15	1.16
	(0.44)	(0.44)	(0.47)	(0.47)	(0.46)

Table 4: Average marginal effects on the probability for an individual with STEM background to be an entrepreneur, 2003–2015

	∂Prob/∂x
non-EU migrant	-0.039***
	(0.001)
EU migrant	-0.061***
	(0.001)
refugee migrant	-0.044***
	(0.001)
female	-0.055***
	(0.000)
marital status	0.005***
	(0.000)
normalized wage t-1	-0.057 ***
	(0.000)
30<=age	0.035***
	(0.000)
35<=age	0.051***
	(0.000)
40<=age	0.069***
	(0.000)
50<=age	0.085***
	(0.000)
age>60	0.146***
	(0.001)
experience	0.001***
	(0.000)
dense close city	0.013***
	(0.000)
rural close city	0.060***
	(0.000)
dense remote	0.037***
	(0.000)
rural remote	0.092***
	(0.000)
secondary	-0.015 ***
	(0.001)
tertiary	0.007***
	(0.001)
Bachelor	0.003**
	(0.001)
Master	0.018***
	(0.001)
doctoral	0.035***
	(0.001)
high-skill STEM	0.024***
	(0.000)
Observations	5,402,380

Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Logit model estimates of Eq (1). Reference category: native=born STEM individuals.

Table 5: The effect of entrepreneurial activity on earnings of STEM workers

	Dependent variable: total earnings			
	High-skill	Low-skill	Female	Male
entrep	-0.017***	-0.009***	-0.033***	-0.012***
	(0.002)	(0.001)	(0.002)	(0.001)
entrep×non-EU	0.043***	0.000	0.023	0.037**
	(0.013)	(0.015)	(0.018)	(0.012)
entrep×EU	0.068***	0.069*	0.015	0.079**
	(0.026)	(0.040)	(0.040)	(0.024)
entrep×refugee	0.003	0.000	0.019	0.005
	(0.011)	(0.010)	(0.015)	(0.008)
age 30-34	0.064***	0.006***	0.026***	0.045***
	(0.001)	(0.001)	(0.001)	(0.001)
age 35-39	0.080***	-0.031***	-0.004***	0.026***
	(0.001)	(0.001)	(0.002)	(0.001)
age 40-49	0.077***	-0.063***	-0.022***	-0.004**
	(0.001)	(0.002)	(0.002)	(0.001)
age 50-59	0.049***	-0.091***	-0.061***	-0.040***
	(0.002)	(0.002)	(0.002)	(0.002)
age $\geq$60	0.009***	-0.107***	-0.119***	-0.067***
	[0.003]	[0.002]	[0.003]	[0.002]
experience	0.019***	0.019***	0.018***	0.020***
	[0.000]	[0.000]	[0.000]	[0.000]
experience^2	-0.001***	-0.001***	-0.001***	-0.001***
	[0.000]	[0.000]	[0.000]	[0.000]
dense close city	-0.049***	-0.046***	-0.049***	-0.056***
	(0.001)	(0.001)	(0.001)	(0.001)
rural close city	-0.058***	-0.052***	-0.052***	-0.063***
	(0.003)	(0.002)	(0.003)	(0.001)
dense remote	-0.057***	-0.049***	-0.047***	-0.059***
	(0.003)	(0.002)	(0.003)	(0.002)
rural remote	-0.075***	-0.069***	-0.064***	-0.081***
	(0.004)	(0.002)	(0.007)	(0.002)
secondary	0.182 ***	0.199***	0.196***	0.208***
	0.023	(0.003)	(0.005)	(0.005)
tertiary	0.242***	0.226***	0.250***	0.266***
	(0.023)	(0.004)	(0.005)	(0.005)
Bachelor	0.366***	0.438***	0.438***	0.474***
	(0.024)	(0.004)	(0.005)	(0.006)
Master	0.484***	0.590***	0.580***	0.618***
	(0.023)	(0.005)	(0.006)	(0.005)
doctoral	0.596***	0.630***	0.665***	0.706***
	(0.024)	(0.012)	(0.007)	(0.007)
high-skill STEM	—	—	0.053***	0.051***

cont.

	Dependent variable: total earnings			
	High-skill	Low-skill	Female	Male
			(0.001)	(0.001)
Observations	2,614,407	2,928,678	1,377,248	4,165,837
σ_u	0.42	0.44	0.37	0.44
σ_ϵ	0.20	0.17	0.19	0.19
ρ	0.81	0.88	0.79	0.85
individuals	416,516	424,634	136,580	433,931
df(model)	34	34	35	35
R^2 (within)	0.100	0.171	0.241	0.181

Notes: Total earnings normalized. Establishments with at least 2 employees. Difference-in-differences estimates of Eq (3). Cluster-robust standard errors at worker level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6: The Effect of entrepreneurial activity on earnings of STEM individuals for subsamples

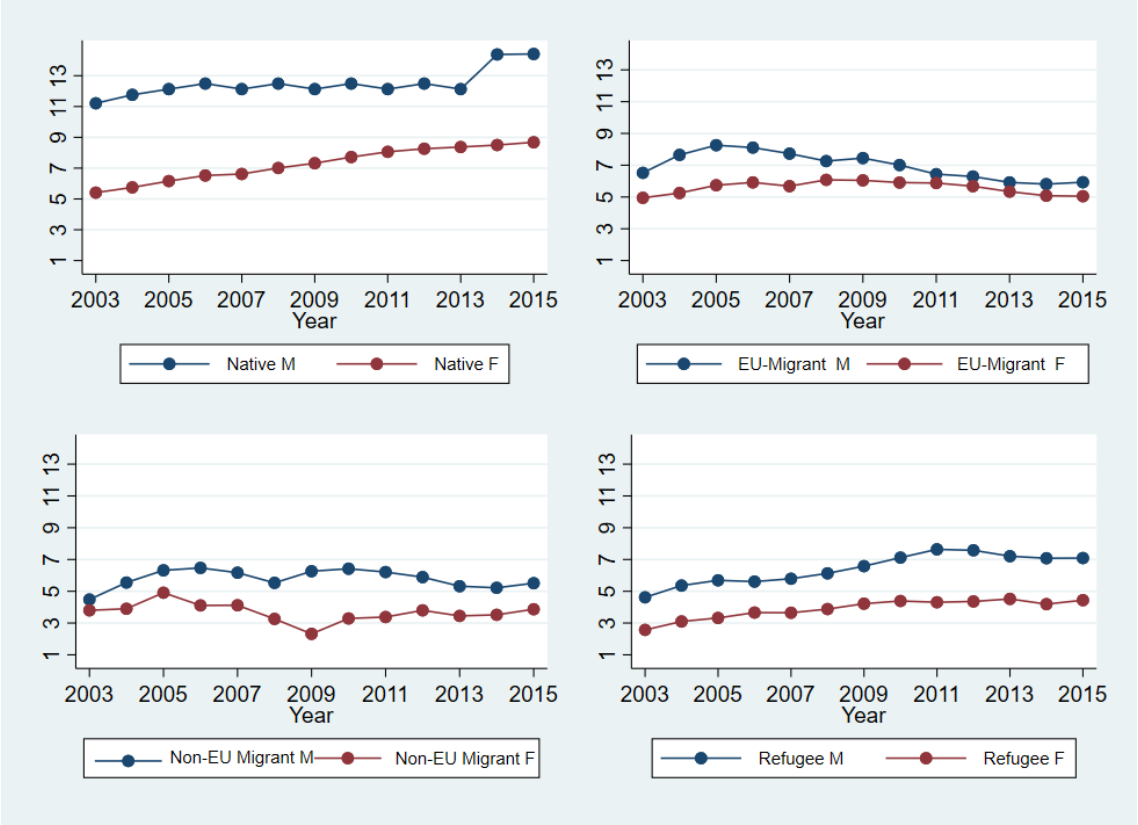
	Dependent variable: total earnings			
	Female High-skill	Female Low-skill	Male High-skill	Male Low-skill
entrep	-0.033***	-0.027***	-0.014***	-0.007***
	(0.003)	(0.003)	(0.002)	(0.001)
entrep×non-EU	0.008	0.031	0.061***	-0.009
	(0.023)	(0.030)	(0.016)	(0.017)
entrep×EU	-0.012	-0.005	0.082*	0.085*
	(0.048)	(0.074)	(0.030)	(0.046)
entrep×refugee	0.003	0.031	0.003	-0.007
	(0.020)	(0.020)	(0.012)	(0.012)
age 30-34	0.041***	0.005***	0.080***	0.007***
	(0.002)	(0.002)	(0.001)	(0.000)
age 35-39	0.041***	-0.039***	0.099 ***	-0.030 ***
	(0.002)	(0.002)	(0.001)	(0.001)
age 40-49	0.043***	-0.067***	0.091***	-0.064 **
	(0.003)	(0.003)	(0.002)	(0.001)
age 50-59	0.021***	-0.103***	0.060 ***	-0.089***
	(0.004)	(0.0.003)	(0.002)	(0.002)
age $\geq$60	-0.045***	-0.136 ***	0.029***	-0.100***
	(0.005)	(0.004)	(0.0.003)	(0.002)
experience	0.018***	0.017***	0.020***	0.020***
	(0.000)	(0.000)	(0.000)	(0.000)
experience^2	-0.001***	-0.001***	-0.001***	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)
dense close city	-0.042***	-0.044***	-0.052 ***	-0.046***

cont.

	Dependent variable: total earnings			
	Female High-skill	Female Low-skill	Male High-skill	Male Low-skill
	(0.002)	(0.001)	(0.001)	(0.001)
rural close city	-0.050***	-0.047***	-0.060 ***	-0.053 ***
	(0.006)	(0.003)	(0.003)	(0.001)
dense remote	-0.051***	-0.041 ***	-0.058***	-0.050***
	(0.006)	(0.003)	(0.003)	(0.002)
rural remote	-0.071***	-0.053 ***	-0.076 ***	-0.072***
	(0.007)	(0.004)	(0.004)	(0.002)
secondary	0.223***	0.187***	0.167***	0.204***
	(0.047)	(0.004)	(0.027)	(0.004)
tertiary	0.270***	0.213***	0.234***	0.229***
	(0.047)	(0.005)	(0.005)	(0.005)
Bachelor	0.385***	0.409***	0.361***	0.458***
	(0.047)	(0.006)	(0.027)	(0.005)
Master	0.501***	0.566***	0.483***	0.617***
	(0.047)	(0.006)	(0.027)	(0.006)
doctoral	0.610***	0.627***	0.601***	0.653***
	(0.048)	(0.016)	(0.028)	(0.017)
Observations	711,131	666,117	1,903,276	2,262,561
σ_u	0.35	0.37	0.42	0.45
σ_ϵ	0.20	0.16	0.20	0.17
ρ	0.76	0.84	0.82	0.88
individuals	108,158	102,232	308,366	322,410
df(model)	34	34	34	34
R^2 (within)	0.158	0.233	0.100	0.166

Notes: see previous Table 5

Figure 1: Fraction of STEM entrepreneurs in Sweden 2003-2015



Notes: M and F refer to gender. Migrants are classified as labor migrants from the EU, labor migrants from outside the EU, and forced (refugee) migrants.