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High-growth Firms and the Labor Market Entry of First-generation Immigrants

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Abstract. The number of refugees in Europe has increased dramatically in recent years, and many countries are facing great challenges to integrating these refugees into their societies. A small group of high-growth firms have at the same time attracted attention because they create the most jobs at any given point in time. Using matched employer-employee data from Statistics Sweden, we find that these high-growth firms in general are more likely to recruit first-generation immigrants that are unemployed. This provides support for the hypothesis that managers in high-growth firms, to greater extents, recruit marginalized individuals because they want to take advantage of their growth opportunities. Rapidly growing firms are thus less selective in their hiring decisions, and policies that are focused on increasing the number of high-growth firms might also help immigrants who face difficulties entering the labor market.

Keywords: firm growth, gazelles, high-growth firms, immigration, integration.

JEL classification: D22; J15, L25, L26.

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1. Introduction

A serious refugee situation has occurred in Europe, with the number of refugee arrivals exceeding one million both in 2015 and 2016 (EASO, 2017). The large inflow of refugees constitutes one of the greatest demographical changes in Europe since World War II (OECD, 2015), and is particularly troublesome considering that first-generation immigrants have major difficulties in

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establishing themselves on the European labor markets. The employment rate of non-EU migrants is, for example more than 10% lower than for workers that are born in Europe (Eurostat, 2019).

A hypothesis launched by Coad et al. (2014a) is that high-growth firms (HGFs) are of particular importance when it comes to integrating immigrants into the labor market. The reason is that HGF-managers want to take advantage of their growth opportunities and therefore focus more on the pace of growth when recruiting new personnel. This implies that HGF-managers are less likely to wait for the best match and will recruit individuals who are more readily available on the labor market, with less regard to their specific skills and prior experience. The authors found some support for their hypothesis by investigating the recruitment of HGFs in the Swedish knowledge-intensive industries, finding that HGFs were more likely to recruit immigrants and low-educated workers compared to non-HGFs.

However, Coad et al. (2014a) made no distinction between immigrants and natives that were unemployed, and they also found that HGFs were less likely to hire unemployed individuals. The unemployment rate is in general higher among first-generation immigrants than native workers and immigrants tend to be hired from other companies and not from the pool of unemployed (Daunfeldt et al., 2019). Immigrants' likelihood of being hired by an HGF might thus depend on whether they are unemployed or not, which means that we still lack knowledge on whether HGFs provide jobs for those immigrants that have difficulties entering the labor market.

We contribute to the literature by investigating the interaction effect between region of birth and employment status using a framework that was suggested by Buis (2010). In total, we analyze 267,020 recruitments in 2015 by 53,168 firms that were active during the 2012-2015 period. Our study builds on an employer-employee dataset from Statistics Sweden that provides information on all residents in Sweden that are at least 16 years old. Sweden is of particular interest to study because of its high share of immigrants and its high inflow of refugees compared to other European countries.[2] Immigrants also have documented difficulties entering the Swedish labor market (Ekberg, 2009; Ekberg, 2012), and their problems seem to be large compared to other countries within Europe (Koopmans, 2010).[3]

2. The number of asylum seekers in Sweden reached, for example,163,000 in 2015 (Migrationsverket, 2016), which corresponded to more than three times as many asylum seekers per capita as in Germany (Eurostat, 2016).
3. The unemployment rate among foreign-born individuals in Sweden (16-64 years) was, for example, 17.3% in June 2019, while the corresponding figure for native-born workers was only 4.6%. As much as 29.6% of all unemployed immigrants are long-term unemployed, i.e., had been unemployed for more than 27 weeks. The employment rate is also significantly higher among native-born individuals (83.6%) than among foreign-born individuals (68%) (Statistics Sweden, 2019).

We find that the 5% fastest growing firms in Sweden tend to hire immigrants from Africa to a greater extent, irrespective of whether HGFs are defined in terms of employment or sales growth, which support Coad et al.'s (2014a) previous findings. However, our results also indicate that HGFs are more likely to recruit first-generation immigrants from Africa and Asia that are unemployed compared to non-HGFs. HGFs thus seem more likely to provide jobs for marginalized groups, which indicates that they are less selective in their hiring decisions. Policies that stimulate risk-taking and high-growth entrepreneurship (see, e.g., Henrekson and Johansson, 2008) might therefore also be important for improving the labor market position of unemployed first-generation nonwestern immigrants.

The rest of the paper is organized as follows. In the next section, a brief theoretical background on why, or why not, high-growth firms might be more likely to hire unemployed immigrants is presented. We describe how we define HGFs in Section 3, and the matched employer-employee dataset is described in Section 4. The estimated model and the results are then presented in Section 5. Finally, section 6 summarizes and concludes.

2. Theoretical Background

The matching process on the labor market is typically characterized by asymmetric information and search costs (Mortensen and Pissarides, 1999). Asymmetric information occurs because employers have more information about the positions that they offer than jobseekers, while the latter group has more information about their particular skills. Employers have an incentive to hide facts from the jobseekers to get the best applicant, whereas employees have an incentive to hide information that might prevent them from getting the position that they strive for. The time it takes for employers and employees to find each other will result in search costs, which will be determined by how much time employers and employees spend in searching for each other.

Coad et al. (2014a) argued that HGFs are more likely than other firms to minimize these search costs because they want to take advantage of their growth opportunities and therefore cannot wait for the best match. Rapidly growing firms typically have greater management challenges than firms who are growing more moderately (Delmar et al., 2003; Demir et al., 2017), which are related to their need to develop organizational structure and routines more quickly. HGF-managers will therefore recruit individuals who are more readily available on the labor market, without regards to their specific skill sets and prior experience. This implies that they will be more likely to recruit first-generation immigrants, especially refugees, because they are overrepresented among individuals that have difficulties in entering the labor market. They are often characterized by lower educational attainment than natives, and their educational level and previous work experience are also more difficult for employers to evaluate

(Chiswick and Miller, 2008). Unemployed immigrants are thus perceived as riskier for employers to recruit, even when they have similar background as native workers.

Information asymmetries furthermore implies that employers have incentives to recruit through their network (Loury, 2006; Aluko et al., 2019). This creates disadvantages for individuals with a limited or no professional network, such as immigrants (Behtoui, 2008). HGFs want to fill their vacant positions more quickly than non-HGFs and are therefore in greater need of searching outside their professional network, also suggesting that they will be more likely to hire unemployed immigrants than non-HGFs.

The theoretical arguments above propose that HGF-managers are more likely to recruit immigrants with documented difficulties in entering the labor market. This suggests that the skill-sorting of immigrants is not only different across industries (Åslund et al., 2017) or occupations (Auer et al., 2019), but also depends on firms' pace of growth.

However, the prediction regarding the likelihood of HGFs to recruit unemployed first-generation immigrants is different if we believe that the observed growth is a consequence of the recruitments, and not the other way around. According to resource-based theory, firms that are possessing resources that cannot easily be duplicated or substituted will outperform firms that are lacking such resources (Barney, 1991). Already Penrose (1959) emphasized the importance of hiring individuals with higher levels of human capital to get a competitive advantage and adequately address the challenges of growth. Other scholars have since then argued that human capital might be one the most valuable resources (Zhou et al., 2018; Rosique-Blasco et al., 2017) that are difficult to imitate by competitors (Kogut and Zander, 1992; Coff, 1997). HGFs might therefore need employees with unique abilities to obtain high growth, suggesting that individuals with high levels of human capital are more likely to be hired by these firms. The resource-based theory thus implies that HGFs will hire individuals with high human capital and extensive work experience, which stipulates that they are more reluctant to recruit immigrants with difficulties in entering the labor market.

Different theoretical models thus provide us with different answers regarding which types of individuals HGFs will hire. Models that are based on the resource-based view suggest that HGF-managers try to maintain their high growth rates by recruiting well-trained, low-risk workers with an accompanying productivity that is easy to identify. This will benefit native workers at the expense of first-generation immigrants. Coad et al. (2014a), on the other hand, argue that rapidly growing firms are more focused on their pace of growth and therefore want to minimize their search costs when recruiting. This suggests that HGFs will be more likely to recruit readily available employees, without extensively evaluating them before hiring. HGF-managers will thus hire individuals whose productivity

level is harder to estimate, thereby being more likely to provide jobs for unemployed immigrants.

3. Defining High-growth Firms

As noted by Davidsson and Delmar (1997), researchers that want to investigate HGFs need to make choices regarding the following: (i) the growth indicator, (ii) the growth measurement (relative vs. absolute change), (iii) the length of the study period, and (iv) the growth process.

To make our results comparable to Coad et al. (2014a), we follow their ways of defining HGFs. The number of employees and sales are the two most commonly used growth indicators (Delmar et al., 2003; Daunfeldt et al., 2014), and Coad et al. (2014a) use both of these growth indicators in their analysis. Although employment and sales growth are modestly correlated (Shepherd and Wiklund, 2009; Coad, 2010), the results are in general not sensitive to which one is chosen (Daunfeldt et al., 2014). However, they represent two different growth phenomena (Delmar et al., 2003). The growth in the number of employees shows how resources grow within the firm, whereas sales growth indicates product or service acceptance in the market.

Following Coad et al. (2014a), we also identify HGFs with respect to their relative growth rates. It is well known that relative growth rates tend to favor smaller firms, whereas absolute growth measures are biased toward larger firms (Delmar et al., 2003). Relative growth can be measured in various ways, e.g., percentage changes, taking log-differences or scaling down by initial size. Coad et al. (2014a) use Törnqvist et al.'s (1985) recommendation to use the log difference to calculate firms' growth rates, which we follow.

Regarding the length of the study period, most previous studies have used a three- or four-year period when identifying HGFs. However, the results do not seem particularly sensitive to the length of the growth period (Coad et al., 2014b). Following Coad et al. (2014a), we use three-year growth periods when defining HGFs.

The final choice relates to the researchers' ability to distinguish between organic and acquired growth in the data. Organic growth refers to growth that is internal to a firm, and acquired growth refers to growth that occurs through external acquisitions or mergers. In accordance with Coad et al. (2014a), we cannot distinguish between these growth modes in the data and so we use a total growth measure (i.e., the sum of organic and acquired growth) when defining HGFs.

Given the choices that are described above, HGFs can be identified in two different ways. The first method defines HGFs as a certain share of the fastest growing firms during a particular period, i.e., the top 1% or 3% of firms that had the highest growth rates. One disadvantage with this method is that it cannot be

used to compare the shares of HGFs across time or across countries (Coad et al., 2014b). The second approach defines HGFs as firms growing at or above a particular pace. Eurostat and the OECD have, for example, recommended that HGFs be defined as firms with at least 10 employees at the start-year and annualized employment growth exceeding 20% during a 3-year period (Eurostat-OECD, 2007). This definition is used in many studies (Bravo-Biosca, 2010; Du and Temouri, 2015; Hölzl, 2014; Teruel-Carrizosa and De Wit, 2017), but has been criticized because the use of the firm size threshold level means that many firms are excluded from the analysis (Daunfeldt et al., 2015). Coad et al. (2014a) used the first approach and identified HGFs as the top 1% and 5% fastest growing firms, and we therefore adopt this definition as well.[4]

4. Data and Descriptive Statistics

We investigate the hiring decisions of HGFs in 2015 using matched employer-employee data from Statistics Sweden (SCB) covering the period from 2012 to 2015. The data are from LISA (*Longitudinell Integrationsdatabas för Sjukförsäkrings- och Arbetsmarknadsstudier)*, a database that covers all legal residents of Sweden that are at least sixteen years old. It contains a wealth of demographic and financial information that is generated from a number of registers, such as individual tax statements, financial records, birthplace registries, and school records. We use this database to control for the individual characteristics that might influence whether the individual was hired by an HGF, including the region of birth, age, gender, education and family composition.

We use the register data from the Swedish Public Employment Service (*Arbetsförmedlingen*) to define employment status. This means that all individuals who were registered as full-time unemployed or participating in a labor market program by the end of November are defined as unemployed. An individual is defined as employed if she is not registered as full-time unemployed or participating in a labor market program but is registered with an association to a firm through a firm identification number.

Firm-specific data are collected from *Företagsdatabasen* (FTG), a database that includes information on corporate firms, excluding the financial sector, collective owned housing enterprises (*bostadsrättsföreningar*) and businesses engaged in the farming, forestry and hunting sectors. For a meaningful comparison between firms, we have restricted our sample to only include limited liability companies. Limited liability firms are selected because we want to focus our analysis on firms that are more likely to accept risk and pursue growth (Bradley et al., 2011). We also omit firms that had zero sales throughout the study period, since we want to focus our analysis on active firms.[5] Finally, we use data

4. The results are similar if we use the 3% fastest growing firms instead. The results are available upon request.

on firm age from *Företagens och arbetsställenas dynamik* (FAD), a database that compiles information on firm structure changes, such as new entries and bankruptcies.

We use the region of birth of the individual to distinguish between different types of immigrants and to identify whether the individual is a second-generation immigrant. The following independent variables are included in our analysis to capture immigrant status (variable names in *italics*).

- *Second*. A dummy variable that captures whether the individual is a second-generation immigrant. It equals one if the individual was born in Sweden and both parents were born outside Sweden, and otherwise it is zero.

- *Nordic*. A dummy variable that equals one if the individual was born in Norway, Finland, Denmark or Iceland, and otherwise it is zero.

- *EU25*. A dummy variable that equals one if the individual was born in a country that belonged to the European Union in 2004 (excluding Finland, Denmark and Sweden), and otherwise it is zero.

- *Eur*. A dummy variable that equals one if the individual was born in another country in Europe other than the Nordic countries and the EU25, and otherwise it is zero. Note that this variable includes immigrants who were born in Romania and Bulgaria since they joined the EU in 2007. Individuals who were born in Turkey are also included here.

- *Africa*. A dummy variable that equals one if the individual was born in Africa, and otherwise it is zero.

- *South Am*. A dummy variable that equals one if the individual was born in South America, and otherwise it is zero.

- *Asia*. A dummy variable that equals one if the individual was born in Asia, and otherwise it is zero.

- *Other*. A dummy variable that equals one if the individual was born in a country that is not captured by the variables above, and otherwise it is zero. Individuals who were born in the former Soviet Union, North America, and Oceania, as well as unknowns and foreign-born individuals with at least one Swedish parent, are included here.

5. These firms correspond to about 5% of the observations in *FTG*.

Note that we want to focus our analysis on the labor market entry of immigrants that have difficulties in entering the labor market. Immigration to Sweden has to a very large extent been dominated by refugees and individuals who have been reunited with their families. The vast majority of these immigrants are born in Africa, Asia, and South America (Daunfeldt et al., 2019). Asia is of course a heterogeneous region, but we know that most immigrants within this group originate from Middle Eastern countries (Statistics Sweden, 2019). Note also that we focus our analysis on the labor market entry of immigrants that are registered as unemployed, which means that they are unlikely to be labor immigrants.

Following Coad et al. (2014a), we also control for other characteristics, both individual and firm-specific, that might influence the hiring decisions of high-growth firms. More specifically, we include the following controls in the estimated equation.[6]

- *Female*. A dummy variable that equals one if the individual is a woman and zero if the individual is a man.

- *Age.* Age of individuals who are 16 years or older. This variable is included as fixed effects, meaning that we control for the entire range of ages. For brevity, these are not included in any of the tables.

- *Married*. A dummy variable that equals one if the individual is married or cohabiting and zero if single.

- *Child*. A dummy variable that equals one if children under the age of 18 are present in the household, and otherwise it is zero.

- *Educational attainment*. *Primary*=1 if the individual completed primary school, *High*=1 if the individual completed a 3-year high-school education, and *Uni*=1 if the individual completed a university program of at least three years. The baseline is those individuals who have less than 9 years of schooling, i.e., did not complete primary school.

- *Firm age.* Firm age is calculated by subtracting the entry year from the observation year.[7] *Start-up firm*=1 if the firm is 4-8 years old in the end

6. Information on hourly wage is not included in the dataset, which means that we are not able to control whether HGFs recruit unemployed immigrants because they have lower wages than unemployed natives. However, we believe that this is unlikely to be the case because minimum wages are not set by law in Sweden, and they are among the highest in the world in relation to average wages (Skedinger, 2010). For example, almost 46 percent of all employees in the retail industry had a wage that was no more than 5% higher than the agreed minimum wages in 2015 (Daunfeldt and Seerar Westerberg, 2018).

of the three-year growth period, Young firm=1 if the firm is 9 years old in the end of the three-year growth period, and Middle-aged firm=1 if the firm is 10-18 years old in the end of the three-year growth period. The baseline is old firm, i.e., firms that have existed for 19 years or more.

- *Firm size*. *Micro firm*=1 if the firm has 1-9 employees, *Small firm*=1 if 10-49 employees, and *Medium-sized firm*=1 if 50-249 employees. The baseline is large firm, i.e., firms that have more than 249 employees.

We restrict our sample to individuals who were hired by a limited liability firm in 2015 but were classified as unemployed or employed in another firm in 2014. The final sample then consists of 267,020 individuals, of whom 80.3% were job changers and 19.7% were unemployed in 2014. The descriptive statistics for all new hires that were hired by non-HGFs, employment-HGFs and sales-HGFs are presented in Table 1.

The shares of hired immigrants are similar among HGFs and non-HGFs, while employees who were hired by HGFs, on average, are more likely to have completed higher education than those who were recruited by non-HGFs.[8]

Next, to investigate whether HGFs are more likely to hire unemployed immigrants than non-HGFs, we exclude job-switchers and reduce our sample to those individuals who were unemployed in 2014 and became employed during 2015 (Table 2). The results then show that the share of Swedish born individuals is 13 percentage points lower among non-HGFs and up to 18 percentage points lower among HGFs compared to all hires (Table 1). It is thus more common that foreign-born individuals are hired from unemployment. The composition of foreign-born workers is marginally different if we choose to define HGFs in terms of employment or sales.

Note, finally, that the recruitment of non-western immigrants is a rare event, and that the recruitment of unemployed non-western immigrants is even more rare.[9] Employers tend to hire natives to a great extent, and individuals that already

7. Firms that are not recorded in FAD but are observed in FTG are considered new firms once they enter FTG (11-12% of the matched sample). Finally, firms that in FAD are founded at a later point but previously appear in FTG are recoded according to their first appearance (11-14% of the matched sample).
8. There are large differences across immigrant groups, firms and along the growth rate distribution when it comes to educational attainment. For instance, a larger share of unemployed immigrants of European descent hired by HGFs tend to have a university education compared to non-HGFs. On the other hand, a smaller share of unemployed Africans hired by HGFs tend to have a university education. As for Asians, the share of university graduates varies depending on the HGF definition. These descriptive statistics are omitted due to reasons of space but are available from the authors upon request.
9. The typical unemployed first-generation immigrant hired by a HGF is of non-European descent, male, non-married without children, and with an educational attainment equivalent to at least a high school degree. See Table A1 in the Appendix.

are employed instead of those that are unemployed. This is especially noticeable among sales-HGFs. The results presented in Table 2 show, for example, that only 23 unemployed immigrants from Africa were hired by the 1% sales-HGFs in 2015.

Table 1: Summary statistics for the data set investigating individuals *hired* in 2015 for non-HGFs and various definitions of HGFs (top 5% or top 1% sales or employment growth)

	Non-HGFs		Emp (1%)		Emp (5%)		Sales (1%)		Sales (5%)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Swe	.78	(.41)	.74	(.44)	.77	(.42)	.72	(.45)	.76	(.43)
Second	.052	(.22)	.051	(.22)	.049	(.22)	.055	(.23)	.051	(.22)
Nordic	.014	(.12)	.014	(.12)	.015	(.12)	.014	(.12)	.013	(.11)
Eu25	.024	(.15)	.031	(.17)	.028	(.16)	.025	(.16)	.031	(.17)
Eur	.034	(.18)	.044	(.21)	.035	(.18)	.034	(.18)	.037	(.19)
Africa	.017	(.13)	.027	(.16)	.019	(.14)	.03	(.17)	.025	(.16)
S_Am	.01	(.1)	.012	(.11)	.011	(.11)	.022	(.15)	.012	(.11)
Asia	.056	(.23)	.068	(.25)	.06	(.24)	.085	(.28)	.066	(.25)
Other	.0085	(.092)	.0088	(.093)	.0086	(.092)	.012	(.11)	.0096	(.098)
Unemployed	.2	(.4)	.19	(.39)	.17	(.38)	.2	(.4)	.19	(.39)
Female	.38	(.49)	.38	(.49)	.37	(.48)	.44	(.5)	.38	(.48)
Married	.26	(.44)	.27	(.44)	.27	(.45)	.23	(.42)	.25	(.44)
Child	.34	(.48)	.35	(.48)	.35	(.48)	.32	(.47)	.34	(.47)
No educ	.018	(.13)	.029	(.17)	.023	(.15)	.027	(.16)	.027	(.16)
Primary	.085	(.28)	.096	(.29)	.091	(.29)	.097	(.3)	.09	(.29)
High	.64	(.48)	.66	(.47)	.63	(.48)	.61	(.49)	.64	(.48)
Uni	.25	(.44)	.22	(.41)	.26	(.44)	.27	(.44)	.24	(.43)
Start-ups	.13	(.34)	.59	(.49)	.46	(.5)	.71	(.45)	.63	(.48)
Young firms	.31	(.46)	.36	(.48)	.4	(.49)	.25	(.43)	.32	(.47)
Middle-aged firms	.26	(.44)	.021	(.14)	.088	(.28)	.038	(.19)	.031	(.17)
Old firms	.29	(.45)	.024	(.15)	.047	(.21)	.0039	(.062)	.018	(.13)
Micro firms	.14	(.35)	.23	(.42)	.25	(.44)	.17	(.38)	.26	(.44)
Small firms	.26	(.44)	.35	(.48)	.33	(.47)	.33	(.47)	.38	(.49)
Medium-sized firms	.22	(.42)	.32	(.46)	.25	(.44)	.44	(.5)	.25	(.44)
Large firms	.37	(.48)	.039	(.19)	.14	(.35)	0	(0)	.046	(.21)
Observations	224,304		10,930		41,492		1,802		12,589	

Table 2: Summary statistics for the data set investigating individuals *hired* from unemployment in 2015 for non-HGFs and various definitions of HGFs (top 5% or top 1% sales or employment growth)

	Non-HGFs		Emp (1%)		Emp (5%)		Sales (1%)		Sales (5%)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Swe	.65	(.48)	.58	(.49)	.6	(.49)	.58	(.49)	.58	(.49)
Second	.061	(.24)	.064	(.24)	.057	(.23)	.066	(.25)	.061	(.24)
Nordic	.015	(.12)	.016	(.12)	.014	(.12)	.016	(.13)	.015	(.12)
Eu25	.03	(.17)	.031	(.17)	.037	(.19)	.022	(.15)	.032	(.18)
Eur	.067	(.25)	.07	(.26)	.072	(.26)	.06	(.24)	.07	(.26)
Africa	.043	(.2)	.072	(.26)	.054	(.23)	.063	(.24)	.064	(.24)
S_Am	.014	(.12)	.014	(.12)	.016	(.12)	.022	(.15)	.013	(.11)
Asia	.11	(.31)	.14	(.35)	.14	(.34)	.16	(.36)	.15	(.36)
Other	.01	(.1)	.0088	(.093)	.012	(.11)	.016	(.13)	.01	(.099)
Unemployed	1	0	1	0	1	0	1	0	1	0
Female	.36	(.48)	.35	(.48)	.37	(.48)	.42	(.49)	.36	(.48)
Married	.16	(.36)	.17	(.37)	.17	(.38)	.14	(.35)	.17	(.37)
Child	.18	(.39)	.19	(.39)	.2	(.4)	.17	(.38)	.19	(.39)
No educ	.036	(.19)	.047	(.21)	.043	(.2)	.049	(.22)	.05	(.22)
Primary	.12	(.33)	.13	(.34)	.12	(.33)	.14	(.35)	.13	(.34)
High	.68	(.47)	.66	(.47)	.65	(.48)	.6	(.49)	.63	(.48)
Uni	.16	(.37)	.16	(.37)	.18	(.39)	.21	(.41)	.19	(.39)
Start-ups	.15	(.35)	.7	(.46)	.54	(.5)	.68	(.47)	.71	(.46)
Young firms	.33	(.47)	.27	(.44)	.38	(.48)	.3	(.46)	.26	(.44)
Middle-aged firms	.26	(.44)	.021	(.14)	.054	(.23)	.016	(.13)	.022	(.15)
Old firms	.26	(.44)	.016	(.12)	.026	(.16)	.0055	(.074)	.0083	(.091)
Micro firms	.16	(.36)	.23	(.42)	.28	(.45)	.15	(.36)	.26	(.44)
Small firms	.25	(.43)	.36	(.48)	.34	(.47)	.3	(.46)	.37	(.48)
Medium-sized firms	.21	(.41)	.28	(.45)	.25	(.43)	.49	(.5)	.25	(.43)
Large firms	.38	(.49)	.059	(.24)	.11	(.31)	0	0	.054	(.23)
Observations	45,297		2,045		7,225		366		2,404	

5. Empirical Method

We are capturing the recruitment decisions of HGFs by using the dichotomous variable HGF_{i2015} that takes the value one if an individual *i* is hired by an HGF in year 2015 and zero if the individual is hired by a non-HGF. Coad et al. (2014a) analyzed the same dependent variable using a Probit model but did not include any interaction effects. These effects are difficult to interpret in nonlinear models because the full interaction effect is different from the marginal effect of the interaction term in a nonlinear model (Ai and Norton, 2003; Norton et al., 2004).[10] The Probit model is thus not suitable when investigating if the effect of

unemployment on the likelihood of being hired by an HGF is moderated by the region of birth.

One possible way to solve this problem, which was proposed by Buis (2010), is to estimate a logit model where the dependent variable is measured using odds and then use a margins command in Stata to obtain the interaction effects for every possible combination of the immigrant term. We follow this approach and assess how being an immigrant (I_i=1) influences the odds of being hired by HGFs compared to the odds of being hired by non-HGFs in the following way:

$$\frac{p(HGF_{i,2015}=1|I_i=1)}{1-p(HGF_{i,2015}=1|I_i=1)}=\exp(\beta_I+\boldsymbol{\beta}'\boldsymbol{X}), \quad (1)$$

where $\boldsymbol{X}$ is a vector of variables that are assumed to influence the odds of being hired by an HGF. It includes an unemployment dummy ($U_{i,2014}$) that takes the value of one if the individual was unemployed in 2014 and zero if employed by another firm. It also includes the individual's gender, age, marital status, educational attainment, and the presence of children in the household in 2014. Following Coad et al. (2014a), we also include a vector of firm-specific characteristics to control whether the decision to be hired by an HGF is related to the age or the size of the firm. Finally, vectors of industry- and region-specific fixed effects are included to control for the time-invariant heterogeneity at the industry and regional levels, respectively.

The odds for nonimmigrants being hired are as follows:

$$\frac{p(HGF_{i,2015}=1|I_i=0)}{1-p(HGF_{i,2015}=1|I_i=0)}=\exp(\boldsymbol{\beta}'\boldsymbol{X}). \quad (2)$$

The odds ratio for being an immigrant is then the odds for immigrants being hired by HGFs divided by the odds for nonimmigrants being hired by HGFs:

$$\frac{\exp(\beta_I+\boldsymbol{\beta}'\boldsymbol{X})}{\exp(\boldsymbol{\beta}'\boldsymbol{X})}=\exp(\beta_I) \quad (3)$$

The odds ratio thus measures the expected number of immigrants being hired by an HGF for every immigrant being hired by a non-HGF. Note that the estimated coefficient will measure the effect of being an immigrant, holding all other variables constant at zero.

We include an interaction term, $I_i * U_i$, in the vector of explanatory variables, $\boldsymbol{X}$, because we want to investigate if the effect of unemployment on

10. Despite this difficulty, interaction effects are often used in nonlinear models. Ai and Norton (2003), for example, found 72 papers in economics journals from 1980-2000 that analyzed interaction terms in a nonlinear model. However, none of them correctly interpreted the interaction effects.

the odds of being hired by an HGF is different for immigrants and natives. However, the estimated coefficient of the interaction term will only measure the odds of being hired by an HGF for immigrants who are unemployed (I_i=1; U_i=1) compared to the baseline. To study if the effect of unemployment on the odds of being hired by HGFs differs between immigrants and nonimmigrants, we follow Buis' (2010) recommendation to use the margins command to calculate every combination of the interaction term.[11]

6. Results

Estimates regarding which individuals are hired by HGFs are presented in Table 3 for both employment-HGFs and sales-HGFs. Note that the interaction effects are excluded to save space[12] and that all results are presented as odds ratios, which means that an estimated coefficient less than one indicates that its corresponding variable is negatively related to the probability of being hired by an HGF, whereas an estimate larger than one indicates a positive association.[13]

Table 3: Logistic regression for the odds ratio of being hired by an HGF

VAR	Emp (1%)	Emp (5%)	Sales (1%)	Sales (5%)
Second	1.00069	0.96176	0.91726	0.96708
	(0.054)	(0.029)	(0.115)	(0.048)
Nordic	0.90447	0.99648	0.92403	0.89438
	(0.091)	(0.055)	(0.214)	(0.085)
Eu25	1.31909***	0.99640	0.99554	1.19329**
	(0.089)	(0.041)	(0.176)	(0.077)
Eur	1.51983***	1.05707	1.00298	1.12781
	(0.094)	(0.042)	(0.175)	(0.073)
Africa	1.51323***	1.04082	1.07783	1.33353**
	(0.139)	(0.064)	(0.211)	(0.117)
S_Am	1.14169	1.00234	1.47811*	0.98211
	(0.120)	(0.064)	(0.282)	(0.098)
Asia	1.10969	0.92518*	1.11426	0.91572
	(0.060)	(0.030)	(0.130)	(0.048)
Other	1.12891	0.89994	1.13611	1.09309
	(0.139)	(0.065)	(0.301)	(0.122)
Controls				
Unemployed	0.82350***	0.73892***	0.90291	0.86531***

11. As a robustness check, we have also estimated a linear probability model (LPM). The results remain qualitatively similar and are available from the authors upon request.
12. We have also estimated the model without any interaction effects, and these results are comparable to those presented by Coad et al. (2014a). The effects of immigrant status then become somewhat more significant, but the results are otherwise qualitatively similar to those presented in Table 3. These results are available from the authors upon request.

	(0.028)	(0.014)	(0.072)	(0.028)
Baseline	0.00038***	0.01251***	0.00005***	0.00037***
	(0.000)	(0.004)	(0.000)	(0.000)
Female	0.85772***	0.89586***	0.67044***	0.82051***
	(0.021)	(0.012)	(0.037)	(0.018)
Married	0.96751	0.98619	0.86904*	0.96922
	(0.027)	(0.016)	(0.059)	(0.026)
Child	1.00509	1.01740	0.94170	1.00616
	(0.025)	(0.015)	(0.057)	(0.024)
Primary	0.88572	0.87942**	0.95651	0.82672**
	(0.065)	(0.040)	(0.170)	(0.058)
High	0.87568*	0.85946***	0.91581	0.83803**
	(0.059)	(0.036)	(0.149)	(0.054)
Uni	0.70191***	0.83918***	0.90887	0.73834***
	(0.049)	(0.036)	(0.152)	(0.049)
Start-up firm	43.80186***	21.57825***	190.91350***	49.60165***
	(2.870)	(0.568)	(74.137)	(3.467)
Young firm	13.88247***	8.33845***	41.43435***	13.51175***
	(0.905)	(0.213)	(16.076)	(0.945)
Middle aged firm	1.10837	2.19950***	10.44825***	1.85349***
	(0.101)	(0.063)	(4.177)	(0.156)
Micro firm	2.23301***	2.00313***	3.70575***	2.35104***
	(0.091)	(0.041)	(0.442)	(0.088)
Small firm	3.06783***	2.03791***	5.09689***	2.97610***
	(0.114)	(0.037)	(0.559)	(0.103)
Medium -sized firm	4.16042***	2.38430***	8.67466***	3.04093***
	(0.150)	(0.043)	(0.915)	(0.105)
N	265,878	266,413	263,675	265,878

Notes: HGFs are defined as the top 1% and 5% fastest growing firms in terms of number of employees (Employment-HGFs) and sales (Sales-HGFs).
*: $p < 0.10$; **: $p < 0.05$; ***: $p < 0.01$.

We find that the odds of first-generation immigrants of several regional origins are up to 52% higher than those of natives in regard to recruitment by the top 1% fastest growing employment-HGFs. Specifically, we find positive and significant effects among immigrants from the EU (31.9%), Eastern Europe (52%) and Africa (51%). We find no such recruitment patterns when we investigate the top 5% fastest growing employment-HGFs. With respect to sales-HGFs, we find no evidence of higher odds among immigrant groups for being

13. As a robustness check, we have also estimated an ordinary least squares linear probability model (OLS-LPM). The results are qualitatively similar and available from the authors upon request.

hired by the 1% fastest growing firms. In contrast, the odds are higher among first-generation immigrants from the EU (19.3%) and Africa (33.4%) in regard to recruitment by the 5% fastest growing firms in terms of sales.

Note, however, that immigrants who are switching job positions are included in the estimated effect of being an immigrant on the odds of being hired by an HGF. Therefore, we cannot conclude from the estimates above how being an unemployed immigrant affects the probability of being hired by an HGF. The results that are presented in Table 3 clearly show that the odds of being hired by HGFs are lower for unemployed individuals. According to the results, the odds decrease by (0.824-1)*100 = -17.6%, (0.74-1)*100 = -26%, and (0.865-1)*100 = -13.5% for both the top 1% and 5% fastest growing employment-HGFs and the top 5% fastest growing sales-HGFs, respectively. Thus, HGFs are not a general recruitment base for individuals who are unemployed and have difficulties entering the labor market. Note finally that the effect of unemployment on the likelihood of being hired by a sales HGFs is not significant for the top 1% fastest growing firms.

With respect to our control variables, females and those that have completed a higher education have lower odds of being hired by any type of HGF. Finally, individuals who are hired by HGFs are hired by start-up firms (in terms of firm age) and medium-sized firms (in terms of firm size) to a greater extent compared to those who are hired by non-HGFs.

The results that are presented in Table 3 are similar to those that were obtained by Coad et al. (2014a), who found that HGFs were more likely to employ first-generation immigrants and young, less educated and unemployed individuals compared to non-HGFs. However, they also found that the recruitment patterns of HGFs appeared to change during their rapid growth period. Although immigrants were still overrepresented among new hires, individuals from other firms were hired at this point, as opposed to hires from unemployment.

To investigate if the effect of being unemployed on the odds of being hired by HGFs is different for immigrants and non-immigrants, we include an interaction term in the empirical model ($I_i * U_i$). The interaction effect measures how much the effect of being unemployed differs depending on the immigrant status of the individual. Following the recommendation of Buis (2010), we compute the predicted probabilities of attaining a job in an HGF given every combination of regional origin and employment status. As such, we are able to distinguish the odds of being recruited for individuals of a given regional origin that were unemployed in 2014 from those of individuals with the same regional origin that were employed in 2014. We can furthermore distinguish the marginal effect of being unemployed in 2014 given regional origin as the difference between the odds of being unemployed and employed in 2014. The odds difference can thus tell us whether unemployment in 2014 influences the odds of being hired by an HGF in 2015 depending on regional origin.

The estimated odds of attaining a job in an HGF are presented in Figures 1 (employment-HGFs) and 2 (sales-HGFs), together with their associated 95% confidence intervals. Figure 1 shows that the odds of being hired by an HGF are consistently higher among first-generation immigrants from Africa and Asia compared to Swedish-born individuals, especially for those who are unemployed. It is thus shown that the immigrant status of these immigrant groups explains their increased likelihood of being recruited by an employment-HGF and not whether they have a job or are unemployed. Note also that the magnitude of these results is larger when analyzing the top 5% fastest growing firms. However, first-generation immigrants from the EU and Eastern Europe have lower odds of being hired by the top 1% fastest growing employment-HGFs if they are unemployed (compared to employed individuals with the same regional origin), while unemployed natives, second-generation immigrants and first-generation immigrants from Nordic countries have lower odds of being hired by a top 5% fastest growing employment HGF.

The results are less clear for sales-HGFs (Figure 2), where we cannot distinguish any effects of unemployment and region of birth on the odds of being hired by a top 1% fastest growing sales-HGF. However, the results for the top 5% fastest growing sales-HGFs are more in line with the results for employment-HGFs, showing that the odds of being hired is higher among first-generation immigrants from Africa and Asia, especially when they are unemployed.

Our results thus support Coad et al.'s (2014a) conclusion that HGFs are more likely than non-HGFs to recruit nonwestern immigrants, but also that this result is robust for nonwestern immigrants that are unemployed and have proven difficulties entering the labor market. The odds of being hired by an HGF are particularly high for unemployed Africans and Asians, relative to unemployed natives (Swedes). Hence, taking into account that recruitment from unemployment is a marginal event, the general finding that HGFs are less likely to hire unemployed individuals (see Table 3) is not driven by nonwestern immigrants.

Finally, it is worth mentioning that the marginal effect of being unemployed in 2014 (although not always significant) is greater when growth is defined as the 5% fastest growing firms, both in terms of sales and in terms of employment (see Table 3). This is an indication that the faster a firm grows, the more unable or unwilling it is to make discriminatory decisions based on employment status.

Figure 1: Odds ratio of being hired by employment-HGFs for all combinations of regional origin and unemployment status in 2014. HGFs are defined as the top 1% and 5% fastest growing firms, respectively.

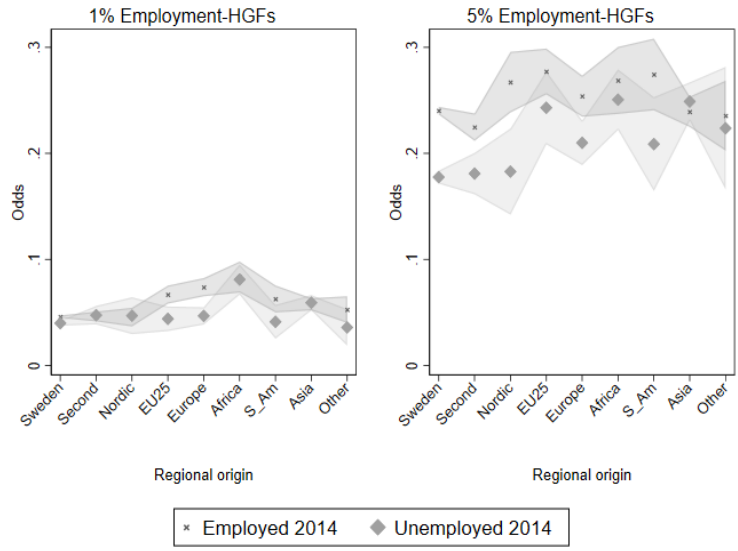
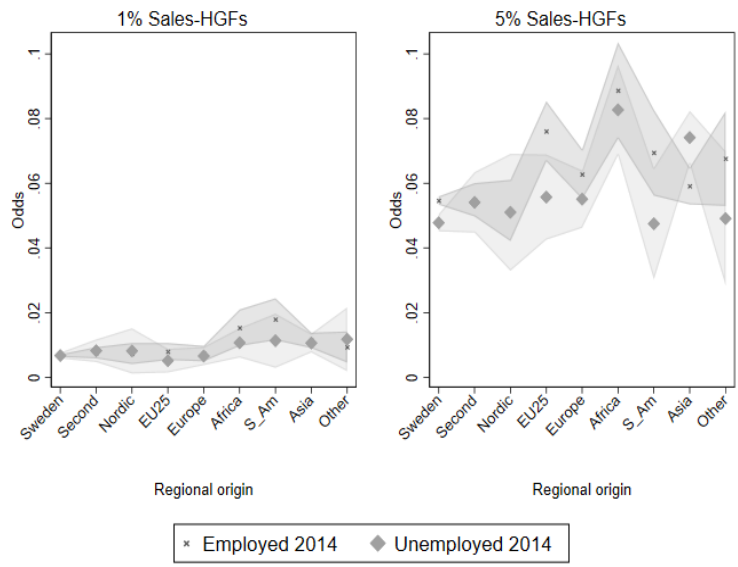


Figure 2: Odds ratio of being hired by sales-HGFs for all combinations of regional origin and unemployment status in 2014. HGFs are defined as the top 1% and 5% fastest growing firms, respectively.



7. Conclusions

The number of refugees that seek asylum in Europe has increased dramatically in recent years, and countries within the European Union are facing great challenges to integrate and assimilate these refugees into their societies. Immigration is also projected to increase greatly given the global upheavals brought on by the climate crisis (Ahmed, 2018).

Coad et al. (2014a) have argued that rapidly growing firms might be of special importance for these immigrants because they want to take advantage of their growth opportunities and therefore are less likely to wait for the best match. They found that HGFs in the Swedish knowledge-intensive service industries were more likely to recruit nonwestern immigrants and low-educated individuals compared to non-HGFs, which supported their hypothesis. They also found that HGFs in general were less likely to hire unemployed individuals than non-HGFs. However, we still lack knowledge on whether HGFs are more likely than non-HGFs to hire nonwestern immigrants that are unemployed and thus have proven difficulties entering the labor market.

The aim of our paper has been to complement Coad et al.'s (2014a) analysis and investigate if HGFs are also more likely to hire immigrants that are unemployed. Using matched employer-employee data from Statistics Sweden, we have investigated the interaction effects between employment status and being a first- or second-generation immigrant using the framework that was suggested by Buis (2010). Our results indicate that HGFs are more likely to recruit first-generation immigrants but not unemployed individuals, thereby confirming Coad et al. (2014a)'s results. We also found a considerably higher probability of being recruited by an HGF for unemployed individuals from Africa and Asia, compared to unemployed natives. It thus seems that rapidly growing firms do not have time to find perfect matches and instead provide newly recruited employees with more on-the-job training, supporting Coad et al.'s (2014a) conclusion.

Earlier contributions suggest that HGFs are important because they create most new jobs at any given point in time. We have contributed to the literature by investigating if HGF-managers also tend to provide jobs for unemployed immigrants, or if they prefer to recruit immigrants that already are employed. Our results show that most new employees are recruited from other employers rather than from unemployment, but HGFs seem more likely to hire unemployed first-generation immigrants than non-HGFs. Policies that focus on increasing risk-taking and high-growth entrepreneurship might therefore also be important for the labor market integration of immigrants that are unemployed.

We believe that more research is needed to understand why HGFs tend to hire unemployed first-generation immigrants to a greater extent than non-HGFs. Future work could, for example, investigate if first-generation immigrants have different skill sets compared to natives, or whether they have the same skill sets but are recruited because they have lower wages. It would also be of interest to

test Auer et al's (2019) matching hierarchies' model by investigating if HGFs' recruitment decisions of first-generation immigrants are dependent on their occupation. Another question that merits more research is whether there are advantages at the firm-level if employees have diverse backgrounds. Regardless the reason why high-growth managers hire first generation unemployed immigrants, they are contributing to speed up the growth of these firms. Future studies could also consider investigating more homogenous samples, such as new ventures, and investigating hiring practices along the whole growth rate distribution. In particular, we need a deeper understanding of how policies can be designed to stimulate high-growth entrepreneurship and the labor market integration of first-generation immigrants.

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Appendix

Table A1: Descriptive statistics of individual characteristics of the typical unemployed first-generation immigrant hired into a HGF in 2015

	Mean	Std.dev.
Nordic	0.043	0.2
Eu25	0.11	0.31
Eur	0.21	0.41
Africa	0.16	0.36
S_Am	0.046	0.21
Asia	0.4	0.49
Other	0.036	0.19
Female	0.42	0.49
Married	0.29	0.46
Child	0.26	0.44)
No educ	0.12	0.32
Primary	0.12	0.32
High	0.48	0.5
Uni	0.28	0.45
N	2,539	