The Impact of Ethnic Communities on Immigrant Entrepreneurship: Evidence from Sweden

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Abstract

This paper seeks to provide novel insights into the effects of ethnic communities on immigrants' entrepreneurial activities. We investigate to what extent the decision of an employed immigrant to become an entrepreneur is associated with his or her embeddedness in ethnic networks in the host region. We capture such embeddedness through various mechanisms. Using longitudinal registered-data from Sweden and employing a Logit model, we find that merely being located in an ethnic community does not have an influence on immigrant entrepreneurship; rather what matters is being located in ethnic communities that have a high share of entrepreneurs themselves.

1. Introduction

This paper examines the relationship between immigrant entrepreneurship and ethnic communities (ECs). Several studies have shown that ECs provide a fruitful environment for immigrant entrepreneurship (e.g. Light et al, 1993; Kloosterman et al. 1999; Rodríguez-Pose and Von Berlepsch, 2014). However, little efforts have so far been made to disentangle various mechanisms by which ECs foster immigrant entrepreneurship and to establish greater clarity about who exactly within such communities contributes to nurturing business ventures by immigrants. Is it anybody within the EC or is it a particular group (e.g. immigrants who are already entrepreneurs themselves)? Moreover, most work on immigrant entrepreneurship is based on case studies of certain ethnic groups, and when there are comparative case studies of various ethnic minorities, the results are usually provided for a single region (Min and Bozorgmehr, 2000; Raijman and Tienda, 2000; Zhou, 2004). This limits the generalizability of findings. Hence, there is a need for systematic studies of all immigrants in all regions of a country. The topic under consideration is also timely and relevant from a practical point of view, since the EU (and particularly Sweden)[1], has faced an immigrant crisis recently. In 2015 alone, about 190,000 asylum-seekers have arrived in Sweden, posing big integration challenges. Entering the job market and promoting employment through entrepreneurship is seen as an efficient way for integration. This paper aims to tackle this issue by investigating what factors enhance immigrant entrepreneurship in Sweden.

Relying on the 'mixed embeddedness' concept (Kloosterman et al. 1998; 1999; Kloosterman, 2010; Jones et al, 2014), we analyse the effect of immigrants' embeddedness into an EC in the host region[2] on their decision to become entrepreneurs. We explicitly account for not only the general social and market interactions of immigrants within their EC (as a proxy for the embeddedness of immigrants into the social network of a community), but also for the occupational structure of the EC itself (as a proxy for the embeddedness of immigrants into the socio-economic and politico-institutional context of the host region). This way, our conceptual framework not only goes beyond the 'human capital argument' in the entrepreneurship literature (Davisson and Honig, 2003; Parrilli, 2009), but also it incorporates various mechanisms of social capital provided by ECs.

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[1] The recent immigrant/refugee crisis in the EU poses challenges on Sweden in particular, due to its generous refugee policy in comparison to most of its neighboring countries.

[2] The host region is captured by the municipality in which a given immigrant is located (see Section 4.2).

Using rich longitudinal registered-data in Sweden covering the population of all immigrant individuals during the years 2003-2010, we find that immigrants show a higher propensity to start their own businesses if they are located in ECs that feature the following characteristics: (i) ECs that have a high share of 'same ethnics-same sector employment' as the focal immigrant, and (ii) ECs that have a high share of 'same ethnics-same sector entrepreneurs' as the focal immigrant. The strongest effect is found in the latter one. This is because immigrant entrepreneurs may rely not only on the social capital and a potential customer group of their ECs, but also they may benefit know-how available within their ECs of how to start a business in the host region/country as well as role mode effect.

The rest of the paper is organised as follows: section 2 reviews the literature on the role of ECs in fostering immigrant entrepreneurship and provides the conceptual framework. This is followed by the development of our hypotheses. Section 3 describes the data and provides descriptive statistics. Section 4 elaborates on the empirical strategy and defines the set of variables employed in our empirical analysis. Section 5 reports and discusses the empirical results. Finally, section 6 concludes.

2. Literature Review, Conceptual Framework & Hypotheses Development

Immigrants are increasingly seen as an important source of growth and prosperity, boosting development and innovation in their host regions and countries (Hunt and Gauthier-Loiselle; 2012; Rodríguez-Pose and Von Berlepsch, 2014; Kerr et al., 2015). There is a strong interest in academic and policy circles in immigrant entrepreneurship (Aldrich and Waldinger, 1990; Clark and Drinkwater, 2010; OECD, 2010). Most of these studies can be categorized into two groups: first, many of them are based on case studies of a certain ethnic group, and when there are comparative analyses of various ethnic minorities, the results are usually confined to a single region (Min and Bozorgmehr, 2000; Raijman and Tienda, 2000; Zhou, 2004). This limits the generalizability of findings. Second, some studies are based on analyses covering more than one region. However, more often than not their focus is on skilled immigrants in the US (Hunt and Gauthier-Loiselle; 2012; Kerr et al., 2015). Systematic evidence from other countries and lower-skilled immigrants is missing.

The literature synthesised above suggests that immigrants show a high propensity to start their own business (OECD, 2010) and that immigrant entrepreneurs contribute substantially to the economic and social vitality of their host regions (Ndofor and Priem, 2011). A key issue that remains however under-researched concerns the role played by ECs in immigrants' decisions to become entrepreneurs.

ECs may have a significant influence on immigrant entrepreneurship through the richness of social capital they provide in terms of the internal values, norms and routines. They might help their members to integrate into the local economy. More specifically, ECs provide potential entrepreneurs with network resources that support new venture creation (Light et al, 1993; Hoang & Antoncic, 2003). As the OECD (2010, p. 9) puts it: "Access to a cohesive social network ... tends to spur entrepreneurship. Migrants tend to form tight social networks with fellow nationals. These networks can facilitate entrepreneurial activity by providing capital, support, knowledge and a supply or customer base. Mentoring, access to sufficient capital and a reliable supply and customer base are often key factors in the decision to undertake an entrepreneurial endeavour. These networks can also make up for the fact that migrants often do not have the contacts and local understanding of regulations and culture that natives often do."

A natural conceptual framework for studying EC effects might be the social capital approach. This approach refers to the importance of resources available to an individual through his or her social relations. Putnam (2001) proposed a distinction between bonding and bridging social capital. Bonding social capital is about the value assigned to social networks between homogeneous groups of people. Bridging social capital is about social networks between socially heterogeneous groups. Therefore, studying the behaviour of same ECs is particularly related to bonding social capital available in homogeneous ECs (Min and Bozorgmehr, 2000; Kanas et al, 2009). However, this approach does not fully capture the 'embeddedness' of immigrant entrepreneurs into their host regions, which has been identified as a shortcoming in the literature (Zhou, 2004).

There is a need to disentangle various effects that might result from being embedded in an EC in the host region and to assess their importance for immigrant entrepreneurship. The 'mixed embeddedness' approach serves as a useful point of departure in this regard. Its protagonists (Kloosterman et al. 1998; 1999; Price and Chacko, 2009; Kloosterman, 2010; Jones et al, 2014) emphasize that the notion of embeddedness should not only be used to refer to the social and

cultural features of groups of co-ethnics but also to the wider economic and institutional context of the host region to which immigrants need to adapt when engaging in entrepreneurial activities. A comprehensive understanding of embeddedness as suggested by the "mixed embeddedness" approach enables us to distinguish between three potential effects of ECs on the likelihood of their members to become entrepreneurs, namely: (i) ECs as customer groups, (ii) ECs as providers of industry-specific know-how, and (iii) ECs as sources of information about institutional set-ups, financial opportunities and business practices in the targeted sector. The first mechanism refers to social and cultural features of groups of co-ethics and the second and third mechanism refer to a wider economic and institutional context of the host region by incorporating the occupational structure of communities. In a next step, we specify these potential effects (plus the 'role model' effect) and we develop hypotheses about how they might affect immigrant entrepreneurship.

(i) ECs as customer groups: ECs may constitute an important (niche) market for immigrant-founded ventures (Le, 2000; Ndofor and Priem, 2011). If an immigrant is surrounded by a high share of immigrants of the same ethnic origin in a region, he/she can enjoy two main advantages leading to a higher chance of him/her to start a business. First, the potential immigrant entrepreneur may benefit from a better access to information about the tastes of other members of the EC (Le, 2000). Such information advantages in turn increase the opportunity structure for potential immigrant entrepreneurs (Aldrich and Waldinger, 1990). Second, inherent trust present within the EC may promise a reliable customer group for the immigrant's future business (Cutler et al, 2008). Moreover, the cultural ingredients of an EC influence consumer attitudes and the creation of demand for certain goods and services (Rafiq, 1992). There are several examples for this, such as *halal* meat or traditional Chinese medicine (Fairlie and Meyer, 1996; Kloosterman et al., 1999). Although there is evidence showing that ECs are not the only target group (Clark and Drinkwater, 2000), there are strong reasons to assume that a good portion of same ethnic market size will have a positive influence on an immigrant's decision to start his/her business (Edin et al, 2003). In other words: the larger the EC, the larger the potential ethnic market (Cutler et al, 2008) and the larger the opportunity structure for potential immigrant entrepreneurs (Aldrich and Waldinger, 1990). This should be particularly true for immigrants aiming to start a business in the personal services industry, since activities in this sector are heavily dependent on the local market (Rusinovic, 2006).

Hypothesis 1*: the higher the share of immigrants from the same EC ('same ethnics') of the total population in the region, the higher the propensity of the immigrant to become an entrepreneur.*

(ii) ECs as providers of industry-specific know-how: Apart from the importance of demand side for immigrant entrepreneurship (hypothesis 1), the supply side should matter too. Within the population of an EC, there is usually a subpopulation of immigrants who are already working in the same sector as the one the focal immigrant has chosen for starting his/her own business. If the focal immigrant is surrounded by a high share of same ethnic immigrants who are also employed in the same industry as the immigrant him/herself, he/she may benefit from the availability of industry-specific know-how that is relevant for his/her future business (Clark and Drinkwater, 2000). Industry-specific know-how may be supplied through two different mechanisms: either through informal (unintentional) knowledge spillovers or through formal training in co-ethnic firms. The former mechanism is about the role of ethnic networks in disseminating job and industry-specific information (Damm, 2009). The latter mechanism is specifically about the so-called "stepladder hypothesis" which asserts that a focal immigrant's previous employment in a firm owned and operated by other co-ethnics enables him/her to acquire the experience and knowledge required to establish his/her own business (Portes and Bach, 1985; Bailey and Waldinger, 1991). For instance, Portes and Bach (1985) found the existence of a 'training system' as a channel for the dissemination of industry-specific knowledge among Cuban and Mexican immigrants in the US during the 1970s in various (mainly low-tech labour intensive) sectors. Bailey and Waldinger (1991) studied training systems among immigrants in New York's garment industry. This, *inter alia*, can explain how immigrants with poor education and/or low language proficiency have been able to start their own businesses in the host country (Raijman & Tienda, 2000). Therefore, being located in a region with a higher share of same ethnics who work in the same sector as the focal immigrant can increase his/her chance of acquiring work experience in these co-ethnic firms and hence increases the opportunities to receive training while being employed in these firms. Such training in turn can increase the know-how about the industry, which is beneficial for an immigrant when he/she is starting his/her own business (Bailey and Waldinger, 1991; Raijman and Tienda, 2000). Examples of such industry-specific know-how relate to supply chain or marketing channels for newly established firms (Raijman & Tienda, 2000).

Hypothesis 2: *the higher the share of 'same ethnics' who are working in the same industry as the immigrant was employed, the higher the propensity of the immigrant to become an entrepreneur.*

(iii) ECs as providers of institutional knowledge about the host region: Region- and country-specific institutional set-ups affect the opportunity structure for entrepreneurship in general and immigrant entrepreneurship in particular (Kloosterman et al. 1998; 1999). Examples of such institutions include: framework of rules and regulations, organization of markets, business support associations (such as incubators), financial channels, and largely unwritten rules concerning business establishment and practices (Kloosterman et al., 1999; Andersson and Larsson, 2016). Those individuals who went through an entrepreneurial journey have presumably equipped themselves with such institutional knowledge through learning-by-doing processes. Our argument here is that if an immigrant is surrounded by a high share of 'same ethnics' who are already entrepreneurs themselves in the same industry as the immigrant him/herself, he/she can enjoy the specific institutional knowledge of how to establish a new firm in the host country/region (Minniti, 2005; Fritsch and Wyrwich, 2014; Andersson and Larsson, 2016). This implies that institutional knowledge required to start a business might spill over within an EC, benefiting potential immigrant entrepreneurs through peer-to-peer effects (Guiso & Schivardi, 2011). Having easy access to such institutional knowledge would in turn imply a better 'embeddedness' of the focal immigrant into the host region, which eventually can lead to a higher propensity of an immigrant to successfully establish his/her own business (Kloosterman et al. 1998; 1999; Kloosterman, 2010).

(iv) ECs as role models: Immigrants, as anybody else, are influenced by 'role models' in terms of the choice of occupation and career. Moreover, immigrant entrepreneurs and their role models tend to resemble each other in terms of characteristics that facilitate role identification, i.e. gender, sector and more importantly ethnicity (Bosma et al, 2012). If an immigrant is thus surrounded by a high share of 'same ethnics' who are already entrepreneurs themselves, he/she can enjoy not only the specific institutional knowledge of how to establish a new firm in the host country/region (mechanism (iii)), but he/she may also be influenced by the role model effect (Bosma et al, 2012; Cholsta et al, 2012). The dominant function of a role model for increasing the likelihood of immigrants to become entrepreneurs is the 'learning by example' mechanism (Bosma et al, 2012). Other mechanisms such as 'learning by support' (mechanism

(iii)), 'inspiration/motivation', and 'increasing entrepreneurial self-efficacy' are also important functions (Bosma et al, 2012; Cholsta et al, 2012).

Hypothesis 3*: the higher the share of 'same ethnics' who are already entrepreneurs in the same/in a similar industry as the immigrant was employed, the higher the propensity of the immigrant to become an entrepreneur.*

3. Data

The unit of analysis in this study are the working-age individual immigrants (25 to 64 years old) in Sweden[3]. The dataset comes from a longitudinal individual level database (LISA) as well as from the Firm and Establishment Dynamics database (FAD and FEK). Both databases are provided by Statistics Sweden (SCB) through the Microdata Online Access (MONA) system. The coverage is the population of all working-age individuals in Sweden over the 2003 to 2010[4]. We constructed our final dataset by taking the following steps. First, we identified all working-age individual immigrants throughout the period 2003-2010. Around 86% of them were employed and another 5% were entrepreneurs. For about 8%, no information about their occupation type was available[5]. Second, we identified the location (municipality) of these individuals, in order to construct ethnic variables (our main explanatory variables) and to match these variables with regional-level control variables. Third, we matched these individuals with the firm (more precisely, the plant or establishment) that employs them, in order to control for plant-level variables. The final dataset was composed of the population of immigrants in Sweden during the period of 2003-2010, which amounted to 3,830,918 individual-year observations (about 12% of the total population), out of which 189,296 individual-year observations were associated with immigrant entrepreneurs (about 5% of the immigrants population). Appendix 1 shows the population distribution of immigrants as well as of

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[3] Because the paper's focus is on the decision of immigrants to transit from employment to entrepreneurship, we limit the sample to the most conventional working age in the Swedish context (25 to 64). Other similar studies on Sweden have imposed the same limitation (e.g. Andersson and Larsson, 2016).

[4] Using the entire population of individuals based on high-quality and registered data, allows us to dramatically reduce problems related to inferences and internal validity, since our estimates are not based on a sample of individuals.

[5] These 8% may be either unemployed, sick, students or there is simply no information about their occupation type. Since we cannot delineate whether they are truly "unemployed", we cannot analyse the transition of unemployed immigrants to entrepreneurship. Therefore, in this paper we focus on the transition of employed immigrants to become entrepreneurs. Such a choice is in line with similar and recent entrepreneurship studies on Sweden (see, e.g., Andersson and Larsson, 2016).

immigrant entrepreneurs in Sweden across ethnic country groups. Most immigrants come from Asia (27%), the Nordic Countries excluding Sweden (24%), and Europe excluding the Nordic countries and the EU15[6] (24%). As regards immigrant entrepreneurs, the same country groups take the lead. Asian immigrant entrepreneurs dominate in terms of their share (35%) followed by immigrant entrepreneurs from the Nordic Countries excluding Sweden (23%), and Europe excluding the Nordic countries and the EU15 (19%). In order to put these figures into context, the following observations are crucial: first, in Sweden like in most OECD countries, the share of immigrant entrepreneurs (here self-employed) is higher than the share of native-born entrepreneurs (some Southern European countries and Ireland are exceptions in this regard). Second, similar to many other OECD countries, in Sweden the majority of immigrant entrepreneurs are from Asia, followed by immigrants from other European countries (Desiderio and Mestres-Domènech, 2011). These observations indicate that the Swedish pattern of immigrant entrepreneurship is the norm rather than the exception when compared with other OECD countries. This leads us to claim that the findings reported below may – at least to some extent – be generalizable to other OECD countries with similar context conditions.

4. Estimation Strategy
4.1. Baseline model

Are ECs and social interaction effects within such communities a source of immigrant entrepreneurship? In order to investigate this question, we model individual immigrants' decisions to switch from employment to entrepreneurship. We employed a Logit model to estimate the influence of various measures of the presence of the same ethnic group in immigrants' residential municipality on the probability that he/she becomes an entrepreneur between the years t-1 and t (t=2003 to 2010). Formally, the baseline empirical model is given as follows:

$$Pr\big(S_{i,t} = 1\big| X_{i,t-1}\big) = \frac{exp(\boldsymbol{\beta} X'_{i,t-1})}{1 + exp(\boldsymbol{\beta} X'_{i,t-1})} \tag{1}$$

$$\boldsymbol{\beta} X'_{i,t-1} = \beta_0 + \boldsymbol{\beta_1} ETH'_{i,t-1} + \boldsymbol{\beta_2} I'_{i,t-1} + \boldsymbol{\beta_3} E'_{i,t-1} + \boldsymbol{\beta_4} R'_{i,t-1} + \varepsilon_{i,t}$$

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[6] EU15 refers to the number of member countries in the European Union prior to the accession of ten candidate countries in May 2004. The official EU15 comprised the following 15 countries: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, United Kingdom. We exclude the three Nordic countries (Denmark, Finland, Sweden) from the official EU15 to include them as a separate group of their own.

Where $S_{i,t}$ is a dummy variable which is 1 if an immigrant i switched from being an employee to being an entrepreneur between years *t-1* and *t*, 0 otherwise. Entrepreneurs are identified based on information about sole proprietorship or ownership of an incorporated business[7]. ***ETH*** is the vector of three ethnic-related variables, which are our main explanatory variables (see section 4.2). ***I***, ***E***, and ***R*** are three vectors of control variables at the level of individuals, establishments (plants), and regions, respectively (see section 4.3).

We used random effects as the panel estimator in order to estimate Equation (1) for two reasons. First, Hausman test speaks in favour of random effects rather than fixed effects. Second, using a fixed effect estimator would drop out time-invariant observations. This means we would not have been able to control for a vast majority of our control variables, e.g. gender, marriage status, number of children, education specialization, occupation specialization and industry specialization. Indeed, using a fixed effects estimator would drop out about 85% of our observations. Moreover, our main explanatory variables vary slowly over time, which, again, speaks in favour of avoiding the use of fixed effects models.

4.2. Explanatory variables

We constructed three measures of ECs to capture the local social interaction to which immigrants are exposed: (i) the share of immigrants of the 'same ethnic' origin as the focal immigrant in the local area, (ii) the share of same ethnics as the focal immigrant who are employed in the same industry as the immigrant was employed, and finally (iii) the share of same ethnics as the focal immigrant who are already entrepreneurs in the same industry as the immigrant was employed[8]. The first measure is simply a proxy to capture the embeddedness of an immigrant in the host region by assuming that the larger the EC, the higher the embeddedness of immigrants. This measure captures the 'local-social' dimension of the mixed embeddedness approach. The second and third measures explicitly account for the occupational structure of ECs by incorporating two main forms of occupation, i.e. being employed by a firm or being an entrepreneur. These two measures can be proxies for "embeddedness in a wider socio-economic and politico-institutional context" of the host region/country (Kloosterman et al, 1999). This is because those 'same ethnics' immigrants who are already employed, or even more importantly,

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[7] The longitudinal individual level dataset provides information about various characteristics of each individual in Sweden. Among other things, it also classifies the main occupation type of each individual to be either (i) a sailor (ii) a farmer (iii) an employee (in the public or the private sector) or (iv) an entrepreneur (founder of a business).
[8] All three ethnic measures (together with all other right-hand-side variables) are calculated in year t-1. In year t-1, an immigrant can be either employed or he/she can be an entrepreneur in our dataset.

have already become entrepreneurs in the host region should be equipped with the host region's (country's) institutional knowledge. Therefore, they can act as a 'conduit' for embeddedness of focal immigrants in the wider institutional context. Starting from the first measure, the share of immigrants of the same ethnic origin as the immigrant i of the total population in the municipality r at year t-1 can be formulated as follows:

$$ETH1_{i,t-1} = \frac{\sum_{i,j \in r} I\left(CG_i = CG_j\right)}{n_{r,t-1} - 1} \tag{2}$$

Where $I(.)$ is an indicator function, which gets value 1 if its argument is true, 0 otherwise. CG_i is the Country Group (CG) of immigrant i and CG_j is the Country Group (CG) of immigrant j. As shown in Appendix 1, an immigrant in Sweden can fall into one of nine defined categories of CG: (i) Nordic countries (excluding Sweden), (ii) EU15 (excluding Denmark, Finland, and Sweden), (iii) Europe (excluding EU15 and the Nordic countries), (iv) Africa, (v) North America, (vi) South America, (vii) Asia, (viii) Oceania, and (ix) the former Soviet Union. It would have been more precise to assign each immigrant to his/her exact country of origin. Unfortunately, we only know the 'country group' of the immigrant's origin. Nevertheless, our 'nine country group approach' is in line with Hofstede's (1980) national culture classification[9]. The geographical unit of region r is 290 municipalities in Sweden (as the host region for immigrant i). The denominator is the total number of individuals surrounding the immigrant i in municipality r in year t-1 [10]. Although $ETH1_{i,t-1}$ is defined at the level of individual immigrants i per year t, nevertheless, by construction, it only varies over CG-region-year in our database. $ETH1_{i,t-1}$ gets the theoretical minimum value of zero, when there is no individual in region r in year t who has the same country group as immigrant i. On the other hand, $ETH1_{i,t-1}$ gets the theoretical maximum value of 1, when all individuals in region r in year t have exactly the same country group as the immigrant i.[11]

Similar to the formulation of $ETH1_{i,t-1}$, one can calculate the share of immigrants with the same ethnicity as the immigrant i, who are also employed in the same industry as the immigrant i in year t-1[12], as follows:

$$\tag{3}$$

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[9] Hofstede (1980) classifies forty modern nations according to their national cultures into several 'country groups' based on four dimensions: Power Distance, Uncertainty Avoidance, Individualism, and Masculinity. Our nine country groups in this paper are very similar to Hofstede's (1980) classification outcome.

[10] This is simply captured as the total number of individuals in municipality r in year t ($n_{r,t}$) minus the immigrant i himself/herself.

[11] We further multiplied *ETH* measures by 100 in order to have a convenient interpretation of the marginal effect in the subsequent analysis.

[12] In year t-1, an immigrant can either be employed or be an entrepreneur.

$$ETH2_{i,t-1} = \frac{\sum_{i,j \in r} I\ (CG_i = CGEM_j)}{n_{r,t-1} - 1}$$

Where CG_i is the Country Group (CG) of the immigrant i and $CGEM_j$ is the Country Group of immigrant j, who is employed in the same 2-digit industry as the immigrant i. Therefore, $CGEM_j$ is a subset of CG_j. This implies that instead of counting all 'same ethnics' immigrants j as the immigrant i (as in $ETH1_{i,t-1}$), the variable $ETH2_{i,t-1}$ only captures the share of those 'same ethnics' immigrants j who are also employed in the same industry as the immigrant i.

Finally, similar to the equation (3) one can calculate the share of immigrants with the same ethnic as the immigrant i, who are already entrepreneurs in the same industry as immigrant i in year *t-1*, as follows:

$$ETH3_{i,t-1} = \frac{\sum_{i,j \in r} I\ (CG_i = CGEN_j)}{n_{r,t-1} - 1} \tag{4}$$

Where CG_i is the Country Group (CG) of the immigrant i, $CGEN_j$ is the Country Group of an immigrant j, who was already an entrepreneur in the same industry as the immigrant i in year *t-1*. Therefore, $CGEN_j$ is also a subset of CG_j. The theoretical minimum and maximum values of $ETH3_{i,t}$ are again 0 and 1 respectively. For all of our three ethnic-related measures, we also inserted their square terms in the subsequent regression analysis, in order to model the possible non-linearity between ethnic-related variables and the probability of entrepreneurship (cf. Andersson and Larsson, 2016).

4.3. Control variables

We included a large set of control variables at the individual, plant and regional levels. The control variables employed in this paper are similar to those used by Andersson and Larsson (2016), hence we only briefly describe them here (exact definitions are given in the Appendix 2). Starting with individual-level control variables, a number of standard characteristics that may influence entrepreneurship are used: age, gender, years of schooling, education specialization, marriage status, and information on children in the household. The propensity to become an entrepreneur increases with age at a diminishing rate (Levesque & Minniti, 2006). This is because with increasing age, the value of benefiting from 'future' money earned through starting a business diminishes, i.e. the relative return to entrepreneurship is reduced, the older an individual becomes. Previous empirical findings for Sweden (Andersson and Larsson, 2016) as well as for many other countries corroborate this pattern (GEM, 2016). The likelihood of switching to entrepreneurship tends to rise with education (Rees and Shah, 1986). An

explanation for this is that education may proxy for human capital and absorptive capacity (Cohen and Levinthal, 1990), which in turn increases the recognition of opportunities and hence entrepreneurial propensity. In other words, well-educated individuals may be in a better position to identify and act on entrepreneurial opportunities. This effect, however, depends on educational specialization, because some specializations create a ground for a higher propensity of entrepreneurship (e.g. social and natural science), while others such as humanities and arts do not (Klaesson and Larsson, 2014).

The second set of our control variables concerns five plant-level variables, which are included to capture the influence of individual immigrants' employer and job characteristics on their decision to switch to entrepreneurship (i.e. employment size of the plant, establishment has closed down between t-1 and t, wage income, industry, and occupation specialization). As regards wage income, two contradicting arguments deserve attention: (i) on the one hand, higher paid individuals (including immigrants) are less likely to leave their employment (due to opportunity cost argument). (ii) On the other hand, highly educated individuals (who are usually higher paid as well) can recognize entrepreneurial opportunities in a better way than less-educated ones. Hence they are more prone to start their own venture (due to opportunity recognition argument). It is up to empirical investigation to assess which of these two arguments holds true in the case of immigrants in Sweden.

Finally, the third type of control variables relates to the regional level. We measured population density as a proxy for pure urbanization, in order to control for the size of the regions in which immigrants are located (Tavassoli & Jienwatcharamongkhol, 2016). We also controlled for the start up rate of the region in order to capture the general 'entrepreneurial climate' of the region (Andersson and Larsson, 2016). Controlling for these factors allows us to isolate the EC effect (our three explanatory variables) from the general size effect of the region as well as from the general entrepreneurial climate effect of the investigated regions. Appendix 2 reports the variable definitions and Appendix 3 shows the descriptive statistics of all variables.

Appendix 3 shows that 1.2% of employed immigrants decided to become entrepreneurs in the period of year *t-1* to year *t* (*STARTUP*). This corresponds to the percentage of all individuals (not only immigrants) in Sweden who left employment for entrepreneurship from year *t-1* to

year *t*, which is 1.3% (not reported in Appendix 3)[13]. Moreover, a considerable share of immigrants had somehow low/medium-skilled service-related occupations and they were employed in low/medium-tech industries. For instance, about 44% of immigrants in Sweden had occupations in service and shop sales industries, craft and related trade industries, or worked as machine operators. This provides good reasons to assume that the local market plays an important role for potential immigrant entrepreneurs (hypothesis 1).

Appendix 4 reports the correlation matrix between all variables. It is evident that there is a high correlation between some of our three ethnic-related variables. For instance, the correlation coefficients between *ETH1* and *ETH2* and *ETH1* and *ETH3* are 0.621 and 0.457 respectively. This issue naturally will prevent us to include all ethnic-variables in the same model in the subsequent regression analysis in order to avoid multicollinearity issues. Apart from high correlations between some ethnic variables, there is no other high correlation between our variables.

5. Results
5.1. Main results

Table 1 shows the results of the Logit model estimation of Equation (1), i.e., the determinants of the decision of immigrants to leave employment for entrepreneurship. Using the population of all immigrants in Sweden, Models (1) to (3) insert our three ethnic variables one-by-one, while all models include the control variables. Models (4) to (6) are similar to (1) to (3), but they are based on the population of natives (as control group for the immigrants' population). We deliberately avoid inserting all three ethnic variables in the same model, in order to rule out possible issues of multicollinearity, as noted earlier.

Starting with the results in Model (1), the share of 'same ethnics' in the region (*ETH1*) shows a positive and statistically significant sign; nevertheless, the Average Marginal Effect (AME) of this variable is almost zero. This implies that the 'general' share of the same ethnic group in a region does not matter for the decision of an immigrant to become an entrepreneur. Therefore, our first hypothesis is rejected.

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[13] Similarly, Andersson and Larsson (2016) reported that 1% of employed individuals in Sweden decided to leave employment for becoming entrepreneurs in the period 2007 to 2008.

Moving to ethnic variables based on the employment structure (*ETH2*), there is a significant effect of ECs based on 'same employment' (Model (2)). This indicates that being located in a region with a high portion of 'same ethnics-same sector' employed immigrants (*ETH2*), increases the propensity of immigrants to become entrepreneurs. The AME of this variable is 0.007, which implies that increasing this variable from its sample minimum value (zero) to its sample maximum value (12.78) is associated with a 9 percentage points (PP) increase in the probability of immigrants' decision to become self-employed. This is a rather mild effect[14]. Previous studies mostly reported such industry-specific effects of enclaves mainly for low-skilled secondary labour markets (Portes and Bach, 1985; Bailey and Waldinger, 1991). Our findings (at least mildly) confirm this pattern not only for low-skilled but for all sectors of the Swedish economy.

Finally, moving to the ethnic variable based on the entrepreneurship structure of communities (*ETH3*), there is a significant effect of same ethnic group immigrants who are entrepreneurs themselves (Model (3)). This implies that an immigrant's decision to become an entrepreneur is positively affected by being located in a region with a high portion of 'same ethnics-same sector' immigrant entrepreneurs (*ETH3*). The AME of this variable is 0.024, which implies that increasing this variable from its sample minimum value (zero) to its sample maximum value (0.76) is associated with a 2 PP increase in the probability, which is rather a small effect. Moreover, increasing this variable from its sample minimum value (zero) to its theoretical maximum value (100) is associated with a 240 PP increase in the probability of the immigrant's decision to become an entrepreneur, which is a substantial increase[15]. Therefore, hypothesis 3 seems to be confirmed[16]. Moreover, it is interesting to note that the AME of *ETH3* is about three times higher than that of *ETH2* (0.024 versus 0.007). We will come back to this issue below.

All in all, the main results show that for the decision of an immigrant to become an entrepreneur, it does not really matter to be merely surrounded by a high portion of immigrants from the same

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[14] Moreover, increasing the *ETH2* from zero to 0.25 (the sample mean value of this variable in Appendix 3) is associated with a 0.2 PP increase in the probability of the immigrant's decision to switch to entrepreneurship, which is rather a small effect. Moreover, if one increases the value of *ETH2* to 100 (the theoretical maximum value of this variable), the probability will increase by 70 Percentage Points (PP).

[15] The gap between the 'large' theoretical and the 'small' sample-based effect of *ETH3* has an important message: there are many opportunities for exploiting the potential of this variable in reality, for instance by policy instruments that aim to promote more knowledge exchange among immigrant entrepreneurs.

[16] For a statement on hypothesis confirmation, we refer to to the next section, where we dig into the observed effect within each of the investigated ethnic groups.

ethnic origin in the region. What does matter is to be surrounded by high portion of immigrants of the same ethnic group *who* are also employed in the same sector as the focal immigrant (*ETH2*), and, more importantly, by a high portion of immigrants of the same ethnic origin *who* are already entrepreneurs themselves in the same sector as the focal immigrant (*ETH3*). Our findings imply that the occupation structure of the EC, as a conduit for embeddedness of an immigrant in a host region, has a strong influence on immigrant entrepreneurship. Particularly, being exposed to 'same ethnics-same-sector immigrant employees' will help the focal immigrant to not only benefit from know-how about the industry (Model 2), but also, and more importantly, from the know-how of starting a business in the host region/country (Model 3). Apart from the occupational structure argument, our findings in Model 3 (ETH3) imply that the existence of role models has a strong effect on immigrant entrepreneurship. Therefore, it should not come as a surprise that the magnitude of the effect of same ethnic immigrants who are already entrepreneurs themselves in the same sector (*ETH3*) is the strongest one among our three ethnic variables. Moreover, the stated AMEs at the individual-level of immigrants' decision can create considerable heterogeneity in entrepreneurial activities of immigrants across municipalities at the aggregate-level.

Looking at the control group of 'natives' (Table 1), the effect of our main explanatory variables (ETHs) is either not significant in the 'natives' population' or remarkably lower in terms of marginal effects (magnitude) compared to the 'immigrants' population'. On the other hand, and in contrast to the results found for the 'immigrant's population', the variable *ENTREPRENEURSHIP* plays a significant role for natives, confirming previous studies (e.g. Andersson & Larsson, 2016). To sum up, it is interesting to observe that within the population of immigrants, the peer-to-peer effect comes from *other co-ethnic immigrant entrepreneurs*, and *not* from all other entrepreneurs in the population. This is reflected in the insignificance of the respective control variable *ENTREPRENEURSHIP* in the immigrants' population models. This is contrary to the population of natives models, hence providing evidence of systematic differences between natives and immigrant entrepreneurs when it comes to peer-to-peer effects mechanism.

As for our control variables, almost all of them show the expected results for the population of both immigrants and natives. The age variable has a positive and significant association with the probability of becoming an immigrant entrepreneur, although – as expected – the positive effect of age falls off as immigrants become older. The dummies for being male, being married,

and having children are all positive and significant. Immigrants with longer schooling years are more prone to become entrepreneurs as well. The employer's plant exit is also positively associated with the decision of immigrants to become entrepreneurs. This is because plant exit is commonly known as a push factor for individuals to switch to entrepreneurship (Andersson and Klepper, 2013). On the other hand, employer's plant size has a negative association with the probability of becoming an entrepreneur. These are well-known and often-found results in the literature on entrepreneurship in general, which turn out to hold true for immigrant entrepreneurship too.

Focusing on the effect of employment wage on immigrant entrepreneurship, our results support the opportunity recognition argument: the higher paid immigrants are, the more likely it is that they leave employment for entrepreneurship. Interestingly, the effect of wage is negative for the native population, which might indicate that the perception of opportunity cost versus opportunity recognition works conversely for natives when compared to immigrants.

At the regional level, while pure urbanization (measured by population density) does not seem to matter, the general entrepreneurship climate (measured as start-up density) in the region is negatively associated with immigrant entrepreneurship, albeit the AMEs are almost zero. On the contrary, the general entrepreneurship climate does matter for natives (model (4) to (6), which is in line with previous studies which examined all (not only immigrant) individuals' decisions to switch to entrepreneurship (Andersson and Larsson, 2016). Our findings contribute to enhancing understanding of immigrant entrepreneurship by showing that the general entrepreneurial climate in the region does not really influence immigrants' decision to become entrepreneurs. What matter is the entrepreneurial climate as part of the occupational structure of the EC (*ETH3*).

[Table 1 about here]

5.2. Result across ethnic groups

Results in Table 1 show that the peer-to-peer effect of same ethnic groups plays a role for increasing the propensity of entrepreneurship among immigrants (regardless of the ethnicity group). However, various ethnic groups of immigrants may have systematically different ways of within-ethnic interaction, hence experiencing varying degrees of benefiting from the peer-

to-peer effect (Cutler et al, 2008). This can be due to varying degrees of average human capital across ethnic groups. Therefore, in the following, we investigate whether or not such a general pattern of the peer-to-peer effect on entrepreneurship is equally pronounced across different ethnic groups. In order to do so, we have broken down the overall population of immigrants into nine ethnic groups and run the same regressions as in Model (1) to (3) in Table 1 for each of the nine categories. Due to space constraints, we only report the AME of our three main explanatory variables across the nine ethnic categories in Figure 1.

[Figure 1 about here]

For each of the nine ethnic groups (country groups) in Figure 1, the AMEs of *ETH1*, *ETH2*, and *ETH3* are illustrated with bars in terms of Percentage Points (PP). The solid bars are the statistically significant AMEs at a 5% confidence level or higher. The dashed bars are the insignificant AMEs. In the following, we only discuss the significant AMEs, which are mostly for *ETH3* but also in few cases for *ETH1* and *ETH2*. Several observations are worth noting. First, *ETH3* always has higher AMEs compared to the two other explanatory variables in all ethnic groups (the significant ones). This corroborates the general pattern we found pooling all ethnic groups together (Table 1). Second, the AME of ETH3 for the ethnic group EU15 is the highest one (50 PP), followed by South America (40 PP), Europe (19 PP) and the Nordic Countries (11 PP). This should be interpreted as increasing the value of a given ETH (in a given municipality) from its sample minimum value to its sample maximum value. For instance, the 50 PP for EU15 means that increasing the ETH3 from its sample minimum value (zero) to its sample maximum value (0.76) is associated with a 50 PP increase in the probability of an immigrant with EU background to become an entrepreneur. The magnitude of the effect on the probability shows a sharp difference with the overall effect we found in Table 1, which was 2 PP. Third, although in Table 1 ETH2 turns out to be significant when pooling the population of all ethnic groups together, breaking down the population into the nine ethnics groups in Figure 1 did not show any significance in any of the ethnic groups for this variable, except for South American immigrants. Nevertheless, the magnitude of the effect here is rather small (6 PP). Therefore, based on pooling all immigrants together (Section 5.1) as well separating them based on their ethnic groups (Section 5.2), we can conclude that what really matters for an immigrant's decision to become an entrepreneur is being surrounded by same-ethnic entrepreneurs in the region. This means that we find strong support for our third hypothesis, while our second hypothesis is only partially confirmed by our results, and our first hypothesis is rejected.

6. Conclusion

This paper examines the relation between ethnic communities (ECs) and immigrant entrepreneurship in Swedish regions. This is a relevant issue, not only from an academic but also from a practical point of view, since the EU (and particularly Sweden), has faced an immigrant crisis recently. Enhancing immigrant entrepreneurship is commonly considered as an effective way for job creation and integration of immigrants. Employing the concept of 'mixed embeddedness' we analyse the effect of being embedded into an EC in the host region on the decision of immigrants to become entrepreneurs. We explicitly account for not only general social and market interactions of immigrants within their EC; we also consider the occupational structure of the EC itself.

The data for our empirical investigation comes from a rich longitudinal registered-data in Sweden, which covers the population of all immigrant individuals for the period 2003-2010. Employing a Logit model, we find that two mechanism matter for immigrant entrepreneurship: first, being located in a region with a high share of immigrants from the same EC who are also working in the same sector. Second, being located in a region with a high share of immigrants from the same EC who are already entrepreneurs in the same sector themselves. The strongest effect is found for the latter mechanism. This is because immigrants may rely not only on the social capital and a potential customer group of their EC in the region, but also they may enjoy the knowledge and experiences available in their EC of how to start a business in the host region/country (Minniti, 2005). In addition, they may also benefit from the role model effect (Bosma et al, 2012). Furthermore, digging into each and every ethnic community, we found that the positive general effect of ECs on fostering immigrant entrepreneurship is mostly pronounced among immigrant groups from the Nordic countries, other European countries and South America.

Interestingly, being solely in a region with a high share of the same ethnic community EC (enclave thesis) does not explain entrepreneurship among immigrants. It implies that 'bonding' social capital within a homogeneous community is not 'enough' for promoting effective entrepreneurship. What really matters is having social interactions with a particular group of immigrants: (i) those who are equipped with the know-how about the industry the focal immigrant has chosen for starting his/her own business; and, even more importantly (ii) immigrants who are already entrepreneurs themselves, since they can provide knowledge about the institutional context of the host region (more precisely, knowledge required to start a

business. Especially regarding the last group, the entrepreneurship literature provides evidence that 'entrepreneurial cultural' effects or 'peer-to-peer feedback' occurring in a cluster of entrepreneurs tend to promote further entrepreneurship in the region/neighbourhood (Fritsch and Wyrwich, 2014; Andersson and Larsson, 2016). What we found in this paper is that such peer-to-peer effects also play a critical role for immigrant entrepreneurship, which enables immigrants to benefit from 'mixed embeddedness' both in the community itself and in the institutional setting of the host region.

Even though the findings in this paper are based on Swedish data, one can draw more general conclusions from our study. As noted in Section 3, the results and implications may be generalized to other countries with similar context conditions. These may include small open economies in Europe which went through similar refugee crises as Sweden or those small open economies that historically have had a large share of immigrants.

As noted earlier, we did not find evidence that (merely) bonding social capital matters for immigrant entrepreneurship. Further work is needed to take into account the dimension of bridging social capital in the mixed embeddedness framework (Putnam, 2001). It would be interesting to examine whether bridging social capital between heterogeneous groups would suffice for immigrant entrepreneurship. The literature indicates that while a positive effect of bonding social capital is in place (which we also found, however with a very small marginal effect), immigrants with access to bridging social capital (brought about by relations to other communities) are more likely to become self-employed (Kanas et al, 2009).

Finally, some limitations of our study and suggestions for future research need to be discussed. Considering the second hypothesis, the data did not allow us to verify whether training actually occurs on the job, and whether this training is transferable to entrepreneurial venturing (especially if an immigrant is hired in a low ranked position with a low chance of formal training). Moreover, using a two-digit industry classification as done in this paper may be too widespread for truly capturing the transfer of industry-specific know-how through training. Future studies should further delineate the mechanisms by which industry-specific know-how is transferred to immigrants through ethnic enclaves. Another limitation of this study is that we focused on the transition from employment to entrepreneurship, leaving out the choice of immigrants to go straight to entrepreneurship. Future studies may investigate if immigrants who straight move into entrepreneurship do have systematically different reasons for doing so compared to those immigrants who transit from employment to entrepreneurship. One reason

could be the "necessity" of becoming an entrepreneur as opposed to the "opportunity" of engaging in entrepreneurial ventures. In this paper, we were more prone to capture opportunity-based entrepreneurship among immigrants. Future studies may compare and contrast opportunity-based with necessity-based immigrant entrepreneurship.

References

Aldrich, H. E., & Waldinger, R. (1990). Ethnicity and entrepreneurship. *Annual review of sociology*, 111-135.

Andersson, M., & Klepper, S. (2013). Characteristics and performance of new firms and spinoffs in Sweden. *Industrial and Corporate Change, 22*(1), 245-280.

Andersson, M., & Larsson, J. P. (2016). Local entrepreneurship clusters in cities. *Journal of Economic Geography, 16*, 39–66.

Bailey, T., & Waldinger, R. (1991). Primary, secondary, and enclave labor markets: A training systems approach. *American Sociological Review*, 432-445.

Clark, K., & Drinkwater, S. (2000). Pushed out or pulled in? Self-employment among ethnic minorities in England and Wales. *Labour Economics, 7*(5), 603-628.

Clark, K., & Drinkwater, S. (2010b). Patterns of ethnic self-employment in time and space: evidence from British Census microdata. *Small Business Economics, 34*, 323-338.

Cohen, W., & Levinthal, D. (1990). Absorptive Capacity: A New Perspective on Learning and Innovation. *Administrative science quarterly, 35*(1), 128-152.

Cutler, D. M., Glaeser, E. L., & Vigdor, J. L. (2008). When are ghettos bad? Lessons from immigrant segregation in the United States. *Journal of Urban Economics, 63*(3), 759-774.

Dahl, M. S., & Sorenson, O. (2012). Home sweet home: Entrepreneurs' location choices and the performance of their ventures. *Management science, 58*(6), 1059-1071.

Damm, A. P. (2009). Ethnic enclaves and immigrant labor market outcomes: Quasi-experimental evidence. *Journal of Labor Economics, 27*(2), 281-314.

Edin, P. A., Fredriksson, P., & Åslund, O. (2003). Ethnic enclaves and the economic success of immigrants-evidence from a natural experiment. *Quarterly Journal of Economics, 118*, 329-357.

Fairlie, R. W., & Meyer, B. D. (1996). Ethnic and racial self-employment differences and possible explanations. *Journal of human resources*, 757-793.

Fritsch, M., & Wyrwich, M. (2014). The long persistence of regional levels of entrepreneurship: Germany, 1925–2005. . *Regional Studies, 48*(6), 955-973.

GEM. (2016). *The 2016 Global Entrepreneurship Monitor (GEM) report .* Boston: Babson College.

Guiso, L., & Schivardi, F. (2011). What determines entrepreneurial clusters? *Journal of the european economic association, 9*(1), 61-86.

Hoang, H., & Antoncic, B. (2003). Network-based research in entrepreneurship: A critical review. *Journal of business venturing, 18*(2), 165-187.

Hofstede, G. (1980). *Culture's consequences: International differences in work-related values .* Sage.

Jones, T., Ram, M., Edwards, P., Kiselinchev, A., & Muchenje, L. (2014). Mixed embeddedness and new migrant enterprise in the UK. *Entrepreneurship & Regional Development, 26*(5-6), 500-520.

Kanas, A., Van Tubergen, F., & Van der Lippe, T. (2009). Immigrant Self-Employment Testing Hypotheses about the Role of Origin-and Host-Country Human Capital and Bonding and Bridging Social Capital. *Work and Occupations, 38*(3), 181-208.

Kerr, S., Kerr, W., & Lincoln, W. (2015). Skilled immigration and the employment structures of US firms. *Journal of Labor Economics, 33*(1), 147-186.

Kloosterman, R. C. (2010). Matching opportunities with resources: A framework for analysing (migrant) entrepreneurship from a mixed embeddedness perspective. *Entrepreneurship and Regional Development, 22*(1), 25-45.

Kloosterman, R., Van der Leun, J., & Rath, J. (1998). Across the border: Immigrants' economic opportunities, social capital and informal business activities. *Journal of ethnic and migration studies, 24*(2), 249-268.

Kloosterman, R., Van Der Leun, J., & Rath, J. (1999). Mixed embeddedness:(in) formal economic activities and immigrant businesses in the Netherlands. *International journal of urban and regional research, 23*(2), 252-266.

Levesque, M., & Minniti, M. (2006). The effect of aging on entrepreneurial behavior. *Journal of Business Venturing, 21*(2), 177-194.

Light, I., Bhachu, P., & Karageorgis, S. (1993). Migration networks and immigrant entrepreneurship. In *Immigration and entrepreneurship: Culture, capital, and ethnic networks* (pp. 25-50). London: Transaction Publishers.

Min, P. G., & Bozorgmehr, M. (2000). Immigrant entrepreneurship and business patterns: A comparison of Koreans and Iranians in Los Angeles. *International Migration Review*, 707-738.

Minniti, M. (2005). Entrepreneurship and network externalities. *Journal of Economic Behavior and Organization, 57*, 1–27.

Ndofor, H., & Priem, R. (2011). Immigrant Entrepreneurs, the Ethnic Enclave Strategy, and Venture Performance. *Journal of Management, 37*(3), 790-818.

OECD. (2010). *Entrepreurship and Migrants. Report by the OECD Working Party on SMEs and Entrepreneurship, OECD.*

Parrilli, M. D. (2009). Collective efficiency, policy inducement and social embeddedness: Drivers for the development of industrial districts. *Entrepreneurship and Regional Development, 21*(1), 1-24.

Portes, A., & Bach, R. L. (1985). *Latin journey: Cuban and Mexican immigrants in the United States.* Univ of California Press.

Price, M., & Chacko, E. (2009). The mixed embeddedness of ethnic entrepreneurs in a new immigrant gateway. *Journal of Immigrant & Refugee Studies , 7*(3), 328-346.

Putnam, R. D. (2001). *Bowling alone: The collapse and revival of American community.* Simon and Schuster.

Rafiq, M. (1992). Ethnicity and enterprise: A comparison of Muslim and non-Muslim owned Asian businesses in Britain. *Journal of Ethnic and Migration Studies, 19*(1), 43-60.

Raijman, R., & Tienda, M. (2000). Immigrants' pathways to business ownership: A comparative ethnic perspective. *International migration review*, 682-706.

Rodríguez-Pose, A., & Von Berlepsch, V. (2014). When migrants rule: the legacy of mass migration on economic development in the United States. *Annals of the Association of American Geographers, 104*(3), 628-651 .

Rusinovic, K. (2006). *Dynamic entrepreneurship: first and second-generation immigrant entrepreneurs in Dutch cities.* Amsterdam: Amsterdam University Press.

Tavassoli, S., & Jienwatcharamongkhol, V. (2016). Survival of entrepreneurial firms: the role of agglomeration externalities. *Entrepreneurship & Regional Development, 28*((9-10)), 746-767.

Zhou, M. (2004). Revisiting ethnic entrepreneurship: convergencies, controversies, and conceptual Advancements. *International migration review, 38*(3), 1040-1074.

Table 1-Determinant of leaving employment for entrepreneurship among immigrants (and natives as control group)

VARIABLES	Immigrants			Natives		
	(1)	(2)	(3)	(4)	(5)	(6)
ETH1	0.008**			0.001		
	(0.003)			(0.006)		
(ETH1)²	-0.000**			0.001		
	(0.000)			(0.000)		
ETH2		0.652***			0.015***	
		(0.028)			(0.002)	
(ETH2)²		-0.088***			-0.001***	
		(0.009)			(0.000)	
ETH3			2.168***			0.092***
			(0.233)			(0.014)
(ETH3)²			-2.738***			-0.025***
			(0.448)			(0.006)
AGE	10.257***	10.129***	10.096***	11.243***	11.224***	10.884***
	(0.796)	(0.801)	(0.800)	(0.299)	(0.299)	(0.300)
(AGE)²	-1.434***	-1.414***	-1.412***	-1.623***	-1.620***	-1.573***
	(0.108)	(0.109)	(0.108)	(0.040)	(0.040)	(0.040)
MALE	0.524***	0.528***	0.516***	0.369***	0.370***	0.385***
	(0.015)	(0.015)	(0.015)	(0.006)	(0.006)	(0.006)
SCHOOLING	0.018***	0.020***	0.018***	0.032***	0.032***	0.032***
	(0.003)	(0.003)	(0.003)	(0.001)	(0.001)	(0.001)
CHILDREN	0.131***	0.127***	0.128***	0.045***	0.045***	0.042***
	(0.014)	(0.014)	(0.014)	(0.005)	(0.005)	(0.005)
MARRIED	0.136***	0.122***	0.130***	0.145***	0.145***	0.143***
	(0.014)	(0.014)	(0.014)	(0.005)	(0.005)	(0.005)
WAGE	0.056***	0.059***	0.059***	-0.030***	-0.030***	-0.027***
	(0.004)	(0.004)	(0.004)	(0.001)	(0.001)	(0.001)
PLANT EMPLOYEE	-0.315***	-0.311***	-0.310***	-1.464***	-1.464***	-1.443***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
PLANT EXIT	0.185***	0.153***	0.176***	-1.855***	-1.854***	-1.821***
	(0.013)	(0.014)	(0.014)	(0.012)	(0.012)	(0.012)
URBANIZATION	-0.010*	0.005	-0.007	0.030***	0.023***	-0.002
	(0.005)	(0.005)	(0.005)	(0.002)	(0.002)	(0.002)
ENTREPRENEURSHIP	-0.003	-0.166***	-0.043***	2.977***	3.039***	6.178***
	(0.017)	(0.016)	(0.016)	(0.140)	(0.141)	(0.156)
Number of Individuals	533,288	533,288	533,288	3,694,224	3,694,224	3,694,224
Observations	2,488,351	2,488,351	2,488,351	19,831,112	19,831,112	19,831,112

Notes for Table 1: The table reports the estimated coefficient of random effect logit model in the Equation (1) for the population of immigrants in Models (1) to (3) and population of natives (as control group) in Models (4) to (6). Robust standard errors are reported in the parentheses. Significance level: *** p<0.01, ** p<0.05, * p<0.1. All models include 9 Education specialization dummies, 9 Occupation specialization dummies, 9 Industry dummies, and 8 Time dummies.

Figure 1: Marginal effect across nine ethnic group categories
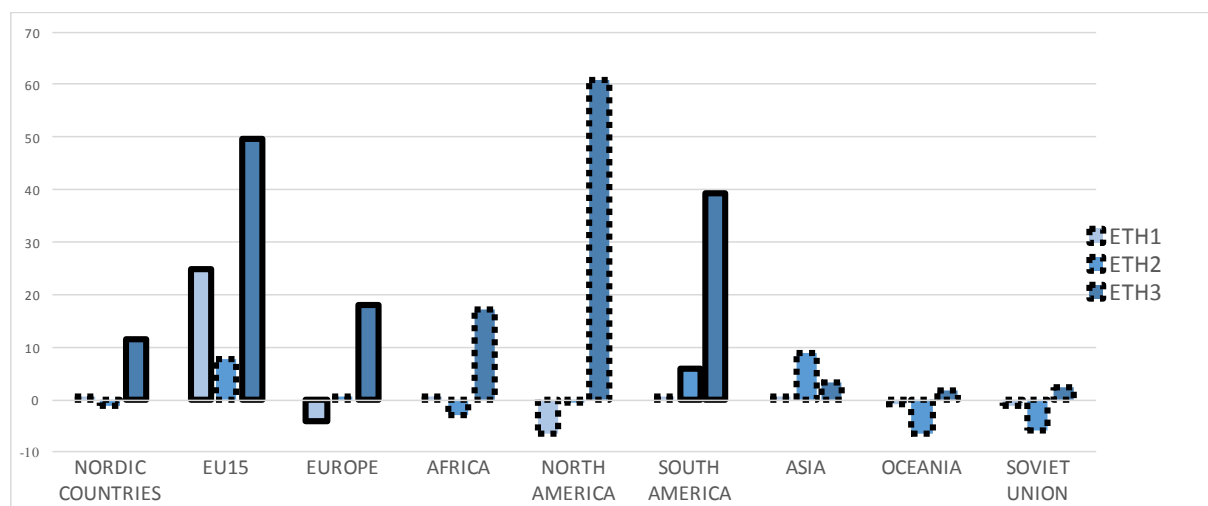
Note: The graph illustrates the Average Marginal Effects (AMEs) of the three variable ETH1, ETH2, and ETH3 across nine ethnic group categories. The solid bars are the statistically significant AMEs at 5% confidence level or higher. The dashed bars are the insignificant AMEs. The AMEs are reported in terms of Percentage Point (PP) increase of the probability of immigrant entrepreneurship, if the value of of given ETH variable is increased from sample minimum value (zero) to the sample maximum value of the variable.

Appendix 1: Population distribution of immigrants and immigrant entrepreneurs in Sweden across ethnic country groups over the period 2003-2010

Country Group of Birth	Immigrants		Immigrant Entrepreneurs	
	Frequency	Percent	Frequency	Percent
1. Nordic Countries [a]	926,708	24	43,917	23
2. EU15 [b]	340,432	10	23,722	13
3. Europe [c]	923,755	24	35,684	19
4. Africa	247,642	6	6,721	3.5
5. North America	90,906	2	4,644	2.5
6. South America	239,633	6	5,969	3
7. Asia	1,028,463	27	66,637	35
8. Oceania	13,907	0.4	927	0.5
9. Soviet Union	19,472	0.5	1,075	0.6
Total	3,830,918	100	189,296	100

[a] "Nordic Countries" excludes Sweden
[b] "EU15" excludes Denmark, Finland, and Sweden
[c] "Europe" excludes EU15 and the Nordic countries

Appendix 2: Variable description

Variables	Description	Source
Dependent Variable		
STARTUP	Dummy denoting whether an employed immigrant decided to become an entrepreneur from year *t-1* to year *t* (1), or not (0).	Individual-level Register Database (LISA), SCB
Explanatory Variables		
ETH1	See section 4.2	Authors' calculation, LISA
ETH2	See section 4.2	”
ETH3	See section 4.2	”
Control Variables: Individual Characteristics		
AGE	Entrepreneur's age in year *t-1*	LISA, SCB
AGE^2	*Age* squared	
MALE	Dummy indicating the entrepreneur's gender, 1 for Male and 0 for Female	”
SCHOOLING	Number of years to complete the immigrant's highest achieved level of education in year *t-1*.	”
MARRIED	Dummy indicating whether the immigrant is married (1), or not (0) in year *t-1*. The variable is also set to 1 for immigrants in domestic partnerships.	”
CHILDREN	Dummy indicating that the immigrant has children registered as living in the same residence in year *t-1*.	”
EDUCATION SPEC.	A set of 8 dummies, indicating the type of education associated with each immigrant's highest achieved level of education.	”
Control Variables: Job &Workplace Characteristics		
WAGE	The immigrant's wage, in Swedish krona, in year *t-1* (ln).	LISA, SCB
OCCUPATION SPEC.	A set of 9 dummies at one digit ICSO-88 standard, denoting the immigrant's occupation specialization.	”
PLANT SIZE	Number of employees in the same work establishment as the immigrants in year *t-1* (ln).	Business Register Database, SCB
PLANT EXIT	Dummy, denoting whether the work plant of immigrant in *t-1* has discontinued its operations before the next period *t*	”
INDUSTRY	A set of 9 dummies at one digit NACE code, denoting the sectoral affiliation of immigrant's work place.	”
Control Variables: Regional Characteristics		
URBANIZATION	Population density in region *r* year *t-1*	Authors' calculation using Firms and Establishments Dynamic database, SCB
ENTREPRENEURSHIP	Share of entrepreneurs in region *r* year *t-1*	

Appendix 3: Descriptive statistics

Variables	Mean	Std. Dev.	Min	Max
STARTUP	0.012	0.11	0	1
ETH1	4.05	3.64	0	41.24
ETH2	0.36	0.56	0	12.78
ETH3	0.02	0.04	0	0.76
AGE	43.5	10.5	25	64
MALE	0.48	0.50	0	1
SCHOOLING	13.16	3.65	6	22
CHILD	0.57	0.49	0	1
MARRIED	0.55	0.50	0	1
WAGE	7.32	1.50	0	12.78
PLANT EMPLOYEE	4.01	2.10	0.69	9.41
PLANT EXIT	0.45	0.50	0	1
URBANIZATION	10.60	1.36	6.61	12.94
ENTREPRENEURSHIP	0.77	0.43	0	2.78
EDUCATION SPECIALIZATIONS				
Education: General	0.26	0.44	0	1
Education: Pedagogics & teaching	0.06	0.24	0	1
Education: Humanities & arts	0.05	0.21	0	1
Education: Social science	0.15	0.36	0	1
Education: Natural science	0.05	0.21	0	1
Education: Technology & manufacturing	0.20	0.40	0	1
Education: Agriculture & forestry	0.01	0.10	0	1
Education: Health & medical care	0.16	0.37	0	1
Education: Services	0.05	0.22	0	1
OCCUPATION SPECIALIZATIONS				
Occupation: Legislators, senior officials, managers	0.04	0.18	0	1
Occupation: Professionals	0.17	0.38	0	1
Occupation: Technicians	0.13	0.34	0	1
Occupation: Clerks	0.08	0.26	0	1
Occupation: Service and shop sales workers	0.25	0.43	0	1
Occupation: Skilled agricultural & fishery workers	0.01	0.05	0	1
Occupation: Craft and related trades workers	0.07	0.26	0	1
Occupation: Machine operators and assemblers	0.12	0.33	0	1
Occupation: Elementary occupations	0.14	0.34	0	1
INDUSTRY SPECIALIZATIONS				
Industry: Agriculture, hunting and related services	0.02	0.14	0	1
Industry: Manufacture of wood & of products of wood	0.08	0.27	0	1
Industry: Manufacture of office machinery & computers	0.06	0.23	0	1
Industry: Electricity, gas, steam and hot water supply	0.03	0.17	0	1
Industry: Sale. maintenance and repair of motor vehicles	0.14	0.35	0	1
Industry: Land transport; transport via pipelines	0.07	0.25	0	1
Industry: Real estate activities	0.17	0.37	0	1
Industry: Education	0.30	0.46	0	1
Industry: Sewage and refuse disposal	0.04	0.18	0	1

Note for Appendix 3 The number of observations for the variable *STARTUP* is 2,761,678. For the rest of variables, the number of observations is 3,832,839 which is the total population of working-age individual immigrants over the period 2003-2010. The log value is shown in the table for continuous variables. The ethnic variables (*ETH1*, *ETH2*, *ETH3*) and share of entrepreneurship in the region *(ENTREPRENEURSHIP)* are multiplied by 100, in order to have a convenient interpretation of the marginal effects in the subsequent analysis.

Appendix 4- Correlation matrix

	STARTUP	ETH1	ETH2	ETH3	AGE	MALE	SCHOOLING	CHILD	MARRIED	WAGE	EMPL	EXIT	URBA	ENTREP
STARTUP	1													
ETH1	0.002	1												
ETH2	-0.022	0.621	1											
ETH3	0.067	0.457	0.355	1										
AGE	-0.012	-0.001	0.016	-0.063	1									
MALE	0.045	-0.008	-0.151	0.071	-0.016	1								
SCHOOLING	-0.002	-0.097	-0.030	-0.110	-0.085	-0.040	1							
CHILD	0.010	0.028	0.034	0.025	-0.092	-0.071	0.005	1						
MARRIED	0.010	0.042	0.024	0.024	0.153	0.004	-0.002	0.297	1					
WAGE	-0.171	-0.029	-0.001	-0.146	0.077	0.045	0.123	-0.023	0.007	1				
EMPL	-0.151	-0.035	0.061	-0.160	0.023	-0.025	0.152	-0.015	0.000	0.304	1			
EXIT	-0.085	-0.020	0.059	-0.069	-0.025	-0.019	0.076	-0.012	-0.015	0.117	0.398	1		
URBAN	0.006	0.028	-0.046	0.079	-0.106	0.029	0.100	-0.045	-0.089	-0.004	0.055	0.058	1	
ENTREP	0.009	0.442	0.216	0.309	-0.038	0.021	0.013	-0.004	-0.030	-0.005	-0.008	0.026	0.379	1

Appendix 5: Identification issues

A key issue in the literature on social interactions (and entrepreneurial decisions) is how to identify the relevant 'interaction arena'. Empirical work has tackled this issue through addressing the so-called 'reflection problem' and 'sorting problem' (cf. Manski, 1993). A true local social interaction effect can be identified if one can isolate such an effect from a non-random spatial sorting of individuals (here immigrant entrepreneurs) into specific locations (here municipalities). It is argued that individuals who decide to start a firm in the near future may move to certain entrepreneurial regions before they actually start their firm. However, at least in Sweden this does not seem to be the case. Andersson and Larsson's (2016) recent study supports this view. Using similar Swedish data as our paper, they showed that all entrepreneurs (including immigrant entrepreneurs) are indeed less mobile than ordinary employees before they start their businesses. This pattern is in line with the notion of 'home bias' of entrepreneurs, meaning that entrepreneurs start their new businesses at the place where they have lived (for a long time) before (Dahl & Sorenson, 2012), enabling them to better exploit the local endowments.

Another issue related to the 'interaction arena' concerns the geographical boundaries within which effective social interactions between entrepreneurs occur. Typically, such geographical areas are identified as cities or municipalities (Lee, 2000; Giannetti and Simonov, 2004; 2009). A recent study discussed and identified lower levels of aggregation all the way down to the neighbourhood level of 1 km^2, arguing that the city level arena is 'too large' for social interactions among entrepreneurs (cf. Andersson and Larsson, 2016). Nevertheless, in this paper we still chose the city (municipality) and not the neighbourhood as the relevant arena for social interaction for the immigrant entrepreneurs. Our reasoning is as follows. Immigrant (entrepreneurs) socially interact with other immigrant (entrepreneurs) differently than native (entrepreneurs). This is because of the 'magnetic' nature of interaction of co-ethnic immigrants (as the minorities in a host country) (Mazumdar et al, 2000; Birman et al, 2005; Danzer & Yaman, 2013). Immigrants find each other beyond a 1 km^2 neighbourhood through a variety of events (religious and/or non-religious ones), get to gathering events, picnics, etc. If they would limit their interaction with co-ethnics within an area spanning only 1 km^2, they would meet and socially interact with very few members of their EC (see, e.g. Zivkovic's (1994) study of Croatian in North America).

Reference list for the Appendix 5

Birman, D., Trickett, E., & Buchanan, R. M. (2005). A tale of two cities: Replication of a study on the acculturation and adaptation of immigrant adolescents from the former Soviet Union in a different community context. *American journal of community psychology*, 35((1-2)), 83-101

Danzer, A. M., & Yaman, F. (2013). Do Ethnic Enclaves Impede Immigrants' Integration? Evidence from a Quasi-experimental Social-interaction Approach. *Review of International Economics, 21*(2), 311-325.

Giannetti, M., Simonov, A. (2004) On the determinants of entrepreneurial activity – social norms, economic environment and individual characteristics. *Swedish Economic Policy Review*, 11: 269–313.

Giannetti, M., Simonov, A. (2009) Social interactions and entrepreneurial activity. *Journal of Economics & Management Strategy*, 18: 665–709.

Le, A. T. (2000). The determinants of immigrant self-employment in Australia. *International Migration Review*, 183-214.

Manski, C. (1993) Identification of endogenous social effects: the reflection problem. *Review of Economic Studies*, 60: 531–542.

Mazumdar, S., Mazumdar, S., Docuyanan, F., & McLaughlin, C. M. (2000). Creating a sense of place: the Vietnamese-Americans and Little Saigon. *Journal of environmental psychology, 20*(4), 319-333.

Zivkovic, I. (1994). Adaptation patterns of parents and their children in the US and Canada. In P. Noack, & M. Hofer, *Psychological responses to social change: Human development in changing environments. Prevention and intervention in childhood and adolescence* (Vol. 18, pp. 87–103). Oxford, England: Walter De Gruyter.