

# **Determinants of Immigrant Self-employment Rates and Self-employment Transitions: Evidence from Switzerland**

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*To my parents and my sweet love*



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# Introduction

## **Introduction**

This thesis is composed of three essays. They present empirical evidence on the determinants of immigrant self-employment rates and self-employment transitions. The focus of the first essay is on the effects of group characteristics and market conditions on self-employment propensity of immigrants. Subsequently, the relevance of spatial spillovers in entrepreneurial aggregate decision outcomes is investigated. Finally, the analysis narrows down on the effects of job (dis-) satisfaction on the propensity to transit into self-employment, given a previous wage employment status.

The self-employment rate is used as a measure of entrepreneurship. It is actually the most basic one, since it is defined as the number of self-employed individuals relative to the labour force (active population). However, because of its availability, it is also widely considered in entrepreneurship research. Typically, self-employment rates are used to compare entrepreneurship across countries (see, among others, Acs *et al.*, 1994; Le, 1999; Blanchflower, 2000 and 2004) or to investigate the determinants of entrepreneurship in single countries and regions (for an overview, see Le, 1999).

Entrepreneurship research, which dates back to the theoretical contribution proposed first by French economists Richard Cantillon and Jean-Baptiste Say in the eighteenth and nineteenth centuries and further developed by Knight (1971) and Schumpeter (1949), has over the last thirty years attempted to explain why individuals choose different occupations (wage- versus self-employment).

The interest in the role of small businesses in the labour market has been stimulated by Birch's claim that small firms create a higher share of new jobs than big ones (Birch, 1979). At the same time, many countries have witnessed the emergence of a blooming small- and medium-sized enterprise sector that consistently and increasingly influenced labour market outcomes. The evolution of the small business sector has led to promising changes in modern economies, playing an important role in technological change and in the growth and evolution of industries (Acs and Preston, 1997).

Since then, entrepreneurship has been incorporated in formal neo-classical models under the assumption that individuals differ in their entrepreneurial or managerial ability. Following Say's interpretation, entrepreneurs are regarded primarily as managers or agents of production, as they assess the most favourable economic opportunities. According to this view, payoffs do not reflect profits (which pertain to capitalists) but rather a compensation (wage) for delivering a scarce type of (talented) labour.

Whether this ability enters in the cost function as an (unknown) efficiency gain as in Jovanovic (1982) and Brock and Evans (1986) or in the production function, maximising total product and marginal product of the factors of production (i.e., capital), as in Lucas (1978), Evans and Jovanovic (1989), Holmes and Schmitz, (1990) and Lazear (2004), the common conclusion is that (in equilibrium) the most talented individuals (self-)select into self-employment, while the least talented remain in wage-employment.

A smaller number of studies have been suggesting that individuals differ in their willingness to tolerate risk (Kihlstrom and Laffont, 1979; Kanbur, 1979) or in the perception of risk (de Meza and Southey, 1996). These formal developments follow the Knightian interpretation (Knight, 1942, 1971), which postulates that entrepreneurs, as owners of companies (i.e., residual claimants), assume the consequences of uncertainty. Uncertainty may arise both through the activity of the entrepreneur himself (innovation) or exogenously. As a compensation of this intermediation, they receive (positive) profits. In their theoretical contribution, Kihlstrom and Laffont propose a model of competitive equilibrium under uncertainty. Similarly to the selection process outlined above, in equilibrium less risk averse individuals become self-employed.

Little attention has been dedicated to the more challenging idea proposed by Schumpeter (1949), who praised the entrepreneurs for their role of innovators. According to his idea, entrepreneurs are responsible for identifying new combinations (i.e., by creating new goods, methods of production, markets, sources of supply, industries, organizations) and react to these by making profits. In opposition to the managers, whose aim is to maximise technical efficiency by combining the factors of production, entrepreneurs shift the production function outward by innovation. Hence, entrepreneurs move the economy "out

of the static equilibrium by creating new products or production methods, thereby rendering others obsolete.” This mechanism, which is known as the process of creative destruction, was seen by Schumpeter as “the driving force behind economic development” (Iversen *et al.*, 2008, p. 6).

With the only exception of Kirzner (1973) and Schultz (1975), whose models were considering individuals dealing with disequilibria, the standard neo-classical approach has dominated the way in which economists have contributed to entrepreneurship research. However, this framework has failed to incorporate either the Schumpeterian idea and the more recent developments in entrepreneurship theory. Moreover, it has been criticised for omitting many of the key issues developed by early theories (Baumol, 1968). It is probably for this reason that the main contributions to entrepreneurship theory continue to be developed outside the standard neo-classical framework (Iversen *et al.*, 2008).

The purpose of this thesis is, on the one hand, to shed light on two issues not (sufficiently) covered in entrepreneurship research, namely the factors influencing entrepreneurship levels on a local scale, and the relevance of spatial spillovers in aggregate entrepreneurial decision outcomes. Furthermore, following an accurate literature review and having acknowledged that existing studies of entrepreneurial choices often lack, in their empirical specifications, subjective evaluations leading to transitions, I aim to introduce job satisfaction variables in entrepreneurship research, and to study their effects on individual outcomes.

A field in which economists have been notably absent, despite the relevance of the phenomenon at the national and international level, is the one of immigrant (or ethnic) entrepreneurship. Research on this issue has been dominated by sociologists – and to lesser extent, by economic geographers and cultural anthropologists – in a quest to explain why immigrants in advanced economies are more likely to become self-employed than natives, and more generally, why some ethnic groups show higher self-employment rates.

Early-stage research pointed out that supply side factors like cultural characteristics (Bonacich, 1973), and resources, are significant factors. Resources can be either individual (e.g., human capital) and collective (group solidarity, social networks – see Portes, 1995 –

as well as start-up capital, information and knowledge, cheap family or co-ethnic labour, a first customer base or supplier chain – see Ram and Jones, 1998). According to the protected market hypothesis, immigrants may benefit from comparative advantages (with respect to natives) in serving the needs of their ethnic community (Light, 1972). Moreover, structural factors like ethnic exclusion and discrimination (a typical feature of local labour markets when immigrants are segregated in ethnic enclaves) have been used to explain why immigrants turn to self-employment (Bonacich, 1973; Wong, 1988). Later on, differences in education and work experience of immigrants have been emphasized (Reimers, 1983; Evans and Kelley, 1986; Bloom *et al.*, 1995). Moreover, ecological approaches stressed the importance of factors such as ethnic and cultural diversity, as well as fluency in the language spoken locally, in encouraging or displacing business ownership (isolated labour pool – Light, 1972; Evans, 1989). Further, the issue has been developed by Waldinger *et al.* (1990), who proposed a model in which demand and supply factors coexist and influence ethnic businesses by three interactive components: opportunity structures (i.e., market conditions, facilities, access, etc.), group characteristics (i.e., culture, aspiration levels, ethnic networks, resources, etc.) and strategies (the interaction between the two, since “ethnic groups adapt to their environments” – Aldrich and Waldinger, 1990).

On the demand side, factors related to the economic environment in which immigrants live have been emphasised. In this regard, ethnic concentration may support business ownership, since it reduces conflicts and prejudices (Alesina and La Ferrara 2002, 2005). Moreover, the dominance of a particular ethnic group is expected to encourage self-employment through increased social interaction (Borjas 1986) and a reduction of transaction costs (Lazear 1999).

Whether the economic environment acts as push factor (e.g., high unemployment, low wages, non-recognition of qualifications, discrimination, etc.), reducing alternatives for immigrants who shift to self-employment as a survival strategy, or as a pull factor (e.g., by providing ethnic niche markets and, more generally, wider markets – see Waldinger *et al.*, 1990), is a question that social scientists, more than economists, addressed extensively. Some notable exceptions are found among labour economists. For instance, Borjas (1986)

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stressed the importance of ethnic concentration in enhancing entrepreneurial opportunities for immigrants (in particular, through the provision of special goods and services to co-ethnics). Fairlie and Meyer (1996) found that self-employment rates of immigrants are higher among the more advantaged groups (i.e., those reporting higher average wages, self-employment earnings and unearned income).

The absence of a comprehensive economic literature in this field is even more surprising since there are many remarkable empirical questions to address like, for instance, the fast rise in the number of immigrants observed in many countries, the increasing need for autonomy (and for self-determinacy), as well as the relevance of immigrant businesses on a local scale (Rath and Kloosterman, 2000).

From a policy viewpoint, ethnic entrepreneurship is desirable under many aspects. On the one hand, ethnic entrepreneurship ensures more efficient allocation of resources, since discriminated or dissatisfied individuals, as well as more talented or less risk averse may turn to entrepreneurship in order to increase their motivational returns. On the other hand, pull factors such as market opportunities or innovation will act in a way to encourage entrepreneurship, which in turn contributes to create new markets, increase and reshape existing ones, foster competition and innovation. This is particularly true in urban areas, where ethnic businesses “become points of reference for immigrants and provide a space for socialisation and a source of identity” (Labrianidis and Hatziprokopiou, 2010). Moreover, ethnic entrepreneurship may play a role in the upgrading of deprived neighbourhood (Sepulveda *et al.*, 2005). Still, the potential for growth of ethnic businesses has been shown to be very limited (Aldrich *et al.*, 1983; Mohl, 1983).

Given the absence of a comprehensive economic theory/literature and the policy relevance of ethnic entrepreneurship, further research is needed on this matter. Especially at local level, where the theoretical gaps mix with local specificities, the ambiguous results found for the above mentioned factors call for more empirical engagement.

Using data at a very high level of geographical disaggregation, this thesis aims to show that group characteristics and market conditions matter in determining local entrepreneurship levels of immigrants. Unlike in previous studies, the set is not limited to



metropolitan or urban areas, but covers the entire area where immigrant communities have been found. Self-employment rates (the number of self-employed individuals relative to the labour force) are used to compare entrepreneurship levels between local communities.

A second relevant issue that has been ignored by the economic literature of entrepreneurship is the role of space. Existing theories approach space in a mere conceptual way, as the place in which activities occur, without taking into consideration that geography matters when it comes to economic relationships. However, the importance of local network externalities in influencing entrepreneurial decisions and outcomes is well documented, and provides an interesting additional piece of explanation on why entrepreneurial activities tend to cluster geographically. Economies of scale and scope, and the resulting lower production and transaction costs, have been traditionally advocated as the main reasons behind spatial concentration of high self-employment rates in certain areas (Minniti, 2005). Sociological and organizational studies show that social networks and embeddedness are crucial factors in individual decisions regarding self-employment (Gulati, 1998, 1999; Uzzi, 1999). The reason why individuals are influenced by the local social environment in making entrepreneurial decisions is that they aim to increase the available set of information, so as to minimize risk. Furthermore, existing entrepreneurs may act as role models for self-employment candidates by providing (possibly) successful examples. In fact, theoretical and empirical research suggests a connection between the presence of role models and the emergence of entrepreneurs (Kolvereid, 1996).

Whether these network effects are bounded locally and restricted to the individual or family level, as argued by Aldrich and Zimmer (1986) and Cooper *et al.* (1989), or stretch beyond the individual's network and local labour markets, is a question that my contribution aims to address.

There is another reason for which the study of entrepreneurship at the local scale should incorporate space in its specifications. This reason pertains to the probability that local self-employment rates are spatially dependent. Spatial dependence in entrepreneurial behaviours might arise from different reasons (LeSage and Pace, 2009). Agents might react to decisions that are taken by other agents in previous periods (time dependence).

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Furthermore, unobservable factors (e.g., location amenities or fiscal incentives) and positive externalities can influence the outcome. Theoretically, there is no reason to exclude that those patterns occur also between agents located in different regions, as far as these regions are somehow linked to each other (e.g., by commuting), causing ‘similar’ regions to be clustered in space. For all these reasons, spatial dependence should be incorporated in models investigating local self-employment levels.

This thesis presents evidence supporting the hypothesis that local (aggregate) entrepreneurial outcomes are influenced by the presence of role models. By accommodating for the presence of spatial spillovers in the (geographical) distribution of self-employment rates, I aim to uncover possible role models effects. In this sense, my contribution aims to fill a gap in the literature which does not accommodate for spatial dependence.

The third critical aspect relates to the factors that are expected to influence entries into self-employment. These are defined as the (positive) change (usually with respect to the year before) in the number of individuals who are reported as self-employed. As such, they capture entrepreneurial outcomes that are more in the spirit of Schumpeterian entrepreneurship, since they reflect changes (Iversen *et al.*, 2008). At the microdata level, self-employment entries consist of individuals reporting a status of self-employed, while previously employed, unemployed or inactive. Typically, transitions from wage employment are considered. Existing research on self-employment transitions makes a wide use of rational agent-based models assuming that individuals choose self-employment if the expected utility of this option exceeds the one associated with wage employment. Traditionally, better prospects of entrepreneurial earnings as compared to wages are, according to most of this literature, a major attraction towards self-employment (Rees and Shah, 1986; Hawley and Fujii, 1991; Taylor, 1996).

However, beside pecuniary motivations, other factors enter into consideration when it comes to occupational choice. More recently, the assumption that earnings act as a proxy for utility has been relaxed (Evans and Leighton, 1989; Taylor, 1996; Hamilton, 2000). A nonpecuniary aspect which is often advocated as a major driving force in entrepreneurship

is the one associated with (dis-) satisfaction (Brockhaus, 1982; Shapero and Sokol, 1982; Noorderhaven *et al.*, 1999; Wennekers *et al.*, 2001; Hofstede *et al.*, 2004). However, on the subjective characteristics of wage employment that are expected to lead to entrepreneurship, as well as on the dynamics of job satisfaction, the literature is limited. Despite the widespread use of job satisfaction measures in social sciences, economists have often been reluctant to incorporate such variables in their models (Freeman, 1978, p.135). There are a few welcome exceptions within the turnover literature (Clark *et al.*, 1998; Akerlof *et al.*, 1988; McEvoy and Cascio, 1985; Freeman, 1978; Flanagan *et al.*, 1974). Within this literature, scholars assume that individuals consider the opportunity of voluntarily leaving their job as a function of expectations regarding pecuniary and nonpecuniary benefits outside of the current employer with respect to those offered inside, in addition to mobility costs (Lévy-Garboua *et al.*, 2007). Job quits are observed among individuals reporting a difference between the sum of pecuniary and nonpecuniary benefits in current and future positions, where job satisfaction is a monotonic, discrete function of these sums (Akerlof *et al.*, 1988).

Building on a job quits model (Akerlof *et al.*, 1988; McEvoy and Cascio, 1985; Freeman, 1978), I propose a representation of transition behaviour from wage to self-employment which includes subjective evaluations of (previous) job satisfaction.

Rather than including current levels of satisfaction or assessments regarding past work characteristics, I rely on subjective levels of satisfaction that were reported before the choice was made, so as to measure real/actual perceptions about past working conditions.

Additionally, I focus on the dynamics of job satisfaction in order to highlight the role played by shocks in subjective evaluations and introduce their interaction with levels to control for threshold effects. Unlike most of the studies cited above, I am able to discriminate between the evaluations regarding pecuniary and nonpecuniary benefits, and to address the question of whether the inclusion of subjective variables and their variations in time matter in modelling self-employment transitions and job quits.

Switzerland, which is known for its high wages, good working conditions and low unemployment rates, is taken as a case study. Similarly to what has been observed in other

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OECD countries, Switzerland has experienced a rise of the self-employment rate since the late 1980s (Flückiger and Ferro Luzzi, 2001; Falter, 2001). At the basis of such increase, Piguet (1996) explains that there have been simultaneous effects of a (slight) rise in unemployment, a change in labour regulations and in the production and consumption habits. Moreover, the development of the ICT sector, the improvement in production processes and the increase in outsourcing activities, as well as fiscal and personal reasons, may have encouraged the increase in the number of self-employed workers (Birchmeier, 2000). Meanwhile, wage employment may have been affected by rigidities in wages and the extension of mandatory health insurance to elderly people (Falter *et al.*, 1998).

Despite the recent rise in numbers, Switzerland has a relatively low proportion of self-employed individuals in an international comparison. With an average rate of self-employment of 11.5 per cent in 2007, it is the 26th country in the OECD ranking, far below other European countries like Italy (26.4 per cent) or Spain (17.7 per cent), as well as the OECD as a whole (16.1 per cent; OECD, 2009). The fact that earnings differentials between self-employed and dependent workers still play in favour of the latter could be a reason. Moreover, the historically low unemployment rates and the good working conditions might have prevented individuals to assume unnecessary risks.

With more than 20 per cent of the overall active population made up by immigrants, Switzerland is one of the countries with the largest foreign population. Even if they benefit from the overall good job environment, immigrants have an unemployment rate which is persistently above that of the natives. In 2003, their unemployment rate was 2.6 times higher than that of the natives, against a 1.6 factor for the OECD as a whole. Only the Netherlands, Norway and Belgium show higher gaps. Thus, the theory would suggest that immigrants will be more entrepreneurial than natives. Switzerland provides an interesting exception in this regard too, since they are, indeed, less likely to work for themselves.

It is then of interest to look at the determinants of self-employment in a country where entrepreneurship is not that popular and where group characteristics, local features and the interaction between the two, along with policy effects, contributed to shape a rather heterogeneous and fractionalised ethnic environment.

The issues outlined above are developed in three essays. The first investigates the factors that influence local self-employment rates of immigrants. I use a cross-section of 2,490 Swiss municipalities and estimate a standard logistic regression model in order to investigate the role played by ethnic concentration, as well as by other ethnic characteristics, in determining local self-employment rates. A correction for extra-binomial variation was required (Williams, 1982). The results show that group characteristics such as linguistic ability and time elapsed since immigration, as well as market conditions such as the ethnic concentration of immigrants and the overall level of unemployment, matter in determining the local level of entrepreneurship among immigrants.

The second essay presents evidence supporting the hypothesis that role models matter in self-employment outcomes. Using the same data set as in the first essay, I first estimate an OLS model incorporating the local self-employment rate of natives. I subsequently accommodate for the presence of spatial spillovers in the distribution of rates, and test a spatial autoregressive model. The results show that the presence of native entrepreneurs within local units provides successful examples (role models) for immigrant entrepreneurship. Moreover, I show that self-employment rates are spatially correlated, causing standard OLS results to be biased. The correlation between self-employment rates should be reconducted to the presence of additional role models, which are represented by the ethnic entrepreneurs living in adjacent communities. Further, the effects of group characteristics and market conditions differ, with respect to self-employment choices, when examining separately urban and rural contexts. Finally, a spatial sensitivity analysis shows that my findings are consistent over different assumptions on the nature and extension of spatial interaction.

The third essay aims to uncover the determinants of transitions from wage- to self-employment. Individual microdata are drawn from the Swiss Household Panel, and cover the time period 1999–2008. I use two measures of job satisfaction: satisfaction with income and satisfaction with working conditions and I regard them as direct measures of individual utility (Clark and Oswald, 1996; Taylor, 2004).

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Using a sample of over 4,000 individuals, I estimate a multinomial logit model including, as explanatory variables, subjective assessments regarding job satisfaction. I show that the job satisfaction variables significantly affect the probabilities of both self-employment entries and job quits. Those who choose self-employment tend to do so in reaction to low levels of pecuniary satisfaction, while job quitters are more reactive to nonpecuniary dissatisfaction. Variations in job satisfaction are also found to significantly influence transition probabilities. Finally, I do not find evidence of threshold effects (i.e., if individuals with lower levels of job satisfaction react differently to equal changes in job satisfaction with respect to more satisfied individuals).

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# **Chapter 1**

## **Ethnic Concentration, Cultural Identity and Immigrant Self-Employment in Switzerland**

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## **Abstract**

Immigrant self-employment rates vary considerably across regions in Switzerland. Business ownership provides an alternative to wage labour, where immigrants have to face structural barriers such as the limited knowledge of the local language, or difficulties in fruitfully making use of their own human capital. Despite their historically high unemployment rates with respect to natives, immigrants in Switzerland are less entrepreneurial. It is therefore important to uncover factors that may facilitate the transition from the status of immigrant to the one of economic agent. Among others factors, concentration in ethnic enclaves, as well as accumulated labour market experience and time elapsed since immigration, have been associated to higher business ownership rates. In this paper, we use a cross-section of 2,490 Swiss municipalities in order to investigate the role played by the ethnic concentration of immigrants, as well as cultural factors, in determining self-employment rates.

Keywords: self-employment, immigrants, Switzerland

JEL codes: C21, J24, J61, O15, R23

## **1.1 Introduction**

Since the 1960s, sociological and economic research on the determinants of ethnic entrepreneurship has attempted to explain why immigrants in advanced economies are more likely to become self-employed than natives, and more generally, why some ethnic groups show higher self-employment rates.<sup>1</sup> Early-stage research pointed out that structural factors like ethnic exclusion and discrimination widely contribute to explain why immigrants turn to self-employment (Bonacich, 1973; Wong, 1988). Later on, differences in education and work experience of immigrants have been emphasized. Results hold for many countries, including Australia, Canada and the United States (Reimers, 1983; Evans and Kelley, 1986; Bloom *et al.*, 1995). However, human capital does not provide a full explanation for such remarkable differences. For instance, ecological approaches stressed the importance of factors such as ethnic and cultural diversity, as well as fluency in the host country's language, in encouraging or displacing business ownership.

The academic discussion on ethnic entrepreneurship has gained much more attention after the works of Borjas (1986) and Evans (1989), which shed light on two important results. The first is that immigrants tend to be more entrepreneurial in areas where other individuals of the same ethnic group are concentrated. Measured by Borjas as the proportion of foreigners on the total population of US metropolitan areas, the effect of ethnic enclaves on business ownership is positive, suggesting that concentration in specific geographic areas enhances opportunities for immigrants to become self-employed. In fact, immigrants located in ethnic enclaves benefit from comparative advantages in serving the needs of consumers of the same ethnic group according to the 'protected market hypothesis' (Light, 1972), even if the results for different groups are mixed. Furthermore,

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<sup>1</sup> Even if self-employment and entrepreneurship are not the same, the literature does not agree on a clear definition of 'entrepreneurs' and 'self-employed' (see, for a brief discussion, Aldrich and Waldinger, 1990). In this paper, we will refer to immigrant self-employment and business ownership as surrogates for ethnic entrepreneurship.

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the size of the immigrant group also provides some explanation for differences in self-employment propensity. Immigrants belonging to very large groups are more likely to be entrepreneurs than immigrants from very small groups (Evans, 1989). This first result has a precise implication in terms of policy: cities with larger ethnic communities produce more entrepreneurs, thus offering immigrants a way to overcome structural barriers on the labour market (Zhou, 2004). Furthermore, business ownership might provide an alternative to wage employment for immigrants, generally increasing their job satisfaction ('self-employment out of dissatisfaction', see Noorderhaven *et al.*, 1999) and employment chances ('self-employment out of unemployment'). Still, the potential for growth of ethnic businesses have been shown to be very limited (Aldrich *et al.*, 1983; Mohl, 1983).

The second important result is that immigrants are influenced in their employment decisions by belonging to ethnic groups which are not fluent in the language spoken by natives. Using Australian data, Evans (1989) finds that immigrants with a large percentage of the group not fluent in English are more likely to be entrepreneurs. However, evidence from the US suggests the opposite: those with English language difficulties are less likely to be business owners (Fairlie and Meyer, 1996; Portes and Zhou, 1996). Given these controversial results and the policy relevance of the linguistic characteristics of immigrants, further research is needed on this matter.

In recent years, the academic community has shown a decreasing interest in decisions regarding self-employment, although it represents an important component of the immigrant experience in many labour markets, as well as a way to overcome isolation and discrimination. Both in the presence of push effects (self-employment as an alternative to wage- and un-employment) and pull effects (the existence of ethnic markets and opportunities), self-employment remains a central policy issue in determining economic progress and integration of immigrant minorities.

With more than 20 per cent of the overall active population made up by immigrants, Switzerland is one of the countries with the largest foreign population. Since 1970, the Federal Government has attempted to manage immigration flows in order to soften the ongoing conflict between economic needs (chronic excess labour demand) and political



pressure from nationalistic groups aiming to reduce the level of foreign population (Gross, 2006). In this regard, the integration of immigrants has gained much attention in the political debate. Switzerland is also known for high wages, good working conditions and historically low unemployment rates, which attract workers from all over the world. Even if immigrants benefit from the overall good job environment, their unemployment rates are persistently above those of the Swiss citizens, both for women (9.1 per cent against 3 per cent in 2003) and for men (7.2 per cent against 2.8 per cent) (OECD, 2009). If compared with other OECD countries, looking only at male active population, the gap between native and immigrant unemployment is rather consistent: in 2003, the unemployment rate of immigrants was 2.6 times higher than that of the natives, against a 1.6 factor for the OECD in a whole. Only the Netherlands, Norway and Belgium show higher gaps.

Despite the (relatively) high unemployment rates, which tend to persist over time, immigrants in Switzerland are less likely to become entrepreneurs than the natives. Self-employment rates of foreign-born individuals are lower than those observed among Swiss citizens (in 2000, 5.6 per cent of the total immigrant labour force against 12.3 per cent among the natives). Evidence collected in the US by Yuengert (1995), in contrast, reports a self-employment rate of immigrants (11.7 per cent) higher than the one of natives (8.3 per cent). Similarly, in the UK, the 1991 Census of Population reported that non-whites had a self-employment rate of 14.6 per cent, compared to 12.3 per cent for whites (Clark and Drinkwater, 2000).

We can think of two reasons for which immigrants are less entrepreneurial than the natives. Firstly, one might argue that Swiss regions are too small to provide sufficiently large ethnic markets for potential ethnic entrepreneurs. Secondly, despite the high number of immigrants, migration flows towards Switzerland used to be strictly regulated.<sup>2</sup> As a

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<sup>2</sup> In fact, they were predominantly 'driven' by economic need. For instance, during the post-war economic boom, Italian immigrants were mainly recruited for low-skilled jobs in the construction, textile and machine-building sectors. Initially, they were entitled to stay for just one year, and permanent permits could be obtained only after a period of ten years. Since the late 1960s, Italians have been followed by

result, Switzerland has turned into a multicultural and multilingual country, far beyond the traditional divisions in the three linguistic regions. Traditional and recent immigration waves<sup>3</sup> contributed to shape a rather heterogeneous and fractionalized ethnic environment, which in some cases might have prevented immigrants from benefiting from the presence of their coethnics, for instance in helping them to tackle bureaucracy, or in providing market incentives to open a business. Heterogeneity between Swiss regions is particularly evident in terms of the linguistic gap, which breaks the country in three main linguistic and cultural areas: German, French, and Italian. Natives share the language with the country from which they are surrounded, namely Germany to the North, France to the West, Italy to the South, and Austria and Liechtenstein to the East.

From 1970 to 1990, the Federal Government used to fix annual quotas for the number of new permits released to foreign workers, which used to be allocated according to the needs of firms, and proportionally to the population of each canton (the main regional entity in Switzerland). The distribution of these permits was subsequently organized by local authorities (municipalities), which nowadays show substantially different ethnic compositions. Since self-employed immigrants are expected to serve their ethnic community, which is locally concentrated, we also observe important differences in self-employment rates, which differ widely within the country. It is therefore important to uncover the local determinants that may facilitate the transition from the status of immigrant to the one of economic agent/entrepreneur.

The aim of this paper is to uncover the influence of ethnic concentration and cultural characteristics on the self-employment rates of immigrants. We use data for a cross section of 2,490 Swiss local units (municipalities) collected by the Federal Population Census

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workers from Spain, Portugal, the former Yugoslavia, Turkey and many other countries, while immigration policies have become less strict. The inflows of workers from economically less developed countries have reduced the overall skill level of immigrants (Fluckiger and Zarin-Nejadan, 1994).

<sup>3</sup> It should be noted that we refer to first immigration waves (Italians, Germans and French) as traditional ones, while immigrants belonging to more recent waves (i.e., the Spanish, Portuguese, Yugoslavians and the Turkish) are referred to as recent.

(FPC) in 2000. We evaluate the effects on self-employment rates of immigrants that are associated with an ethnic concentration index and with the characteristics of the dominant ethnic group, with respect to the country of origin and its proficiency in the host region's language. We show that highly concentrated ethnic communities have higher immigrant self-employment rates. This is particularly true for local ethnic communities which are dominated by groups of traditional origin or speaking the same language as the natives (German, French or Italian, according to the region).

The paper is organized as follows. In Section 1.2, we present a model for the determinants of immigrant self-employment rates. In Section 1.3, we describe the data employed in our analysis and we examine preliminary statistical features. In Section 1.4, we present our findings for Switzerland. Section 1.5 concludes the paper by discussing current open research questions and further refinements of our model.

## **1.2 The Model**

The model addresses the aggregate behaviour of a local multiethnic community of foreign workers who individually decide between self-employment and paid work, given a set of characteristics. We do not make direct inference on individual behaviour, since this has been thoroughly investigated in the literature and would require micro-level data (for an overview, see Zhou, 2004), nor we look at wage/earnings differentials between the two options.

The aim of this paper is to uncover the role played by the immigrant pool attributes and the local unit's characteristics in determining business ownership. We measure self-employment among immigrants as the share of self-employed on the overall foreign active population. As local conditions, we refer to the average characteristics of the multi-ethnic pool (gender, age, family, education, ethnic concentration, residential status, language integration, working status composition) and to the characteristics of the local unit (population density, geographic remoteness, linguistic region). In particular, we assume that

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there are effects on the local level of immigrant self-employment due to ethnic concentration, that is, to the presence of a dominant ethnic group within the area.

From a microeconomic perspective, it may be optimal for an individual to build economic relationships preferentially with other individuals of the same ethnic group (Glaeser *et al.*, 2000; Alesina and La Ferrara, 2002; for a formal discussion of transaction costs in a multiethnic society, see also Lazear, 1999). From a more general perspective, ethnic concentration may be favourable to business ownership since it reduces conflicts and prejudices, and thus uncertainty. Furthermore, the dominance of an ethnic group increases the pool of ideas, needs, human resources and capitals within the local unit, as well as the opportunities for its members to capture and activate those resources. The presence of an ethnic social capital it is often referred to as a key determinant in immigrant business creation (Aldrich and Waldinger, 1990). On the other hand, a concentrated ethnic community might be less suitable than a diverse one to enhance productivity and innovation, since the melting pot ensures the mix of abilities, cultures and thoughts that is at the basis of creativity and actual problem-solving processes (for an overview, see Alesina and La Ferrara, 2005).

We test the ethnic concentration hypothesis with regard to the seven main ethnic groups which we expect to affect the self-employment propensity of immigrants. The selected groups (Italians, Germans, French, Portuguese, Spanish, Turkish and former Yugoslavians) account for almost three quarters of the entire foreign active population in Switzerland, but show substantial differences in self-employment rates. For this reason, we discriminate local units where the dominant nationality belongs to the groups of recent immigration. We expect those communities to be less integrated and more fragile, as their social networks are not completely developed so as to encourage them towards self-employment. Recent immigrants often lack first-hand knowledge, experience and capitals to start an economic activity on their own, since they need to accumulate savings and establish credit in order to obtain financing.

In addition, we control for local units where the dominant nationality is formed by immigrants of the same linguistic group as the natives. On the one hand, immigrant groups

which are not proficient in the language spoken locally may be more likely to show high self-employment rates, as suggested by the isolated labour pool and disadvantaged theory (Light, 1979; Evans, 1989). On the other hand, linguistic integration could also encourage self-employment because of cultural proximity. Speaking the same language as the natives could provide immigrants with more business opportunities.

The diffusion of self-employment among immigrants, specified as the share of self-employed immigrants over the immigrant active population, is then modelled as a function of: (1) ethnic concentration; (2) the characteristics of the immigrant community, evaluated at the average and related to family, labour market and human capital features; (3) a set of control variables for geographic and linguistic characteristics of the local unit. While Table 1 provides definitions of the variables included in the model, the following subsections discuss their relevance in detail.

### ***1.2.1 Ethnic Concentration Variables***

We examine how ethnic concentration of the local immigrant pool affects local self-employment rates. The dominance of a particular ethnic group may be expected to encourage self-employment through increased social interaction and the rise of specific needs, ideas and resources that a sparse minority cannot otherwise ensure. We use an adaptation of the Herfindahl-Hirschman Index (HHI) (Hirschman, 1945; Herfindahl, 1950), usually used as a measure of trade or industrial concentration, in order to measure ethnic concentration of the seven proposed groups of immigrants.

In our data set, the HHI ranges from 0 to 1.0, where 0 implies no concentration and 1 means that there is a single immigrant group (among the seven considered) within the local unit. For each local unit  $i$  ( $i = 1, \dots, N$ ), we compute the HHI as:

$$HHI_i = \sum_{k=1}^7 s_{i,k}^2, \quad (1)$$

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where  $s_{i,k}$  is the share of immigrants of the  $k$ th ethnic group (among the seven groups selected) on the immigrant active population living in local unit  $i$ .

In addition, we expect some differences in self-employment to arise in local ethnic communities where the dominant group is constituted by newcomers. Since we do not have data on time elapsed since immigration or on the labour market experience of immigrants, we single out those communities for which there is a dominance of newcomers as pools of recent immigration, as a proxy for limited experience on local labour markets. A dummy variable is used to assess whether or not the local units meet this characteristic.

Finally, we account for the linguistic integration of immigrants, that is, whether or not the locally dominant ethnic group speaks the same language as the natives. We expect groups which are proficient in the host region's language to be more effective in rising human/financial resources and in becoming business owners (for example, it may be easier for them to tackle bureaucratic issues or serve/interact with the natives). Language proficiency is proxied with a dummy variable that takes the value of 1 if the dominant nationality belongs to the same linguistic group as the locals, and 0 otherwise.

#### ***1.2.2 Characteristics of the Immigrant Active Population in the Local Unit***

The model tests the effects of additional local immigrant pool characteristics, namely education, gender, size of the family and age, on self-employment rates. The overall level of education attained is expected to positively influence the share of self-employed immigrants within the local unit. On the one hand, education – and more generally human capital – is traditionally associated with business longevity and success (Kim and Won Moo, 1985; Yoon, 1991; Bates, 1994), since it is assumed to increase the set of skills enabling individuals to assess market opportunities and to improve their organizational and managerial ability (Borjas, 1986). On the other hand, immigrants with higher educational attainments should be better equipped for collecting resources within their family and their ethnic community (Sanders and Nee, 1996). Our analysis uses two measures of education: the share of professionally educated immigrants (on the overall immigrant active

population), and the share of immigrants with academic education. This distinction is made because we expect the former to have accumulated more job experience, both within their home country and in Switzerland.

In addition, the gender composition of the immigrants, as well as their average age – in quadratic form to catch nonlinearities<sup>4</sup> – are added as control variables. We expect a positive effect of the share of men and of the average age of the immigrants on self-employment, since men are more likely to start a business (because they are less risk averse and more continuative in their work experience than women), as well as older persons, at least until a certain age. Marital status is added as well, in order to control for the incidence of family. Between immigrants who have a family, we may expect to observe risk averse behaviour, which would reduce the self-employment rate within the immigrant pool.<sup>5</sup> The average size of the immigrant household provides a picture of the cultural milieu, with larger families disposing of fewer capitals and being characterized by a higher risk aversion, thus being less attracted by business ownership.<sup>6</sup> We expect a negative effect of this variable on self-employment rates.

We also control for the share of non-permanent residents within the local community, since a less stable workforce, often linked to a seasonal or temporary job, is assumed to be less predisposed towards business ownership. The local industry mix is taken into account by the share of immigrants employed in services. We expect a positive effect on self-employment incidence since it has been shown that immigrants employed in trades, sales and managerial occupations are more likely to turn to self-employment (Borjas, 1986; Le, 2000).

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<sup>4</sup> Age is specified in a quadratic form to control for the possibility that turning into self-employment may increase at a diminishing rate with age (Sanders and Nee, 1996).

<sup>5</sup> However, early empirical research at the micro level highlighted a positive relationship between being married and being self-employed (Borjas, 1986), because of the increased ability of married persons to collect help among familiars.

<sup>6</sup> Larger families may also profit from members working – often for free – within the business. However, we expect this result to be less important in Switzerland, where wages and working conditions are under strict surveillance.

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As for the occupational status of immigrants, the literature usually refers to unemployment as an ambiguous determinant of self-employment. On the one hand, high unemployment regions may experience high rates of immigrant self-employment because of the option that business ownership offers to immigrants who do not have a job ('self-employment out of unemployment'), suggesting a positive relationship with self-employment. On the other hand, low unemployment regions could provide immigrants with potentially wider ethnic markets, thus increasing their opportunity to become self-employed, for example in migrant-related services (phone centres, ethnic shops, etc.). In this case, an inverse relationship with self-employment could be expected.<sup>7</sup> For these reasons, we include in the model the immigrant unemployment rate, in quadratic form to catch nonlinearities. Because the nature of the relationship between unemployment and self-employment is controversial, we let the data speak, and we do not formulate a specific sign expectation.

### *1.2.3 Controls for Geography*

Additional variables, identifying the characteristics of the local units, have been added to control for geographical differences. A possible urban-rural gap is captured by a categorical variable which splits our cross-section in: cities, suburbs and rural units, the latter being the reference level. Urban areas are expected to increase the propensity of the immigrants to be self-employed, according to a market view hypothesis (Le, 2000). Furthermore, the urban-rural distinction is expected to capture unobserved urban characteristics such as land price, firm size, urban density, and central or peripheral location. For this reason, interpretation of the urban-rural estimated coefficients should be given with care. The average distance between municipalities, that is, whether the area is easily linked to other areas or is rather

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<sup>7</sup> Empirical evidence, based on individual-level entry rates and duration models, is also mixed (for an overview, see Glocker and Steiner, 2007).



isolated (as is the case for the municipalities in the Alpine region) is proxied by the minimum altitude of the areal unit.

Our model can be generically expressed as follows:

$$y_i = \alpha + \beta_1 HHI_i + \beta_2 D_{1,i} + \beta_3 D_{2,i} + \sum_k \gamma_k X_{k,i} + \varepsilon_i, \quad (2)$$

where:  $y_i$  is the share of self-employed immigrants over the immigrant active population, for each local unit  $i$ ;  $HHI_i$  is the ethnic concentration index;  $D_{1,i}$  and  $D_{2,i}$  are the dummy variables for recent immigration and language proficiency;  $X_{k,i}$  is the  $k$ th control variable; and  $\varepsilon_i$  is the error term.

### 1.3 Data

The data used in this paper are drawn from the Swiss Federal Population Census (FPC) of 2000 (FSO, 2000). The data set includes population variables (citizenship, country of origin, place of residence, position in the household, education, profession, age, gender, etc.) and household data (number of individuals living in the household, etc.).<sup>8</sup> Additional variables controlling for geography, as well as geo-referenced data for local units, are provided by the Swiss Federal Statistical Office (FSO, 2001, 2004).

The basic unit of analysis is the local unit (municipality), including – after the exclusion of the municipalities with less than five immigrant workers – 2,490 observations.<sup>9</sup> The definition of residents of a particular area is given by the Federal Statistical Office after the concept of economic domicile, that is, by looking at where they work or attend school four

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<sup>8</sup> Participation in the census is compulsory and reached 99.87 per cent of the population. Unlike many census-based studies, we have a virtually full population sample, although unfortunately, the FPC does not provide any information on wages.

<sup>9</sup> Since we have a high variation in the dimension of the local immigrant population, we eliminate all local units that are below 5 foreign workers. This data reduction significantly increases the quality of our findings, without losing too much information (we eliminate 406 out of 2,896 local units).

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at least four days per week without commuting to another local unit. All immigrant-related variables are available at the municipality level and shares are computed dividing by the immigrant active population of the area.<sup>10</sup> The sectoral distribution of immigrants is proxied by the share of immigrants employed in services. The definition of immigrant groups is based on the country of origin (nationality), and all immigrants are non-citizens. Naturalized foreigners are not considered as immigrants, since the naturalization process, which is voluntary, usually takes at least 12 years – unless it is carried out through a facilitated naturalization procedure<sup>11</sup> – and requires approval at the federal, cantonal and municipal levels, making the procedure very slow and its effects rather marginal. In our data set, self-employed immigrants are defined as independent foreign workers, both full and part-time.

Table 2 reports descriptive statistics for our data set. Immigrant self-employment rates are relatively low (8 per cent), compared with those of the natives (whose average – not reported – is 15.4 per cent). Extreme values extend to the full possible range of the variable (from 0 to 100 per cent), but can only be found for scarcely populated local units. The numerator and denominator of the immigrant self-employment rates are reported as well, to show the high heterogeneity in the size of our local units. With regard to the explanatory variables, the HHI for ethnic concentration has an average of 0.2459 and ranges from 0 to 1. Male immigrants account on average for 60 per cent of the labour force, which is predominantly married (69 per cent). The share of non-permanent residents on the immigrant active population is very small (4.3 per cent on average), suggesting that most immigrants are in Switzerland on a stable basis. Moreover, highly educated immigrants

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<sup>10</sup> In the absence of place-of-birth information in our data set, we will refer to all non-citizens as foreign-born and to nationals as natives. The non-citizens are both permanent residents (permit C) and non-permanent ones (permit B), where the former requires less restrictive conditions to open a business. In principle, permits of type B give the possibility to obtain a C permit after a period of 5-10 years. Active population is defined as the number of inhabitants that at the time of the interview (5 December 2000) were employed or unemployed.

<sup>11</sup> Facilitated naturalization, that should meet some legal requirements, benefits in particular foreign spouses of Swiss nationals and children of a Swiss parent who do not yet hold Swiss nationality (Federal Office for Migration).

(those having a professional or an academic education degree) are still a minority in the Swiss labour market (jointly, they account for about 20 per cent of the foreign active population), while the average immigrant unemployment rate is quite large (6.8 per cent) compared to the one of Swiss citizens (2.2 per cent, not reported). Finally, as it is shown in the final rows of Table 2, the local immigrant population stretches from a minimum of 5 to a maximum of 106,386, recorded in Zurich, which is also the main Swiss city in terms of overall population (363,273).

Figure 1 shows the geographical distribution of immigrant self-employment rates. Unsurprisingly, self-employment rates among foreigners differ widely within the country. High rates are registered close to the border with Italy, in the Italian-speaking part, and close to France, in the French-speaking part. Low self-employment rates are recorded over the Alps or scattered across the dominant German-speaking region. On a purely descriptive basis, border regions seem to offer better conditions for self-employment among immigrants. Apart from this, the picture does not provide a clear spatial pattern other than immigrant self-employment not being an urban phenomenon (the main cities show average rates).

Figure 2 depicts the shares of immigrants on the overall local population. The spatial distribution observed is rather different from the previous one. High shares of immigrants are registered in the Lake of Geneva region, in the Zurich area and in the South (the Canton of Ticino). Low shares are recorded in the rural region of the Cantons of Bern and Fribourg.

Since in our analysis we use HHI values for the Swiss municipalities as a proxy for the ethnic concentration of immigrants, we are interested in observing how this variable is distributed in space (Figure 3). Dominance of a particular immigrant group is registered in the South – the Italian-speaking region – and in the rural areas of the German-speaking part. Low HHI values are recorded within and around the main cities (Geneva, Bern, Basel and Zurich), which attract different nationalities.

In terms of ethnic background, the presence of the selected ethnic groups on the total immigrant population vary substantially at the regional level (Figure 4). The former Yugoslavians are dominant in the German-speaking part – the Middle Land and the North-

East; the Italians constitute the main group in the region close to the border with Italy and in the suburbs of the main cities in the Middle Land (Bern, Basel, Zurich); the Portuguese are leading in the French-speaking part, especially around the Geneva Lake (the West). Italians are, except for the Italian-speaking Canton of Ticino, where they are dominant, the second-biggest group in most areas (not shown). The French and the Germans are relevant in some areas of their language-related region.

Table 3 presents selected descriptive statistics for the seven largest groups of immigrants, as well as for Swiss citizens. Among these groups, immigrants coming from the former Yugoslavia are the second-biggest pool (21 per cent of the overall immigrant active population) after the Italians (23 per cent). Self-employment rates of immigrants are significantly lower than the one observed for the natives, in particular for the groups of more recent immigration. Immigrants from Germany (9.3 per cent), Italy (7.5 per cent) and France (8.4 per cent), instead, show above-average self-employment rates. Unemployment hits severely the former Yugoslavians, the Turkish and immigrants of other nationalities ('Others'). Taken as a whole, immigrants face much higher unemployment rates than the natives (8.1 per cent against 2.8 per cent), and with the exception of the Portuguese and the Spanish, groups with higher self-employment rates appear to show lower-than-average unemployment rates.

## **1.4 Empirical Application**

We estimate, for 2,490 Swiss municipalities, a model for the rates of immigrant self-employment, which we assume to be influenced by the level of ethnic concentration, measured by the Herfindahl-Hirschman Index, by the time elapsed since immigration – proxied by a dummy variable indicating whether or not the locally-dominant nationality is of recent (rather than traditional) immigration – and by the proficiency in the host region's language – also proxied by a dummy variable for whether or not the dominant nationality belongs to the same linguistic group of the natives. As additional covariates, we use a set of

control variables describing the characteristics of the local immigrant population and the geographic and linguistic characteristics of the local units, as discussed in Section 1.2.

Since our dependent variable – the share of immigrant self-employed – is a ratio, it is convenient to estimate our model in a logistic regression framework, so as to explicitly account for the constrained nature of the variable analysed. By doing so, we identify the numerator of the self-employment rate as the number of successes (the number of self-employed immigrants), while the denominator represents the number of trials (the active immigrant population, which includes the self-employed, the wage-employed, and the unemployed). Our model can then be written as:

$$\begin{aligned} y_i &= f(\alpha + \beta_1 HHI_i + \beta_2 D_{1,i} + \beta_3 D_{2,i} + \sum_k \gamma_k X_{k,i}) + \varepsilon_i \\ &= \frac{1}{1 + e^{-(\alpha + \beta_1 HHI_i + \beta_2 D_{1,i} + \beta_3 D_{2,i} + \sum_k \gamma_k X_{k,i})}} + \varepsilon_i, \end{aligned} \quad (3)$$

where all symbols are as before.

We first estimate a standard logistic regression (Model (1)), whose results are reported in Table 4. The estimated coefficients for two of our key variables – the ethnic concentration variable and the dummy variable identifying local units dominated by a group of recent immigration – turn out to be non-significant, while the coefficient for linguistic proficiency is significant and of the expected sign (positive). The coefficients of the remaining variables are as expected (see below for further details). These results do not seem to support our hypothesis that ethnic concentration has a positive effect on self-employment rates of immigrants.

However, our results could be influenced by unobserved heterogeneity due to missing explanatory variables (for which variance is unknown). This is a common drawback of cross-sectional models. Therefore, we follow Patuelli *et al.* (2010) and apply a correction for so-called extra-binomial variation in logistic regressions by means of an overdispersion adjustment, which was originally suggested by Williams (1982) and provides a quasi-likelihood model estimate. More in detail, the method postulates ‘a source of extra-

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binomial random variation between observations' (Williams, 1982, p. 144), and leads to an iterative estimation of the dispersion parameter associated with the data, with a concurrent adjustment of the regression weights. This estimation approach goes beyond the common practice of just computing so-called robust standard errors, since it also provides updated estimates of the regression coefficients.

Table 4 reports the results for the overdispersed logistic regression (Model (2)). As it can be seen from the diagnostics at the bottom of the table, the explanatory power of Model (2) represents a substantial improvement over Model (1). This is evident from the observation of Akaike's information criterion (AIC), whose value is approximately half of the previous one, from the residual deviance, as well as from the log-likelihood. The estimated coefficients now support our hypothesis that ethnic concentration and cultural diversity explain differences in self-employment rates.

The regression coefficient for the HHI is positive and significant, suggesting that highly concentrated ethnic communities provide more incentives or more favourable conditions for business ownership. This result suggests that the dominance of an ethnic group increases opportunities for social interaction within the group, thus raising potential for ethnic businesses. Since individuals prefer to build economic relationships with their peers, ethnic homogeneity may be seen as multiplying business opportunities. Furthermore, the positive coefficient for the HHI provides additional evidence for the presence of ethnic enclaves, where immigrants of the dominant group benefit from comparative advantages in serving the ethnic market.

The estimated coefficient for the recent immigration dummy variable turns out to be negative and highly significant, meaning that, if the locally dominant nationality is of recent immigration, self-employment among immigrants is lower. This result is consistent with our hypothesis that nationalities of latest immigration face more difficult conditions with regard to entrepreneurship (i.e., less integration and fragility).

Furthermore, the coefficient for the language proficiency dummy variable remains positive and significant, which means that local units with a dominant ethnic group belonging to the same linguistic group of the natives show higher self-employment rates.

This result is in contrast with evidence collected in other countries, where linguistically isolated groups are found to be more likely to turn to self-employment in order to overcome discrimination and communication difficulties. We interpret the positive coefficient of the language dummy variable as an indication of the existence of a market effect, which produces more opportunities for immigrants speaking the language of the natives in serving the local markets.

The remaining estimated coefficients all have the expected signs and are significant, except for the share of married immigrants and for the share of academically educated people. In the case of the share of married immigrants, the non-significance of the finding could be due to information redundancy regarding the inclusion of the average family size or age, while for the case of academic education, language proficiency could be redundant.<sup>12</sup> With regard to the remaining variables related to the characteristics of the immigrant community, the share of men is positively associated with self-employment, as well as their average age, which shows a linear behaviour (the quadratic term is non-significant). A higher share of immigrants with a non-permanent residence permit tends to reduce business ownership, since such immigrants do not plan to stay for a long time, or have just arrived. The coefficient for the share of immigrants employed in services is positive, suggesting that a sectoral composition of the local labour force favourable to the trade, sales, restaurant and hotel sectors encourages self-employment. As for the average family size, it tends to reduce local self-employment rates, most likely because of a stronger risk aversion. Immigrant communities with a large share of professionally educated people also show higher self-employment rates, supporting the hypothesis that higher educational attainments increase self-employment opportunities. The local unemployment rate has a strong negative effect on business ownership, meaning that immigrant communities with low unemployment rates experience high rates of immigrant self-employment. This result

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<sup>12</sup> The regression coefficient for academic education becomes marginally significant when language proficiency is excluded from the model.

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strengthens the market view hypothesis which suggests that low unemployment regions provide immigrants with potentially wider ethnic markets. Because we do not have income-related variables in our data set, unemployment may also be seen as a proxy for the general level of welfare of the local units. The coefficient estimated for the quadratic term of unemployment is also significant and positive, suggesting that the relationship between immigrant unemployment and self-employment rates is not linear, but U-shaped. The nature of this relationship will be discussed in more detail below. The coefficients for the city and suburbs dummy variables are negative, suggesting that immigrant self-employment in Switzerland is not an urban phenomenon. This result is somehow surprising under the market view hypothesis (big cities, big markets), but is consistent with what we found for the ethnic concentration of immigrants. According to our findings, self-employment matters in concentrated immigrant communities, which are dominated by a traditional immigration nationality or by one nationality which is fluent in the host region's language. Typically, these characteristics are associated with the countryside, rather than with the major cities. Finally, the coefficient for the minimum altitude of each local unit turns out to be non-significant.

Because we estimated a nonlinear model (logistic regression), it may be interesting to observe how the effect of each of the explanatory variables on the dependent varies over their range, keeping all other variables constant at their representative values. Figure 5 shows the effect plots for selected explanatory variables, as well as the related 95 per cent confidence intervals (Fox, 1987, 2003). The predicted effect of the HHI is reported in Diagram (a), which highlights the positive association between local units characterized by a dominance of one or few ethnic groups and the self-employment rates of immigrants. The positive effects of both the share of immigrants employed in services and the share of professionally educated workers on the dependent variable are also clear in Diagrams (b) and (c), respectively. Diagram (d) provides additional evidence on the U-shaped relationship between unemployment and self-employment rates. An increase in the share of unemployed immigrants has a negative effect on the self-employment rate, which is evident



in the lower part of the range, but becomes less relevant when the unemployment rate reaches 10 per cent.

## **1.5 Conclusions**

In this paper, we estimated a model explaining the variation in the self-employment rates of immigrants in Switzerland in relation to ethnic concentration and cultural characteristics. In this regard, Switzerland is a particularly interesting case study: on the one hand, it has a large foreign working force; on the other hand, the self-employment rate of immigrants is much lower than the one of Swiss citizens, which is in contrast with evidence collected in other developed countries.

Using census data collected in 2000 for a cross section of 2,490 Swiss municipalities, we estimated a logistic regression model for the share of self-employed immigrants. We found that the local concentration of particular ethnic groups is a significant factor in increasing self-employment rates. Additionally, cultural characteristics were also found to be relevant. In particular, the proficiency of immigrants in the language spoken locally, as well as belonging to more traditional immigration waves, turned out to be associated with higher shares of self-employment. Our results are relevant in particular from a policy-making viewpoint, since self-employment is seen as a useful way towards the integration of immigrants. On the one hand, we shall argue that the Swiss immigration policy, which at least until the 1990s aimed to limit the presence of immigrants and to strictly regulate their working conditions, has turned to be detrimental for the concentration of immigrants, and thus for their economic advancement. On the other hand, local authorities should now develop policies aiming to increase the immigrants' potential with regard to business ownership by favouring professional education, language proficiency and interaction within ethnic groups. Groups of recent immigration may deserve special consideration, since they appear to be less prone to business ownership.

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Future refinements of our model should also consider the differentials between immigrants and Swiss citizens in terms of self-employment, in order to filter out local conditions and specificities. In addition, spatial aspects should be investigated, in particular with regard to unobserved spatially correlated variables and spatial dependence. Finally, a more in-depth analysis, focusing on the behaviour of immigrants, could ideally be carried out using micro-level data, for example investigating imitation phenomena in space with respect to self-employment.

**Table 1. Definition of variables**

Variable definition	Variable name
Local Immigrant Self-employment Rate = Immigrant Self-Employees / Immigrant Active Population	FOREMPSE
<i>Ethnic Concentration Variables</i>	
Herfindahl-Hirschman Index of Ethnic Concentration (Eq. (1))	HERFINDAHL
Dominant Ethnic Group, of Recent Immigration = 1, Otherwise 0	RECENTIMMIGR
Dom. Ethnic Gr., Same Language as Region = 1, Otherwise 0	LANGPROALL
<i>Characteristics of the Immigrant Active Population in the Local Unit</i>	
Share of Male Immigrants = Immigrant Active Men / Immigrant Active Population	FORACTIVEMEN
Share of Married Immigrants = Immigrant Active Married / Immigrant Active Population	FORACTIVEMARRIED
Share of Immigrants with a Non-Permanent Residence Permit = Immigrant Active Non-Permanent Residents/ Immigrant Active Population	FORACTIVENON
Share of Immigrants Employed in Services = Immigrant Employees in Services / Immigrant Employees	FOREMPTEP
Average Age of Immigrants = (Sum of Immigrant Actives * Age (in Years)) / Immigrant Active Population	FORACTIVEAGE
Average Family Size of Immigrants = (Sum of Immigrant Actives * Family Size) / Immigrant Active Population	FORACTIVECHIL
Share of Immigrants with a Professional Degree = Immigrant Active with Professional Degree/ Immigrant Active Population	FORACTIVEPROFEDU
Share of Immigrants with an Academic Degree = Immigrant Active with Academic Title / Immigrant Active Population	FORACTIVEACCAEDU
Unemployment Rate of Immigrants = Immigrant Unemployed / Immigrant Active Population	FORUNEMP
<i>Controls for Geography</i>	
Urban Dummy, City = 1, Otherwise 0	URBAN City
Urban Dummy, Suburb = 1, Otherwise 0	URBAN Suburb
Minimum Altitude	ZMIN

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**Table 2. Descriptive statistics**

	Mean	Stdev	Min	1.Quart.	3.Quart.	Max
Self-employment rate of immigrants (dep)	0.0797	0.0753	0.00	0.04	0.10	1.00
Self-employed immigrants (num)	18.36	102.15	0.00	1.00	13.00	3,310.00
Immigrant active population (denom)	358.35	2,033.90	5.00	20.00	223.00	69,937.00
Herfindahl-Hirschman index of ethnic concentration (hhi)	0.2459	0.1405	0.01	0.16	0.30	1.00
Share of male immigrants	0.6145	0.0928	0.18	0.57	0.66	1.00
Share of married immigrants	0.6902	0.1051	0.00	0.64	0.74	1.00
Share of immigrants with a non-permanent residence permit	0.0428	0.0801	0.00	0.00	0.05	1.00
Share of immigrant employed in services	0.4939	0.1554	0.00	0.39	0.60	1.00
Average age of immigrants	37.539	3.0064	25.50	35.76	39.15	52.38
Average family size of immigrants	3.1262	0.5438	1.56	2.81	3.41	8.50
Share of immigrants with a professional degree	0.1088	0.0805	0.00	0.06	0.14	0.60
Share of immigrants with an academic degree	0.0934	0.0923	0.00	0.03	0.13	0.60
Unemployment rate of immigrants	0.0676	0.0579	0.00	0.03	0.09	0.69
Minimum altitude	524.10	207.33	192.00	406.00	592.00	1791.00
Immigrant population	600.03	3,240.13	5.00	33.00	377.25	106,386.00
Overall population	2,898.27	10,473.42	38.00	500.00	2,655.70	363,273.00

**Table 3. Selected descriptive statistics by ethnic background**

Group	Share on overall active population	Share on immigr. active population	Self- employment rate	Unemployment rate
Natives	0.7835		0.1234	0.0278
Immigrants	0.2165	1.0000	0.0564	0.0812
- Italians		0.2303	0.0753	0.0512
-Fmr. Yugoslavians		0.2106	0.0288	0.1143
- Portuguese		0.1086	0.0250	0.0445
- Germans		0.0860	0.0927	0.0315
- Spanish		0.0664	0.0423	0.0456
- Turkish		0.0467	0.0483	0.1487
- French		0.0454	0.0841	0.0545
- Others		0.2528	0.0619	0.1221

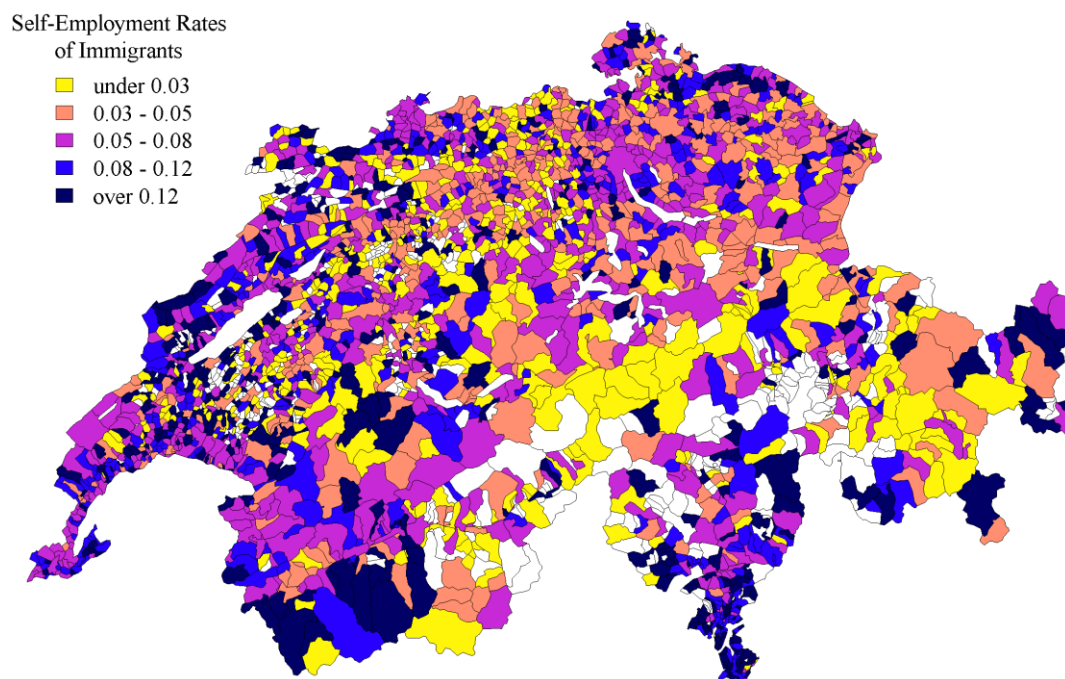
Source: 2000 FPC.

**Table 4. Estimated Models**

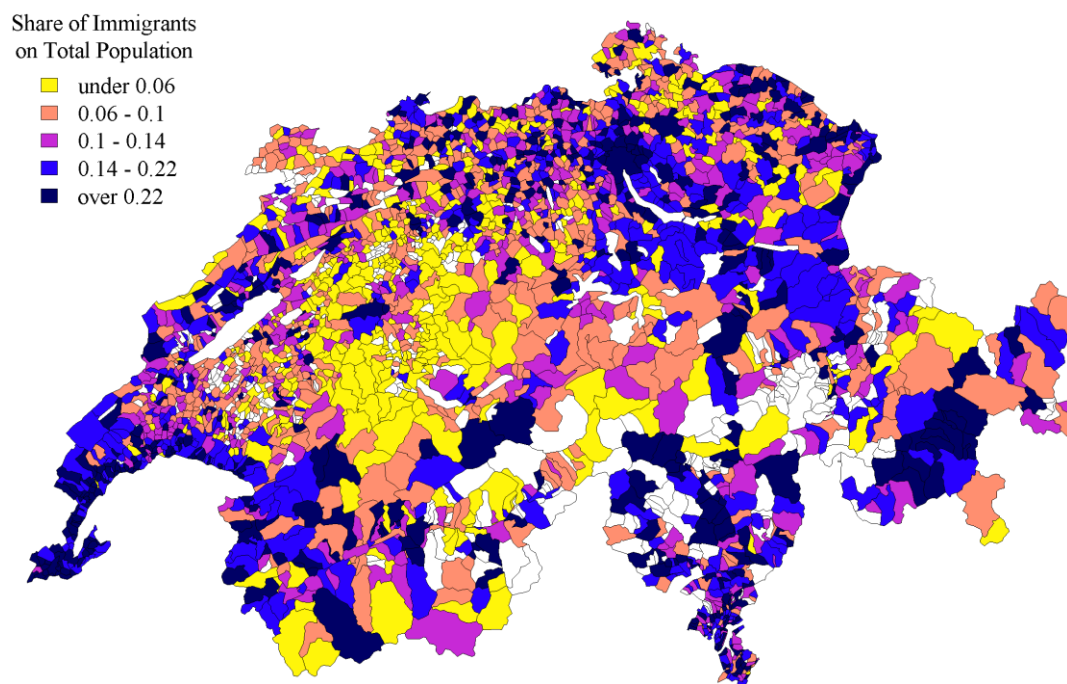
Explanatory variables	(1)	(2)
Ethnic concentration of immigrants (hhi)	0.00	0.10**
Recent immigration dummy	0.00	−0.09***
Language proficiency dummy	0.15***	0.13***
Share of immigrant active men	0.77***	0.55***
Share of immigrant married	−0.10	−0.07
Share of immigrants with a non-perm. resid. permit	−0.23***	−0.17***
Share of immigrant employed in services	0.35***	0.38***
Immigrant average age	11.02***	11.06***
Immigrant average age^2	1.12	0.76
Immigrant average family size	−0.42***	−0.36***
Share of immigrants with a professional degree	0.58***	0.39***
Share of immigrants with an academic degree	−0.03	0.04
Immigrant unemployment rate	−2.29***	−1.79**
Immigrant unemployment rate^2	1.45*	2.25**
Urban dummy: city	−0.15***	−0.21***
Urban dummy: suburb	−0.12***	−0.10***
Minimum altitude	−0.09***	−0.03
(Intercept)	−0.86***	−1.25***
AIC	12098	6547
Log-likelihood	−6030.75	−3255.53
Residual deviance (Residual degrees of freedom)	4176.1 (2472)	2368.1 (2472)

Notes: Significance levels: ‘\*\*\*’ 0.01 ‘\*\*’ 0.05 ‘\*’ 0.1

**Figure 1. Immigrant self-employment rates by local unit**

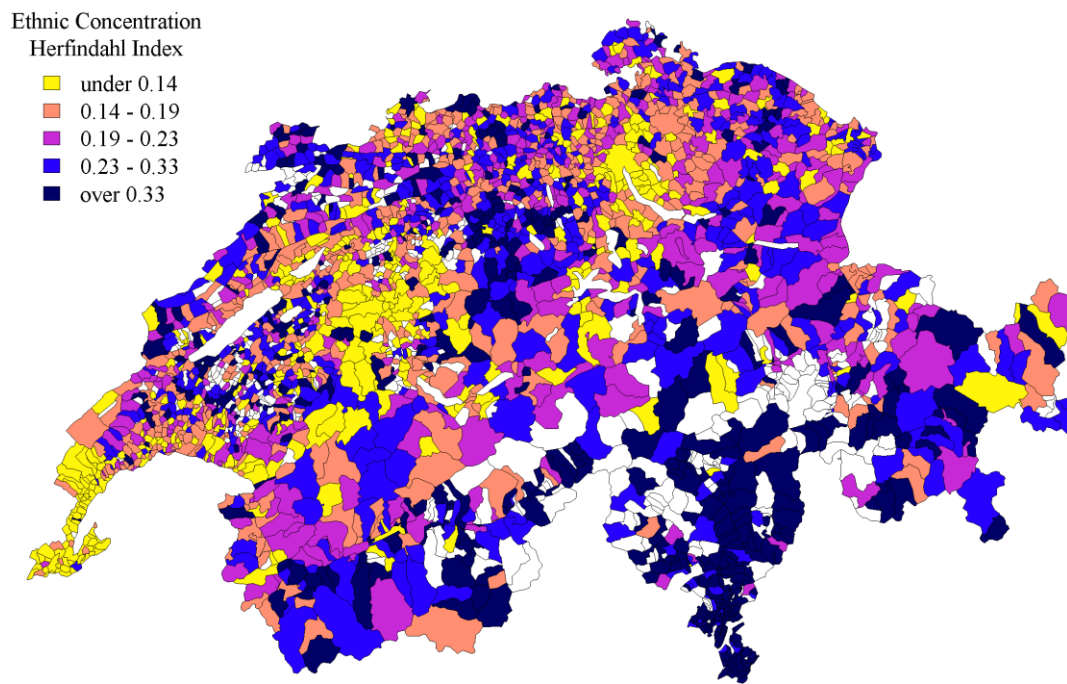


**Figure 2. Shares of immigrants on overall population by local unit**

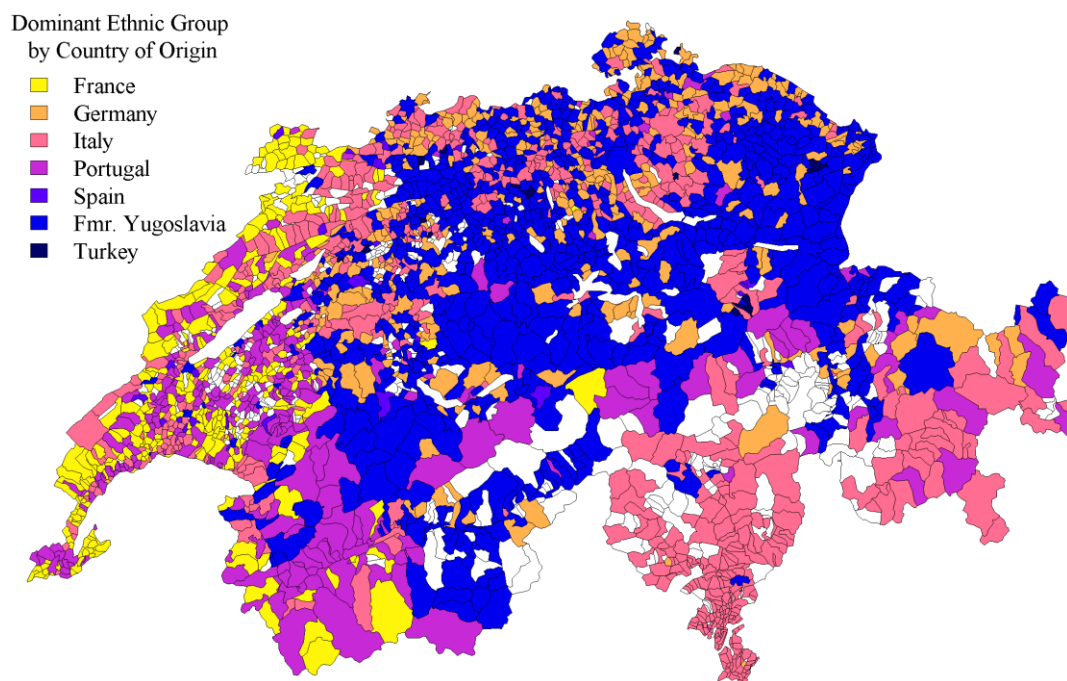




**Figure 3. HHI ethnic concentration index by local unit**

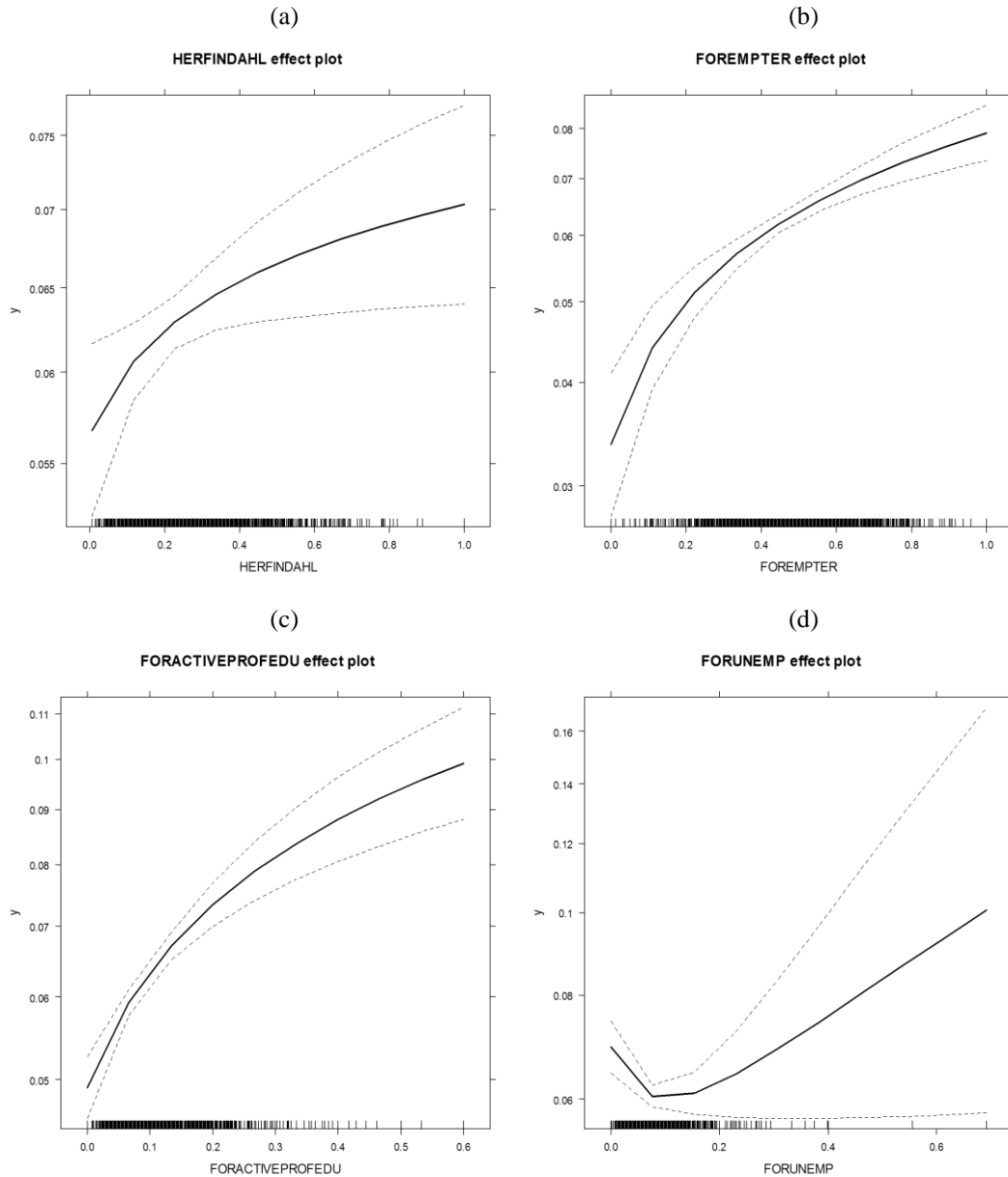


**Figure 4. Dominant nationality by local unit**



**Figure 5. Effect plots**

(a) HHI of ethnic concentration, (b) Share of immigrants employed in services, (c) share of immigrants with a professional degree and (d) immigrant unemployment rate. All variables to their original range



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## **Chapter 2**

# **The Influence of Role Models on Immigrant Self-Employment: A Spatial Analysis for Switzerland**

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## **Abstract**

Theoretical and empirical research suggests a connection between the presence of role models and the emergence of entrepreneurs. Existing entrepreneurs may act as role models for self-employment candidates by providing successful examples. By explicitly considering the self-employment rates of the natives, which may influence locally the decisions of immigrants towards entrepreneurship, we develop a simple model that explains immigrant self-employment rates for a sample of 2,490 Swiss municipalities. In addition, we accommodate for the presence of spatial spillovers in the distribution of rates, and test a spatial autoregressive model which takes into account the average self-employment rates of immigrants living in nearby municipalities. Our evidence shows a significant (positive) effect of such spatial network effects, which are characterized by a quick distance decay, suggesting spatial spillovers at the household and social network level. Additionally, we show that local conditions and immigrant pool characteristics differ, with respect to self-employment choices, when examining separately urban and rural contexts.

JEL codes: C21, J24, J61, O15, R23

Keywords: immigrants, self-employment, role models, Switzerland, spatial lag



## **2.1 Introduction**

Since the late 1970s, somewhat in contrast with the global trend of increasing firm size, many countries have witnessed the emergence of a blooming small- and medium-sized enterprise sector that consistently and increasingly influenced labour market outcomes (in terms of job creation). Moreover, the evolution of the small business sector has led to promising changes in modern economies, playing an important role in technological change and in the growth and evolution of industries (Acs and Preston, 1997).

At the same time, western societies experienced major demographic transformations. Past and current immigration trends led to cities and countries experiencing increasing flows of people with a different ethnic background, creating the conditions for the surge of new business activities in specific and separate ethnic segments of the population. Initially, ethnic enterprises were serving predominantly the needs of the ethnic minority, but they increasingly began to expand their market share to cover other groups' and even the natives' demand for goods and services. Later on, immigrant businesses were found to stimulate direct and induced demand for production factors, housing and land, while they were fostering technological change, scale and agglomeration economies, and other economic and demographic changes (for example, in labour market structure, labour force participation, unemployment, internal migration, externalities and fertility patterns; Greenwood, 1994). In this framework, ethnic enterprises have become popular (Masurel *et al.*, 2002). Thus, cultural and ethnic diversity eventually represents an opportunity for immigrants that can be realized by entering the self-employment sector.

The literature on immigrant entrepreneurial activity mostly focuses on the individual characteristics of ethnic entrepreneurs, whereas the underlying regional and structural conditions are investigated only to explain individual heterogeneity and unexplained common factors. For instance, the only way in which previous studies have considered space is through the inclusion of regional dummies (fixed effects), explaining regional differences by the differences in industrial and occupational composition of local labour

markets, the unemployment level (Clark and Drinkwater, 1998) or by the concentration of particular groups in some areas (ethnic enclaves; Borjas, 1986).

The relevance of spatial dependence in self-employment rates has been largely ignored in the literature. Spatial dependence in entrepreneurial behaviours might arise from different reasons (LeSage and Pace, 2009). First, agents might react to decisions that are taken by other agents in previous periods, following a time dependence motivation. Theoretically, there is no reason to exclude that those patterns occur also between agents located in different regions, as far as these regions are somehow linked to each other (e.g., by commuting), causing ‘similar’ regions to be clustered in space. Second, omitted variables issues may easily arise in regional modelling where unobservable factors (e.g., location amenities or fiscal incentives) can influence the outcome. Third, positive externalities can arise from neighbours influencing the behaviour of agents located in other regions.

With regard to the latter hypothesis, the scarce attention to spatial dependence is even more surprising, since the importance of local network externalities in influencing entrepreneurial decisions is well documented in the literature, and provides an interesting additional piece of explanation on why entrepreneurial activities tend to cluster geographically. Economies of scale and scope, and the resulting lower production and transaction costs, have been traditionally advocated as the main reasons behind spatial concentration of high entrepreneurship rates in certain areas (for an overview, see Minniti, 2005). However, attempts to replicate these processes often failed, while regions showing similar conditions experience very different levels of entrepreneurial activity (Lomi, 1995; Gimeno *et al.*, 1997). Thus, other factors besides economic characteristics are expected to influence entrepreneurial activity.

In particular, a promising extension of classic models seeking to explain the geographical distribution of entrepreneurship is the one provided by sociological and organizational studies investigating the role of the social environment. Social networks and embeddedness have been shown to be crucial factors in individual decisions regarding entrepreneurship (Gulati, 1998, 1999; Uzzi, 1999). The reason why individuals are

influenced by the local social environment in making entrepreneurial decisions is that they aim to increase the available set of information, so as to minimize risk. Furthermore, existing entrepreneurs may act as role models for self-employment candidates by providing (possibly) successful examples of the social condition that the potential entrepreneurs want to achieve. Theoretical and empirical research suggests a connection between the presence of role models and the emergence of entrepreneurs (for a brief overview, see Kolvereid, 1996). Moreover, self-employed husbands have been shown to provide an incentive for married women to become self-employed (Caputo and Dolinsky, 1998; Bruce, 1999).

The influence of role models is described as a non-pecuniary network externality that is assumed to show increasing returns with adoption (Minniti, 2005). In other words, the more entrepreneurs there are in one area, the less risky/ambiguous is – for a potential entrepreneur – the process of deciding whether to enter the market or not. Thus, the local entrepreneurial environment influences individual decisions regarding self-employment (Mueller, 2006). Whether these network effects are bounded locally and restricted to the individual (or family) level, as argued by Aldrich and Zimmer (1986) and Cooper *et al.* (1989), or stretch beyond the individual's network and local labour markets is a question that our paper aims to address.

In our model, we want to test the extent to which the influence of role models can be traced in the aggregate decision outcomes of the immigrants regarding self-employment. For this reason, we use data at the highest level of geographical disaggregation, the Census tract – which in Switzerland corresponds to the local unit or municipality – in order to capture the expected spatial spillovers of network effects due to the presence of entrepreneurs both (1) *within* and (2) *nearby* the local units.

With regard to point (1), we explicitly account for the self-employment rates of natives living in the same municipality, as we regard them as additional (potential) role models for immigrants. The natives can simply be seen as the most numerous ethnic group in every local unit, and their behaviour can be considered to be exogenous to the immigrants pool. Additionally, we expect this variable to capture all unobservable factors that affect local propensities toward entrepreneurship (e.g., the overall business climate, institutional

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facilities, etc.). In this framework, we should interpret the self-employment rates of natives as the baseline around which the local behaviour of immigrants is evaluated, that is, the level from which it deviates.

With regard to point (2), we can consider the self-employed rates of immigrants living in neighbouring municipalities, since existing ethnic entrepreneurs can influence decisions regarding self-employment of the immigrants living in adjacent communities. In particular, because our model is based on variables that are evaluated at the local unit in which immigrants live, we expect that entrepreneurial decisions are taken also on the basis of the observed self-employment rates in communities where the immigrants have social relations, or where they go in order to work or consume. Moreover, it has been widely shown that when using cross-sectional data at a highly disaggregated level, additional spatial dependence (e.g., due to local specific time-dependent variables such as adjustments of the tax levels, or unobservable factors such as location amenities and prestige, or infrastructure accessibility; see LeSage and Pace, 2009) can occur, causing standard linear assumptions to fail. To accommodate spatial dependence, spatial econometric techniques are needed (Anselin, 1988).

In addition, we want to evaluate the effects of local ethnic characteristics in determining the self-employment rates of immigrants. Besides ecological characteristics that influence both natives and immigrants in their entrepreneurial decisions, as well as the geographical characteristics of the local unit, which are captured by the above-mentioned self-employment rates of natives, we argue that the characteristics of the local immigrant pool need to be considered as well.

Using Swiss Census data, Guerra *et al.* (2012) have highlighted the role played by ethnic concentration in influencing local self-employment rates. In particular, they show that local communities with high ethnic concentration (i.e., where the pool of immigrants is dominated by one or few nationalities) show higher rates of self-employed immigrants. Furthermore, local communities where the most important group is made up of immigrants coming from the traditional immigration countries (Germany, France or Italy) or speaking the same language as the (local) natives, show higher rates as well.

We aim to show that geography plays a role in determining to what extent entrepreneurial activity is undertaken among immigrants. In particular, a dummy variable discriminating communities located in cities and suburbs (against a baseline of rural areas) shows a negative coefficient, that is, self-employment among immigrants is significantly higher outside of the urbanized areas.

The aim of this paper is to address the above issues by providing an analysis of the relevance of spatial spillovers in entrepreneurial decisions of immigrants, for a cross-section of 2,490 Swiss municipalities, in the year 2000. Understanding the relationship between natives and ethnic attitudes towards entrepreneurship, the local characteristics of the immigrant community and geography is crucial in a country where immigrants are about 20 per cent of the labour force and, unlike in most other countries, are scarcely attracted by the self-employment choice. Poolability tests suggest splitting our data in two subsets, according to the urban-rural divide. Thus, we estimate two models, for urban and rural local units. In addition, we provide complementary insights on the role played by local ethnic characteristics in enhancing business ownership rates.

## **2.2 The Model**

We propose a model that aims to explain local self-employment rates of immigrants as a function of (1) the local characteristics of the immigrant community and (2) the characteristics of the local unit in which the community is located. In its spatial extension, the model will consider also (3) the spatial effects due to the immigrant communities living in neighbouring municipalities.

### ***2.2.1 Local characteristics of the immigrant community***

In this paper, our primary unit of analysis is the immigrant community, defined as the community of foreign individuals living in a specific local unit. We define as foreign all

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individuals who do not carry a Swiss citizenship. In terms of the characteristics of the immigrant community, we consider its size, the degree of ethnic concentration and the characteristics of the most relevant ethnic group (referred to as the dominant one) as the main explanatory variables.

We account for the presence of ethnic enclaves, measured by an index of ethnic concentration, with the aim to measure the effect of cultural proximity on the self-employment rates of immigrants. Borjas (1986) has shown that immigrants living in ethnic enclaves are associated with higher business ownership rates, suggesting that concentration of ethnic groups in specific areas enhances opportunities for immigrants to become self-employed.<sup>1</sup> Potential entrepreneurs located in ethnically concentrated communities are expected to benefit from comparative advantages in serving the needs of consumers of the same ethnic group (Light, 1972). Furthermore, ethnic concentration may be favourable for business ownership, since it reduces conflicts and prejudices (Alesina and La Ferrara, 2002, 2005). Moreover, the dominance of a particular ethnic group is expected to encourage self-employment through increased social interaction (Borjas, 1986) and a reduction of transaction costs (Lazear, 1999). Beside the existence of ethnic markets, which would eventually pull individuals into entrepreneurship with the aim to exploit opportunities offered by ethnic concentration, there is evidence of factors pushing individuals living in ethnic enclaves towards self-employment. The typical disadvantaged position and limited opportunities of immigrants are expected to generate such push effect. In this respect, discrimination, high unemployment, low wages, the non-recognition of qualifications, and the lack of language skills are the most cited determinants of entrepreneurship among immigrants (see, among others, Fischer and Massey, 2000; Reitz, 2002; Cohen and Kogan, 2007; Senik and Verdier, 2011).

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<sup>1</sup> We do not control directly for the size of the ethnic community (e.g., by considering the share of immigrants on the total population), but we account for the different spatial regimes in which the communities live. Therefore, controlling for the urban-rural divide, we expect to indirectly capture size effects.

In addition, we take into account the characteristics of the dominant ethnic group with regard to its immigration history and its linguistic proficiency. Following Guerra *et al.* (2012), we identify local units where the dominant nationality belongs to groups of recent immigration,<sup>2</sup> since we expect those communities to be less integrated in the local labour market. Recent immigrants often lack first-hand knowledge, experience and capitals to start an economic activity on their own, as they need to accumulate savings and establish credit in order to obtain financing. We also control for local units where the dominant nationality is formed by immigrants of the same linguistic group as the natives. On the one hand, immigrant groups which are not proficient in the language spoken locally may be more likely to show high self-employment rates, as suggested by the isolated labour pool and disadvantaged theory (Light, 1979; Evans, 1989). On the other hand, linguistic integration could also encourage self-employment because of cultural proximity. Speaking the same language as the natives could provide immigrants with more business opportunities.

### **2.2.2 Control variables**

As control variables, we include additional information regarding the educational level, the gender and age composition, the average size of the family, and additional characteristics of the local immigrant community. The level of education is evaluated in the model through the share of immigrants who hold a professional degree. The underlying hypothesis is that communities with a higher share of professionally educated people will have higher self-employment rates. Education has been shown to positively influence the entrepreneurial decisions of immigrants, since it provides skills and knowledge which represent an advantage in organizing and operating a business, as well as greater access to financial capital (Sanders and Nee, 1996). On an individual basis, men have been shown to be more

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<sup>2</sup> We consider as newcomers the immigrants belonging to more recent waves (i.e., the Spanish, Portuguese, Yugoslavians and the Turkish), as opposed to traditional immigrants, coming from the countries surrounding Switzerland (Italians, Germans and French).

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entrepreneurial than women (Meyer, 1990; Blanchflower and Oswald, 1991; Lindh and Ohlsson, 1996). Furthermore, many studies have suggested that there are some basic differences in the reasons why men and women opt for self-employment (Boden, 1996; Carr, 1996; Boden, 1999). Therefore, keeping everything else constant, we expect local communities with a higher share of men to display higher rates of self-employment. Individual probabilities to become self-employed also increase with age, although at diminishing rates (see Rees and Shah, 1986; Blanchflower and Oswald, 1990; Sanders and Nee, 1996 for the UK; Evans and Leighton, 1989 for the United States). On the one hand, very young people do not own the necessary skills and professional contacts, and are less likely to dispose of sufficient capitals to open their own business. On the other hand, older persons tend to lose interest in becoming entrepreneurs (Rees and Shah, 1986), because of the decrease in the related expected lifetime earnings. In our model, we include the average age of immigrants, which is expected to be associated with higher self-employment rates, along with its square term to catch nonlinearities.

#### ***2.2.3 Characteristics of the local unit***

The characteristics of the local unit in which the immigrants live are also included in our model, following the idea that local conditions influence attitudes towards entrepreneurship. In particular, we include the self-employment rate of natives living in the same local unit, in order to investigate the extent of role models influences. We expect the natives to provide successful examples regarding the local self-employment experience. Moreover, the natives self-employment rate may be expected to capture unobserved ecological variables that influence equally the entrepreneurial behaviour of both immigrants and natives.

Furthermore, we evaluate the urban-rural gap by means of a dummy variable splitting our sample in two groups: cities and suburbs are compared to rural areas. Following the results of a poolability test performed on the basis of this dummy variable (see Section 2.4.2), we estimate two separate models for the urban and rural milieus.



Finally, we include a proxy for the accessibility of the local units using the minimum elevation of the area in order to discriminate for areas that are easily linked to other areas or are rather isolated (as is the case of the municipalities in the Alpine region).

#### ***2.2.4 Characteristics of neighbouring units and spatial extensions***

In addition to the natives' self-employment rates, we consider the entrepreneurial behaviour of immigrants living in the surrounding areas. Thus, we include in our model the average self-employment rate of the immigrants living in neighbouring municipalities. Our hypothesis is that existing ethnic entrepreneurs can influence, for example through informal networks, the decisions regarding self-employment of immigrants living in neighbouring communities. In particular, we expect to observe similarities in self-employment rates among local communities between which commuting flows or intense social relations occur (e.g., contiguous communities).

In addition to a model specification motivation, there is also an econometric motivation to explicitly include such spatial spillovers in our model. The spatial econometrics literature has shown that OLS estimation is potentially inappropriate (i.e., biased) when spatial effects are not properly modelled. As shown in Cliff and Ord (1981) and Anselin (1988), models of spatial dependence are used to account for direct influence from spatial neighbours or spillovers between cross-sectional units of observation. There are several methods which incorporate spatial dependence in an econometric model. We choose to rely on the model that incorporates only the spatial autocorrelation term  $\rho$ , which is expected to capture spatial dependence pertaining to the dependent variable and residual unobserved common factors correlated with the explanatory variables.

It is important to underline, at this stage – as it is central to our identification strategy – that because we include in our model the self-employment rates of natives and regional characteristics, we already implicitly control for ecological variables that influence both immigrants and natives.

### **2.2.5 The full model**

In summary, our model is made up of the following components:

- the immigrant local characteristics;
- a set of control variables:
  - o for the composition of the local immigrant community;
  - o for geography;
- the self-employment rate of the natives;
- the average self-employment rate of immigrants from neighbouring municipalities.

Our model can then generically be written as follows:

$$FOREMPSE_i = f(SWIEMPSE_i, FOREMPSE_j, X_{k,i}, C_{s,i}, V_{t,i}), \quad (1)$$

where  $FOREMPSE_i$  is the self-employment rate of immigrants registered in the local community  $i$ , with  $i = 1, \dots, N$ ;  $SWIEMPSE_i$  is the self-employment rate of the natives in unit  $i$ ;  $FOREMPSE_j$  is the self-employment rate of immigrants living in the neighbouring units  $j$ ;  $X_{k,i}$  is a vector containing the  $k = 1, \dots, K$  characteristic of the local ethnic community  $i$ ;  $C_{s,i}$  contains the set of  $s = 1, \dots, S$  controls for the local ethnic community; and  $V_{t,i}$  describes the  $t = 1, \dots, T$  geographical characteristics of the local unit.

In order to estimate such a model, we resort to spatial econometric methods. Following Anselin (1988), we design a spatial lag (or spatial autoregressive model; SAR). Our model can then be estimated as:

$$r_i = \frac{Y_i}{n_i} = \rho W r + \beta_0 + \beta_{1k} X_{k,i} + \beta_{2s} C_{s,i} + \beta_{3t} V_{t,i} + \varepsilon_i, \quad (2)$$

where  $r_i = \frac{Y_i}{n_i}$  is the self-employment rate of immigrants registered in the local community  $i$  (and  $i$ th element of the vector  $r$ ), computed as the number of self-employed immigrants  $Y_i$  divided by the related active population  $n_i$ ;  $\rho$  is the coefficient measuring the dependence of the dependent variable from the average rates reported in neighbouring units  $j$  ( $r_j$ );  $W$  is a suitably chosen spatial weights matrix;  $\beta_0$  is the intercept of the model;  $\beta_{1k}$  is the regression coefficient associated to the  $k$ th characteristic of local ethnic communities expressed in matrix  $X$ ;  $\beta_{2s}$  is the coefficient for the  $s$ th control variable in matrix  $C$ ;  $\beta_{3t}$  is the coefficient for the  $t$ th characteristic of the local units, given in matrix  $V$ . Finally,  $\varepsilon_i$  is the error term for unit  $i$ , which is expected to meet the usual assumption  $\varepsilon_i \sim i.i.d.(0, \sigma^2)$ .

## 2.3 Data

We consider the number of self-employed immigrants recorded by the Swiss Federal Population Census for 2,490 municipalities in the year 2000.<sup>3</sup> The sample includes 46,162 entrepreneurs among 892,300 (5.2 per cent) immigrants who are considered active on the labour market. According to the Federal Population Census, individuals are considered as immigrants if they do not hold a Swiss nationality. Table 5 provides an overview of selected descriptive statistics.

The number of ethnic entrepreneurs (#FOREMPSE) ranges from 0 to 3,310, the latter figure being registered in the city of Zurich (4.7 per cent of 69,937 active immigrants). Self-employment rates for each local community (FOREMPSE) were computed dividing the number of self-employed immigrants (all sectors, both with and without employees) by the immigrant active population, and range from 0 to

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<sup>3</sup> We excluded local units with less than five active immigrants (406 out of the 2,896 local units reported in the Census) in order to decrease the heterogeneity in the sample and avoid high shares of unreliable extreme values.

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Figure 6 shows their spatial distribution across Swiss municipalities (our unit of analysis), suggesting that higher rates are observed mostly in the proximity of the Swiss borders, that is, where considerable cross-border commuting exists, and where immigrants from countries of traditional immigration may be expected to be dominant. The average rate across all municipalities is 8 per cent, which is considerably lower than the average rate observed for the natives (SWIEMPSE, 15 per cent). In our sample, the average (immigrant) local unit population (#FORACTIVE) is 358, varying from 5 to 69,937.

As for the characteristics of the local ethnic communities, the average size of the ethnic community (FORACTIVE, not included in the model) is rather small, 14.1 per cent on the total active population, but varies considerably, in particular upwards (up to 70.3 per cent). The distribution of different nationalities in the local communities (HERFINDAHL)<sup>4</sup> highlights a prevalence of units with a rather diverse ethnic composition. The average indicator for ethnic concentration is 0.25, and ranges from 0 (no ethnic concentration) to 1 (full concentration; i.e., all active immigrants are of the same nationality). Local unemployment rates among immigrants (FORUNEMP) are 6.8 per cent on average.

Self-employment rates among natives (SWIEMPSE) are persistently higher than the ones observed among immigrants, with an average of 15.4 per cent in the sample and a symmetric distribution ranging between the extremes of 0 and 52.5 per cent.

In 1,154 of the 2,490 local communities investigated, the dominant nationality is made up of so-called newcomers (RECENTIMMIGR). In 873 immigrant communities, the most relevant nationality speaks the same language of the natives (LANGPROALL).<sup>5</sup> Finally,

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<sup>4</sup> We use an adaptation of the Herfindahl-Hirschman index (Hirschman, 1945; Herfindahl, 1950), originally used as a measure of trade or industrial concentration, in order to measure ethnic concentration. For each local unit  $i$  ( $i = 1, \dots, N$ ), we compute the index as:  $HERFINDAHL = \sum_{p=1}^P s_{i,p}^2$ , where  $s_{i,p}$  is the share of active immigrants of the ethnic group  $p$  on the total active immigrants within local unit  $i$ .  $P$  is set to seven, for the main immigrant groups in Switzerland (Italians, Germans, French, Portuguese, Spanish, Turkish and former Yugoslavians).

<sup>5</sup> The language proficiency of the dominant group is proxied by a dummy variable that takes the value of 1 if the dominant nationality belongs to the same linguistic group as the locals, and 0 otherwise.

out of the total number of local units censused, 1,524 have rural characteristics, while 966 are cities or suburbs (URBAN).

Because of the very different industrial structure and labour force characterization typical of urbanized and rural areas, we may expect the characteristics of immigrants to vary as well, according to the urbanization characteristics of the municipalities. Table 6 presents average values for the two subsamples obtained by splitting our data according to the urban-rural divide, while Figure 7 provides information on the geographical location of the urbanized and rural units.

While the average rates of immigrant self-employment are rather similar for the two groups (with a greater standard deviation for rural areas), the same rates for the Swiss natives are instead rather different (13 vs 17 per cent), suggesting that within the two contexts the behaviour of the natives may influence the one of the immigrants to different extents, keeping everything else constant. Alternatively, if the influence of the natives on the immigrants were equal over the two subsamples, we should then expect further explanatory variables to influence immigrant self-employment differently in the two contexts. A further clear difference between the two sub-samples is that rural areas appear to have welcomed higher shares of ‘newcomers’. The rural local units with a dominant nationality of recent immigration are more than half (they are only around one third in urbanized areas). Likewise, in 69 per cent of the total cases (801 out of 1,154), local units with a non-traditional dominant ethnic group are rural. Finally, rural units are predominant from a numerical viewpoint, as they represent about 61 per cent of the sample.

## **2.4 Empirical Findings**

The existing literature on ethnic self-employment, which mostly seeks to explain differences among ethnic groups in individual probabilities to become entrepreneur, suggests that differences are partly explained by group characteristics such as family background (Sanders and Nee, 1996), location in ethnic enclaves (Borjas, 1986), linguistic

proficiency (Evans, 1989), taxation levels (Blau, 1987), and ethnicity (for an overview, see Yuengert, 1995).

We investigate *local* differences in immigrant self-employment rates, in order to uncover which local characteristics encourage entrepreneurship, and we concentrate our analysis on the variables that may detect the presence of family or ethnic networks as important factors. We proceed in three steps. First, we estimate our model for the full sample of Swiss municipalities. Second, following the results of an urban/rural poolability test, allowing differences in coefficients between ethnic communities located in urbanized and rural areas, we carry out separate estimations for our model. Third, in order to investigate the geographical extent of spatial network effects, we perform a spatial sensitivity analysis using different definitions of proximity (e.g., contiguity, distance or travel times) and varying geographical extents of spatial interaction.

Since our analysis involves rates as the dependent variable and the rates are computed on small areas with (sometimes) relatively scarce population, we expect our dependent variable not to respect the assumptions typical of linear regression models (Gaussian distribution and homoskedasticity). More appropriate models for proportions are provided within the family of generalized linear models (GLM). However, since tests for spatial autocorrelation, and in particular the use of Moran's  $I$  test for GLM regression residuals, are still speculative and provisional (Bivand *et al.*, 2008), we choose to rely on linear models and on an appropriate transformation of the dependent variable.

We may expect the counts  $Y_i$  (in our case the number of self-employed immigrants) to follow a binomial distribution with  $E\left(\frac{Y_i}{n_i}\right) = r_i$  and  $\text{var}\left(\frac{Y_i}{n_i}\right) = \frac{r_i(1-r_i)}{n_i}$ . However, for small  $r_i$ , the variance is proportional to the mean, suggesting a square-root (or log) transformation to smooth out heteroskedasticity. Furthermore, the presence of spatial autocorrelation (i. e., the fact that the counts of self-employed immigrants are sums of spatially dependent binomial random variables) requires a stronger transformation (Cressie, 1993). Thus, we transform the dependent variable as follows:

$$Z_i = \log\left(\frac{1000(Y_i - 1)}{n_i}\right). \quad (3)$$

The proposed log-transformation has the advantage that it helps discriminating between local units with a small number of self-employed immigrants ( $Y_i \leq 1$ ) but with different population size (Waller and Gotway, 2004, p. 348), as in our case. This transformation contributes to reshaping a very skewed distribution, with many zeros, into one that is reasonably symmetric and approximately normally distributed, with a mean value of 4.45, a median value of 4.41 and a standard deviation of 0.72 (see Figure 8).

Among our set of covariates, many show a non-normal distribution. Thus, we choose to transform these variables as well, using the conventional log-transformation:  $x^* = \log(x + 0.0001)$ .<sup>6</sup>

#### **2.4.1 Pooled model results**

In the first step of our analysis (see above), we estimate our model for the full sample of 2,490 Swiss municipalities. Table 7 presents the results for three nested specifications, which are sequentially estimated as follows:

- Model 1: OLS model, including the immigrant pool's local characteristics (HERFINDAHL, RECENTIMMIGR, LANGPROALL), the control variables for the composition of the local immigrant community (FORACTIVEMEN, FORACTIVEMARRIED, FORACTIVENON, FOREMPTEER, FORACTIVEAGE,

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<sup>6</sup> The 0.0001 constant added to selected variables before taking logs is elided in the remaining text.

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FORACTIVECHIL, FORACTIVEPROFEDU, FORACTIVEACCAEDU, FORUNEMP), and the controls for geography (ZMIN, URBANsubcities);

- Model 2: OLS model with the same specification as Model 1, and including the self-employment rates of the natives (SWIEMPSE);
- Model 3: Spatial lag model, with same specification as Model 2, estimated by maximum likelihood (ML), and based on a row-standardized queen contiguity spatial weight matrix.

From Table 7, it is evident that the inclusion, in Model 2, of the native self-employment rates (SWIEMPSE) leads to a significant statistical improvement in model fit (measured by means of  $R^2$  and the Akaike information criterion – AIC), as confirmed by an F-test. Additionally, Model 3, including the average rates observed in neighbouring units, which have a positive and significant coefficient, shows a further improvement in AIC. A likelihood ratio test of Model 3 against Model 2 provides further confirmation. Additionally, our estimates are rather stable – in both sign and size – over the three model specifications. Consequently, we limit ourselves, in subsequent analyses, to commenting the results obtained for the full model (Model 3).

Our estimation results generally show that the coefficient estimates for some of the control variables tend to decrease in size or to altogether lose significance (e.g., ZMIN and URBANsubcities) once the natives self-employment rates are considered, confirming that this variable is convoluted with most (observed and unobserved) ecological factors that may influence all entrepreneurs. Likewise, the coefficient attenuation observed increases when moving to Model 3.

More in detail, with regard to the local ethnic characteristics, the regression coefficient for the ethnic concentration index suggest a negative effect on the dependent variable, which however only becomes significant in Model 3. If the locally dominant nationality is made up of newcomers, the estimated self-employment rates are smaller. This result is consistent with the hypothesis that ethnic communities of more recent (historical) immigration face greater obstacles towards self-employment. Language proficiency,



instead, has a significant and positive effect on local self-employment rates, suggesting that linguistic integration with the locals (the natives) is an important factor for ethnic communities.

As for the control variables, the regression coefficients for the share of male immigrants and for the share of active immigrants reported as married are non-significant. The variable accounting for the share of immigrants without a permanent residence permit is negatively associated with local self-employment rates. The industrial composition of the labour force does have a positive, but rather small and unstable, coefficient. The average age of the immigrant community increases self-employment rates, at a more-than-linear rate (the quadratic term is also positive and significant), while the negative coefficient for the average household size may be seen as reducing the positive effect of age, because of the risk aversion tied to the presence of children. The results of the pooled model also suggest that a higher share of professionally or academically educated immigrants implies less self-employed, probably because of the opportunity cost associated with setting up an independent business. This finding is in contrast with the one of Guerra *et al.* (2012), who find a positive coefficient estimate for the same variables. Finally, local unemployment rates are negatively associated to the dependent variable with respect to the linear term, but the relationship becomes positive for the quadratic term, leading to a U-shaped relationship suggesting that an increase in unemployment pushes the immigrants towards self-employment only within a high-unemployment environment.

Among the local factors, we find that communities located in the Alpine region do not seem to behave differently (the regression coefficient for altitude is non-significant). Also, in Model 1, ethnic communities located in urban areas show significantly lower self-employment rates than the ones located in the countryside. However, this difference in intercepts disappears when considering the self-employment rates of the natives (Models 2 and 3), confirming again that most ecological factors are included in our model by means of the latter variable. Needless to say, the natives' rates are positively and strongly significantly correlated with the entrepreneurial activity of immigrants. This finding confirms that ecological conditions are relevant and that the presence of native

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entrepreneurs within local units provides successful examples (role models) for immigrant entrepreneurship. Finally, the spatial dependence coefficient  $\rho$  estimated in Model 3 is positive and significant as well. This result is consistent with the hypothesis that local immigrant self-employment rates are correlated, causing standard OLS results to be biased and requiring spatial econometric techniques. The correlation between self-employment rates should be reconducted to the presence of additional role models, which are the ethnic entrepreneurs living in adjacent communities. Not surprisingly, the size of the spatial dependence coefficient is relatively small, also, in comparative terms, with respect to the coefficient estimate for the natives' rates. The above findings suggest that: (i) our hypothesis on the influence of role models both within and outside the municipality of reference holds; and that (ii) the effect of role models may occur not only between immigrants, but also across nationalities (including the natives).

#### ***2.4.2 Unpooled model results***

The results presented in Table 7 assume poolability of our baseline model at the regional level. However, there are reasons to believe that ethnic communities located in rural areas behave differently from their urban counterparts. In particular, there are strong differences between rural and urban areas with regard to immigrant characteristics and their spatial distribution. As suggested by the descriptive statistics given in Table 6, we may expect to find different coefficient estimates for the urban and rural subsamples, that is, the determinants of immigrant self-employment may differ. This hypothesis does not necessarily regard the intercept, as proven by our findings for the baseline model, in which the URBANsubcities dummy variable becomes non-significant once we augment Model 1.

We test for poolability of our baseline model by estimating an unrestricted model and testing it against the restricted model. Therefore, the hypothesis  $H_0$  we test here is:

$$\beta_U = \beta_R = \beta, \quad (4)$$

where  $\beta_U$  is the vector of regression coefficients for the submodel estimated only for urbanized areas, and  $\beta_R$  is its counterpart for the rural areas;  $\beta$  is the vector of coefficients for the restricted model. The restricted and unrestricted models are clearly nested, as the restricted model is a special case of the unrestricted one. If  $H_0$  is rejected up to a satisfying probability, then we must conclude that the restricted model is misspecified, and that separate estimations should be carried out.

We obtain the unrestricted model by interacting the URBANsubcities dummy variable identifying urbanized and rural areas with all remaining explanatory variables, and we perform an F-test between the two models, the number of restrictions applied being 16 (2472 vs 2456 residual degrees of freedom). The F statistic is equal to 5.954, and leads to a highly significant rejection of  $H_0$ .<sup>7</sup> Consequently, separate models are estimated for the urban/suburb and rural subsamples, whose regression results are reported in Table 8.

Two findings can be drawn from these additional regressions. Our first finding is that the unpooled models confirm the significance and (approximately) the size of the coefficient estimates for our key variables. Both the self-employment rates of the natives (SWIEMPSE) and the spatial dependence coefficient  $\rho$  are consistent with the previous estimation. However, the above estimates differ between the urban and rural contexts, suggesting that the impact of role models is greater in an urban context, most likely because of the increased chances for face-to-face interaction that may be expected in higher density areas.

The second finding is that, indeed, the two models differ under many respects, in both significance and size of the coefficients estimated for the control variables. The unstable result found in Table 7 for the ethnic concentration index (HERFINDAHL) breaks down here to the non-significant coefficient for the urbanized subsample and the significant and

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<sup>7</sup> Further poolability tests (Chow and Roy-Zellner tests, not reported) confirm our finding. For computational reasons, we perform all poolability tests on Model 2, since spatial lag models imply a number of complications with regard to poolability testing. However, the similar AIC of the two models, as well as the high significance of the test result, make us confident that an identical result would be found for Model 3.

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negative one for the rural subsample, implying that a stronger ethnic concentration is less relevant in the cities, while in a less dense geographical context increased chances for interaction with other immigrants of the same nationality reduces job search costs, and consequently leads to an increased propensity towards wage employment. Clearly, in a rural context, ethnic entrepreneurship targeting the needs of the immigrants is less desirable, given the lower density. Language proficiency, instead, becomes more relevant – as it is typical – outside of the melting-pot environment typical of urban contexts.

The gender balance appears to be relevant only in the urban context, as well as the industrial specialization in the tertiary sector (as it may be expected). The negative and significant coefficients for education in the rural model reinforces the finding for industrial specialization, supporting the view that different types of required skills imply different types of businesses managed by the immigrant entrepreneurs. This finding deserves, in our view, further investigation, which goes beyond the aim of this paper.

In the urban context, the number of children does not seem to act as a deterrent against self-employment, given the existence of a possible back-up plan based on wage employment. The effects of age appear to be much greater – and quadratic – in rural areas. This finding can be explained by the fact that, in most cases, younger immigrants – whether they have wage- and self-employment ambitions – are attracted to the cities, leaving the rural alternative mostly to older immigrants. Finally, higher unemployment rates are associated with lower self-employment rates in the urban context (greener economic pastures attract entrepreneurs). The U-shaped relationship found in Table 7 for the pooled model is confirmed only for the rural context, suggesting that the common self-employment-out-of-unemployment hypothesis can be supported in this case (for higher unemployment regions), again most likely because the sparser network relationships in rural areas diminish the hopes of finding a (new) wage job.

## 2.5 Spatial Sensitivity Analysis

The analyses presented in Section 2.4 show that spatial network effects can be hypothesized for Swiss municipalities when it comes to the self-employment choice of immigrants. We want to investigate at which geographical extent these effects actually occur. Do they arise only at a very local scale? If that is the case, we may infer that family-related contacts and social networks play a role (*push effects*). Do these spatial effects occur instead at a larger geographical scale (e.g., local labour markets)? In this case, it is likely that market effects, or further unobserved labour market characteristics are relevant (*pull effects*). It is good practice to assess the extent and the shape of spatial dependence in the observations being analysed by means of an exploratory spatial data analysis (Haining, 1990; Bailey and Gatrell, 1995; Anselin, 1998, 1999; Le Gallo and Ertur, 2003). This set of techniques provides measures of global and local spatial autocorrelation.

We first test the rates of self-employed immigrants in the whole sample (before partitioning it) for global spatial autocorrelation using Moran's  $I$ .<sup>8</sup> Statistical tests were performed using three different spatial weights matrices ( $k$ -nearest neighbours (KNN), queen contiguity neighbours, and distance threshold neighbours)<sup>9</sup> using the common row-standardization and under the randomisation assumption (Bivand *et al.*, 2008, p. 262). In

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<sup>8</sup> Moran's  $I$  is the most commonly used statistical indicator for spatial autocorrelation. It is essentially a modified correlation index, and is calculated as:

$$I = \frac{N \sum_i \sum_j w_{ij} (x_i - \bar{x})(x_j - \bar{x})}{(\sum_i \sum_j w_{ij}) \sum_i (x_i - \bar{x})^2},$$

where, for  $N$  regions,  $x_i$  represents the value taken by the generic variable  $x$  in unit  $i$ , and  $w_{ij}$  is the value of the  $(i, j)$  cell of a spatial weights matrix  $W$ , suitably defined to indicate the spatial relationship between each pair of regions  $i$  and  $j$ .

<sup>9</sup> The  $k$ -nearest neighbours definition of proximity considers the geographical centroid of each local unit, and selects as neighbours the units which have the closest  $k$  centroids. Distance threshold neighbours are selected similarly, using as the only criterion a suitably selected maximum distance between centroids. Neighbours defined according to the queen definition of contiguity share a common border. Differently from the rook contiguity case, queen contiguity also allows the length of the common border to be zero (as it would be for diagonal neighbours in a chessboard grid).

order to evaluate the extent of spatial dependence in a more realistic way, particularly in a country like Switzerland where, for instance, contiguous units may not have a direct road connection (as on the Alps), spatial weights matrices based on inverse travel times distances were tested as well, under the assumptions of both road congestion and no congestion.<sup>10</sup> The results of the tests (see Table 9) show that the spatial patterning of the immigrant self-employment rates is significant for each definition of proximity, with neighbouring units that are likely to exhibit similar rates. On the other hand, the magnitude of the estimated global spatial autocorrelation is low (Griffith, 2003). By changing the number of neighbours considered for each local unit, we can see that the resulting  $p$ -value decreases consistently the more neighbours we account for, while Moran's  $I$  follows a nonlinear pattern reaching a peak first, and then starting to fall. This occurs roughly when the spatial weights matrix accounts on average for more than two and less than five neighbours per spatial unit, suggesting that the observed spatial patterns are bounded within the immediately adjacent municipalities.

If we account for neighbours according to travel time (under both hypotheses of congestion and no congestion), Moran's  $I$  values are somehow lower with a comparable number of neighbours (e.g., 2-nearest neighbours and travel times neighbours with a cut-off of 5 minutes). However, it should be noted that the results for the first two cut-offs (5 and 15 min) do exclude some observations (which are left with no neighbours because they are too distant from any other unit). If we consider the congestion hypothesis, the measure of global autocorrelation is even lower.

For illustrative purposes, we report, in Figure 9, correlograms for the first 15 orders of the  $k$ -nearest- and queen-contiguity-based neighbours definitions, while the correlogram for the distance thresholds covers all ranges (to a maximum of 360km). In Figure 9a, Moran's  $I$

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<sup>10</sup> Travel time data were computed for the year 2005, considering travel by car in minutes for a network that: (1) considers no other road users; and (2) considers other road users based on the capacity-restrain-function. The zones are based on the 2000 definition of the Swiss Federal Office for Statistics (municipalities).

estimates for the  $k$ -nearest neighbours are plotted for every  $k = 1, \dots, 15$  (each point adds an additional neighbour). All indices identify statistically significant spatial autocorrelation. The largest Moran's  $I$  is reported for  $k = 3$ . Thus, this definition is suggested to capture the largest degree of spatial dependence in our dependent variable. In Figure 9b, a comparable graph is reported for the queen contiguity neighbours, with appropriate confidence intervals (each point represents an additional order of contiguous neighbours that are taken into consideration). All the orders of contiguity are significant but the last, although  $p$ -values should be adjusted for comparative reasons (Bivand *et al.*, 2008, pp. 267–8). The correlogram in Figure 9c shows the significant (bigger dots) and non-significant values of Moran's  $I$  by distance bands. In this case, significant global spatial autocorrelation is detected below a coordinate range of 60,000 from each local unit, which corresponds, in the Swiss coordinates system, to a great-circle range of 60km (metric system). There are, however, two additional distance bands for which Moran's  $I$  is again significant, corresponding to roughly 280km and 320km, but the range is far beyond our interest, and most likely captures similarities between the French- and Italian-speaking regions.

Although there is no overall consensus that models explaining the determinants of immigrant self-employment may reveal spatial dependence (with the only exception, to our best knowledge, of a regional analysis of Brazilian natives' entrepreneurship rates; Moro *et al.*, 2003), we find evidence of spatial clustering in our data. The magnitude of global autocorrelation is small. Nonetheless, not correcting for spatial dependence can lead to model misspecification resulting in biased and/or inconsistent OLS estimates (Anselin, 1988). Moreover, the results of tests for the presence of global autocorrelation using different definitions of proximity have highlighted patterns limited to the immediate surroundings, suggesting processes of contamination/imitation that are locally bounded. In fact, the effects of proximity decay after considering more than six neighbours in the  $k$ -nearest neighbours definition, or more than eight orders of contiguity. Using a distance matrix, Moran's  $I$  decays as well when we account for neighbours within a range beyond 60km. Finally, we re-estimate Model 3 using different the spatial weights matrices considered above.

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Table 10 presents the results obtained for the urban/suburb data subsample. The consistent significance of the spatial dependence coefficient  $\rho$  in our spatial lag models is further support for our hypothesis of spatial network effects between immigrants, while with regard to size, the coefficient estimate ranges from 0.08 and 0.25. The coefficient estimates for all other variables are highly stable.

The variation in  $\rho$  is driven by the extent of the geographical range selected for the spatial weights matrix, as the coefficient increases with the number of neighbours that are accounted for. Among the control and ecological variables, we find an opposite result: the coefficient estimates for the share of men, for the share of employed in the third sector, and for age tend to slightly decrease in size the more neighbours are used. Such coefficient attenuation is consistent with what is suggested by LeSage and Pace (2009), who point out that inference regarding impacts in a spatial autoregressive model should be taken with caution (with respect to the usual interpretation of OLS estimates), since the spatial lag model allows changes observed for an explanatory variable in local unit  $i$  to affect the dependent variable both in unit  $i$  and in other units  $j$  ( $\neq i$ ) defined as neighbours of  $i$  in the spatial weights matrix used. Total effects estimates for each explanatory variable, computed, following LeSage and Pace (2009, 2010), as the sum of direct (reported) and indirect (not reported) effects, are found to be very similar for all spatial weights matrices, and generally increasing slightly with the implied geographical extent of spatial interaction.

In Table 10, the only regression coefficient that experiences a change in its significance level is the one for altitude (ZMIN). It is clear that the enlargement of the geographical area considered by the model will lead to comparisons between regions that are more far away from each other, and altitude comes into play, particularly in a country with wide elevation differences like Switzerland. The coefficient for altitude becomes significant for the wider distance bands, and is positive, suggesting that, when the share of low- and high-elevation units are compared, it helps explaining the conditional share of self-employed. Our interpretation is that in more elevated municipalities employment opportunities are rare (and often subject to high seasonality, at least in skiing resorts), and therefore local immigrants tend to self-select themselves into entrepreneurial positions.



According to the AIC and log-likelihood values reported in the lower part of Table 10, the model specification that shows the best fit – although within a framework of rather small variations from case to case – is the one accounting for neighbours within a distance range of 1.5 times the minimum distance (11.7km) necessary in order for all local units to have at least one neighbour (‘Distance thresh. \* 1.5’, which corresponds to  $11.7\text{km} * 1.5 = 17.6\text{ km}$ ).<sup>11</sup>

Table 11 provides similar results obtained for the rural subsample of our data. Again, the results of Table 8 are confirmed for all spatial weights matrices, with rather robust findings. As above, the spatial dependence coefficient  $\rho$  is always significant, and increases with the geographical range of the neighbouring criteria. Residual spatial autocorrelation is non-significant in seven cases out of nine, when using contiguity-based spatial weight matrices, or after the inclusion of neighbours in a distance band of more than 11.7km, or when using  $k$ -nearest neighbours with  $k > 1$ . Because this result is only found for the rural subsample, we conclude that urbanized areas ‘hide’ further unobserved variables and spatial interaction effects, for example due to urbanization (core-periphery effects), which are instead not relevant at the rural level. Model fits improve when increasing the number of neighbours, and the model estimated using the widest distance band (‘Distance thresh. \* 1.5’, corresponding to 23.4km) shows the best log-likelihood and AIC. Given the geographical size of rural municipalities, which are much wider than in the urban case, this result could have been expected. Nonetheless, it confirms that also in a rural context spatial interaction beyond city boundaries occurs, and it stretches to adapt to the geographical characteristics of the area.

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<sup>11</sup> The spatial lag specification does not seem to catch all residual autocorrelation, which remains significant for all estimations. A richer modelling specification, based on the so-called spatial Durbin approach, would be most likely to eliminate this further residual correlation. However, in this paper, we limit our analysis to the spatial lag specification, since our interest lies in the estimation of the spatial dependence coefficient.

## **2.6 Conclusions**

This paper presented a series of statistical analyses aimed at investigating the determinants of immigrant self-employment rates in Switzerland. Unlike many countries, in Switzerland immigrants show a considerably lower propensity towards entrepreneurship compared to the natives, while they represent a high share of the total labour force.

Using Census data collected in the year 2000 and available at a high level of geographical disaggregation (our unit of analysis is the municipality), we focused on the exploration of local effects of imitation. We accounted for the presence of local role models by including in our model the self-employment rates of the natives. These are expected to capture network effects due to interaction with existing entrepreneurs, as well as, from an econometric viewpoint, all unobservable factors that influence both natives and immigrants. Spatial network effects were captured by means of a spatial econometric approach which allowed us to consider the self-employment rates of immigrants living in adjacent communities (interaction with other immigrants is expected to increase the available set of information and to provide successful entrepreneurial examples).

The empirical results obtained for our model suggest that, in addition to the control variables typical of the self-employment literature, the self-employment rates of immigrants are positively related to the ones displayed (locally) by the natives, with a strongly significant regression coefficient. Furthermore, we found a significant and positive effect of the self-employment choices of immigrants living in neighbouring communities, identified by a spatial dependence coefficient. We stress that our identification strategy, including the characteristics of the immigrant pool, controls for geography and other local aspects, and the natives' rates allows us to interpret the spatial dependence coefficient as an indicator of spatial spillovers and knowledge exchange within the immigrant population of wider areas. In summary, potential immigrant entrepreneurs are influenced in their decision on whether to enter self-employment by the success rates of both native and immigrant entrepreneurs which can be directly observed in a local context.

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Robustness analyses controlling for the different features of urbanized and rural municipalities show differences in the set of skills and characteristics required for self-employment choices. Finally, a spatial sensitivity analysis showed that our findings are consistent over different assumptions on the nature of spatial interaction. However, spatial spillover effects are locally bounded and disappear beyond a range of about 60km.

Future developments on this topic should ideally focus on georeferenced microdata, which would allow the analyst to pinpoint more accurately imitation effects and spillovers due to knowledge exchange. Additionally, panel data could be a valuable source of information for studying the dynamic processes towards self-employment.

**Table 5. Selected descriptive statistics**

	Mean	St. dev	Min	Max
<i>Dependent variable</i>				
FOREMPSE (%)	7.97	7.53	0.00	100.00
- Numerator: #FOREMPSE	18.54	102.15	0.00	3,310.00
- Denominator: #FORACTIVE	358.35	2,033.94	5.00	69,937.00
<i>Local ethnic characteristics</i>				
FORACTIVE (%)	14.14	9.35	0.95	70.34
HERFINDAHL	0.25	0.14	0.01	1.00
<i>Controls</i>				
FORUNEMP (%)	6.76	5.79	0.00	69.23
<i>Local unit's characteristics</i>				
SWIEMPSE	15.38	5.49	0.00	52.50
- Numerator: #SWIEMPSE	144.25	417.64	0.00	15,709.00
- Denominator: #SWIACTIVE	1,212.30	3,954.86	13.00	142,452.00
#TOTACTIVE	1,570.75	5,914.73	18.00	212,389.00
<i>Factors</i>				
	No. of local units			
RECENTIMMIGR: yes	1,154			
LANGPROALL: yes	873			
URBAN: Rural areas	1,524			
URBAN: Cities and suburbs	966			
Total local units	2,490			

*Notes:* # defines counts; % defines percentages.

**Table 6. Selected descriptive statistics for the urban/suburb and rural subsamples**

	Urban units Mean (St. dev)	Rural units Mean (St. dev)
<i>Dependent variable</i>		
FOREMPSE (%)	7.88 (5.01)	8.03 (8.76)
- Numerator: #FOREMPSE	40.47 (161.38)	4.64 (7.34)
- Denominator: #FORACTIVE	777.81 (3,215.33)	92.47 (167.21)
<i>Local ethnic characteristics</i>		
FORACTIVE (%)	18.50 (9.90)	11.38 (7.83)
HERFINDAHL	0.22 (0.14)	0.26 (0.14)
<i>Controls</i>		
FORUNEMP (%)	7.00 (3.91)	6.60 (6.71)
<i>Local unit's characteristics</i>		
SWIEMPSE	12.57 (3.71)	17.16 (5.69)
- Numerator: #SWIEMPSE	240.22 (651.33)	83.41 (81.92)
- Denominator: #SWIACTIVE	2,252.39 (6,166.65)	553.02 (587.88)
#TOTACTIVE	303,020 (9,269.18)	645.50 (725.81)
<i>Factors</i>	No. of local units	No. of local units
RECENTIMMIGR: yes	353	801
LANGPROALL: yes	350	523
Total local units	966	1524

Notes: # defines counts; % defines percentages.

**Table 7. Regression results for the pooled models**

	Model 1	Model 2	Model 3
<i>Local ethnic characteristics</i>			
log(HERFINDAHL)	−0.04 (0.03)	−0.05 (0.03)*	−0.06 (0.02)***
RECENTIMMIGR	−0.15 (0.03)***	−0.17 (0.03)***	−0.17 (0.03)***
LANGPROALL	0.32 (0.03)***	0.25 (0.04)***	0.23 (0.03)***
<i>Controls</i>			
log(FORACTIVEMEN)	0.05 (0.09)	0.04 (0.1)	0.04 (0.07)
log(FORACTIVEMARRIED)	−0.08 (0.05)*	−0.04 (0.07)	−0.04 (0.04)
log(FORACTIVENON)	−0.04 (0)***	−0.04 (0)***	−0.04 (0)***
log(FOREMPTEP)	0.08 (0.03)***	0.04 (0.04)	0.04 (0.02)**
FORACTIVEAGE	6.58 (0.75)***	5.44 (0.74)***	5.10 (0.63)***
FORACTIVEAGE ** 2	2.40 (0.79)***	1.95 (0.73)***	1.91 (0.57)***
log(FORACTIVECHIL)	−0.38 (0.09)***	−0.38 (0.1)***	−0.36 (0.07)***
log(FORACTIVEPROFEDU)	−0.03 (0.01)***	−0.03 (0.01)***	−0.02 (0.01)***
log(FORACTIVEACCAEDU)	−0.02 (0.01)**	−0.01 (0.01)**	−0.01 (0.01)**
log(FORUNEMP)	−7.42 (0.69)***	−6.55 (0.82)***	−6.26 (0.6)***
log(FORUNEMP) ** 2	5.14 (0.7)***	5.18 (0.7)***	5.28 (0.57)***
<i>Local unit's characteristics</i>			
log(ZMIN)	0.12 (0.04)***	0.04 (0.05)	0.04 (0.04)
URBANsubcities	−0.16 (0.03)***	−0.05 (0.04)	−0.04 (0.03)
log(SWIEMPSE)	—	0.44 (0.14)***	0.42 (0.03)***
$\rho$	—	—	0.15 (0.02)***
(Intercept)	3.77 (0.29)***	5.06 (0.49)***	4.36 (0.29)***
Residual standard error (dof)	0.55 (2,473)	0.53 (2,472)	0.52 (2,471)
$R^2$ (Adjusted $R^2$ )	0.43 (0.42)	0.46(0.46)	—
AIC	4,100.17	3,946.33	3,903.74
F-test (Model 2 vs Model 1)	—	159.65***	—
Likelihood ratio test (Model 3 vs Model 1)	—	—	44.587***

Notes: \*\*\*, \*\* and \* denote significance at the 1, 5 and 10 per cent levels.

**Table 8. Regression results for the unpooled models**

	Model 3 Urban/suburb	Model 3 Rural
<i>Local ethnic characteristics</i>		
log(HERFINDAHL)	0.00 (0.03)	−0.09 (0.03)***
RECENTIMMIGR	−0.14 (0.03)***	−0.17 (0.05)***
LANGPROALL	0.13 (0.04)***	0.23 (0.05)***
<i>Controls</i>		
log(FORACTIVEMEN)	0.70 (0.15)***	−0.03 (0.08)
log(FORACTIVEMARRIED)	0.03 (0.14)	−0.05 (0.05)
log(FORACTIVENON)	−0.04 (0.01)***	−0.04 (0.01)***
log(FOREMPTEP)	0.24 (0.07)***	0.04 (0.02)*
FORACTIVEAGE	2.71 (0.56)***	3.81 (0.67)***
FORACTIVEAGE ** 2	0.18 (0.41)	1.53 (0.64)**
log(FORACTIVECHIL)	−0.11 (0.14)	−0.43 (0.09)***
log(FORACTIVEPROFEDU)	0.07 (0.02)***	−0.03 (0.01)***
log(FORACTIVEACCAEDU)	−0.02 (0.01)	−0.01 (0.01)**
log(FORUNEMP)	−2.07 (0.44)***	−5.98 (0.65)***
log(FORUNEMP) ** 2	0.61 (0.43)	6.31 (0.64)***
<i>Local unit's characteristics</i>		
log(ZMIN)	0.05 (0.05)	0.06 (0.05)
log(SWIEMPSE)	0.54 (0.06)***	0.36 (0.04)***
$\rho$	0.11 (0.03)***	0.07 (0.02)***
Intercept	5.19 (0.43)***	4.54 (0.38)***
Log-likelihood	−465.26	−1,342.96
ML residual standard deviation ( $\sigma$ )	0.39	0.57
AIC	968.52	2,723.92

Notes: \*\*\*, \*\* and \* denote significance at the 1, 5 and 10 per cent levels.

**Table 9. Moran's  $I$  values for immigrant self-empl. rates by definition of proximity**

	KNN ( $k = 1$ )	KNN ( $k = 2$ )	KNN ( $k = 3$ )	Queen 1st order	Queen 2nd order	Queen 3rd order	Distance thresh.	Distance thresh. *
Moran's $I$	0.090	0.112	0.120	0.111	0.095	0.094	0.101	0.095
$p$ -value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mean no. of links	1	2	3	5.2	17.1	36.4	40.6	83.5
	Distance thresh. *	Travel time (cut- off = 5 min) <sup>1</sup>	Travel time (cut- off = 15 min) <sup>2</sup>	Travel time (cut- off = 31 min)	Cong. travel time (cut-off = 5 min) <sup>3</sup>	Cong. travel time (cut-off = 15 min) <sup>4</sup>	Cong. travel time (cut-off = 36 min)	
Moran's $I$	0.090	0.080	0.083	0.072	0.077	0.081	0.067	
$p$ -value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
Mean no. of links	137.5	1.9	34.0	175.3	1.8	31.3	222.5	

<sup>1</sup> 786 regions with no links; <sup>2</sup> 8 regions with no links; <sup>3</sup> 837 regions with no links; <sup>4</sup> 8 regions with no links.

Notes: KNN ( $k = k$ ) =  $k$ -nearest neighbours; Queen  $a$ th order = queen definition of contiguity of order  $a$ ; distance thresh. \*  $b$  = distance threshold equal to max distance of KNN ( $k = 1$ ) \* the factor  $b$ ; (cong.) travel time (cut-off =  $c$  min) = neighbours based on a (congested) travel time threshold of  $c$  minutes.



**Table 10. Regression results for the unpooled model, by neighbours definition (urban)**

	KNN ( <i>k</i> = 1)	KNN ( <i>k</i> = 2)	KNN ( <i>k</i> = 3)	Queen 1st order	Queen 2nd order	Queen 3rd order	Distance thresh.	Distance thresh. * 1.5	Distance thresh. * 2
<i>Local ethnic characteristics</i>									
log(HERFINDAHL)	0.01 (0.03)	0.00 (0.03)	0.00 (0.03)	0.00 (0.03)	−0.01 (0.03)	−0.02 (0.03)	−0.01 (0.03)	−0.02 (0.03)	−0.01 (0.03)
RECENTIMMIGR	−0.14 (0.03)***	−0.14 (0.03)***	−0.14 (0.03)***	−0.14 (0.03)***	−0.14 (0.03)***	−0.14 (0.03)***	−0.13 (0.03)***	−0.14 (0.03)***	−0.14 (0.03)***
LANGPROALL	0.14 (0.04)***	0.14 (0.04)***	0.13 (0.04)***	0.13 (0.04)***	0.13 (0.04)***	0.13 (0.04)***	0.13 (0.04)***	0.13 (0.04)***	0.12 (0.04)***
<i>Controls</i>									
log(FORACTIVEMEN)	0.72 (0.15)***	0.71 (0.15)***	0.7 (0.15)***	0.70 (0.15)***	0.68 (0.15)***	0.68 (0.15)***	0.69 (0.15)***	0.67 (0.15)***	0.67 (0.15)***
log(FORACTIVEMARRIED)	0.02 (0.14)	0.04 (0.14)	0.03 (0.14)	0.03 (0.14)	0.03 (0.14)	0.01 (0.14)	0.02 (0.14)	0.03 (0.14)	0.03 (0.14)
log(FORACTIVENON)	−0.04 (0.01)***	−0.04 (0.01)***	−0.04 (0.01)***	−0.04 (0.01)***	−0.04 (0.01)***	−0.04 (0.01)***	−0.04 (0.01)***	−0.04 (0.01)***	−0.04 (0.01)***
log(FOREMPTEP)	0.25 (0.07)***	0.24 (0.07)***	0.24 (0.07)***	0.24 (0.07)***	0.22 (0.07)***	0.21 (0.07)***	0.23 (0.07)***	0.21 (0.07)***	0.21 (0.07)***
FORACTIVEAGE	2.80 (0.56)***	2.76 (0.56)***	2.68 (0.56)***	2.71 (0.56)***	2.60 (0.56)***	2.54 (0.57)***	2.59 (0.56)***	2.53 (0.57)***	2.55 (0.56)***
FORACTIVEAGE ** 2	0.15 (0.41)	0.17 (0.41)	0.19 (0.41)	0.18 (0.41)	0.13 (0.41)	0.16 (0.41)	0.13 (0.41)	0.10 (0.41)	0.06 (0.41)
log(FORACTIVECHIL)	−0.11 (0.14)	−0.12 (0.14)	−0.10 (0.14)	−0.11 (0.14)	−0.11 (0.14)	−0.09 (0.14)	−0.10 (0.14)	−0.11 (0.14)	−0.11 (0.14)
log(FORACTIVEPROFEDU)	0.07 (0.02)***	0.07 (0.02)***	0.07 (0.02)***	0.07 (0.02)***	0.07 (0.02)***	0.07 (0.02)***	0.07 (0.02)***	0.07 (0.02)***	0.07 (0.02)***
log(FORACTIVEACCAEDU)	−0.02 (0.01)	−0.02 (0.01)	−0.02 (0.01)	−0.02 (0.01)	−0.02 (0.01)	−0.02 (0.01)	−0.02 (0.01)	−0.02 (0.01)	−0.02 (0.01)
log(FORUNEMP)	−2.15 (0.44)***	−2.08 (0.44)***	−2.13 (0.44)***	−2.07 (0.44)***	−2.11 (0.44)***	−2.16 (0.44)***	−2.15 (0.44)***	−2.18 (0.44)***	−2.19 (0.44)***
log(FORUNEMP) ** 2	0.58 (0.43)	0.60 (0.43)	0.62 (0.43)	0.61 (0.43)	0.68 (0.43)	0.66 (0.43)	0.57 (0.43)	0.64 (0.43)	0.65 (0.43)
<i>Local unit's characteristics</i>									
log(ZMIN)	0.03 (0.05)	0.04 (0.05)	0.04 (0.05)	0.05 (0.05)	0.06 (0.05)	0.08 (0.05)	0.07 (0.05)	0.10 (0.05)**	0.10 (0.05)**

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	KNN ( $k = 1$ )	KNN ( $k = 2$ )	KNN ( $k = 3$ )	Queen 1st order	Queen 2nd order	Queen 3rd order	Distance thresh.	Distance thresh. * 1.5	Distance thresh. * 2
log(SWIEMPSE)	0.54 (0.06)***	0.54 (0.06)***	0.54 (0.06)***	0.54 (0.06)***	0.53 (0.06)***	0.54 (0.06)***	0.54 (0.06)***	0.54 (0.06)***	0.54 (0.06)***
$\rho$	0.08 (0.02)***	0.09 (0.03)***	0.12 (0.03)***	0.11 (0.03)***	0.17 (0.04)***	0.22 (0.05)***	0.18 (0.04)***	0.25 (0.05)***	0.25 (0.05)***
Intercept	5.45 (0.41)***	5.39 (0.43)***	5.22 (0.44)***	5.19 (0.43)***	4.84 (0.46)***	4.5 (0.51)***	4.72 (0.48)***	4.25 (0.5)***	4.24 (0.51)***
Log-likelihood	-467.26	-468.88	-466.75	-465.26	-463.17	464.59	-464.28	-461.99	-462.86
ML residual standard deviation ( $\sigma$ )	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39
AIC	972.53	975.76	971.51	968.52	964.35	967.18	966.56	961.98	963.73
LM test for res. sp. autocorr.	2.88*	9.54***	11.73***	9.75***	31.02***	27.57***	29.08***	56.26***	72.99***

\*\*\*, \*\* and \* denote significance at the 1, 5 and 10 per cent levels.

Notes: KNN ( $k = k$ ) =  $k$ -nearest neighbours; Queen  $a$ th order = queen definition of contiguity of order  $a$ ; distance thresh. \*  $b$  = distance threshold equal to max distance of KNN ( $k = 1$ ) \* the factor  $b$ .

**Table 11. Regression results for the unpooled model, by neighbours definition (rural)**

	KNN ( <i>k</i> = 1)	KNN ( <i>k</i> = 2)	KNN ( <i>k</i> = 3)	Queen 1st order	Queen 2nd Order	Queen 3rd order	Distance thresh.	Distance thresh. * 1.5	Distance thresh. * 2
<i>Local ethnic characteristics</i>									
log(HERFINDAHL)	−0.08 (0.03)**	−0.08 (0.03)***	−0.08 (0.03)***	−0.09 (0.03)***	−0.09 (0.03)***	−0.09 (0.03)***	−0.09 (0.03)***	−0.10 (0.03)***	−0.10 (0.03)***
RECENTIMMIGR	−0.16 (0.05)***	−0.16 (0.05)***	−0.16 (0.05)***	−0.17 (0.05)***	−0.16 (0.05)***	−0.15 (0.05)***	−0.15 (0.05)***	−0.15 (0.05)***	−0.14 (0.05)***
LANGPROALL	0.23 (0.05)***	0.22 (0.05)***	0.22 (0.05)***	0.23 (0.05)***	0.23 (0.05)***	0.22 (0.05)***	0.22 (0.05)***	0.21 (0.05)***	0.21 (0.05)***
<i>Controls</i>									
log(FORACTIVEMEN)	−0.04 (0.08)	−0.04 (0.08)	−0.05 (0.08)	−0.03 (0.08)	−0.04 (0.08)	−0.04 (0.08)	−0.05 (0.08)	−0.05 (0.08)	−0.06 (0.08)
log(FORACTIVEMARRIED)	−0.04 (0.05)	−0.05 (0.05)	−0.05 (0.05)	−0.05 (0.05)	−0.06 (0.05)	−0.05 (0.05)	−0.05 (0.05)	−0.05 (0.05)	−0.05 (0.05)
log(FORACTIVENON)	−0.04 (0.01)***	−0.04 (0.01)***	−0.04 (0.01)***	−0.04 (0.01)***	−0.04 (0.01)***	−0.04 (0.01)***	−0.04 (0.01)***	−0.04 (0.01)***	−0.04 (0.01)***
log(FOREMPTEP)	0.04 (0.02)*	0.03 (0.02)*	0.04 (0.02)*	0.04 (0.02)*	0.04 (0.02)*	0.04 (0.02)*	0.03 (0.02)*	0.03 (0.02)*	0.03 (0.02)*
FORACTIVEAGE	3.80 (0.66)***	3.77 (0.66)***	3.76 (0.66)***	3.81 (0.67)***	3.83 (0.66)***	3.81 (0.66)***	3.81 (0.66)***	3.80 (0.66)***	3.71 (0.66)***
FORACTIVEAGE ** 2	1.44 (0.63)**	1.57 (0.63)**	1.53 (0.63)**	1.53 (0.64)**	1.52 (0.63)**	1.48 (0.63)**	1.51 (0.63)**	1.48 (0.62)**	1.49 (0.62)**
log(FORACTIVECHIL)	−0.42 (0.09)***	−0.41 (0.09)***	−0.40 (0.09)***	−0.43 (0.09)***	−0.41 (0.09)***	−0.37 (0.09)***	−0.37 (0.09)***	−0.35 (0.09)***	−0.35 (0.09)***
log(FORACTIVEPROFEDU)	−0.03 (0.01)***	−0.03 (0.01)***	−0.03 (0.01)***	−0.03 (0.01)***	−0.03 (0.01)***	−0.03 (0.01)***	−0.03 (0.01)***	−0.03 (0.01)***	−0.03 (0.01)***
log(FORACTIVEACCAEDU)	−0.01 (0.01)**	−0.01 (0.01)**	−0.01 (0.01)**	−0.01 (0.01)**	−0.01 (0.01)**	−0.01 (0.01)**	−0.01 (0.01)**	−0.01 (0.01)**	−0.01 (0.01)**
log(FORUNEMP)	−5.80 (0.64)***	−5.79 (0.65)***	−5.78 (0.64)***	−5.98 (0.65)***	−5.94 (0.65)***	−5.86 (0.65)***	−5.92 (0.64)***	−5.87 (0.64)***	−5.89 (0.64)***
log(FORUNEMP) ** 2	6.26 (0.63)***	6.26 (0.63)***	6.25 (0.63)***	6.31 (0.64)***	6.26 (0.64)***	6.36 (0.63)***	6.33 (0.63)***	6.40 (0.63)***	6.39 (0.63)***
<i>Local unit's characteristics</i>									

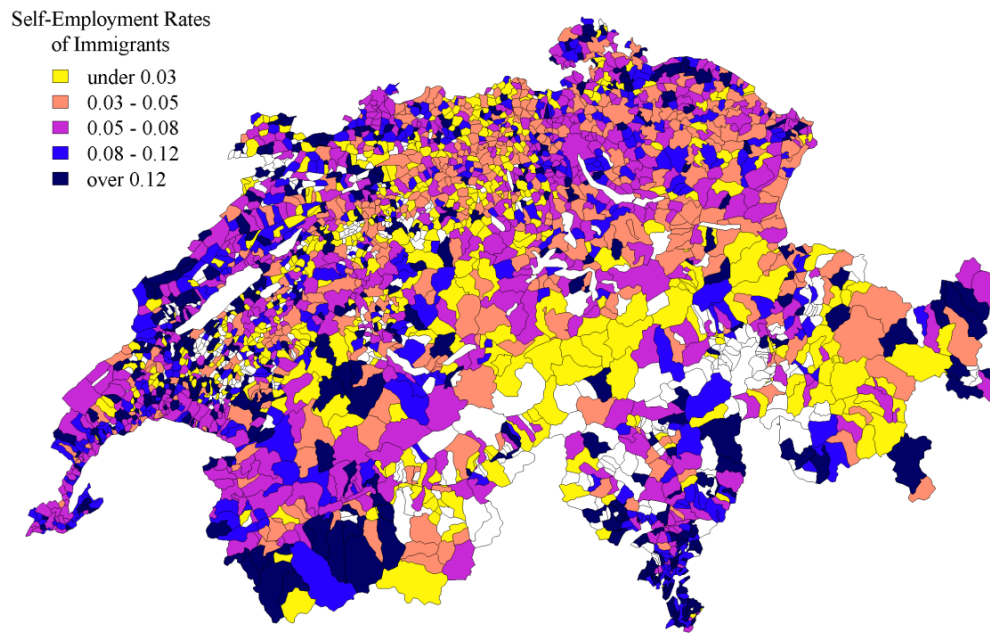
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	KNN ( $k = 1$ )	KNN ( $k = 2$ )	KNN ( $k = 3$ )	Queen 1st order	Queen 2nd Order	Queen 3rd order	Distance thresh.	Distance thresh. * 1.5	Distance thresh. * 2
log(ZMIN)	0.05 (0.05)	0.05 (0.05)	0.05 (0.05)	0.06 (0.05)	0.05 (0.05)	0.06 (0.05)	0.06 (0.05)	0.06 (0.05)	0.05 (0.05)
log(SWIEMPSE)	0.35 (0.04)***	0.36 (0.04)***	0.36 (0.04)***	0.36 (0.04)***	0.36 (0.04)***	0.35 (0.04)***	0.35 (0.04)***	0.35 (0.04)***	0.35 (0.04)***
$P$	0.11 (0.02)***	0.13 (0.02)***	0.16 (0.03)***	0.07 (0.02)***	0.16 (0.04)***	0.26 (0.04)***	0.26 (0.04)***	0.34 (0.05)***	0.38 (0.05)***
Intercept	4.38 (0.38)***	4.27 (0.38)***	4.09 (0.38)***	4.54 (0.38)***	4.09 (0.4)***	3.6 (0.42)***	3.58 (0.41)***	3.19 (0.42)***	3.03 (0.42)***
Log-likelihood	-1,327.60	-1,331.43	-1,327.53	-1,342.96	-1,337.35	-1,329.53	-1,326.33	-1,319.97	-1,319.02
ML residual standard deviation ( $\sigma$ )	0.57	0.57	0.57	0.57	0.58	0.57	0.57	0.57	0.57
AIC	2,693.20	2,700.86	2,693.07	2,723.92	2,712.71	2,697.07	2,690.67	2,677.94	2,676.05
LM test for res. sp. autocorr.	5.30**	4.01	2.57	1.06	0.82	1.49	4.65**	0.06	1.14

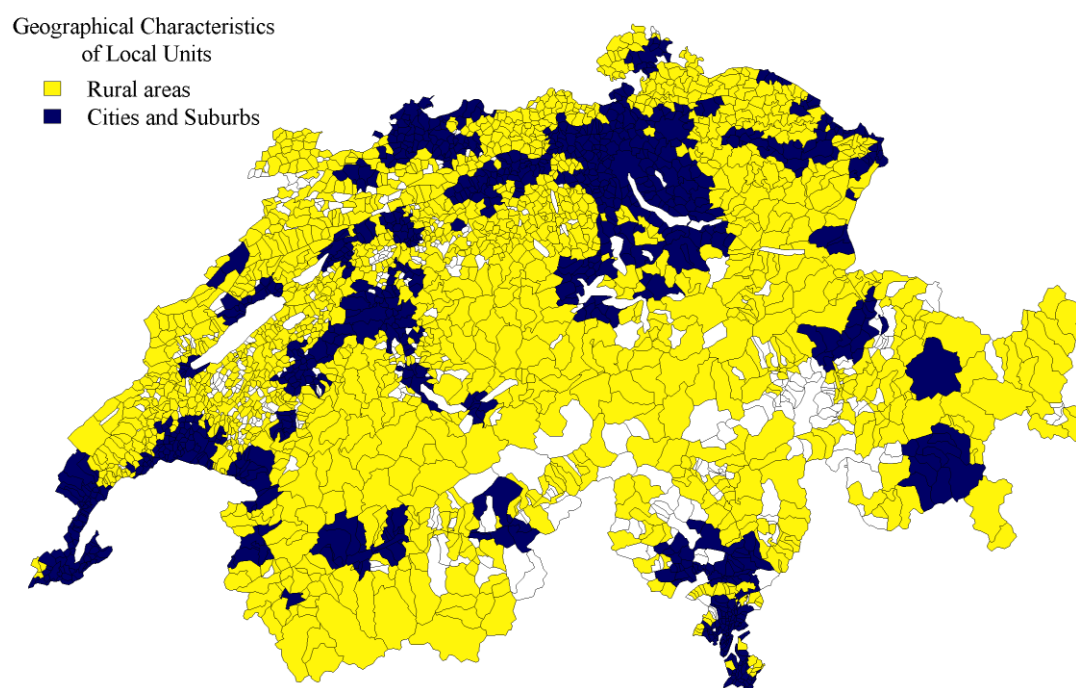
\*\*\*, \*\* and \* denote significance at the 1, 5 and 10 per cent levels.

Notes: KNN ( $k = k$ ) =  $k$ -nearest neighbours; Queen  $a$ th order = queen definition of contiguity of order  $a$ ; distance thresh. \*  $b$  = distance threshold equal to max distance of KNN ( $k = 1$ ) \* the factor  $b$ .

**Figure 6. Cloropleth quantile map of immigrant self-employment rates**

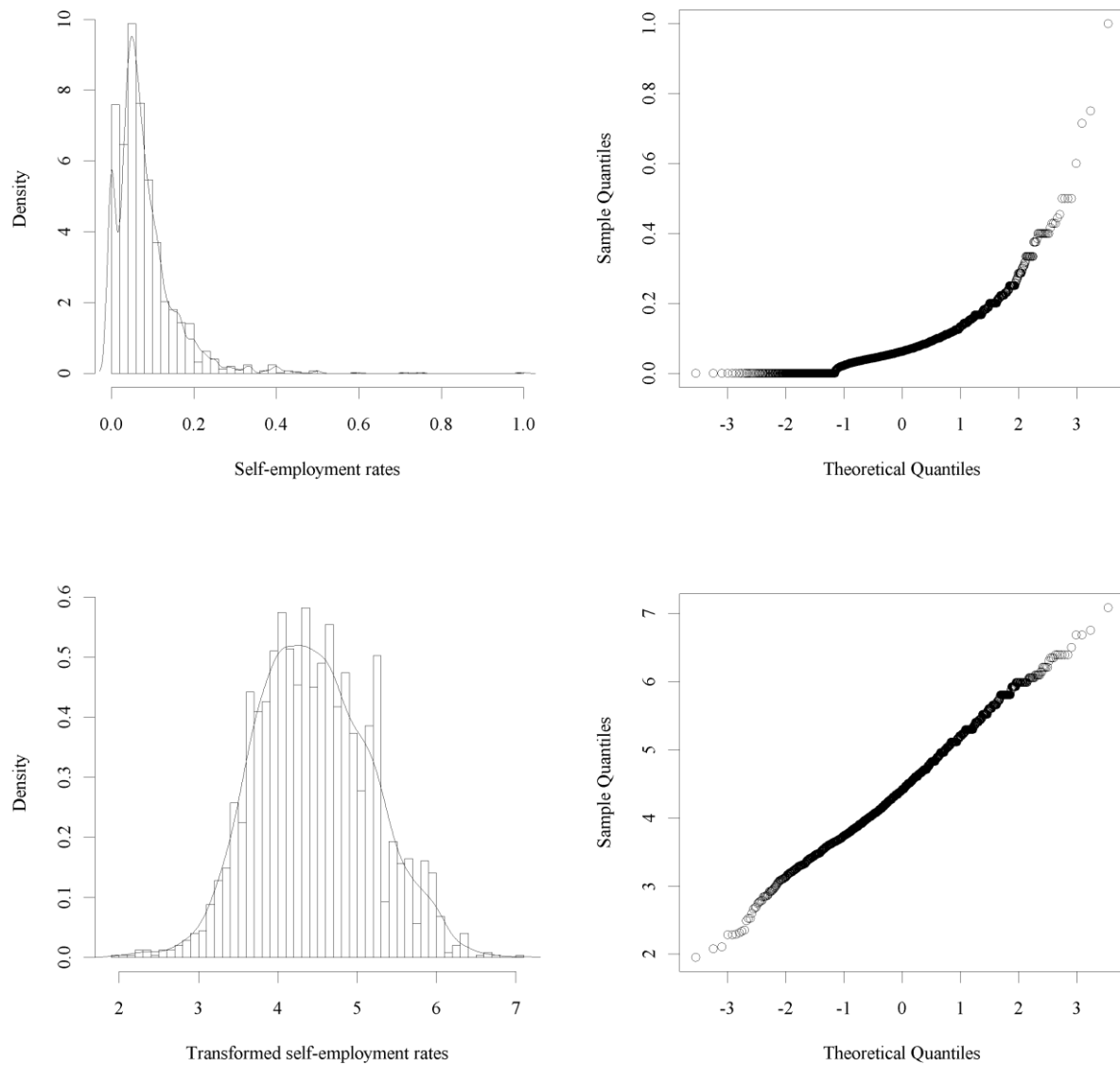


**Figure 7. The geographical distribution of urbanized and rural local units**



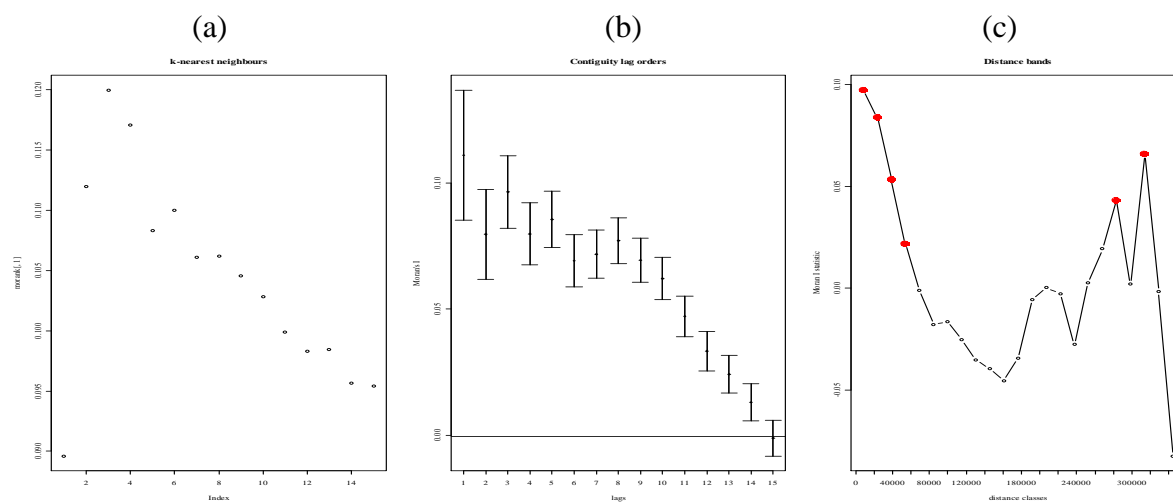
**Figure 8. Histograms and Q-Q plots**

Untransformed (above) and transformed (below) immigrant self-employment rates for the full sample of Swiss municipalities



**Figure 9. Correlograms for lags by neighbouring definitions**

(a)  $k$ -nearest neighbours; (b) rook contiguity; (c) distance thresholds.





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## **Chapter 3**

# **The Role of Job Satisfaction in Transitions into Self-Employment**

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Working paper

## **Abstract**

As observed in many advanced economies experiencing an increase of self-employment rates since the late 1970s, a flourishing small- and medium-size enterprise sector is traditionally associated with positive economic development and growth. In the regional context, areas benefiting from an established entrepreneurial culture are in general more successful and innovative, as well as better equipped to sustain structural changes and to contrast unemployment. It is therefore important to investigate the reasons why individuals choose self-employment, and why they do it despite lower protection, higher risks, and possibly more effort than what is offered in a comparable wage employment position. Existing research identifies better prospects of entrepreneurial earnings as compared to wages as a major attraction towards self-employment. However, beside pecuniary motivations, other factors may be considered when it comes to occupational choice, as, among others, displacement, uncertainty, (the threat of) unemployment, and (dis-)satisfaction. Building on a job quits model, I propose a representation of transition behaviour from wage to self-employment which includes subjective evaluations of pecuniary and nonpecuniary satisfaction on the previous job. Individual microdata are drawn from the Swiss Household Panel (SHP), and cover the time period 1999–2008. Additionally, I focus on the dynamics of job satisfaction in order to highlight the role played by shocks in subjective evaluations, and introduce their interaction with levels to control for threshold effects.

Keywords: self-employment, job satisfaction, job transition, Switzerland

JEL codes: C25, J62, M13

### **3.1 Introduction**

About 650,000 men and women operate as self-employed agents in Switzerland, including incorporated self-employed (employed by their own company) and family workers (FSO, 2011a). Comprising almost 15 per cent of all active individuals, they run businesses in the retail, trade, manufacturing, financial and insurance sectors, as well as in the accommodation and food services (FSO, 2011a and 2000).

With a slight delay with respect to other OECD countries, Switzerland has experienced a rise of the self-employment rates since the early 1980s (Flückiger and Ferro Luzzi, 2001; Falter, 2001). Among the factors that may have encouraged the increase in the number of self-employed workers, it is worth mentioning the development of the ICT sector, the improvement in production processes and the increase in outsourcing activities, as well as fiscal and personal reasons (Birchmeier, 2000). In the meanwhile, wage employment could have been affected by rigidities in wages and the extension of mandatory health insurance to elderly people (Falter *et al.*, 1998). Earnings differentials between self-employed and dependent workers still play in favour of the latter, who earn about 10 per cent more per year (FSO, 2011a).<sup>1</sup> However, the share of individuals in the highest-earning class (more than CHF104,000 per year) is considerably larger among the self-employed than among the employees (23 and 18 per cent, respectively, of those reporting positive earnings; FSO, 2011b). Further evidence shows that differences in earnings between self- and wage employment becomes less important for men (6.7 per cent), and indistinguishable for resident immigrants (approximately 0 per cent).

Several studies have shed light on the role played by small-business owners in economic growth (e.g., Lucas, 1978; Kihlstrom and Laffont, 1979; Blau, 1985; Brock and Evans, 1986; Rees and Shah, 1986; Evans and Leighton, 1989a, b), and on their ability to create

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<sup>1</sup> Computations are made on full-time yearly gross revenues evaluated at the median for resident dependent workers (CHF80,400) against self-employed and family workers (CHF72,900), for the year 2009.

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new jobs (Birch, 1979). Existing studies on transitions from wage- to self-employment identify start-ups as an important source of business dynamics and innovation (Jovanovic, 1982; Dunne *et al.*, 1987; Evans, 1987a, b; Pakes and Ericson, 1987). Moreover, differences in the earnings distributions of self-employed workers and dependent employees have been analysed, giving rise to a number of theories seeking to explain such differences (Lazear and Moore, 1984; Jovanovic, 1982; Rosen, 1981).

At the same time, many policy interventions aiming to encourage self-employment have been implemented by national and regional governments around the world in order to stimulate new employment opportunities and reduce unemployment (Blanchflower, 2000). Most governments offer assistance to small businesses, providing subsidies for individual start-ups, and Swiss national and regional policies are no exception. Universities often contribute as well, establishing start-up centres and incubators, with the dual aim of supporting newly-formed businesses and conducting related research. From a regional development perspective, filling up the gap between wage and self-employment earnings may contribute to the convergence of less dynamic and peripheral areas towards more successful and innovative regions (Reynolds, 1994 and 1999; Acs and Armington, 2004).

Existing research on self-employment transitions makes a wide use of rational agent-based models assuming that individuals choose self-employment if the expected utility of this option exceeds the one associated with wage employment. Better prospects of entrepreneurial earnings as compared to wages are, according to the greater part of this literature, a major attraction towards self-employment (Rees and Shah, 1986; Hawley and Fujii, 1991; Taylor, 1996).

However, beside pecuniary motivations, other factors enter into consideration when it comes to occupational choice. Recently, the assumption that earnings act as a proxy for utility has been relaxed. Hamilton (2000) shows that the nonpecuniary benefits of self-employment are substantial, with most entrepreneurs entering – and staying – in business despite lower initial earnings and lower earnings growth with respect to wage employment. Evans and Leighton (1989a) and Taylor (1996) find that, beside higher expected earnings,



the independence offered by self-employment positively influences individual decisions towards business ownership.

A nonpecuniary aspect which is often advocated as a major driving force in entrepreneurship is the one associated with (dis-)satisfaction. Brockhaus (1982) finds self-employed workers to be relatively strongly dissatisfied with their previous (dependent) work, with supervision and with opportunities for promotion. More generally, emotional factors such as feeling inappropriate/displaced, and uncertainty often precede the formation of a company (Shapiro and Sokol, 1982). Moreover, (the threat of) unemployment, as well as being bored or angered, has been shown to positively affect self-employment choices (Hofstede *et al.*, 2004; Wennekers *et al.*, 2001). Thus, individuals dissatisfied with their job are expected to be more inclined to enter into self-employment. As a result, the self-employed generally report higher satisfaction with their job than employees (Blanchflower and Freeman, 1997; Blanchflower and Oswald, 1998; Blanchflower, 2000; Taylor, 2004). However, on the subjective characteristics of wage employment that are expected to lead to entrepreneurship, as well as on the dynamics of job satisfaction, the literature is limited.

Since people may self-select into entrepreneurship (given the inability to find a satisfying job in the case of low-skilled workers, or the inexistence of comparatively remunerated alternatives in wage employment in the case, for example, of physicians or lawyers), it is important to look also at objective work conditions, so that job satisfaction can be seen as an “excess” reward discounting future potential flows of utility deriving from a change in working conditions with respect to the current situation. Moreover, given the (relatively) high persistence of job satisfaction levels and the reduced propensity to react to them with longer tenure (and greater age), my suggestion is to look not only at levels of job satisfaction, but also at variations. Dissatisfied workers may react differently if they experienced recent improvements in job satisfaction. In the meantime, more satisfied workers may behave differently if they came across a negative variation in their satisfaction levels.

Building on a job quits model (Akerlof *et al.*, 1988; McEvoy and Cascio, 1985; Freeman, 1978), I propose a representation of transition behaviour from wage to self-

employment which includes subjective evaluations of (previous) job satisfaction. Individual microdata are drawn from the Swiss Household Panel (SHP), and cover the time period 1999–2008. I use two measures of job satisfaction: satisfaction with income and satisfaction with working conditions and I regard them as direct measures of individuals utility (Clark and Oswald, 1996; Taylor, 2004). Rather than including current levels of satisfaction or assessments regarding past work characteristics, I rely on subjective levels of satisfaction that were reported before the choice was made, so as to measure real/actual perceptions about past working conditions.

Additionally, I focus on the dynamics of job satisfaction in order to highlight the role played by shocks in subjective evaluations and introduce their interaction with levels to control for threshold effects. Unlike most of the studies cited above, I am able to discriminate between the evaluations regarding pecuniary and nonpecuniary benefits, and to address the question of whether the inclusion of subjective variables and their variations in time matter in modelling self-employment transitions and job quits.

The remainder of the paper is structured as follows. In Section 3.2 I discuss my empirical approach. In Section 3.3 I briefly describe the data. In Section 3.4 I present estimates for my model of job transitions including levels and variations of job satisfaction, controls for demography, human and financial capital, as well as job characteristics. I also test a specification that incorporates the interaction between levels and variations of job satisfaction in order to investigate the presence of threshold effects. In Section 3.5 I summarize and discuss my findings.

## **3.2 The Model**

Despite the widespread use of job satisfaction measures in social sciences, economists have often been reluctant to incorporate such variables in their models, partly because of their subjective nature, and partly because satisfaction is supposed to provide a proxy for individual utility, and thus it requires caution (Freeman, 1978, p.135).

A promising representation of the choice problem faced by individuals addressing the question of whether or not leaving a paid position for venturing into self-employment is the one provided by the job quits literature (Clark *et al.*, 1998; Akerlof *et al.*, 1988; McEvoy and Cascio, 1985; Freeman, 1978; Flanagan *et al.*, 1974). Within this framework, I assume that individuals consider the opportunity of voluntarily leaving their job as a function of expectations regarding pecuniary and nonpecuniary benefits outside of the current employer with respect to those offered inside, in addition to mobility costs (Lévy-Garboua *et al.*, 2007). Job quits are observed among individuals reporting a difference between the sum of pecuniary and nonpecuniary benefits in current and future positions, where job satisfaction is a monotonic, discrete function of these sums (Akerlof *et al.*, 1988). Dissatisfied workers have higher quit rates than satisfied workers because the former perceive the expected present value of their job as being lower with respect to the one offered by outside opportunities. Alternatively, mobile workers experience greater increases in satisfaction if they were willing to leave than if they were not (Bartel and Borjas, 1981; Gottschalk and Maloney, 1985; Clark, 2001). As a result, quitters report higher satisfaction levels in their new job than in their old one (Akerlof *et al.*, 1988).

Similarly, I argue that transitions into self-employment are taken into consideration if the expected pecuniary and nonpecuniary benefits of entrepreneurship are greater than those in paid work. However, since individuals do not have complete and adequate information on these potential benefits *before* entering self-employment, they estimate them on the basis on their experience, their level of education and existing opportunities. Job satisfaction can be seen as a reasonable indicator summing up perceptions about the comparative advantage of remaining in the current job against the alternatives.

However, given the existence of self-selection problems in models explaining entrepreneurial choices – optimistic people may choose to enter self-employment or simply to address differently the costs that the more heterodox option of turning to self-employment implies (in terms of mobility, and risks) – I include controls for objective job characteristics, so as to regard job satisfaction as the “excess” rewards in current paid job with respect to average rewards potentially available to the worker in self-employment.

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Additionally, I include the effects of changes in job satisfaction. Variations in this variable might hide serious concerns about the current and future job position in comparison to past experience. Moreover, since it is likely that workers, while assessing their satisfaction, also include general assessments regarding the alternatives, changes in job satisfaction may reveal the opening of new opportunities against which the comparison is made, or improvements in existing alternatives.

In order to facilitate comparison with the existing literature on job quits, and to check whether job satisfaction differently affects quits and self-employment transitions (as we should expect, since the former decision might be more conservative and less risky), I consider also those who quit their job but remain in paid employment.

For a cross-section of individuals reporting a working status as employee at time  $t - 1$  and  $t - 2$ , I estimate the effects of (dis-)satisfaction and other determinants on transition probabilities by means of a multinomial logit model (McFadden, 1974; Greene, 2008) taking the form:

$$\Pr(y_t = i) = \frac{e^{X_{t-1,t-2}\beta^{(i)}}}{\sum_i^I e^{X_{t-1,t-2}\beta^{(i)}}} \quad (1)$$

where  $i = 1, 2, \dots, I$  are the possible outcomes of the transition function  $y$ , evaluated at time  $t$ , and  $X$  are the explanatory variables evaluated at time  $t - 1$  and  $t - 2$ . In my model, I assume that there are  $I = 3$  outcomes: “staying in current (paid) job”, “changing job/employer”, and “changing status from wage- to self-employment”. I thus estimate two sets of coefficients,  $\beta^{(2)}$  and  $\beta^{(3)}$  corresponding to each outcome, where  $\beta^{(1)}$  is set to zero for identification purposes.  $\Pr(y = i)$  is the probability that the worker will choose the outcome  $i$  at time  $t$ . Probabilities of transition are linked to the individual and job characteristics, including job satisfaction levels evaluated at time  $t - 2$  and recent variations

in job satisfaction.<sup>2</sup> The matrix of covariates includes standard socioeconomic variables evaluated at time  $t - 1$ , such as age, gender, nationality, marital status, and the level of education. Additionally, I control for union membership and homeownership. Objective work aspects are included as well, and they account for the level of earnings, the number of working hours, assessments regarding job insecurity and unemployment risk. Time fixed effects – controlling for the influence of the business cycle on transition decisions – are also incorporated in the model.

Job satisfaction is evaluated on a 0–10 scale, where 0 corresponds to the answer “not at all satisfied” and 10 is “completely satisfied”. Dynamic effects of satisfaction on transition probabilities are estimated through the inclusion of the percentage change between the individual’s satisfaction level at time  $t - 1$  and the level of satisfaction expressed in the year before, divided by the latter:

$$\frac{\Delta x_{t-1}}{x_{t-2}} = \frac{x_{t-1} - x_{t-2}}{x_{t-2}}. \quad (2)$$

Since we may expect the dynamic effects of satisfaction to differently influence transition probabilities depending on the previous level of satisfaction, I include the interaction term between the percentage change and the level of satisfaction. By doing so, I am able to assess whether, say, individuals starting from low levels of satisfaction experiencing a decline of the same are influenced differently in their decisions than individuals facing the same percentage change, but starting from higher levels of satisfaction. In this respect, my paper intends to fill a gap in turnover research, by including an assessment on the formation of individual perceptions about job satisfaction.

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<sup>2</sup> We select satisfaction levels at time  $t - 2$  in order to interpret them, in our model specification, as initial levels, while variations in job satisfaction measure changes from satisfaction levels evaluated at time  $t - 2$  to levels in  $t - 1$ .

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The log of the wage is used as a measure of pecuniary rewards, while in order to control for nonpecuniary aspects, I include variables measuring the number of weekly worked hours, the feeling of job insecurity (ranged 1–5), and the risk of falling into unemployment (on a 0–10 scale). A set of additional variables is used to control for differences in human and financial capital: the level of education (distinguishing between individuals with a vocational or a university degree against the reference of people with basic education), union membership, and homeownership. Previous studies have shown that both self-employment probabilities and earnings are strongly influenced by liquidity constraints (Evans and Jovanovic, 1989; Holtz-Eakin *et al.*, 1994; Lindh and Ohlsson, 1996; Black *et al.*, 1996; Blanchflower and Oswald, 1998). Moreover, financial capital, and in particular real estate, is an important source of collateral for entrepreneurs, that is expected to reduce the default premia (Henley, 2005).<sup>3</sup>

Furthermore, I control for age (which is expected to capture both work experience and wealth accumulation possibilities), nationality, marital status, and gender. Some of these characteristics are expected to capture differences in individual perceptions of, and attitudes to, risk (risk aversion), since people may be differently aware of the risk of failure in the entrepreneurial case or of unemployment in paid work.

### **3.3 Data**

The empirical analysis in this paper makes use of waves 1-10 of the SHP, for the time period 1999-2008. I select men and women above age 18 in the first wave and under age 65 years in the last wave, obtaining a sample of over 38,000 observations regarding

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<sup>3</sup> It would be worth to address parental background as well, and more specifically the example (familiar role models) provided by parents, which has been shown to represent a powerful predictor of the propensity towards business ownership. Although our data set would do allow to control for parental occupation, unfortunately the number of cases being recorded is too small to provide significant insights.

economically active and inactive individuals who are tracked during the ten years of the survey.

Transitions between the four employment categories across all panels are summarized in Table 12. As it can be seen from Table 12, the majority of those in wage employment stay in that category from one year to another (more than 92 per cent). Only a small proportion of employees at any time turn to self-employment in the following year (1.9 per cent). Nearly 4 per cent quit wage employment and exit the labour force, and very few become unemployed (1.2 per cent). Among those who are self-employed at  $t - 1$ , more than 78 per cent remain self-employed in the following year, whereas a considerable minority transits into wage employment (15.7 per cent) or exit the labour force (5.1 per cent). In general, self-employment is less stable than wage employment, although transition rates into unemployment and inactivity do not differ much for these two categories. Finally, among those who are unemployed in year  $t - 1$ , the most frequent occurrence is to become either employed or inactive (54.9 and 19.7 per cent respectively) or to remain in unemployment (22.8 per cent). Very few individuals enter self-employment (2.6 per cent). Among those recorded as inactive, the majority remains inactive in the following year (76.4 per cent) or enters wage employment (18.1 per cent). Transitions into self-employment or unemployment are rare.

In order to analyse transitions from wage- to self-employment, the data have been restricted to only cases in which individuals were employed at time  $t - 1$  and  $t - 2$  and either (1) stayed in wage employment without changing their job/employer, (2) quit their job/employer without changing status or (3) became self-employed at time  $t$ . The information is drawn from the pooled sample of observations from 2001 (Wave 3) to 2008 (Wave 10), which has been further restricted in order to select cases where information on all the listed covariates was available. This confines the analysis to a sample of 4,713 cases

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among which 1,266 are associated with job quits (26.9 per cent) and 443 (9.4 per cent) with transitions into self-employment.<sup>4</sup>

In order to investigate the drivers leading to transition I consider the variables listed in Table 13. They account for the level of satisfaction regarding pecuniary and nonpecuniary job aspects, human and financial endowments, as well as for other demographic and job characteristics. Table 13 provides descriptive statistics for each variable for the sample of stayers, for the one of quitters (leaving their job/employer without changing their status) and for that of emergent entrepreneurs (leaving their job/employer for a self-employment position).

The level of satisfaction with income in the sample of quitters and in the one of emergent entrepreneurs is on average lower than the one of the stayers (6.9, 7.0 and 7.3, respectively), suggesting that dissatisfaction linked to pecuniary aspects may act as a push factor. On the other hand, percentage changes in income satisfaction are higher among the former two groups than the control group of stayers (5.3 and 4.8, versus 2.5 per cent), implying that, on average, quitters and emergent entrepreneurs experience more favourable evolutions in job satisfaction. However, heterogeneity in all samples is rather high.

The level of satisfaction with working conditions is on average higher among the emergent entrepreneurs than in the reference group of stayers (8.2 and 8.0, respectively), while the quitters are the least satisfied (7.5). This suggests that the former benefit from more advantageous job conditions or that they just assess them in a more optimistic way than the ones deciding to stay in wage employment (either changing their job/employer or not). Variations in job satisfaction regarding nonpecuniary aspects are also higher among the group of those that turn to self-employment than among individuals deciding to stay in wage employment, either changing their job or not (4.2, -0.0 and 1.5 per cent respectively),

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<sup>4</sup> Clearly, this data set restriction is carried out under the assumption that transitions into self-employment are still traceable after one year, that is, that the number of transitions failing before being recorded in the subsequent SHP wave is negligible.



suggesting that nonpecuniary job evaluations may be correlated with intrinsic/individual characteristics/attitudes rather than solely with objective job aspects.

In general, there is, in all samples, less heterogeneity for assessments regarding the level of satisfaction with working conditions than with income, suggesting that the distribution of (dis-)satisfaction is more equal for nonpecuniary aspects than for pecuniary job characteristics. Moreover, in all samples the percentage change in income satisfaction is on average higher than the percentage change in nonpecuniary satisfaction, which may indicate that improvements in the perceptions regarding pecuniary job aspects are more likely to occur (consistent with the underlying distribution of income, that is expected to be more linear in time), even if the high heterogeneity observed suggests that there are many winners and losers. Finally, my data suggest that static and dynamic reactions to pecuniary job rewards impact differently on transition behaviours.

The average age in the emergent entrepreneurs sample is 45.5, which is significantly higher than the average age of 43.8 in the stayers sample.<sup>5</sup> Quitters are on average younger (36.2). Emergent entrepreneurs are more likely to be female with respect to the stayers and the quitters (54.9 per cent in the sample, compared to 49.4 and 47.5 per cent respectively). At a first glance, this suggests that women in Switzerland are more entrepreneurial or that they self-select in sectors characterised by more favourable business opportunities (e.g., personal services, education, health- and childcare). The emergent entrepreneurs sample has a significantly lower proportion of foreigners than the stayers and the quitters samples, which reflects a peculiarity of the Swiss labour market where immigrants are less likely than natives to become entrepreneurs (Guerra *et al.*, 2012). The percentage of non-married individuals (single, divorced or widow) is considerably higher among the quitters (53.8 per cent) than among the stayers and the emergent entrepreneurs (35.7 and 24.8 per cent).

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<sup>5</sup> We test differences by means of a t-test on the null hypothesis that the means in each group (job stayers vs job quitters) are the same. Statistics are not reported, but can be obtained upon request.

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With regard to the proxies for human and financial endowments, self-employment candidates seem to be more likely to have attained a vocational (20.0 per cent) or university degree (20.8 per cent) than those staying in wage employment (16.4 and 16.6 per cent among the quitters; 13.8 and 13.5 per cent among the stayers). There are significant differences among the proportion of those who are member of a union in the three groups (23.7 per cent among the stayers, 18.5 among the quitters and only 15.6 among the emergent entrepreneurs). Homeownership rates are higher among the emergent entrepreneurs than the stayers and the quitters (64.4 per cent, against 51.4 and 44.1 per cent, respectively). This preliminary evidence suggests that probabilities of transition towards self-employment are positively associated with the level and quality of both human and financial capital, and negatively correlated with union membership, this latter result possibly being related to the different work functions of workers belonging to the two groups.

Emergent entrepreneurs make slightly more (CHF9,860 more per year, +15.8 per cent) than the average income registered for the stayers, while quitters report on average significantly lower earnings (CHF6,330 less per year, -10.1 per cent). Differences among the three averages are significant at the 1 per cent level. However, heterogeneity in the emergent entrepreneurs sample is high, which suggests that the decision to enter into self-employment is not confined to a particular income category.<sup>6</sup> There are little, although significant, differences between the amount of working hours reported in the three samples, with an increasing number of hours that are dedicated by the quitters and the emergent entrepreneurs to their working activity. There are differences between those deciding to stay in their current job, the quitters and those turning to self-employment with regard to the level of job insecurity, with an average level of 1.7, 2.0 and 1.8 respectively. Finally,

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<sup>6</sup> It would be interesting to test whether transitions into self-employment significantly increase income. In fact, median income among the stayers (CHF58,310) is significantly higher than for the quitters (CHF50,200) and the emergent entrepreneurs (CHF49,250), which is consistent with FSO data, measuring income after the choice was made (FSO, 2011a).

there is little exposure to unemployment risk in both the stayers and the emergent entrepreneurs samples (1.6, 1.7 respectively), while the quitters are significantly more exposed (2.8).

I abstain from considering the industrial and professional composition of our samples, since the inclusion of these characteristics was found to capture objective work conditions, without increasing goodness of fit. Furthermore, the high number of missing values for these variables would considerably reduce my sample size. Similarly, the inclusion of regional dummies was found not to affect my results.

### **3.4 Empirical Results**

Equation (1) is estimated by maximum likelihood using the covariates discussed in Section 3.3. Table 14 reports a first set of estimates: column (2) shows parameter estimates for the quitters against the reference category of the stayers; column (3) reports estimation results for those who changed their status in self-employed (and are thus referred to as emergent entrepreneurs).

The inclusion of satisfaction variables improves the goodness of fit (with respect to a base model including only objective job and personal characteristics, not shown), without affecting sign and significance of other parameter estimates (McFadden's pseudo- $R^2$  of 0.167 against 0.156 in the base model; AIC 6,238.03 against 6,405.62; BIC 6,543.63 against 6,660.90 in the base model. A  $\chi^2$ -based likelihood ratio test confirms that the inclusion of subjective variables leads to a highly significant model improvement.

According to my results, satisfaction significantly affects transition probabilities, although the effects are different for job quitters and for emergent entrepreneurs. The level of satisfaction regarding pecuniary job rewards (i.e., income) negatively affects probabilities of both entering self-employment and quitting the job, whereas this latter effect is rather small and not statistically significant. Thus, persistent income dissatisfaction provides a push factor for entrepreneurial choices, while it does not affect job quits. With

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regard to variations in income satisfaction (our measure of changes in long-run satisfaction levels), recent improvements discourage decisions leading to self-employment, while they are positively associated with job quits.

The level of satisfaction about nonpecuniary job aspects (i.e., work conditions) negatively influences job quits, but positively affects probabilities of moving towards self-employment. These results are reinforced by the negative (positive) effects found for variations in satisfaction regarding nonpecuniary aspects.

I argue that individual perceptions regarding pecuniary and nonpecuniary job rewards do matter when deciding to take the risk of quitting an existing job for a new (eventually self-employed) position. According to my results, job quitters change not for money but to improve their work conditions (either to get away from annoying colleagues/boss or to get a more satisfying job), whereas emergent entrepreneurs are generally more satisfied with their work conditions (probably, because they have different – i.e., higher – job functions) but change mostly for money.

The opposite signs found here for the effects of our two measures of job satisfaction on transition probabilities towards self-employment may reflect differences in the workers' reactions between subjective evaluations of pecuniary and nonpecuniary aspects. Differences in reactions may arise because of the different nature and distribution of the underlying work characteristics (income and job conditions, respectively). Moreover, one might argue that it is easier, for the worker, to assess satisfaction with current earnings (by comparing them with what was earned in the past, with earnings in comparable positions and with expectations regarding future earnings, thanks to an underlying variable – i.e., income – that is generally increasing over time) than with work conditions (which are more subject to favourable and unfavourable changes, like management turnover, mergers and acquisitions, new regulation, etc., while being less easily comparable with what is offered in an alternative position). Finally, problems of self-selection may arise, where more optimistic workers may choose to become self-employed.

Probabilities of quitting are negatively influenced by the age of the respondent, as well as by gender (i.e., males are more likely to quit), whereas the opposite hold for probabilities

to enter self-employment, although the effect of age is not significant in this case. Nationality does not seem to affect transition probabilities (most probably because of the very few cases of foreigners recorded in our samples), whereas being single or divorced decreases the probability of entering self-employment – probably because of the inability of singles to draw on partners' pecuniary and nonpecuniary contributions (which may be crucial especially in the early times of self-employment) – but is positively related to job quits.

Transition probabilities are positively affected by the level of education, implying that higher levels of human capital – as expected – increase knowledge regarding the alternatives and expected probabilities of success, whereas unionized workers are more reluctant to change their job/status. Homeownership is seen as a factor positively influencing self-employment transitions, since it reflects wealth accumulation and because of the fact that housing wealth is usually seen as a source of collateral for business ownership, while it does not seem to affect job quits.

As for the effects of the objective work characteristics, I find a negative effect for the level of (log)income on self-employment probabilities, which implies that higher wages provide a disincentive for transitions into self-employment, while there are no apparent effects of pecuniary rewards on job quits. The number of hours worked is positively and significantly associated to transition probabilities, both for emergent entrepreneurs and for job quitters, suggesting that there is a certain degree of self-selection of the most active/assiduous workers for more challenging outcomes.<sup>7</sup> As for the effects of the other measures of objective work conditions, both the level of self-reported job insecurity and the risk of unemployment do not seem to significantly influence transitions to self-employment, but they positively affect job quits.

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<sup>7</sup> This hypothesis is somehow related to the surprising results found by Taylor (2004) for job satisfaction levels of the self-employed, which report higher levels of job satisfaction with hours of work than employees, despite the well-documented fact that the former work in general much harder than the latter (Blanchflower, 2004).

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Finally, time dummies are significant, and most likely reflect business cycle dynamics.

In order to investigate whether individuals with below-average job satisfaction levels are more likely to change their job or to move towards self-employment if they experienced recent declines in job satisfaction, as we would expect, I include interaction terms between levels and percentage changes in both satisfaction measures. Table 15 reports my estimates for this specification. The inclusion of interactions slightly improves the goodness of fit (McFadden's  $R^2$  of 0.17; AIC 6,223.63 and BIC 6,554.69). Likelihood ratio tests confirm that this specification (with interaction terms) is significantly better than the base model and the one without interactions.

In my new estimates, while size and significance of the parameters for the level of pecuniary and nonpecuniary satisfaction do not change meaningfully in both the quitters and the emergent entrepreneurs sample, implying that most of the main effects of long-run satisfaction persist even after controlling for possible interaction effects, the inclusion of interactions moderates the significance of all estimated coefficients for variations in job satisfaction.<sup>8</sup>

However, according to the non-significant effects found for every interaction between satisfaction levels and variations – with the only exception of quitters' reaction to nonpecuniary satisfaction – I cannot accept the hypothesis that long-run satisfaction influences one worker's reaction to recent shocks in subjective work assessments. As for the significant and negative effect of the interaction between levels and variations in nonpecuniary satisfaction found for the quitters, we will interpret this effect as the different reactions that individuals with higher, respectively lower levels of job satisfaction can reveal with respect to recent variations in job satisfaction. According to my results, the

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<sup>8</sup> These results are apparently affected by the choice of the multinomial framework, where each effect is estimated by considering deviations from a reference group (i.e., the stayers). Preliminary evidence using a logistic framework (without the benchmark), shows that interactions matter. Alternatively, the assumption that the error terms are iid might be relaxed using a nested logit (Williams, 1977), that allows for the existence of correlation in a group of alternatives. Furthermore, there are models that consider more than one random component, allowing for the presence of both correlation and heteroskedasticity (mixed logit). I agree that further research is needed in this regard.

former will react more negatively (significantly decreasing their probabilities to quit) to increases in job satisfaction than the latter, that are less reactive. In other words, persistently dissatisfied people will tend to absorb negative shocks in job satisfaction, while historically satisfied people – which are more used to favourable work conditions or simply are more optimistic – will react more radically by leaving their job.

### **3.5 Conclusions**

The recent surge of self-employment in Switzerland, providing no exception in the international context, has raised the attention of the academic community and of the public on the effects of small business growth on economic development. The strong belief that small businesses foster innovation and competitiveness has led to a number of policy interventions aiming to encourage start-up activities, although their effects are often disputed.

Nevertheless, it is important to investigate the reasons why individuals choose self-employment, and why they do it despite lower protection, higher risks, and possibly more effort than what is offered in a comparable wage employment position.

Using microdata from a panel of Swiss individuals for the time period 1999–2008, I investigate the factors that are expected to affect probabilities of choosing self-employment (and, alternatively, of just quitting his job), given a previous employment position.

I show that job satisfaction variables significantly affect transition probabilities of both self-employment candidates and job quitters. However, the effects are different for the two groups. Those who choose self-employment tend to do so in reaction to low levels of pecuniary satisfaction (while their level of nonpecuniary satisfaction is higher than the one reported by the reference group of stayers). Job quitters are more reactive to nonpecuniary dissatisfaction. Variations in job satisfaction are also found to significantly influence transition probabilities, even if their effects are absorbed by the interaction terms once we control for threshold effects. In fact, we cannot accept the hypothesis that long-run

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satisfaction influences one worker's reaction to recent shocks in job satisfaction. The only exception is provided by the quitters, who have been found to be particularly reactive to negative shocks if they experienced initially high satisfaction levels.

The distinction between pecuniary and nonpecuniary satisfaction allows me to uncover different effects of subjective job assessments on transition probabilities, that a single satisfaction measure would not capture.

From a policy point of view, the divergent reactions of the job quitters and the emergent entrepreneurs samples with respect to (time and cross-sectional) differences in pecuniary and nonpecuniary satisfaction suggest that, on the one hand, managers should pay more attention to their coworkers that are dissatisfied with actual work conditions if they want to reduce turnover (since job quitters have been found to be particularly exposed to such issues), while on the other hand, they should care about pecuniary dissatisfied coworkers if their aim is to reduce risks of future competition (given their enhanced probabilities to switch towards self-employment). Since the latter are also on average the least unionized, as well as the most talented workers, it would be worth for managers to rely on them. Given the nonsignificant results found for most of the interactions between levels and changes in job satisfaction, managers' attentions should be paid equally to individuals reporting below average levels and to those experiencing negative variations of job satisfaction.

Finally, it would be definitely interesting to test whether job quitters and emergent entrepreneurs will find better conditions, once the choice been made.



**Table 12. Transitions between employment categories**

Year $t - 1$	Year $t$				Total cases
	Employed	Self-employed	Un-employed	Inactive	
Employed	25,419 (92.6)	511 (1.9)	316 (1.2)	1,207 (4.4)	27,453 (100.0)
Self-employed	524 (15.7)	2,626 (78.6)	19 (0.6)	171 (5.1)	3,340 (100.0)
Unemployed	387 (54.9)	18 (2.6)	161 (22.8)	139 (19.7)	705 (100.0)
Inactive	1,208 (18.1)	192 (2.9)	173 (2.6)	5,105 (76.4)	6,678 (100.0)
Total cases	27,538 (72.1)	3,347 (8.8)	669 (1.8)	6,622 (17.3)	38,176 (100.0)

*Notes:* Transition probabilities between brackets.

**Table 13. Descriptive Statistics, by Groups**

	Stayers		Quitters		Emergent entrepreneurs	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Satisfaction						
Satisfaction: income ( $t - 2$ )	7.313	1.990	6.863	2.181	6.966	2.231
% change in satisfaction: income	0.025	0.384	0.053	0.615	0.048	0.490
Satisfaction: job conditions ( $t - 2$ )	7.933	1.679	7.516	1.839	8.240	1.638
% change in satisfaction: job conditions	0.015	0.257	-0.002	0.337	0.042	0.371
Demographics						
Age	43.762	11.176	36.245	11.013	45.489	10.198
Female	0.494	0.500	0.475	0.500	0.549	0.498
Ethnic minority	0.111	0.314	0.112	0.315	0.081	0.273
Married: no	0.357	0.479	0.538	0.499	0.248	0.432
Human and financial capital						
Education 2	0.138	0.345	0.164	0.371	0.200	0.400
Education 3	0.135	0.342	0.166	0.372	0.208	0.406
Union membership: yes	0.237	0.426	0.185	0.389	0.156	0.364
Homeownership	0.514	0.500	0.441	0.497	0.644	0.479
Objective work characteristics						
Income/10,000	62.385	43.179	56.057	58.353	72.243	99.962
Working hours	31.269	12.011	32.815	11.366	32.571	15.321
Job (in-)security	1.720	0.721	1.982	0.965	1.809	0.848
Risk of unemployment	1.624	2.224	2.835	3.017	1.679	2.599
Cases	3,004		1,266		443	

**Table 14. Multinomial Logit Estimates on Transition Probabilities (1)**

	(2) Quitters		(3) Emergent entrepr.	
	Parameter	Standard errors	Parameter	Standard errors
Satisfaction				
Satisfaction: income	-0.024	0.026	-0.219	0.039***
% change in satisfaction: income	0.201	0.099**	-0.309	0.168*
Satisfaction: job conditions	-0.142	0.03***	0.216	0.05***
% change in satisfaction: job conditions	-0.516	0.161***	0.549	0.246**
Demographics				
Age	-2.197	0.156***	0.355	0.252
Female	-0.156	0.091*	0.41	0.154***
Ethnic minority	-0.113	0.127	-0.092	0.208
Married: no	0.156	0.09*	-0.437	0.148***
Human and financial capital				
Education 2	0.519	0.11***	0.645	0.16***
Education 3	0.543	0.112***	0.983	0.164***
Union membership: yes	-0.19	0.095**	-0.569	0.155***
Homeownership	0.002	0.083	0.231	0.13*
Year (Reference: 2001)				
2002	0.338	0.139**	0.677	0.23***
2003	0.404	0.15***	0.66	0.248***
2004	0.283	0.182	-0.709	0.459
2005	0.887	0.172***	-0.26	0.428
2006	-0.027	0.14	2.04	0.19***
2007	0.349	0.137**	-0.49	0.308
2008	0.215	0.133	-0.709	0.314**
Objective work characteristics				
Income	-0.008	0.067	-0.389	0.089***
Working hours	0.012	0.004***	0.014	0.006**
Job (in-)security	0.199	0.055***	0.126	0.089
Risk of unemployment	0.133	0.017***	-0.031	0.029
(Intercept)	7.073	0.753***	-0.978	1.203
Observations		4,301		
LR chi2 (dof)		1,230.51 (46)		
Mac Fadden Pseudo R2		0.1669		
AIC		6,238.03		
BIC		6,543.63		
Log Likelihood		-3,071.02		

Notes: \* Denotes parameter significant at 10%, \*\* at 5%, \*\*\* at 1%.

**Table 15. Multinomial Logit Estimates on Transition Probabilities (2)**

	(2) Quitters		(3) Emergent entrepr.	
	Parameter	Standard errors	Parameter	Standard errors
Satisfaction				
Satisfaction: income	-0.016	0.027	-0.23	0.04***
Satisfaction: income (difference)	0.24	0.144*	-0.075	0.219
Satisfaction: income (difference*level)	-0.002	0.037	-0.081	0.057
Satisfaction: job conditions	-0.152	0.03***	0.221	0.051***
Satisfaction: conditions (difference)	0.869	0.349**	0.782	0.502
Satisfaction: conditions (difference*level)	-0.259	0.059***	-0.021	0.087
Demographics				
Age	-2.182	0.156***	0.359	0.252
Female	-0.157	0.092*	0.414	0.154***
Ethnic minority	-0.149	0.128	-0.103	0.208
Married: no	0.16	0.09*	-0.45	0.149***
Human and financial capital				
Education 2	0.522	0.11***	0.651	0.16***
Education 3	0.555	0.113***	0.979	0.164***
Union membership: yes	-0.183	0.095*	-0.572	0.155***
Homeownership	0.013	0.083	0.235	0.13*
Year (Reference: 2001)				
2002	0.344	0.139**	0.686	0.23***
2003	0.41	0.15***	0.664	0.248***
2004	0.287	0.183	-0.684	0.458
2005	0.899	0.172***	-0.26	0.428
2006	-0.025	0.14	2.046	0.19***
2007	0.343	0.138**	-0.481	0.308
2008	0.219	0.133	-0.695	0.315**
Objective work characteristics				
Income	-0.011	0.068	-0.373	0.09***
Working hours	0.012	0.004***	0.014	0.006**
Job (in-)security	0.189	0.055***	0.12	0.09
Risk of unemployment	0.131	0.017***	-0.033	0.03
(Intercept)	7.044	0.758***	-1.124	1.207
Observations			4,301	
LR chi2 (dof)			1,252.91 (50)	
Mac Fadden			0.1699	
AIC			6,223.63	
BIC			6,554.69	
Log Likelihood (dof)			-3,059.81	

Notes: \* Denotes parameter significant at 10%, \*\* at 5%, \*\*\* at 1%.

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## Conclusions

## **Conclusions**

With more than 20 per cent of the overall active population made up by immigrants, Switzerland is one of the countries with the largest foreign population. Even if immigrants benefit from the overall good economic environment, their unemployment rate is much higher than the one displayed by natives, which would suggest also higher self-employment rates. However, the opposite is true. There are many possible reasons why immigrants in Switzerland are less entrepreneurial than natives. Firstly, this might reflect the good conditions faced by residents (both natives and immigrants) within the labour market. In fact, wages are in general high, while unemployment is historically low, even if relative to the natives, unemployment hits more frequently immigrants. Thus, it is possible that labour market outcomes may have dissuaded individuals from entering into self-employment as an alternative to wage employment.

Another reason is that immigration flows used to be strictly regulated. Since the 1970s, Swiss national and regional authorities have attempted to manage immigration in order to balance economic needs (chronic excess labour demand) and excessive concentration. As a result, Switzerland has turned into a multicultural and multilingual country, far beyond the traditional divisions in the three linguistic regions. Traditional and recent immigration waves contributed to shape a rather heterogeneous and fractionalized ethnic environment, which in some cases might have prevented immigrants from benefiting from the presence of their coethnics, for instance in helping them to tackle bureaucracy, to rise financial resources and to provide cheap family or coethnic labour.

Moreover, Swiss cities and regions are probably too small to provide sufficiently large ethnic markets for potential ethnic entrepreneurs. Thus, the absence of market incentives might have discouraged ethnic business.

The effects of group characteristics and of market opportunities have been analysed in the first essay. The empirical analysis contributes to shed light on local determinants of immigrant self-employment. A comprehensive dataset of over 2,400 Swiss local units has

been used. By considering the characteristics of the ethnic community and the local conditions, I show that the local concentration of particular ethnic groups is a significant factor in increasing self-employment rates. Although self-employment among immigrants is generally low (compared with the natives), immigrants living where other immigrants of the same group are concentrated have probably been experiencing push and pull effects, which led them to choose self-employment. Additionally, the proficiency of immigrants in the language spoken locally, as well as belonging to more traditional immigration waves, turned out to be associated with higher entrepreneurship levels.

My results should help understanding the reasons that influence local self-employment level of immigrants. In order to filter out local conditions and specificities, differences in the entrepreneurial behaviours of immigrants and Swiss citizens have to be considered. Moreover, the presence of unobserved spatially correlated variables and spatial dependence should be investigated. A more in-depth analysis, focusing on the behaviour of immigrants, could ideally be carried out using micro-level data in order to directly investigate, for example, imitation phenomena within ethnic enclaves.

From a policy perspective, although the low entrepreneurial levels acknowledged in Switzerland, some regions (especially cities) may be tempted to encourage immigrant self-employment with the aim to reduce unemployment and poverty, especially for those groups reporting higher unemployment rates (former Yugoslavians and Turkish), as well as to encourage local employment opportunities. Local authorities should favour in particular professional education, language proficiency and interaction within and between ethnic groups in order to increase the immigrants' potential with regard to business ownership. Groups of recent immigration may deserve special consideration, since they appear to be less prone to business ownership.

Further, I present a series of statistical analyses aimed at investigating the influence of role models on the local immigrant self-employment rates. I show that the self-employment rates of immigrants are positively related to the ones displayed by the natives. This finding confirms that ecological conditions are relevant and that the presence of native entrepreneurs within local units provides successful examples (role models) for immigrant

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entrepreneurship. Moreover, I find that spatial spillovers occur in aggregate decision outcomes: immigrant communities surrounded by highly entrepreneurial communities show higher self-employment rates. This result is consistent with the hypothesis that immigrants are influenced in their entrepreneurial behaviour by the presence of entrepreneurs living in adjacent communities. My results are consistent over different assumptions on the nature of spatial interactions, and they show that immigrants are influenced in their entrepreneurial propensity by the success rates of both native and immigrant entrepreneurs, which have been found to act as role models (positive examples). Finally, robustness analyses controlling for the different features of urbanized and rural municipalities show differences in the set of skills and characteristics required for self-employment choices.

The results presented in this thesis should encourage both empirical and theoretical research to focus on the effects of the presence of role models in immigrant entrepreneurship, and to incorporate spatial spillovers in the distribution of self-employment rates. Any empirical analysis avoiding the use of spatial econometric techniques in this field should be taken with care.

Moreover, local authorities should be acknowledged that their policy efforts aimed at increasing market opportunities and resources for potential (ethnic) entrepreneurs, as well as their effects, will spread over a wider range. Therefore, cooperation between local authorities in this regard could be particularly helpful.

In addition to the local determinants of entrepreneurial behaviours, I present an empirical representation of the factors which are expected to encourage individuals to quit their previous (wage) job either for another job, or for a self-employment position. The results confirm the hypothesis that dissatisfaction influences individual decisions leading to entrepreneurship, and that it act as a push factor. Individuals who are dissatisfied with their income are found to be particularly attracted by self-employment, while job quitters are more reactive to nonpecuniary dissatisfaction. Recent changes in job satisfaction are also significant factors, even if their effects are absorbed by the interaction terms once I control for threshold effects. In fact, we cannot accept the hypothesis that long-run satisfaction influences one worker's reaction to recent shocks in job satisfaction. The only exception is

provided by the quitters, who have been found to be particularly reactive to negative shocks if they experienced initially high satisfaction levels.

Future research should focus on testing whether job quitters and emergent entrepreneurs actually find better working conditions (i.e., experience higher satisfaction levels) once their choice has been made. Moreover, different statistical methods should be considered, in order to allow for the existence of correlation between groups of alternatives (nested logit) and for the presence of both correlation and heteroskedasticity (mixed logit).

According to my results, managers should look closely at permanently dissatisfied individuals if their aim is to reduce risks of future competition (since they display enhanced probabilities to switch towards self-employment) or turnover. Given the nonsignificant results found for most of the interactions between levels and changes in job satisfaction, managers' attentions should be paid equally to individuals reporting below average satisfaction levels and to those experiencing negative variations of job satisfaction.

The research proposed in this thesis has followed a path from regional- to microeconomic aspects of entrepreneurship. The second essay, while introducing the theoretical relevant issue of the influence of role models in local entrepreneurial outcomes, presents a series of supplementary analyses investigating the differences between the urban and rural contexts, and their effects on entrepreneurial activity. In this sense, it is intended to contribute to the literature of small business and regional economics. Moreover, the inclusion of spatial spillovers lead to a substantial refinement of the empirical specification presented in the first essay. Exploratory spatial data analysis is used to assess the extent and the shape of spatial dependence. Different types of spatial weight matrices, as well as different numbers of neighbours, are considered.

There is a change in the measure of entrepreneurship used to implement the empirical investigation in the third contribution (self-employment transitions) with respect to the previous two (self-employment rate), which narrows the analysis to the more challenging (and difficult) view of entrepreneurship proposed by Schumpeter. It is important to investigate the reasons why individuals choose self-employment, and why they do it despite lower protection, higher risks, and possibly more effort than what is offered in a

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comparable wage employment position. The inclusion of dynamics in job satisfaction, and the analysis of whether or not threshold effects in this regard occur, should contribute to the explanation of the reasons which are expected to influence self-employment transitions.

Finally, the distinction between nonpecuniary and pecuniary satisfaction measures, and their different effects on job quits, should represent a novelty.