Network effects in hiring strategies*

Catia Nicodemo†
Rosella Nicolini‡

This version: May 2011

Abstract

This study provides some preliminary insights about the hiring policies at firm level concerning immigrants. In the most recent years, Spain experienced a huge entrance of immigrants and this entrance produced interesting effects on the structure of the local labor market. Rather than focusing on the study of the complementarity and substitutability between natives and immigrants, this analysis provides some evidence about to what extent the recruiting policies adopted for immigrants are driven by the social networks and the changes in the qualifications of the natives. We exploit the information at individual level included in the Muestra Continua de Vida Laborales (MCVL) for a period ranging from 1980 to 2008. By working with the sub-samples of high and low skill (hired) immigrants, we are able to isolate two basics effects: (i) hiring immigrants is strongly influenced by the presence of the stock of immigrants hired in the same firms, above all in the superior positions (such as managers), (ii) the hiring of high skill immigrants is also driven by the scarcity of natives with the same level of qualification of immigrants. Under this perspective, our study sketches a new alternative path to evaluate the assimilation of immigrants in the Spanish labor market.

Keywords: Education, Immigrants,Labor market, Natives.

JEL CODE: J21, J24, J61.

*We are very grateful to C. Giuletti, T. Kevin, I. Garcia Perez and K. Lang for his insightful suggestions. We thanks the participant to the AIEL Conference (2010) and SAE (2010) for useful comments. C. Nicodemo is currently visiting New York University. Her visit is sponsored by the research programme "José Castillejos" from the Secreteria de Estado de Universidades. Part of this research was done while the second author was visiting Boston University. All errors are our own responsibility. Financial support from research grants 2009SGR00600 and SEJ2008-01850 is acknowledged.

†Universitat Autònoma de Barcelona and IZA.

‡Universitat Autònoma de Barcelona, Edifici B- Campus UAB, 08193 Bellaterra (Barcelona)

1 Introduction

> " In 14 if the 25 largest metropolitan areas, including Boston, New York and San Francisco, more immigrants are employed in white-collar occupations than in lower-wage work like construction, manufacturing and cleaning.[...] Economic growth in urban areas has been clearly connected with an increase in immigrants' share of the local labor force.[...] Surprisingly the analysis showed, that the growing cities were not the ones, like St. Louis, that drew primary high-earning foreigners.[..] Rather, the fastest economic growth between 1990-2008 was in cities like Atlanta, Denver and Phoenix that received large influxes of immigrants with a mix of occupations-including many in lower-paid services and blue-collar jobs."
>
> Source: The New York Times, April 15th 2010.

The economic impact of immigrants in host countries is a controversial issue. The principal debate develops around two positions. On the one hand, according to Borjas (2003), the US experience allows for assessing that there exists a clear substitution (competition) effects between natives and immigrants: immigration reduces unskilled natives' real wages. Entrepreneurs perceive immigrants more flexible and less costly than natives for job positions, and therefore they usually prefers the former to the latter for filling up the opening positions. On the other hand, Peri and Sparber (2009), recovering some previous studies developed by Peri and coauthors, assess that US census data demonstrate that immigrants specialize in occupation intensively in manual skill while natives in communication-language tasks. Their argument arises from a simple transformation of a basic trade-specialization model whose principal results is the complementarity between these two categories of workers. Nevertheless, one can argue that these outcomes rely on a specific job market (the US) and they might not hold for other countries where market conditions are structurally different.

In the wake of the previous approaches, various studied have been produced at national levels: Bratsberg and Raaum (2010) for Norway, Dustman and others (2010) for Germany and United Kingdom or Amuedo-Dorantes and de la Rica (2008) for Spain. They all investigate this complementary-skill relationship between natives and immigrants with respect to job position, but, in our opinion, the most challenging results refer to the Spanish environment. As well described in Amudeno-Dorantes and de la Rica (2008) the entrance of immigrants in Spain has been impressive in the last decade. At the end of 2008 immigrants represented 10% of the population: a unique record. Hence, it is worth deserving some attention to the analysis of the impact of immigrants on the Spanish host market. The clear evidence found by Amudeno-Dorantes and de la Rica (2008) endorses the idea

that immigrants are not perfect substitutes of natives: the intense immigration flows did not affect significantly the wage of natives. On the contrary, immigration seems to have affected the distribution of jobs across natives. Funding on a standard comparative advantage effects, the (most skilled) natives shifted towards the no-manual skills, leaving the most manual tasks to immigrants, with naturally an important component of gender composition in this occupation movement. Put differently, the entrance of more manual skill immigrants allow native-women for searching for a job according to her educational degrees and outsourcing the conventional home-tasks (Farré et al., 2010). As a consequence of this movement, we should expect that during the last decade Spain is experiencing a sensitive increase of natives coursing superior degrees. However, empirical evidence for Spain unveils a labour stock effect for each category of workers and smooths the potential impact of such recomposition effect.

In fact, when comparing these results with the educational performance of Spanish citizens in the 2000s (as in López Mayan, 2010, for instance) we find some puzzling results. The Figure **??** depicts an interesting evidence: the proportion of young people that complete graduate studies (i.e. at university level) drop impressively from 2005 to 2009. This evolution may be due to two jointly effects. On the one hand there could be the entrance of educated woman into the job market that directly shift down the potential deman for young educated employées. On the other hand we may also experiencing a conjuntural effect. The position of the business cycle makes less interesting (in terms of opportunity costs) investing in education. Therefore, this second effect yields a shortage of qualified skill workers in the near future. Our paper aims at assessing to what extent this potential stock effects may impact on the job distribution between natives and immigrants, when experiencing a shortage of qualified natives.

ftbpFU4.9303in3.3745in0ptProportion of young Spanish natives with a graduate degree (Source EPA, Calculus: Authors).Fig$_{e}ducFigure$

Working on data about the post-compulsory education of Spanish young persons, López-Mayan (2010) assesses that the Spanish wage structure in 2006 discourage post-compulsory attendance. The shortage of skill natives should not leave unaffected the dynamics process described by Amudeno-Dorantes and de la Rica (2008): without the presence of a stock of skill-native workers the shift dynamics might not take place. If so, what could be the consequence for the labor composition of the Spanish labor market ? Intuitively the dominant effect would signal a clear preference for still hiring natives for skilled positions. Nevertheless, the shortage effect of skill natives and the sustained opening of vacancies (due to the economic expansion cycle) leave room for immigrants to access to qualified position and, then, throught a network effect, pushing the hiring of immigrants for unskilled postions.

This analysis aims at providing some further insights in order to interpret the potential

impact on the labor market composition issued by the shortage of qualified natives when receiving abundant flows of foreign workers. Our starting point is the canonical framework of reference for the interaction between natives and immigrants, with further elements embedding the external effects of a shortage in the stock of skill natives (in the spirit of Lang et al, 2003). In particular our idea of network grants a lot from Carrigton and Trostke (1998). We are referring as network to the spatial clusters of people belonging to the same ethnicity. The degree of density of people in this cluster favours contacts triggered by the ethnicity and the similarity of technical background. We are aware that the canonical idea of networks involve also to model the kind of ties linking people; unfortunately with data at hand we cannot control for this feature.

Therefore, this paper addresses a second-degree question about the complementarity and substitutability between immigrants and natives. In order to understand the potential impact of the lack of qualified workers, we are focusing on two principal working questions:

a) Are natives progressively loosing participation in the high-qualification positions of the Spanish job market ?

b) Do a stable presence of an immigrant in the managing position in a firms favour the hiring of other workers of the same nationality (both with similar and different qualification)?

It is quite likely to expect that the shortage of skill workers among natives should favor the recruitment of skill immigrants for such positions. A similar result (even if for a narrower ethnic setting) has been found in Carrington and Troske (1998). In the US, they found that black employers are more likely to hire black workers when the size of the ethnic group allows to perform this discrimination choice. If so, we cannot but considering another important consequence in the composition of the labor force entailed by the network effect: immigrants managers are more prone to hire workers belonging to the same ethnic groups. This is the canonical consequence of the network effects that has been already studied by Åslund and others (2009) for the case of Sweden and Goel and Lang (2009) for the case of Canada. However, our setting includes a further selecting features that has not be taken into account in the two previous studies: the stock effect.

We exploit the information at individual level included in the *Muestra Continua de Vida Laborales (MCVL)* for a period ranging from 1980 to 2008. In these years, Spain hosted a progressively increasing number of immigrants with different origin. The most representative group is that of individuals born in Latin countries and the European ones. By working with the subsample of high and low skill (hired) immigrants, we are able to isolate two basics effects: (i) hiring immigrants is strongly influenced by the presence of the stock of immigrants hired in the same firms, above all in the superior positions (such as managers), (ii) the hiring of high skill immigrants is also driven by the scarcity of na-

tives with the same level of qualification of immigrants. Under this perspective, our study sketches a new alternative path to evaluate the assimilation of immigrants in the Spanish labor market. It is not just a matter of complementarity or substitutability among the two groups, but we can think of a third intermediate situation.

The remaining is organized as follows. Section 2 introduces a brief theoretical framework that is useful to understand the economic factors backing our study. Section 3 presents a few empirical evidence and statistical data about the dataset we are exploiting, while Section 4 includes the econometric results. Finally, Section 5 concludes.

2 The theoretical backgroung

Our theoretical background inspires by the canonical litterature of adverse selection in labor market. We focus on the workers who enter for the first time into the job market. In our approach we are skipping all the discussion associated to the productivity effect, the effort to find a job as well as the reservation wage. It is very important to keep in mind that we are considering a labor market with very rigid institutions. In Spain, almost all contracts are defined after a collective bargaining; then there is no room for productivity to play the discriminatory role as in the canonical framework (see appendix A). Empirical evidence support our statement: working with the information included in our database we can establish that just 20% of workers voluntarily leave their job for a better position. The most frequent causes of job departure are associated with the end of the contract (temporary contracts are very diffused).

Any vacancy is the results of the maximization process at firm level; each new vancancy would bring positive or null profits to the corresponding firm. In the spirit of Lang et al. (2003, 2010) and Lang and Manove (2003), we assume that workers and firms meet randomly. We limit the amount of potential strategies by assuming that a worker can apply just to one vacancy in one firm. The salary of this position corresponds to her expected wage. We consider a situation in which we have two categories of workers: skill (H) and unskilled (L). We also consider that a firm can hire just one applicant in one or both the categories.The firms post a different wage in correspondence of each category: w_H for the skill positions and w_L for the unskilled ones (with w_H ¿w_L).

We assume that the skill workers carry a degree that allow them to differentiate from the unskill workers at the moment they apply for a job. For sake of simplicity, we admit that each worker can apply to open vacancies in her own category and she cannot shift to the other. This idea would easy represent the fact that each applicant needs to hold a scholar degree before applying to a skill position. In addition, no skill worker may have an interest in applying for an unskilled position, because wages are definitely lower.

We model the labor market by introducing an addition discimination feature; we do not only admit the presence of *native* workers in the market, but we also account for the presence of *immigrants* searching for a job. Even in the category of immigrants, we can separate between skill (H) and unskilled (L) according to the condition previously introduced.

We are interested in defining the conditions that affect the probability of a worker searching for an employment to match it. Our initial hypothesis considers the presence of a large and fix number N of identical firms that open N vacancies randomly split into skill and unskilled positions. The total number of native and immigrant workers are Poisson-distributed with (large) mean Z_i and Y_i for natives and immigrants (being $i = H, L$).

The productivity of natives is υ_i ($i = H, L$), with $\upsilon_H > \upsilon_L$,while the productivity for immigrants is $\upsilon_i(1-\delta)$ ($i = H, L$) and $\upsilon_H(1-\delta)$ ¿$\upsilon_L(1-\delta)$. As usual, in the two groups the productivity of high skill workers is larger than for the unskilled ones. In addition, we also assume that the productivity of immigrants (for any group) is downgraded by a factor $\delta(>0)$ with respect to native one. Immigrants always suffer from some cultural differences (language, for instance) that prevent them from being as productive as natives. Of course, as far as δ approached to zero, the discrimination effect is reducing and, eventually, there would be no difference between native and immigrant productivity.

By ordering the previous level of productivity, we are able to define a clear ranking orders in terms of productivity that firms respect:

a) In the case of skill jobs $\upsilon_H > \upsilon_H(1-\delta)$

b) In the case of unskilled jobs υ_L¿$\upsilon_L(1-\delta)$.

Being the two job categories fully separated we do not need to establish a ranking across groups.[1]

When opening a vacancy, the firm post a wage that is the national wage issued by the national bargaining process and we assume that the firms will make positive or null profits (but not negative profits) when hiring a native or an immigrant for that position. On one hand, because of the differences in productivity, the firm would prefer to hire native (if available) rather than an immigrant. This is an obvious strategy when considering the profit maximizing process at firm-level. On the other hand, a worker applies for a position when the posted wage is identical (or higher) to her own expected wage.

First, let us focus on the case a firm post a H-type job for a wage $w_H(>0)$.

Given the distribution of natives, the expected number of applicants for a H-type job is z_H,

$$z_H = p(w_H)Z_H$$

[1]If we allowed workers to apply to jobs in different categories, we would need to redifine a general ranking by introducing an order criteria to compare the two individual categories too.

and the probability that a native applicant gets that job is

$$P_H(native) = \frac{1 - e^{-z_H}}{z_H}.$$

when she is willing to apply. According to Lang et al. (2003, 2010), because of the symmetry of the model, the expected wage of a H-type native is identical across all the firms posting such a job. Therefore, a H-type native worker would apply for a vacancy if the official posted wage (w_H) is

$$w_H = \upsilon_H e^{-Z_i}.$$

Because of the ordered ranking in terms of productivity, if a position is not filled up by a native, it may be filled up by an immigrant. In this last case, the probability to be hired for an immigrant is

$$P_H(immigrant) = e^{-z_H} \frac{1 - e^{-y_H}}{y_H}, \text{ with } y_H = p(w_H)Y_H$$

and, as above, the immigrant would be willing to apply for this position if

$$w_H = \upsilon(1 - \delta)(e^{-Z_i}) \frac{1 - e^{-Y_H}}{Y_H}.$$

The probability to hire a native or an immigrant relies on different factors: the level of productivity of the two groups of workers, the size of the two groups and the degree of discrimination between the two groups. Because of the ranking order between immigrants and natives, even if the size of the two were identical, the probability to hire an immigrant would be lower than that of a native.

In accordance to the previous expression, we can define the expected profits of a firm hiring just H-type workers as:

$$\pi_H = (1 - e^{-z_H})(\upsilon - w_H) - e^{-z_H}(1 - e^{-y_H})[\upsilon(1 - \delta) - w_H].$$

Because of the linear composition, a true maximizing firm would prefer to hire just natives (if possible) for maximizing the benefits π_H for given level of wage w_H.

When contracting an unskilled type (L), again, a firm posts a national bargained wage (w_L) knowing that at such a wage a firm can make positive or null profits. Once more, a firm would find applicants for this position if the posted wage corresponds to the individual expected wage. Even for this hiring problem, we work with two groups of individuals (natives and immigrants) whose salient characteristics are similar to those of the skill ones.

If a firm were carrying out the recruiting process as in the case of skill jobs, but offering

lower wages, the outcome would be structurally identical. However, if the firm were applying network strategy in hiring policy, the outcomes would be slightly different. Let us introduce some notation. First, we consider that the distribution of skill and unskilled types either in natives and immigrant group is completely independent. As for the skill types, the unskilled types follow a Poisson distribution whose mean is Z_L and Y_L, for natives and immigrants respectively. We define the expected number of natives applying for a L-type job as

$$z_L = p(w_L)Z_L,$$

and that of an immigrants is

$$y_L = p(w_L)Y_L.$$

If the recruiting process of the unskilled types were run independently from the skilled one, the probability of hiring a native or an immigrants would be respectively:[2]

$$P_L(native) = \frac{1-e^{-z_L}}{z_L}; P_L(immigrant) = e^{-z_L}\frac{1-e^{-y_L}}{y_L}.$$

Instead, if the process were running according to some network criteria we would expect that the probability of unskilled native workers to be recruited by a firm is dependent on the presence of H-type native workers. The same would hold for immigrants. This assumption reflects the idea we discussed in the introduction: the existence of a manager (in a firm) belonging to an ethnic group would favor the recruitment of other workers with lower qualification still belonging to her own ethnic group.This dynamic translates into the following expression. The probability to hire a L-type native in a firm i with respect to the presence of H-type natives workers in the same firm is equal to:

$$\frac{P_L(native)}{P_H(native)} = \frac{\frac{1-e^{-z_L}}{z_L}}{\frac{1-e^{-z_H}}{z_H}} = \left(\frac{1-e^{-z_L}}{1-e^{-z_H}}\right)\left(\frac{z_H}{z_L}\right).$$

The conditional probability turns out to depends on the relative abundance of skill-type versus unskilled-type of the same ethnic group and that apply for a job. In addition we are also able to state that:

Proposition 1 *In the group of natives, in each firm i the the realtive employment rate between L-type native workers and H-type native workers is always greater that the individual measure of employment of L-type native workers.*

[2]Once more, we are assuming that each worker applies for a job if her expected wage corresponds to the posted one in her category.

Proof. The proof is straighforward from the comparison of the two probabilities. Therefore

$$\left(\frac{1-e^{-z_L}}{1-e^{-z_H}}\right)\left(\frac{z_H}{z_L}\right) > \frac{1-e^{-z_L}}{z_L},$$

if and only if

$$\frac{z_H}{1-e^{-z_H}} > 1,$$

that is always true for $z_H > 1$. ■

This condition assesses that is sufficient to record one H-type worker belonging to the native group (in a firm) to guarantee that the network effect increases the probability to hire a L-type native workers in the same firm.

In the same manner, we can also define the relative probability to hire a L-type immigrant workers in presence of H-type workers in the same firm. It can be defined as follows:

$$\frac{P_L(immigrant)}{P_H(immigrant)} = \frac{e^{-z_L}\frac{1-e^{-y_L}}{y_L}}{e^{-z_H}\frac{1-e^{-y_H}}{y_H}} = \left(\frac{1-e^{-y_L}}{1-e^{-y_H}}\right)\left(\frac{y_H}{y_L}\right)\left(\frac{e^{-z_L}}{e^{-z_H}}\right).$$

The conditional probability to hire a L-type immigrant workers is dependent on the relative number of skill versus unskilled workers in the same groups. In addition, it is also depends on the relative composition of the hired individuals from the group of natives: a larger number of L-type native individuals applying for a L-type job will lead to a lower probability to hire a L-type immigrant worker.

Proposition 2 *In the group of immigrants, in a firm i, the relative employment of L-type workers and H-type workers is greater than the individual measure of employment for L-type workers when the number of H-type workers is sufficiently large.*

Proof. We compare the two probabilities as follows:

$$\left(\frac{1-e^{-y_L}}{1-e^{-y_H}}\right)\left(\frac{y_H}{y_L}\right)\left(\frac{e^{-z_L}}{e^{-z_H}}\right) > e^{-z_L}\frac{1-e^{-y_L}}{y_L}.$$

After some algebraic manipulations, the previous inequalities reduces to:

$$\frac{y_H}{e^{-z_H}(1-e^{-y_H})} > 1, \text{ with } (1-e^{-y_H}) > 0$$

that reduces to:

$$y_H > e^{-z_H} - e^{-(z_H+y_H)} > 0.$$

■

The condition for the existence of a network effect in the group of immigrants claims for a size effects: there is the need to have a minimum number of H-type workers in this group to allow for the network effects. This condition is basically driven by the ranking order established at the beginning according to which the productivity of a native is always bigger than the productivity of an immigrant.

Our next step is to understand the impact on the hiring issues for low skill workers when the recruiting policy is led at firm level by a person that does not belong to the same ethnic group of the hired people. In order to provide those results, we need to define the preferences of the firm that translates into the basic condition to fulfill an open vacancy. For sake of simplicity, we identify the firms'preferences for low skill hiring matters with the ethnicity of the managers of the same firm. Therefore, we define a pro-native (pro-immigrant) oriented firms if the managers running that firms are natives (immigrants). In order to simplify a bit the framework of the analysis without incurring in important distorsions in final results, we assume that in each firms the probability to hire a immigrant-manager is always stochastic dominated by the probability to hire a native-managers. Hence, the presence of immigrants as managers in firms is due either to the lack of sufficient natives to apply for that position, or native rejected to be employed there. This assumption is well endorsed by the empirical evidence we discuss in the next Section.

First, we focus on firms run by natives. When a native-oriented firm open a vacancy, this vacancy can be fulfilled by a native or an immigrants.

In case of addessing the opening to natives, the expected number of natives that could be hired as first choice by that firms can be computed ad follows:

$$\frac{1-e^{-z_H}}{z_H} = \frac{1-e^{-z_L}}{z_L} \Longrightarrow z_L = \left[\frac{1-e^{-z_L}}{1-e^{-z_H}}\right] z_H; \tag{1}$$

while the expected value of immigrants to be hired as first choice turns to be:

$$\frac{1-e^{-z_H}}{z_H} = \frac{1-e^{-y_L}}{y_L} \Longrightarrow y_L = \left[\frac{1-e^{-y_L}}{1-e^{-z_H}}\right] z_H. \tag{2}$$

By comparing equation (**??**) and (**??**) we get the following result:

Proposition 3 *The expected number of natives that can be hired in a firm with a native-manager is always greated than the number of immigrants to be hired under the same condition if and only if the average L-type native workers available on the markets is greater than one.*

Proof. The proof it is straightforward by comparing

$$\left[\frac{1-e^{-z_L}}{1-e^{-z_H}}\right] > \left[\frac{1-e^{-y_L}}{1-e^{-z_H}}\right],$$

that is always true for $z_L > y_L$. ■

In the same manner we are able to compute the expected number of immigrants that can be hired for low-skill vacancies opened in native-oriented firms, when an immigrant is a second choice option for the manager. This result is obtained by building up the following identity:

$$\frac{1-e^{-z_H}}{z_H} = e^{-z_L}\left[\frac{1-e^{-y_L}}{y_L}\right] \Longrightarrow y_L = e^{-z_L}\left[\frac{1-e^{-y_L}}{1-e^{-z_H}}\right] z_H. \tag{3}$$

Proposition 4 *The expected numbers of L-type immigrants that can be hired in a firm as a second choice option by a native manager is always lower than the expected number of L-type natives when the average number of L-type natives and L-type immigrants is bigger than 1.*

Proof. We proceed by comparing equation (**??**) and (**??**) and we get to the following inequality:

$$\frac{1-e^{-z_L}}{1-e^{-z_H}} > e^{-z_L}\left[\frac{1-e^{-y_L}}{1-e^{-z_H}}\right],$$

that reduced to:

$$1-e^{-z_L} > e^{-z_L}(1-e^{-y_L}).$$

After a few algebraic manipulation, we achieve the folling inequality

$$2-\frac{1}{e^{y_L}} < e^{z_L},$$

that is always fulfilled for $z_L > 1$, and $y_L > 1$. ■

We turn to consider the case of vacancies posted by an immigrant managers. By assumption, we know that a immigrant can be a manager just if no natives applied for that position.

Of course, a immigrant manager may have an interest in hiring either natives or immigrants.

In case an immigrant manager has an interest to hire a native (for a L-type position), the expected number of natives that can fullfill the posted vacancies is:

$$e^{-z_H}\left[\frac{1-e^{-y_H}}{y_H}\right] = \frac{1-e^{-z_L}}{z_L} \Longrightarrow z_L = \frac{e^{z_H}\left[1-e^{-z_L}\right]}{1-e^{-y_H}} y_H. \tag{4}$$

Instead, when an immigrant manager target a L-type immigrant as first choice, the expected number of immigrant that can be hired (in her firm) is:

$$e^{-z_H}\left[\frac{1-e^{-y_H}}{y_H}\right] = \frac{1-e^{-y_L}}{y_L} \Longrightarrow y_L = \frac{e^{z_H}\left[1-e^{-y_L}\right]}{1-e^{-y_H}} y_H. \tag{5}$$

Finally, whenever an immigrant manager target to hire a L-type immigrant as a second choice, the expected number of immigrants to be hired is:

$$e^{-z_H}\left[\frac{1-e^{-y_H}}{y_H}\right]=e^{-z_L}\left[\frac{1-e^{-y_L}}{y_L}\right]\Longrightarrow y_L=\frac{e^{z_H}}{e^{z_L}}\left[\frac{1-e^{-y_L}}{1-e^{-y_H}}\right]y_H. \tag{6}$$

Given the expected number of hirings run by the H-type immigrant, an L-type immigrant is always a second choice with respect to a L-type native, if the average number of L-type natives is larger than the average numeber of L-type immigrants. Infact, by comparing equation (**??**) and (**??**) we replicates the same result discussed in Proprosition 3. The same result is confirmed by comparing equation (**??**) and (**??**); once more there is room for an L-type immigrant to be a first choice (even for a H-type immigrant) just in case no L-type native is available on the market.

Therefore, because of the a-priory ranking condition, a L-type immigrant is always a second choice option for a vacancy even if the vacancy is posted by an immigrant oriented firm. The hiring of an immigrants is always the result of a lack or scarsity of available natives.

Keeping in mind these theoretical predictions, in the next section we proceed to perform some econometric estimation for measuring the extend of the network effects matters for the hiring policies of the immigrant workers in Spain by taking into account the group composition as pointed out in this section.

3 Empirical evidence

The *Spanish Social Security (MCVL) records* were released in 2004. It includes workers are a random sample of whom are affiliated to the Social Security in the year when the survey was extracted, and reproduces the labour history of the affiliated starting from their first job. The MCVL is a large dataset consisting of workers matched to their establishment of employment. This database has some limitation: attrition because we do not observe workers when they go out of the labour market, we do not know when immigrants arrive in Spain for the first time and their previous labor experience, and, also, since a part of immigrants are illegal, no information are available for that group.

Although this limitation, the MCVL is a good database for studying the Spanish labour market. Another database that is frequently used is the EPA (Labour Force Survey). The MCVL is complementary to the EPA because it gives more exhaustive information on the labor trajectory of workers; besides the MCVL contains information about the amount of contribution to the Social Security System, which is a good approximation at the wage of workers.

3.1 The MCVL database

This data set gives information about all the historical relationships of any individual with the Social Security System (in terms of work and unemployment benefits). We also have information with respect to the type of contract, the sector of activity, the qualification and the earnings that every month an individual must pay to the Social Security System, the date when entering or going out of the job market, the part-time or the full-time contracts and the size of firm. Moreover, it contains information on the gender, the nationality, the residence and the date of birth and the level of education for each individual. In addition the MCVL provides also information about the establishment (location, number of workers, industry and sector) in which a worker is hired. The data allow us to track managers, employees and establishments over time. In the MCVL we extract information concerning workers as employee and without taking into account the special regimes (self-employer, ...).

In the *MCVL* we are selecting the firms (that are active in 2008) with at least 4 employee. We restrict our analysis to firms with less than 50 employee with minimum 4 workers employed because in this case is more likely that the manager has the power in the hiring and firing employees. We eliminate firm created in 2008 or out of the market in 2008. Therefore, we operate a selection of new hires for the each establishment from 1980 to 2008 using the wave of 2008 of MCVL. Matching workers and establishments is difficult because the MCVL born as a data to control just employees, but inside the data we have also the identification of the firms, that help us to organize this part of the information.Once obtained such a sample, we are selecting the number of individuals (legal immigrants) that kept a position in the same Spanish firm for at least two years. Then, we can track the evolution of the recruiting policy followed by the firm since the entrance of such individuals onward. Some preliminary descriptive statistics help to define the terms of the problem we are focusing on.

We define immigrants by country of birth, and we contrapose them to natives.[3] There is a high variance across the type of contracts offered to immigrants. Immigrants are usually enjoying temporal contracts with a high turnover among firms. By discriminating according to nationality, immigrants from China and Romania record the lowest level of turnover (probably because they are more likely to run their own private business rather than being hired as employees), while workers from the rest of Eastern European countries (above all Ukrainian) and from the Latin America are recording the highest rate of temporary jobs. We define a manager in a establishment according to his qualification by following the definition of García (2008), i.e. managers are workers that have a qualification between 1-3, while

[3]Although the immigration in Spain is quite heterogeneous, we can isolate three big groups: Latin, Europeans and Africans.

the other workers are other hiring (native or immigrants), with middle qualification(4-6), middle-low qualification (7-8) and at the end low qualification (9-10).

In Table 1a we report the descriptive statistics about native and immigrants by gender included in our sample. Overall, we have 167064 entries, whose 155427 are natives and 11637 immigrants. Immigrants are younger than natives and, on average, less educate. The education variable is quite sensitive in this database because is not update by Social Security but from another source (Padron). If we compare the value of this variable in the MCVL with the value in the EPA, we find that the values for each level of education are lower (see García, 2008). Both natives and immigrants work in small firm (66%) with a low qualification. Most of immigrants are concentrated in regions such as Catalonia and Madrid and work in the construction or hotel and restaurant sectors, while natives are most in the industry sector.

Focusing on the composition of the workforce of all the firms belonging to our sample, and selecting exclusively the high qualified positions (the group 1-3), we are recording an interesting evolutionary trend. The percentage of natives filling up these positions monotonously dropped from 95% in 2001 to 81% in 2008. At the same time, in 2008, the percentage of immigrants filling up these positions increased. For the lower qualification a clear convergence trend between the two groups takes place.

European workers account for (about) 0.8% on average by group (according to their nationality), while workers from various countries of Latin America achieved 2% (on average) by group. This second group basically doubled their participation in the Spanish labor market (at this qualification level) passing from 2001 to 2008 .

According to the current literature (Amuedo-Dorantes and de la Rica, 2008), but also the common perception, immigrants from Latin America are filling up job positions at the lowest degree of job qualification. Then, this group of immigrants is perceived as the biggest threat for native-no-qualified workers. Nevertheless, our evidence claims that we have an relative important group of immigrants that are occupying qualified positions.

Table 1b complements the previous information by emphasizing the most salient features distinguishing natives from immigrants. The total percentage of high skill immigrants holding a high education degree (secondary plus graduate) is mostly identical to the same value for natives. Concerning the distribution across sectors of activities, there is always a slight dominance of natives in filling up vacancies at the highest education degree while immigrants concentrate to the vacancies at medium education degree. Splitting sectors into the finest level, the presence of low skill immigrants dominates that of low skill natives in the sector of construction, hotels and finance. Instead, looking at high skill positions, immigrants are relatively more concentrated in services (like retails, hotels, transport, education

and health).[4]

Two possible explanations come to the mind for understanding this figure:

1. In 2005/2006 the Spanish government approved a reforms for speeding the recognition of foreign degree and make foreign citizens more suitable to be hired for the position matching their educational degree. At the same time, we may want also to take into consideration the educational problems suffered from Spain in the middle of 2000s: the easy job opportunities gave a strong incentive for entering into the labor market before (or rather than) achieving a graduate degree.

2. Jointly with the previous event, there is a clear guess about the cultural and language proximity between natives and Latins for increasing the participation of the last group in the Spanish labor market at the highest degree. This is a reasonable explanation thinking of the kind of expected tasks for these positions: managers and other directives are expected to communicate frequently (daily) with the other workers in the enterprise and language fluidity is strongly recommended. This would explain the preference for Latin directives rather than the European ones.

Table 1a: **Descriptive statistics for natives and immigrants**

(Value: %, Source: MCVL 2008, Calculus: Authors)

[4]Also remark that half of the high skill immigrants brings a Spanish citizenship even if they were born abroad.

	Native		Immigrant	
	Men	Women	Men	Women
Age	38.55	35.67	37.22	36.80
Less Primary Educ	0.21	0.15	0.26	0.18
Less Sec. Educ	0.37	0.30	0.33	0.31
Second. Rduc	0.29	0.35	0.29	0.37
Graduate	0.11	0.19	0.10	0.13
Micro-size firm	0.24	0.23	0.24	0.23
Small size firm	0.66	0.66	0.66	0.66
Middle size firm	0.10	0.11	0.10	0.11
Low qual.	0.71	0.70	0.84	0.83
Middle qualif.	0.11	0.07	0.07	0.06
High qual	0.17	0.22	0.09	0.11
Regions				
Catalonia	0.17	0.19	0.23	0.23
Madrid	0.15	0.16	0.22	0.23
Murcia	0.02	0.02	0.03	0.02
Valencia	0.10	0.10	0.11	0.10
Andalucia	0.18	0.16	0.09	0.07
Agricult.	0.01	0.00	0.01	0.00
Industr.	0.17	0.08	0.13	0.06
Construc.	0.21	0.04	0.24	0.02
Hotels and Rest.	0.09	0.12	0.19	0.31
Nationality				
North Europ.			0.13	0.15
East Europ			0.09	0.10
Spanish			0.31	0.37
African			0.20	0.07
Asian			0.04	0.01
South American			0.21	0.27

Table 1b: **Descriptive statistics for natives and immigrants**

(Value: %, Source: MCVL 2008, Calculus: Authors)

	Low Skill		High Skill	
	Natives	Immigrants	Natives	Immigrants
Age	38	36	42	42
Primary Educ.	0.23	0.33	0.06	0.06
Secondary Educ.	0.67	0.60	0.55	0.64
Graduate Educ.	1.10	0.07	0.39	0.30
FIRM SIZE				
¡ 10 emp	0.07	0.06	0.09	0.09
between 10 and 49	0.49	0.48	0.53	0.51
between 50 and 100	0.44	0.46	0.38	0.40
OCCUPATION				
Low skill postion	0.97	0.98		
Medium skill position	0.03	0.02	0.33	0.39
High skill position			0.67	0.61
Sector: Agriculture	0.00	0.01	0.01	0.00
Secotor: Industry	0.12	0.08	0.14	0.10
Sector: Construction	0.11	0.13	0.13	0.09
Sector: Retail	0.09	0.07	0.11	0.12
Sector: Hotels	0.18	0.25	0.08	0.19
Sector: Transport	0.04	0.04	0.03	0.04
Sector: Finance	0.25	0.32	0.15	0.14
Sector: Civil Servant	0.08	0.02	0.13	0.06
Sector: Education	0.02	0.01	0.09	0.10
Sector: Health	0.05	0.04	0.08	0.10
Sector: Others	0.06	0.04	0.06	0.07
Spanish citizenship		0.35		0.50
Number of Observations	261445	27843	34696	2086

3.2 Descriptive statistics

In order to be able to perform our analysis, we focus on a selected sample of informationi included in the MCVL.

First, we select a sample that exclusively includes all the hiring process implemented by managers in firms from 2000 to 2008. The full trend of the hiring process in depicted in the following picture:

ftbpFU3.9634in3.2309in0ptHiring process (2000-2008). (Source: MCVL, Calculus: authors).Figure

Comparing the two picture, the percentage of high skill natives drops along the period

(with a relevant pick in the latest years), while the share of hired low skill immigrants increases at a sustained pace.

Furthermore, we look at the potential association between high-skill and low-skill hiring. We concentrate our attention on the group of firms between 4 and 100 employees with at last one active managers in their organigram. This last choice is driven by the concern to limit the analysis to the hiring processes in which the decision attributes of the managers are the dominant features of the recruiting process. To this end, we also limit the period a manager is active in the same firm at least for 2 years. Once applied these selection criteria to the sample, we obtain a sample of 8808 firms for about 15000 managers (whose 90,11% are natives) with an average employment spell of 1.96 (and S.D. 2.57).

Row data at hand show that the composition of the managers (according their nationality) is represented in the following picture:

ftbpFU3.7481in2.3108in0ptEthnic composition of the manager group (Source: MCVL, Calculus: authors).ManagcomposFigure

Beyond natives, most of the managers are citizens from South America and, then, from European Union (EU15). The same group of managers organized recruiting processes for 20822 individuals (at low qualified positions) in the period 2000-2008 with an average spell of 1,63 for any recruited worker. The whole number of position filled up is 30694 whose 76,52% has been filled up by natives. The remaining positions have been filled up by immigrants according to the following proportion:

ftbpFU3.7965in2.341in0ptComposition of the low-skill recruited worked by nation of origin.recruitinglowFigure

The two major groups of low-skill hired individuals come from South America and Africa. The Rest of Europe (namely East Eastern countries) and EU(15) countries follow.

Looking at the compositon of the groups of hiring and hired workers there is somewhat of ethnic in the matching process that drives the recruiting action. However, even if it is possible to disantagle some major directives, it is not so clear to which extent the ethnic compositon of the manager group can be a good predictor of the ethnic composition of hired workers. A simple look at the statistical composition of the hiring spells confirm it.

ftbpFU4.6605in1.3292in0ptTable 2: Compostion of hiring spells (Source: MCVL, Calculus: Authors)table$_h iringTable$

[Table 3 about here]

In Table 3 we deep inside the hiring spell composition by group of immigrant workers and a few interesting features pop up. In general, the average of spells (number of months of the lenght of the contract) is quite similar for peoples from South America and Africa (around 18 months), while it is almost the double for workers from EU15 and Asian (more

than 30 months). Standard deviations are quite high; henceforth we cannot refer just to this data. Nevertheless, by comparing the descriptive statistics presented in the table it is quite evident that workers from South America experience a higher turnover (for temporary or cumulative part-time contracts) and this strong flexibility makes their unemployment rate lower than that of African workers (whose contract lenght is comparable) an European workers.

Even if the great part of low-skill hiring is involve a native manager and worker, there is a not marginal proportion of hiring of immigrants endorsed by a native manager, while the association between immigrant manager and low skill worker is marginal.

Understanding the regularity of this behaviour is not a marginal issue. Is there any constraint in the choice of low skill immigrants on the side of native managers ? And what is about the evolution of the composition of the group of managers between natives and immigrants ?

The three following pictures may help in disentangling this puzzle. A unifying view that can explain this patterns take into consideration the relative aboundance of skill and unskill workers in the two groups. According to the information included into the MCVL database, since 2000 the proportion of native managers over the native population is progressively shrinking across time while the same ratio is slighly increasing in the group of low skill workers (Figure **??**).

ftbpFU3.5155in2.5849in0ptShare of managers in the native and immigrant population (Source: MCVL; Calculus: Authors).proport$_m anagersFigure$

If we turn to consider the evolution of the compostion in the group of low skill workers, the same trend is even amplified.

ftbpFU3.397in2.4915in0ptShare of native and immigrants worker in the low and middle skill group (Source MCVL; Calculus authors).composition$_l owskill_i mmigrantsFigure$

An unifying way to interpret the two trends goes in the direction of the argument put forward in the Section 1. The insertion of the immigrants in the local labor market took place at any level. It may be due to a shortage or natives for some postions or a clear substitution effect between natives and immigrants for others. Figure (**??**) endorses this hypothesis by disantangling this effect for various subgroups of the previous two categories.

ftbpFU5.9767in4.3846in0ptHiring of natives and immigrants by qualification. (Source: MCVL, 2008, Calculus: Authors).Hiringimm1.jpg

We may be even more precise concerning the country of origins of the immigrants that fill up a vacancy in Spain and the subsequent regularities. Figure (**??**) summarizes this issue:

ftbpFU4.9208in2.6809in0ptCountries of origin of the immigrant hirings (Source: MCVL, Calculus: Authors).hiring$_b y_c ountryFigure$

Hiring of Immigrants from European countries is more concentrated into the skill position. In the case of immigrants from UK the combination between skill vs less skill workers is even more important than in the group of natives. Conversely, immigrants from South America, Africa, and Asia are relatively more present in the group of the less skill workers. Once knowing the composition by nationality of the hired immigrants, we may easily disentangle the correspondent degree of association between the nationality of the managers organizing the recruiting process at firm level.

ftbpFU4.4815in2.7198in0ptComposition of hiring by country (Source: MCVL; Calculus: Authors).hiring$_c ompostion_c ountry Figure$

Figure (**??**) display the propensity in hiring by nationality of a selected group of managers (natives, or form EU15, Rest of Europe, Africa, Asian and South American countries). Excluding natives, when a manager has to fill up a low-skill position, the first choice is for immigrants from South America. This decision is very likely due to the cultural proximity and language facilities that caracterize this group of workers with respect to the remaining ones. Referring to the other groups, there is a general tendency to equalize the hiring selection among the other ethnic groups (for low skill workers) independently of the origin of the manager with the esclusion of the Asian group where the ethnic linkages between managers and low skill workers seem really be very pronounced.

Therefore, a general analysis of the empirical evidence clearly emphasizes that there exists a general tendency in favouring cultural and ethnic linkages during the recruting process in Spanish firms. Then, the purporse of the empirical analysis is to quantify the strenght of this effect.

4 Econometric results

One of objective of this study is to find to what extent social networks may have an impact in recruiting policies at firm level. Same culture, language or relationship make that probability to hiring people with ethnic similarity between managers and workers is higher. There are many explanations such as: preference among agents (Becker 1957), managers that can evaluated better some characteristics (level of education, experience, etc.) due to share them or/and network across workers.

The first exercise we run is a conditional logit estimation. Conditional logit model is intended for problems where consumers are partely made based on observable attributes of each alternative. The utility of each choice is assumed to be a linear function in choice attributes X_{ij} with a common parameter vector β.

Table 5 presents the first results for the determinants of hiring of the low skill workers. Managers ethnicity exacerbates the discrimination effects in the case of hiring policies for low

skill workers from Europe (no EU15) and South America. In the former case, it is evident that managers from the Rest of Europe displays a postive and significant probability to hire low skill of the same ethnicity, while managers from African and Asia countries apply a negative discrimination strategy. In the latter case, the ethnic ties among workers from South America makes stronger the ethnic hiring effects: the probability that South American manager hire a worker of the same ethnicity is larger than that to hire a native. Focusing on the results concerning the unemployment rate, it seems that low skill workers from no-EU15-Europe and South America are complements of natives, while African workers are rather substitute. Finally, in our estimations we also introduce the stock of immigrants (splitted into nationality) as covariates.These variables should be considerd as a further indicator to capture the potential size effect of the network (i.e. the size of the ethnic network in a firm can be a further attractive effect for hiring immigrants). Unfortunately, statistical results are not always very strong. In line with the previous disucssion, it seems that we records a clear positive size ethnic effect in the group of low skill workers from the no-EU15-Europe worker stock, while the stock of African workers produce a clear deterrent effect.

[Table 4 about here]
[Table 5 about here]

Finally, we perform a multinomial exercise in order to capture to what extend the ethnicity of the manager may influence the hiring strategy. Results presented in Table 5 emphasize that the ethnic origin of the managers turns out to be important and create an implicit discriminatory effect. Managers from EU15 display clear preferences for hiring workers from no-EU15-Europe, rather then, for instance, natives.

[TO BE COMPLETED]

5 Conclusions

This study provides some preliminary insights about the hiring policies at firm level concerning immigrants. In the most recent years, Spain experienced a huge entrance of immigrants and this entrance produced interesting effects on the structure of the local labor market. Rather than focusing on the study of the complementarity and substitutability between natives and immigrants, this analysis provides some evidence about to what extent the recruiting policies adopted for immigrants are impacted by the social networks and the changes in the qualifications of the natives. Our preliminary estimations assess that the networks effects matter for hiring policy for immigrants. The presence of an immigrant as a manager of a firm is evaluated as a positive and important factor for further hiring inside the

groups of the immigrants. However, when turning to consider the subsample of high skill immigrants, such a network effect is complemented by the relative scarcity of natives with the same qualification of immigrants. Hence, the probability to find an immigrant fulfilling a qualified position in the firm is basically associated with two effects: the possible presence of other qualified immigrants in the same firms, and the shortage of natives with the same kind of qualifications. Under a policy viewpoint, these results proposes an alternative perspective to consider the impact of immigration over the Spanish labor market. Immigrants cannot be considered just as persons hired for low skill occupations allowing natives to shift toward the highest ones. They also are present in the high skill positions because natives stop coursing graduate studies. We need to perform additional robustness check about this outcome, but, however, we could anticipate some considerations concerning the optimal reaction of natives. They cannot but thinking of putting more effort for coursing graduate and post-graduate studies either for improving their productivity and increasing their chances to get employed at the highest levels. Maybe, the current stagnation of the Spanish labor market can provide a further incentive for moving into this direction.

A second line of comments refers to the discriminatory practice often applied in the Spanish job markets. In the light of our results, a clear question to address is the potential impact in the long run of the policy adopted by the Spanish government to attract talented professional from abroad by guaranteeing a very convenient fiscal regime. The entrance of those professional, should it be seen as a limitation or a stimulus for natives for training to access to the most qualified position ?

References

[1] Amuedo-Dorantes, C., de la Rica, S. (2008): "*Complements or Substitutes? Immigrant and Native Task Specialization in Spain*", IZA dp 3488.

[2] Åslund, O, Hensvik, Nordström Skans, O. (2009): "*Seeking similarity: How immigrants and natives manage at the labor market*", CReAM Discussion Paper n. 06/09.

[3] Beker, G. (1957): "*The Economics of Discrimination*", Chicago University Press.

[4] Borjas, G. J. (2003): "The Economics Benefits from Immigration", *Journal of Economic Perspecticve,* vol. 9(2), pp. 3-22.

[5] Bratsberg, B, Raaum, O (2010): "*Immigration and wages. Evidence from Construction*", CReAM Discussion paper.

[6] Carrington, W. J, Troske, K.R. (1998): "Segregation and the Black/White Wage gap", *Journal of Labor Economics*, vol. 16(2), pp. 231-260.

[7] Dustman, Ch., Glitz, A.,Vogel, Th. (2010): "Employment, Wages and the Economic Cycle. Difference between Immigrants and Natives", *European Economic Review,* vol. 54(1), pp. 1-17.

[8] Farré, L., González, L., Ortega, F. (2010): "*Immigration, Family Responsability and the Labour Supply of Skilled native women"*, mimeo.

[9] García Pérez, J. (2008): "La muestra continua de vidas laborales: una guía de uso para el analísis de transiciones", *Revista de Economía Aplicada*, vol. XVI E(1), pp. 5-28.

[10] Goel, D., Lang, K. (2009): "*Social Ties and the Job Search of Recent Immigrants"*, NBER working paper n. 15186.

[11] K. Lang, J.Y.K. Lehmann (2010): "*Racial discrimination in the Labor Market: Theory and Empirics*", mimeo.

[12] K. Lang, M. Manove (2003): "Wage Announcements with a Continuum of Workers Types", *Annales d'Economie et Statistique*, vol. 71-72, pp. 223-244.

[13] K.Lang, M. Manove, W. Dickens (2005): "Racial discrimination in Labor Markets with Posted Wage Offers", *American Economic Review,* vol. 95(4), pp.1327 -1340.

[14] López-Mayan, C. (2010): "*Demand for Post-compulsory Education: The Choice Between Academic and Vocational Tracks",* mimeo.

[15] Peri, G., Sparber, C., (2009): "Task Specialization, Immigration and Wages", in *American Economic Review: Applied Economics,* Vol. 1(3), pp. 135-169.

A Appendix

The principal features of the labor market in Spain have been recently discussed by O. Fanjul in a document published en 'El País – Negocios" on January 23th 2001.

We may summarize them in a few points:

1. The contracts issued by a collective barging (convenios) are true legal agreements between two agents (the employer and the employee). A new firm cannot grant labor conditions to her workers that are different from those established in the convenio of the correspondent sector.

Example: in Spain, a new bank cannot decide a different open time and days for its own branches (for instance, on Sunday morning) or salary scheme of its own employees different from those are established in the national convenio of the banking sector.

2. Some major decisions at firm level cannot be taken without the approval of the local administration authorities: the authorities without taking the responsibility of the consequences of this decision.

Example: Because of a bad economic situation, a firm needs to reduce the number of employees. First, this decision needs to be discussed with the local representatives of the labor unions and, then, to get the approval of a local or national administrative authorities.

3. Before planning cuts in the number of employees, it is compulsory that the firm has already had operative losses in the previous years. It cannot make adjustments in advance.