Random or Referral hiring: when social connections matter*

JOB MARKET PAPER
Catia Nicodemo†
Rosella Nicolini

January 12, 2012

Abstract

This study investigates the existence of hiring criteria associated with the degree of social connections between skill and low-skill workers. We provide evidence to what extent managers rely on their social connections in recruiting low-skill workers rather than on random matching. As one novelty, we follow an approach for a posted wage setting that reflects the main features of the Spanish labor market. By working with the sub-samples of high and low skill workers we are able to assess that the recruitment of low-skill immigrants quite often follows a referral strategy with interesting irregularities across the ethnic groups we identify. As a common feature, referral hiring usually reckons from the ethnicity of the manager and the relative share of immigrants inside the firm and at the firm's place. Under these perspectives, our study sketches some novel insights to evaluate the future perspectives of the Spanish labor market.

Keywords: Labor market, Job qualification, Immigration and Social connections.

JEL Classification: J21, J24,J61.

*We are very grateful to A. Bisin, K.Tomas, C. Giulietti, I. García Pérez, K. Lang and G. Topa for their insightful suggestions. We thank the participants to the AIEL Conference (2010), SAE (2011) and 8th IZA Annual Migration Meeting (Washington) for useful comments. This research has been performed when C. Nicodemo was visiting Department of Economics at New York University and R. Nicolini was at Department of Economics at Boston University. We acknowledge the two departments for their hospitality. All errors are our own responsibility. Financial support from the Fundación Ramón Areces (*Ayuda Investigación 2010*) is gratefully acknowledged.

†Corresponding author: Dept Applied Economics, Universitat Autònoma de Barcelona, Edifici B- Campus UAB, 08193 Bellaterra (Barcelona). Email catia.nicodemo@uab.cat.

1 Introduction

The economic efficiency usually requires that the labor market identifies the best matching for firms and workers, but this is not always possible when firms and workers cannot costless observe all relevant aspects of the potential trading partners.

One could easily think of the hiring process as simple random process based on the selection of applicants once a vacancy is posted. However, the selection process is not so neutral. It may be that the applicants for a vacancy are not a simple random sample of job seekers; rather they can also be a sample of candidates that learn about the job availability via informal market channels. In the same wake, the selection of the candidates can be led by a manager on the base of additional personal information with the purpose to achieve the highest benefits from the hiring process. This is a typical regularity that appears quite often in the job market. According to the most recent statistics from Eurostat (2011), the percentage of Spanish people searching for a job by asking to relatives and friends is around 86%, while in Germany is around 40%.(see Figure 1).

The different hiring procedures generate interesting effects on the labour market outcomes and they are well discussed in the literature. In a survey for a sample of European countries, Bonoli and Hinrichs (2010) identify that unsolicited applications and recommendations from already employed workers are considered as a positive signal during the selection process of low-skilled workers. Oyer (2011) recalls that Montgomery (1991) established that firms can mitigate asymmetric information problems by accessing workers' social networks in making hiring decisions. A few country studies support this evidence. Exploiting Swedish data, Åslund *et alli.* (2009) assess that immigrant managers are more likely to hire low-skill immigrants (with respect to native managers) in a sample of Swedish firms, even if the group of immigrants is underrepresented in managerial positions. The same also occurs in other countries like Germany (as discussed in Dustman *et alli*, 2010) or Canada (Goel and Lang, 2009). In particular, it happens that even similar establishments in the same localities differ in their recruitment decisions depending on the origin of the manager (and this happens both in the public or private sector). This effect is widely discusses in the contribution by Giuliano *et alli* (2008). Referring to a sample of retail shops in the US, and looking at their labor force composition jointly with the turnover rate of the shop managers, they found that no-black managers (when in charge of the recruiting process of the shop) hire more white employees than black managers do. They also find that the high density of an ethnic group (like Hispanic) produce a secondary important effect: Hispanic managers hire more Hispanics and fewer white than a white manager would do.[1]

In the light of the previous results, Spain is an interesting case study for testing the importance of the referral hiring practice when different ethnic groups of workers coexist. Due to the huge flow

[1] A similar result (even if for a narrower ethnic setting) has been found in Carrington and Troske (1998). In the US market, 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.

of immigration that Spain has experimented in this last ten years the labour market composition experienced important changes.

The economic impact of immigrants in a host labour market is usually 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) assess that US census data demonstrate that immigrants specialize in occupations intensive in manual skills while natives do 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 in our opinion, also the assessment of the type of recruiting strategies adopted at firm level is extremely important to understand the position of immigrants versus natives.

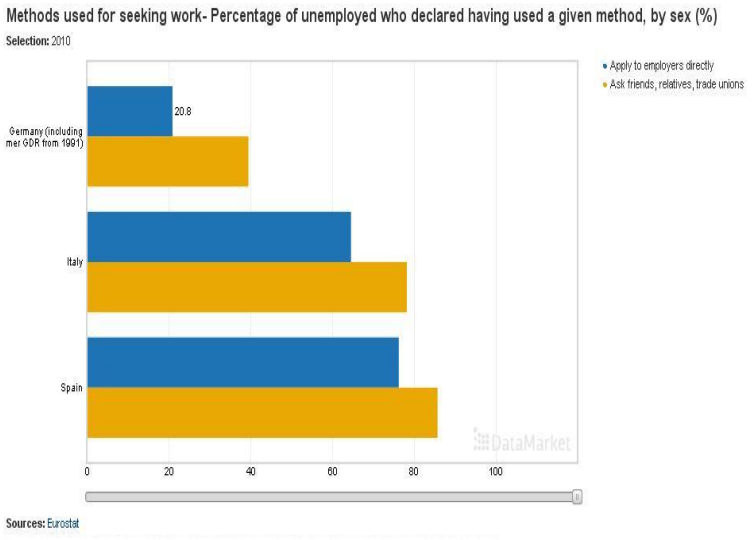
If we trusted in the substitution effect between natives and immigrants and the referral hiring were the most common practice, native or immigrants managers would guarantee a sort of labor segregation status for low-skill qualification. Recent studies documents large effect of ethnic segregation across workplaces in the US or Germany for example (see Hellerstein and Neumark , 2008 or Dustmann et all., 2009). Of course, the degree of segregation of immigrants could be smoothed by two factors: the scarcity of natives applying for such positions (namely, low skill positions) or the progressive replacement of immigrants to natives in the managerial positions that would bring with them their social connections.

To our knowledge, there is scarce literature in Spain about the importance of social connections underpinning the recruiting strategies. The main reason is the lack of reliable data. However, in 2005, the Spanish Social Security office released part of its records allowing for the flourishing of contributions in this field.

This study contributes to the current discussion on the hiring strategies in two ways. First, we aim at providing a theoretical framework for understanding which factors endorse the adoption of a referral strategy. One novelty of this contribution is the definition of a theoretical setting fitting the strong rigid features of the Spanish labor markets different from those of other studies performed up to now (for instance, Dustman et alli (2009)). Second, we perform an econometric analysis to identify the existence and importance of ethnic-social connections at the base of the referral process. We select the information at individual level included in the Spanish *Social Security records (MCVL)* for the period 2000 to 2008. Our results emphasize the evidence that social connections matter only for a few ethnic groups whose size is quite large and social ties strong. In this respect, the referral hiring may be considered as a practical way to overcome the limitations of an imperfect labor market subject to important rigidities. The interesting features is that

the canonical referral hiring we define in our empirical exercise does not identify the recruitment practice for low-skill EU15 immigrants.[2] For this group, the random hiring channel prevails. A few reasons can be put forward. On the one hand, the weak social ties often characterize this group (because of cultural and linguistic differences among its members). This effect may smooth the strength of the referral practice. On the other hand, it is also likely that the EU15 immigrants assimilate more to natives than to the other immigrant ethnicities and, then, the referral hiring channel cannot be the preferential recruiting option. Nevertheless, the wide adoption of the referral practice as a substitute to the competitive market device might yield ethnic discrimination effects in the labor market composition that could encompass limitations in the truly accessibility to open vacancies.

The remaining is organized as follows. Section 2 introduces the Spanish labour market and the data using for our analysis. Section 3 theoretical framework we would refer to in our empirical analysis. Section 4 introduces includes the econometric results. Finally, Section 5 concludes.



2 The theoretical background

Our theoretical background inspires by the literature of adverse selection in labor market. We focus on the workers who enter for the first time the job market. 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 small room for productivity to play the discriminatory role as in the pure incentive framework (see appendix A).

The information about wages disclosed by the MCVL reveals that there is not almost variance across workers in the gross wages. In Figures 1-3 we represent the distribution of the wages paid

[2]We identify as EU15 immigrants as people born in one of the country of the European Union as in 1995.

to different group of low skill workers (split into their ethnic group). These data refers to nominal wages in 2008 as in the records of the Social Security for three of the most representative sectors of activity: industry, construction and hotel. As consequence the lack of variance entails that the level wages is not informative enough about the true productivity of workers.

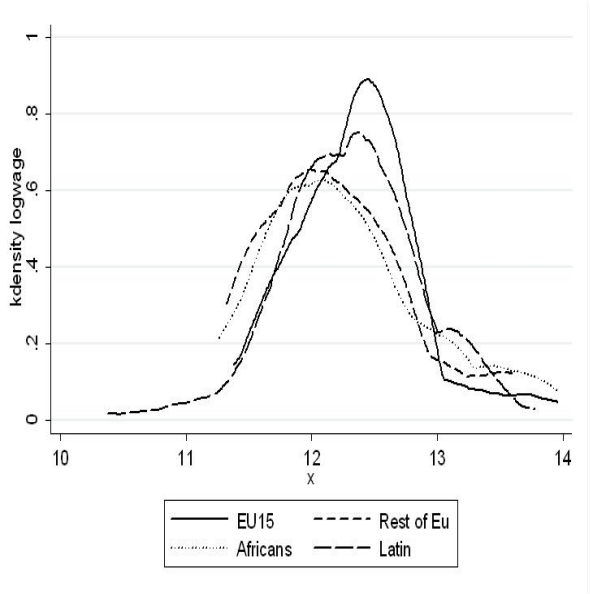


Figure 1: Distribution of nominal wages for full time low skill employees in industry sector (2008, Source MCVL)

In our setting, any vacancy is the results of a maximization process at firm level; each new vacancy would bring positive or null profits to the corresponding firm. At the moment of organizing a recruitment process for a low-skill vacancy, a manager faces two options. The former is posting a call for application advertising the vacancy. Once reviewed the applications, the manager ranks the candidates according to pre-established firm-level selection criteria and fill up the vacancy with the best available candidate. [3] The latter relies on the existence of the social network of a manager (as already studied in Dustmann *et ali* (2011), Pellizari (2010) or Patel and Vella (2007)). Here, as social network we consider the group of persons irrespective of their ethnicity or qualification having a social tie (or connection) with the manager. In this case, the manager spreads the information about the vacancy through her social connections; her contacts may keep the information or spread it by word-of-mouth to their own (social) connections. In this case the manager hires on the base of the first-come-first-served candidate.

We label the first option as a random channel recruitment, while the second one as referral. Our strategy is to formalize each of the two selection options and, finally, compare their outcomes in order to fix the conditions that make the one be statistically dominant over the other.

We limit the amount of potential strategies by assuming that a worker can apply just for one

[3]This option is particularly time and cost demanding. As discussed in Pellizari (2010), firms usually prefer to adopt this practice when recruiting for filling up high productivity positions.

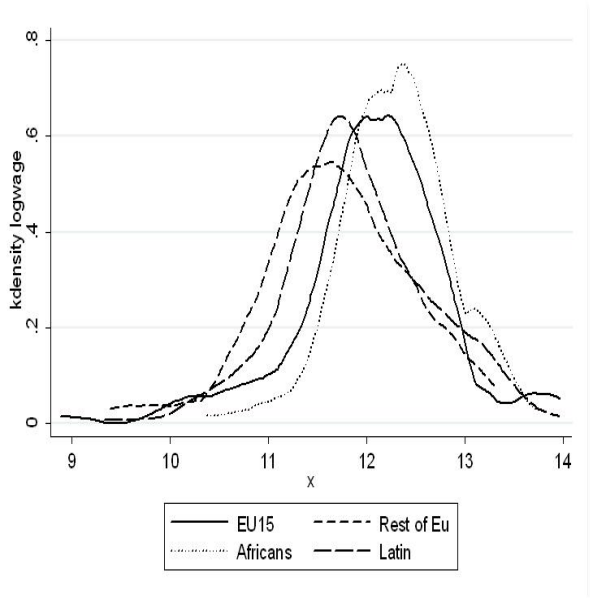


Figure 2: Distribution of nominal wages for full time low skill employees in construction sector (2008, Source MCVL)

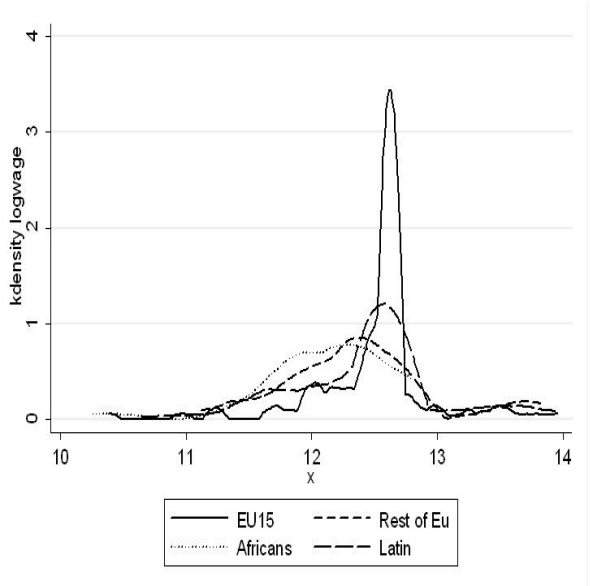


Figure 3: Distribution of nominal wages for full time low skill employees in tourist sector (2008, Source MCVL)

low-skill vacancy in one firm. The wage is set unilaterally by the employer before the worker and the employer meet. A firm usually sets a wage that just fit with a low-skill occupation (preventing skill workers to apply for) and the worker accepts it if it is larger than her reservation wage.

Our initial hypothesis considers the presence of a large and fix number of identical firms that open vacancies (at the rate of one vacancy per firm). Henceforth, we introduce a general selection criteria. We split the job candidates into two groups: the compatriots of the manager (z_L) and the rest of candidates (y_L). Each compatriots grants her status to the nationality of the manager is running the recruiting process. [4]

The total number of compatriot and the rest of the workers are Poisson-distributed with (large) mean Z_L and Y_L for the compatriots and the others respectively.

First, we concentrate on the situation in which the manager hires a low skill employee through a random recruiting process.

In the spirit of Lang et al. (2003, 2010) and Lang and Manove (2003), we begin with assuming that workers and firms meet randomly.

When opening a vacancy, the firm posts 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 someone for that position.

Let us focus on the case a manager posts a low-type job for a wage $w(> 0)$. [5]

We assume that the manager is not totally indifferent between the members of the two groups for productivity reasons: it may happen that cultural or language differences between the manager and the low-skill workers reduce the performances of these last ones. Managers care about firms' profits and they will select those they consider the most productive workers. We postulate that low-skill compatriots are expected to be more productive than the other candidates (as it happens for natives in Amudeno and de la Rica, 2011). Of course, as soon as these differences shrink the two groups may be virtually identical in productivity. Because of these initial discrepancies in productivity, a manager would prefer to hire a compatriot (if available) rather than another one for an identical fixed wage.

We define the expected number of compatriots applying for a low-skill job as

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

and that of the others is

[4] In this respect, this framework is as general as possible In the empirical part we will proceed to adapt this concept to the data at hand by referring to the nationality of the manager. In our sample, we will find either native and immigrant managers. In this sense, we will be able to clearly identify in the group of low-skill workers the sample of natives and that of four major groups of immigrants.

[5] We assume that the level of wages is as low as possible to prevent skill workers from applying for this position. In the canonical wage-posted models, the optimality condition guarantees that the salary corresponds to the expected wage.

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

Then, the probability of hiring a compatriot or another candidate would be respectively:[6]

$$P_Z(random) = \frac{1 - e^{-z_L}}{z_L}; P_Y(random) = e^{-z_L}\frac{1 - e^{-y_L}}{y_L}.$$

Another candidate would be hired just in case a compatriot does not apply for an open vacancy, because of the ex-ante ranked preferences of a manager.

Instead, if the recruiting process is run by a manager through the referral process, we need to define the type of social connections composing the manager's social network.

We model the referral hiring possibility by adapting the framework presented by Casella and Hanaki (2008). When a manager decides to run a hiring process through referrals personal connections are very important. More information about the productivity of a worker as well as other selecting features (otherwise not signalled information) are available. In our particular case, we associate the referral dimension (and hence the size of the social connections of a manager) with a measure of cultural or ethnic similarity (Giuliano et al., 2008). The rational is straightforward: it is more likely to get in touch or to share social connections with persons belonging to the same ethnic group (as in Montgomery, 1991). Let us assume that the size of the group of low qualified workers is N and it is composed by compatriots and the others. In order to be consistent with the previous notation $N = z_L + y_L$. We define as $\frac{\alpha}{N}$ (with α in $(0, 1)$) the probability that a low-skill compatriot has a connection with the manager. In the same manner $\frac{(1-\alpha)}{N}$ is the probability that other low-skill workers has a connection with the same manager. In the spirit of Montgomery (1991), α is the parameter which labels the "inbreeding bias". If $\alpha > \frac{1}{2}$, this means that the manger is more likely to be connected with a compatriot than with another potential candidate.

For a quite large population (i.e. for large N), the number of ties connecting the managers with low skill natives and immigrants is described by a Poisson distribution. As in Casella and Hanaki (2008), when considering a manager with several connections to each group of low-skill workers, the probability $\widehat{p_Z}$ that a compatriot low-skill worker connected to the manager receives an offer (when the managers decides to recruit through a referral process) is

$$\widehat{p_Z} = 1 - e^{-1}.$$

As an interesting result, the probability $\widehat{p_Z}$ is totally independent of the composition of the pool of social connections (driven by the size of the parameter α). It just relies on the features of the Poisson distribution. This result yields the probability ($\widehat{p_Y}$) that another low-skill worker receives an offer under the previous conditions is identical to $\widehat{p_Z}$.

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

However, connection matters. Therefore, on both manager and employee sides, the probability that a manager working through a referral process will hire a compatriot low-skill worker (conditional on having at least one connection) is α (and similarly $(1-\alpha)$ for the others). As proved in Casella and Hanaki (2008), at the equilibrium, the firm profit maximization problem entails that the expected profits from referral hiring must coincide with the probability of hiring a worker whose value (a combination of his productivity and future referrals) should be at least identical to the posted wage [7]. Under this condition the probability of hiring a low-skill compatriot through referral - $P_Z(referral)$- turns out to be:

$$P_Z(referral) = \alpha(1 - e^{-1}); \tag{1}$$

and, similarly, for the other low-skill workers the probability is:

$$P_Y(referral) = (1-\alpha)(1 - e^{-1}). \tag{2}$$

Once established the hiring probabilities through referrals, the next step is to consider which conditions determine that the probability to be recruited through referrals is higher than the random one (namely, without any connection between the manager and the low-skill worker).

In order to address this issue, we split the treatment of the problem into two parts: the former considering the case of recruiting process for natives and the latter for immigrants.

When comparing the random and referred probability in the case of natives (both manager and low skill worker), we have to compare the two probabilities:

$$P_Z(referral) = \alpha(1 - e^{-1}), P_Z(random) = \frac{1 - e^{-z_L}}{z_L}.$$

On the one hand, the referral probability is basically a constant whose value is increasing in the proportion of compatriots in the low-skill population. On the other hand, the random probability is always decreasing in the total size of the compatriot-low-skill population, since:

$$\frac{dP_Z(random)}{dz_L} = \frac{e^{-z_L}(1-z_L) - 1}{(z_L)^2} < 0,$$

$$\text{for } e^{-z_L}(1-z_L) - 1 < 0; \frac{1-z_L}{e^{z_L}} < 1.$$

By the monotonicity of the random probability, it is necessary a minimum number of low-skill compatriots in order to make the referral probability higher than the random. This implies that

[7] The original contribution by Casella and Hamaki (2008) considers the referral wage (as reserve wage identical for natives and immigrants). The wage structure is such that the expected value of the referral is slightly larger than the proposed wage. In our case, the referral wage has to be identical to the posted wage, because no (official) labour market exists outside of this equilibrium. As for, in our framework, we are assuming when a firm opens a vacancy, this choice is profit maximizing.

there is the need to have a minimum size of the network to make the referral structure effective. However, the minimum size of this group decreases with respect to the increase of the proportion of this group in the total population of low-skill workers. For any given number of the social connection α, as far as the number of low-skill compatriots increases, the referral probability is more and more dominant over the random one.

As second step, we focus on the comparison between the random and referral probabilities when a manager hire another low-skill candidate that is not a compatriot. In this case we have to compare the following two probabilities:

$$P_Y(referral) = (1-\alpha)(1-e^{-1}); P_Y(random) = e^{-z_L}\frac{1-e^{-y_L}}{y_L}.$$

As one could expect, the probability to hire an immigrant through referrals is increasing with respect of the size of those workers in the low skill population (namely, decreasing in the share of the low-skill compatriots). The same happens for the random probability, as one easily checks:

$$\frac{dP_Y(random)}{dz_L} = -e^{-z_L}\frac{1-e^{-y_L}}{y_L} < 0.$$

Instead, in the case of the random probability, it is not so clear the effect of changes in the size of their group in the low-skill population. Formally,

$$\frac{dP_Y(random)}{dy_L} = \frac{e^{-z_L}}{y_L}\left[-\frac{1-e^{-y_L}}{y_L} + e^{-y_L}\right] < 0.$$

As before, the sign of the previous expression is always negative (that implies that the random probability to hire another low-skill candidate is decreasing with respect to the number of the low-skill compatriots). However, in this case, the central issue is that the comparison of the two probabilities (i.e. random and referral) relies both on the size of the two groups. For low level of α (i.e low probability of social connections with compatriots) the referral probability (for the members of the other group) is always higher than the random one. Instead, for high values of α (i.e. high probability of social connections with compatriots) the referral probability is higher than the random probability when the number of compatriots is less than that of the others, and this happens if the other group achieve a minimum size threshold.

We may sum up the previous results and formulate some testable predictions:

- Hiring through referrals is effective if and only if the connections involve a minimum number of individuals.
- he probability to select a candidate belonging to one of the two groups is proportional tTo the relative size of this group in the total population.
- Referral hiring for one group is effective if and only if the members of this group are relatively more abundant than the other one in the job searching population.

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.

3 Spanish labour market and our sample data

In the last decade, Spain hosted a progressively increasing number of immigrants from different origins. As well described in Amudeno-Dorantes and de la Rica (2011) the entrance of immigrants in Spain has been impressive. At the end of 2008 immigrants represented 10% of the population: a unique record. A few studies (Amudendo-Dorantes and de la Rica, 2011 or Farré *et al.*, 2011) find evidence that immigrants are not perfect substitutes for natives, in the national labor market. This huge immigrant wave shifted the (most skilled) natives towards no-manual skill positions, leaving the most manual tasks to immigrants. In particular, the entrance of more manual skill immigrants allowed native-women for searching for a job according to her educational degrees and outsourcing the conventional home-tasks (Farré et *all.*, 2011).

In the light of this results, one would expect a massive shift of natives versus high skill positions and a strong enrollment of native-young cohorts in education degree to reinforce this complementary patterns. Instead, data at hand show a different pattern: the educational performance of Spanish citizens in the 2000s (as in López-Mayan, 2010, for instance) is puzzling and 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 demand for young educated employees. On the other hand we may also experiencing a conjunctural effect. The position of the business cycle makes less interesting (in terms of opportunity costs) investing in education and the Spanish wage structure in 2006 discourage post-compulsory attendance (López-Mayan, 2010). This second effect yields a shortage of qualified skill workers in the near future. By joining the shortage effect of skill natives with the sustained opening of vacancies (due to the economic expansion cycle), there is room for immigrants to access to qualified position and, then, through a network effect, pushing the hiring of immigrants for low-skill positions.

In this perspective, the identification of potential hiring strategies based on social connections in the current Spanish market would suggests some insights about its evolution in the next future. The existence of a strong influence of social- ethnic connections concerning hiring tendencies inside each group (natives or immigrants, respectively) and a progressive replacement of natives in managerial positions by immigrants would eventually drive out natives from the low skill positions. Given the relative abundance of low skill natives in the work force composition, this movement could yield either to a massive re-qualification effort (among natives) to be able to access to high skill positions or the consolidation of a high unemployment rate among the native group. In addition,

if this recruiting patterns reinforce in time, there could be also a secondary effects against a truly assimilation of immigrants in the host labor market and, therefore, maybe leaving some discrimination problems consolidate.

The data used for this study come from the register of Social Security system for active people in the labour market. This database provides information about all the historical relationships of any individual within the Social Security System (in terms of work and unemployment benefits). We dispose data about the type of contract (part-time or full time), the sector of activity, the qualification (professional category) and the monthly earnings that every month an individual must pay to the Social Security System, as well as the time at which an individual entered and/or left the job market. Moreover, it contains information about the general personal information including the level of education for each individual. In addition the MCVL delivers details about the establishment (location, number of workers, industry and sector) in which a worker is hired. This second group of data makes it possible to track the professional career of any employee over time. By arranging the available information we may easily detect the labor force composition of our sample of firms and, in particular, we may extract information about the qualified and no-qualified employees. We adopt a definition of "qualified" employee for any employee who brings an academic degree and he/she is hired at the highest professional categories. All the other group of workers are defined as no-qualified or low-skill workers. The temporal dimension of the MCVL panel allows us to track the entry of a manager in a firm and the corresponding recruitment for low-skill employers organized by him/her after that moment. In order to be able to select the sample of firms in which the manager is really the principal authority in the management of human resources, we restrict our analysis to a significative sample of active firms (in 2008) with less than 100 employee and with at least 4 workers. Then, we operate a selection of new hires for the each establishment from 1999 to 2008 using the wave of 2008 of MCVL, given that the big immigration flows started from 2000 onward. Matching workers and establishments is difficult because the MCVL database has been created to control just for employees, but the *id* firm number is a special string code that makes possible to retrieve part of the missing information. Once obtained such a sample, we select the number of individuals (legal immigrants) that kept a position in the same Spanish firm for at least one year. In this way, we track the evolution of the recruiting policy adopted by the firm since their entrance onward. Hereforth, we define as immigrant an individual born in a foreign country, while a native is a worker born in Spain. [8]

In our sample, our group of managers organized recruiting processes for 144133 individuals (at low qualified positions) in the period 2000-2008. As we can depict from Figure 4, low-skill-immigrant distribution shapes the same pattern that high-skill workers.

In Figure 4 we represent the hiring process across years for high and low skill immigrants and

[8] Although the immigration in Spain is quite heterogeneous, we can cluster all the major nationalities in three big groups: Latin, Europeans and Africans.

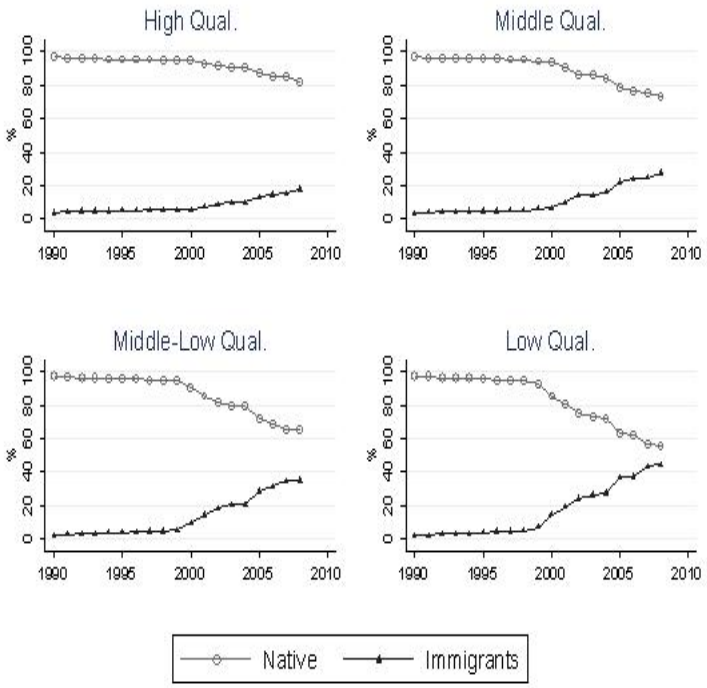


Figure 4: Hiring of natives and immigrants by qualification (Source: MCVL 2008, Calculus: authors)

natives. The hiring of low skill immigrants increased quite a lot after 2000 and that of natives dropped. In the high skill sample the recruiting trend between natives and immigrants is the opposite.

Nevertheless, data provide somewhat evidence about a potential ethnic association between the high and low skill recruitment.

Notice that native managers are more prone to hire native-low-skill workers (Table1), but they are not totally insensitive to hire immigrants. Instead, immigrant-managers seems being more native oriented in their recruiting strategies.

Finally, Figure (5) portraits the propensity in hiring by nationality of managers and low skill

Table 1: **Sample description**

Middle and Low-skill	**Manager**	
	Natives	**Immigrants**
Natives	79.72%	4.13%
	114,899	5,958
Immigrants	14.78%	1.37%
	21,304	1,972

Source: MCVL 2008, Calculus: Authors

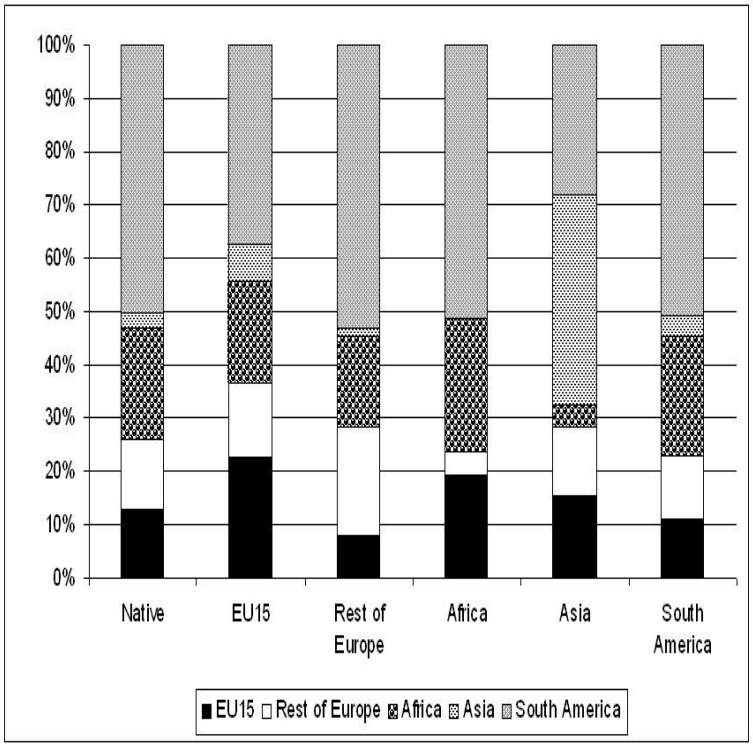


Figure 5: Composition of hiring by country (Source: MCVL 2008, Calculus: authors)

workers. 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 mostly due to the cultural proximity and language proficiency that characterize this group of workers with respect to the remaining ones.

Two possible explanations come to the mind for understanding these figures:

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. There could be that the speed-up of this reform was driven by the brisk increase of qualified vacancies. In the same moment, the easy job opportunities gave a strong incentive to natives 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 Latin people for increasing the participation of the last group in the Spanish labor market at the highest degree. It is a reasonable thinking of the kind of expected tasks for persons filling up 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. For instance, this would explain the preference for Latin managers rather than European ones.

In Table 2 we report the descriptive of our sample by ethnicity, and skills. The total percentage of high skill immigrants holding a high education degree (secondary plus graduate) replicates the patterns identified for natives, while most of low skills (immigrants and natives) have primary and secondary education. Concerning the distribution across sectors of activities, there is always a slight dominance of natives in filling up vacancies requiring a high 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). [9]

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 exclusion 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 recruiting process in Spanish firms. Then, the purpose of the empirical analysis is to quantify the strength of this effect.

4 Econometric results

In the light of the empirical evidence we previously discussed, it seems that ethnic connections (as a proxy of the social networks) may matter in recruiting strategies. 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. Oyer (2011) stated that Casella and Hanaki (2008) are the seeds of a theory of firm-level hiring strategy, but the empirical literature about firm-level choices in presence of employees social networks is still in *its infancy*. In this study we perform a few econometric exercises to target such a scope by working with data at firm level.

[Table 3 about here]

The aim of this section is twofold. On the base of our theoretical framework, on the one hand we are targeting to identify the potential dominance of a referral recruitment strategy over the other, and, on the other hand, the features at firm level that potentially may support this dominance. In particular, in our empirical exercise, we are disentangling the different ethnic groups inside the whole sample of immigrants and focus on their specific distinguishing features that shape their entry in the Spanish labor market.

[9] Also notice that part of the high skill immigrants brings a Spanish citizenship even if they were born abroad.

Our scope is understanding weather the selection of a low-skill immigrant for a vacancy is due to the true preferences for the professional profile of this candidate (rather than a native, for instance).Besides, we are also interested in disentangling the potential racial preferences that may drive the recruitment of a specific member of an ethic group rather than other candidates. According to the data at hand, we identify four different ethnic groups of candidates that we label as:

- African: all immigrants born in one of the African country,
- Latin: all immigrants born in one of the Latin American country,
- EU15: all immigrants born in one of the 15 countries of the European Union as established by official treaties in 1995.
- Rest of Europe: all immigrants born in one of the European countries that was not a member of the European Union in 1995.

Our empirical strategy begins with an assessment of the variables influencing the results of the recruitment processes of low-skill workers conditional on a few characteristics of the firms opening vacancies. In particular, we are focusing of the nationality of the manager running the process. The rational is to disentangle the potential strength of ethnic affinities between employer and employee at the moment to select a candidate. In this manner, we are identifying the referral option with the ethnic dimension assuming that immigrants belonging to the same ethnicity, working (or looking for a job) in the same industry, in the same region and at particular moment in time are likely to be connected by informal contacts and, therefore, they are more suitable to adopt a referral hiring choice, if available. The rational of this behavior is quite intuitive: in absence of effective market selection mechanisms, cultural ties are a sort of alternative device to cope with the hiring risk entailed by asymmetric information.

However, there could also exist some cross-cultural connections among individuals that share the same condition (namely immigrants versus natives) in a specific firm that is active in an industry, in a specific place at a given time, independently of their ethnic origin. This may be the case of the group of immigrants inside a firm that may propose suitable candidates to a manager for a vacancy. If the manager followed the suggestions proposed by this group of workers and hired without passing through the official market, the hiring process would take place by means of indirect connections of the manager. Again, the amount of the direct connections magnifies the proportion of the indirect connections and, therefore, leads to a most likely referral recruiting choice. In our empirical exercise, we identify this last feature (i.e. the potential impact of indirect connection of a manager) by the share of immigrants already working in a firm.

In the light of the previous assessment, the first step of our analysis is exactly to identify the potential existence of ethnic ties (and therefore, direct connections) encompassing referral hiring.

To this end, we are performing a multinomial logit estimation. Wooldridge (2006) assesses that in the multinomial logit models the conditioning variables do not change across alternatives; the covariates are specifics to individuals and not to alternatives. Therefore this model can be applied when the characteristics of the alternatives are unimportant or not available. In our case, we want to calculate the probability than an employee i hired in sector j at time t belongs to race group k. This can be represented as follows:

$$\Pr(race_{ijt=k}) = \frac{\exp(MangEth^k_{jt}\beta + X^k_{it}\gamma + \alpha^k_j)}{\sum_{b=1}^{k}(\exp(MangEth^b_{jt}\beta + X^k_{it}\gamma + \alpha^b_j))}.$$

In running these estimations, we are interested in detecting any potential ethnic connections in hiring strategy as predicted in Montgomery (1991). As a consequence, somewhat race pattern (embedding the existence of a social network at firm level) may appears. One of the novelties of this exercise is aiming at identifying the potential existence of social networks at firm level, however, without having a direct measure (or indicator) of their existence. Results presented in Table 3 emphasize that the ethnic origin of the managers turns out to be important and create an implicit discriminatory effect. Taken the group of African workers as a baseline, the multinomial logit assess the potential preference in hiring candidates of other groups with respect of African candidates. The statistical significant association are quite evident: native managers always prefer to recruit native candidates, and the same association holds for managers whose nationality belongs to one of the EU15 countries. Instead, manager whose ethnicity is that of one of Latin American countries or the Rest of EU countries do not have a clear preference to hire low-skill workers of their ethnicity, rather then African candidates. Instead, the size of the share of immigrants already active in the same firm always entails a positive attitude for filling up vacancies with immigrants, but the strength of this preference for each ethnic group is never superior to that for natives.

Thus, this first exercise enlightens an important evidence: ethnic association holds for a few groups, but it is not exclusive. The existence of cross-ethnic preferences (Latin versus natives against African, for instance) puts in evidence that either the recruiting tendencies follow a specific process at firm level and several other effects masks the statistical significance of ethnic preferences or the relative small size of an ethnic group in a place (matching the required qualifications for a vacancy) yields the hiring of other candidates irrespective of their ethnicity.

These two last statements require further investigations. It is important to analyze the possible determinants that shape the recruitment strategy. On the base of the prediction of our theoretical framework, we run a linear probability model. Finally, we run also some robustness checks by adding fixed effects at firm and establishment level to the linear probit estimations.

In our case, we want to calculate the probability that a low-skill employee i which has been recruited in sector j at time t belongs to a specific ethnicity k(namely, Latin, African etc....).

$$\Pr(H_{ijtk=1}) = \phi(MangEth_{jt}\beta + X_{it}\gamma + \alpha_j)$$

In accordance with the theoretical prediction, first we account for the ethnic characteristic of the manager running the recruitment process and, for sake of simplicity, we simply distinguish between natives or immigrants. Then, we focus either on the relative size of the ethnic group (with respect to the whole size of the group of the low skill workers) in a specific place and on relative size of the immigrant group at firm level. The manager variable and the share of hired immigrants at firm level are expected to capture to what extent a firm is prone to hire immigrants. Besides, the presence of the stock of immigrants already active in the firm also capture the potential existence of cross cultural ties that can push the manager to follow a referral recruiting process for filling up a vacancy. Instead, the relative size of ethnic group in the active population at very sharp territorial unit (province) allows for capturing the relative abundance of immigrants in a specific area as a further device pulling their selection in the recruiting process by a potential ethnic network. When facing a large ethnic group, it could happen that the hiring of its member is pushed by their connections and information spread easily as word-of-mouth. Finally, in all this set of estimations, we control for regional, time and industry dummies as well as of a set of their interaction in order to take into account the possible changes in the local environment, [10] that could affect the dynamics of the recruitment process.

In the empirical estimations, first we focus on the hiring for low-skill vacancies in the whole group of immigrants, and then we focus on the individual ethnicity. Once again, we point out that all this estimations are run exploiting all information at firm level.

[Table 4 about here]

In Table 4, we summarize the set of estimation we performed for the whole group of immigrants. As one may expect the manager dummy and the share of immigrants at firm level are alternative (statistical) measures for identifying the propensity to hiring immigrants at firm level. In case of an immigrant manager organizing a recruitment process the relative abundance of all ethic groups in a place is positive associated with the probability to select an immigrants. Instead, in the case of accounting also for the stock of immigrants at firm level only the relative size of immigrants from EU15 countries or Latin countries is positive and statistical significant associated with the probability to hire a low-skill immigrant. In this respect, the probability of hiring an immigrant displays a clear and discriminatory association when the stock of immigrants at firm level matters, i.e. only the availability of immigrants from EU15 and Latin countries matters. Instead, when considering only the nationality of the manager the stock of all immigrants in the local active population matters.

[10] This could be the case of particular phases of the business cycles or specific expansion period of an industry as it happened for the construction sector.

[Table 5 about here]

[Table 6 about here]

[Table 7 about here]

[Table 8 about here]

In Tables 5-8 we apply the same empirical strategy to evaluate the probability of hiring an immigrant belonging to one of the four different ethnicities we are able to identify in our sample. As general tendency, there is a clear association between the probability of hiring a low-skill immigrant with the relative size of her ethnic group in her place of residence, except for EU15 low-skill workers. Therefore, for three out of four selection processes the potential ethnic network matters. We identify an interesting selective path: for the case of African, EU15 and the Rest of Europe the presence of immigrants (in the same place) belonging to other ethnic groups is detrimental for the recruitment of their members. This can hold when thinking of considering low-skill occupations with a high degree of substitutability among candidates. Instead, in the case of Latin candidates this *competition* effect is present just for the African ethnic group but not for the other groups. Latin people may achieve a higher degree of assimilation (for instance, for linguistic or cultural similarities) with the native population that reflects in a sort of job complementarity with the other two foreign groups. Furthermore, the Latin and African group distinguish for another interesting feature. If for European low-skill employees the stock of immigrants at firm level as well as the type of manager matter for increasing their probability to be hired, the same does not hold in the case of the other two groups. In the probability to hire a Latin or an African low-skill employee, the immigrant manager may represent an obstacle for their hiring when associated to the size of immigrants present in the firm. We could think of an implicit upper bound limit (at firm level) for the presence of these two groups of workers that may be potentially explained by their degree of substitutability with respect to the natives.

[Table 9 about here]

[Table 10 about here]

[Table 11 about here]

[Table 12 about here]

In order to check the robustness of the previous results, we run further linear probit models with fixed effects at firm and establishment level. In the previous discussion, we often claimed that part of the results may be driven by the recruitment criteria established at firm level. [11] Our idea is to include those effects in order to test the robustness of the statistical determinants yielding the hiring of an immigrant. In the database we built, we are able to identify either the recruitment led

[11] In the theoretical setting we identify this effect with the ranking of preferences established by each manager.

by each establishment and by each firm. We run again the previous estimations adding up both type of effect knowing that the former are more stringent than the latter.[12]

Table 9-12 present the results of this second range of estimations. On the whole, these last estimations confirm the previous results. Thus, by taking into account the specificity of the recruitment process either at firm and establishment level, we are able to replicate the statistical significant hiring factors as in the previous set of estimations. In addition, controlling for recruitment criteria at firm level renders the impact of the stock of immigrant and the manager type in the hiring selection for African and Latin low-skill employee as that for the other ethnic groups. This result confirms our hypothesis that the previous results were associated with some specific conditions at firm level. Instead, the adoption of fixed effects allow to better qualify the determinants for the hiring of EU15 and Rest of Europe low-skill workers. When accounting for fixed effects, the determinants of recruitment of employees from the Rest of Europe follows the same pattern of Latin or African workers. Instead, we encounter both a reinforced absence of referral effect and a very weak effect of manager type and firm immigrant stock in their hiring for the EU15 workers.

There is a clear cut between the recruitment strategies of low-skill EU15 workers versus the others ethincities. The EU15 get hired independently of their potential network connections. A few reasons can put forward to qualify better this result. In the light of our theoretical background, we can interpret this result as an outcome of a typical random process where the hiring is mostly driven by the productivity of the workers according to which the manager builds his ranking of preferences. The EU15 immigrants enjoy working conditions similar to those of natives and also their level of education is comparable to that of natives (because of the European free movement settlements). This evidence assimilates more this group of immigrants to natives than to the others whose professional and education curricula are not always comparable to the natives' ones. Besides, it is also important to consider that the group of EU15 is very heterogeneous. For instance, the members do not speak a same language and this makes the potential cultural and linguistic ties (the base of our network idea) weaker than those for Latin, for instance. Once more, in absence of this potential effect of the referral condition the hiring of EU15 candidates needs to be based just on their curricula. This last statement endorses one outcome of our theoretical framework: the dominance of the random-style hiring appears when the network connections are particularly weak or the size of the ethnic group is relatively small. And, again, the dominance of the random hiring implies that contracting is mostly based on the productivity-ranking factors.

[12] As establishment we consider a branch of a firm in a specific location. Each branch can share the same recruitment criteria established by the firm it belongs to, but it can also add further condition mostly due to its specific location. Of course, our main assumption is that these general criteria are invariant across time in our sample.

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. This analysis delivers some evidence about to what extent the recruiting policies adopted for low skill workers immigrants are impacted by the existence of social connections. Our preliminary estimations assess that the networks effects matter for hiring policy.

We identify that the relative size of the groups of immigrants at firm level is a key factor for driving the hiring of other immigrants. However, inside each ethnic group the social ties are not always identical.

Our empirical strategy emphasized that the probability of hiring of low-skill employee is principally driven by referral strategy in the case of African, Latin and Rest of Europe workers. Instead, contracting EU15 workers is mostly associated with a random selection that privileges the curricula of the candidates. In term of efficiency (at firm level) which strategy should be preferred ? In a sticky wage system, the challenge of the labor market is to recover the efficiency lost with the dissociation of productivity from wages. In this respect the random practice partially overrides this problem and recruiters hire the best applicant for the vacancy in terms of curricula. However, this system is particularly costly and time consuming. Instead, the referral process is less time consuming but it does not always guarantee to contact the best candidates. The optimal referral situation would be the case of high densely connected networks that allowed to get in touch with an extremely large number of applicants (comparable to a random strategy) and, then, choose according to the best qualification.

A second line of comments refers more generally to the Spanish market composition and its perspective in the long run. In the light of our results, it is evident that there exists a significant hiring association between immigrant managers and immigrant low-skill employees. In perspective terms, the progressively reduction of the stock of qualified native workers (to be hired as skill workers) may also involve a reduction in the probability of hiring low-skill natives, if skill positions are filled up by immigrants. To this extend, this contribution joins the conclusion of other studies (like Amuedo-Dorantes and de la Rica, 2011) on the importance for natives to distinguish from immigrants in their qualification. In addition to the standard complementarity versus substitution effect that justify this strategy, there is also the indirect effect previously detected that may drive the low-skill natives out of the market if no (or very few) skill natives occupy managerial positions.

A Appendix: Spanish labor institutions

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 2011).

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 that agreement of the correspondent sector. For 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 agreement 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.

References

[1] Amuedo-Dorantes, C., de la Rica, S. (2011): "Complements or Substitutes? Immigrant and Native Task Specialization in Spain", *Journal of Labor Economics,* vol.18(5), pp. 697-707.

[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] Bonoli, G. and Hinrichs, K. (2010): "*Statistical Discrimination and Employers' Recruitment Practices for Low-Skilled Workers",* REC-WP 10/2010.

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

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

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

[8] Casella, A. and Hanaki, N. (2008): "Information channel in labor markets: On the resilence of referral hirings", *Journal of Economic Behaviour and Organization,* vol. 66, pp. 492-513.

[9] 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.

[10] Farré, L., González, L., Ortega, F. (2011): "Immigration, Family Responsability and the Labour Supply of Skilled native women", *B.E. Journal Economic Analysis and Policy (contributions),* vol.11(1), pp. 1-46.

[11] 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.

[12] Giuliano, L., Levine, D. and Leonard, J. (2009): "Manager Race and the Race of New Hires*",* *Journal of Labor Economics,* vol. 27(4), pp. 589-631.

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

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

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

[16] 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.

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

[18] Montgomery, J.D. (1991): "Social Network and labor-market outcomes: toward an economic analysis", *American Economic Review,* vol.81, pp. 1408-1418.

[19] Oyer, P. and Schaefer, S. (2011): "Personnel Economics: Hiring and Incentives", in Card, D. and Ashenfelter, O. (Ed): "*Handbook of Labor Economics",* vol. 4B, pp. 1769-1823, Elsevier.

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

[21] Wooldridge, J. (2006):"*Introductory Econometrics. A Modern Approach"*, 3rd edition, Thomson South-Western.

Table 2: **Descriptive statistics for natives and immigrants**

	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.	0.10	0.07	0.39	0.30
Nationality				
EU15		2.21		3.11
Rest of Europe		3.24		0.95
Latin		12.37		4.67
Africans		4.55		0.43
Asian		0.79		0.24
Other		0.20		0.34
Spanish citizenship		0.35		0.50
Firm size				
< 10	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	0.97	0.98		
Medium skill	0.03	0.02	0.33	0.39
High skill			0.67	0.61
Industry				
Agriculture	0.00	0.01	0.01	0.00
Industry	0.12	0.08	0.14	0.10
Construction	0.11	0.13	0.13	0.09
Retail	0.09	0.07	0.11	0.12
Hotels	0.18	0.25	0.08	0.19
Transport	0.04	0.04	0.03	0.04
Finance	0.25	0.32	0.15	0.14
Civil Servant	0.08	0.02	0.13	0.06
Education	0.02	0.01	0.09	0.10
Health	0.05	0.04	0.08	0.10
Others	0.06	0.04	0.06	0.07
Number of Observations	261445	27843	34696	2086

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

Table 3: **Multinomial logit**

	Low-skill hiring by race			
	Native	**Latin**	**EU15**	**Rest of EU**
Manager(ref. cat.: African)				
Native	0.009***	-0.004	-0.001	-0.001
	0.0020	0.002	0.001	0.002
EU15	0.009*	0.002	0.005***	-0.003***
	0.005	0.002	0.002	0.001
Rest of Europe	-0.0004	-0.002	0.016**	-0.006***
	0.0061	0.003	0.006	0.001
Latin	0.017***	-0.003***	-0.001	-0.001
	0.006	0.002	0.001	0.002
Share imm. at firm level	0.185***	0.081***	0.045***	0.069***
	0.003	0.002	0.001	0.002
Obs.	165896			
R2	0.2597			

Dependent variable: The hiring probability by race (base: Africans). Significance levels:*** 1%; ** 5%; * 10%. We control for regions, years and industry dummies. Robust standard errors

Table 4: **Linear Probability model**

	Immigrants				
	M1	**M2**	**M3**	**M4**	**M5**
Manager Immigrants	0.103***	0.085***	0.003	0.001	0.082***
	0.004	0.003	0.003	0.003	0.003
Share of immig.in the firm			0.992***	0.997***	
			0.004	0.004	
Share of African resident				-0.024	0.871***
				0.082	0.098
Share of EU15 resident				0.980***	0.986***
				0.252	0.304
Share of Rest of Europe resident				-0.088	0.993***
				0.17	0.205
Share of Latin resident				0.464***	0.766***
				0.091	0.11
Constant	0.113***	0.019***	-0.024**	-0.034***	0.058***
	0.001	0.004	0.012	0.013	0.015
R-Square	**0.0058**	**0.0853**	**0.3532**	**0.3563**	**0.0644**
0bs					
	166746	**166735**	**166736**	**153218**	**153218**

Dependent variable: The hiring probability of an immigrant. Significance levels:*** 1%; ** 5%; * 10%. M1 includes any variables control. M2 includes: regions, years dummies, M3 includes M2 plus industry dummies, M4 includes M3 plus the interaction between region-year, M5 include M4 plus the interactions industry-year and industry-region-year dummies. Robust standard errors.

Table 5: **Linear Probability model**

	Latin				
	M1	**M2**	**M3**	**M4**	**M5**
Manager Immigrants	0.039***	0.027***	-0.012***	-0.014***	0.025***
	0.003	0.002	0.002	0.002	0.003
Share of imm.at firm level			0.502***	0.508***	
			0.003	0.003	
Share of resident immigrants by province					
Africans				-0.801***	-0.334***
				0.068	0.073
EU15				0.900***	0.958***
				0.211	0.227
Rest of Europe				0.356**	0.903***
				0.142	0.153
Latin				0.493***	0.642***
				0.076	0.082
Constant	0.057***	0	-0.032***	-0.063***	-0.022*
	0.001	0.003	0.01	0.011	0.012
R-Square	**0.0016**	**0.0222**	**0.1778**	**0.1804**	**0.0445**
0bs	**178478**	**165896**	**165834**	**152415**	**152415**

Dependent variable: The hiring probability of an immigrant. Significance levels:*** 1%; ** 5%; * 10%. M1 includes any variables control. M2 includes: regions, years dummies, M3 includes M2 plus industry dummies, M4 includes M3 plus the interaction between region-year, M5 include M4 plus the interactions industry-year and industry-region-year dummies. Robust standard errors.

Table 6: **Linear Probability model**

	EU15				
	M1	**M2**	**M3**	**M4**	**M5**
Manager Immigrants	0.025***	0.022***	0.010***	0.011***	0.021***
	0.002	0.001	0.001	0.001	0.002
Share of imm. at firm level			0.138***	0.137***	
			0.002	0.002	
Share of resident immigrants by province					
Africans				-0.232***	-0.107**
				0.042	0.043
EU15				0.104	0.362***
				0.131	0.133
Rest of Europe				-0.188**	-0.041
				0.088	0.09
Latin				-0.159***	-0.119**
				0.047	0.048
Constant	0.019***	0.009***	-0.002	0	0.011*
	0	0.002	0.006	0.007	0.007
R-Square	**0.0018**	**0.006**	**0.0393**	**0.0391**	**0.0091**
0bs	**178478**	**165896**	**165834**	**152415**	**152415**

Dependent variable: The hiring probability of an immigrant. Significance levels:*** 1%; ** 5%; * 10%. M1 includes any variables control. M2 includes: regions, years dummies, M3 includes M2 plus industry dummies, M4 includes M3 plus the interaction between region-year, M5 include M4 plus the interactions industry-year and industry-region-year dummies. Robust standard errors.

Table 7: **Linear Probability model**

Rest of Europe					
	M1	**M2**	**M3**	**M4**	**M5**
Manager Immigrants	0.024***	0.022***	0.013***	0.014***	0.023***
	0.002	0.001	0.001	0.001	0.001
Share of imm. at firm level			0.121***	0.123***	
			0.002	0.002	
Share of resident immigrants by province					
Africans				-0.061	0.052
				0.037	0.038
EU15				-0.382***	-0.15
				0.115	0.116
Rest of Europe				0.397***	0.529***
				0.077	0.079
Latin				0.065	0.101**
				0.041	0.042
Constant	0.013***	-0.002	0.012**	0.021***	0.031***
	0.00	0.001	0.005	0.006	0.006
R-Square	**0.0023**	**0.0106**	**0.0428**	**0.0437**	**0.0124**
0bs					
	178478	**165896**	**165834**	**152415**	**152415**

Dependent variable: The hiring probability of an immigrant. Significance levels:*** 1%; ** 5%; * 10%. M1 includes any variables control. M2 includes: regions, years dummies, M3 includes M2 plus industry dummies, M4 includes M3 plus the interaction between region-year, M5 include M4 plus the interactions industry-year and industry-region-year dummies. Robust standard errors.

Table 8: **Linear Probability model**

Africans					
	M1	**M2**	**M3**	**M4**	**M5**
Manager Immigrants	0.009***	0.008***	-0.009***	-0.010***	0.007***
	0.002	0.002	0.001	0.002	0.002
Share of imm. at firm level			0.217***	0.216***	
			0.002	0.002	
Share of resident immigrants by province					
Africans				0.907***	0.906***
				0.044	0.045
EU15				-0.291**	0.117
				0.136	0.14
Rest of Europe				-0.607***	-0.375***
				0.092	0.095
Latin				0.003	0.066
				0.049	0.051
Constant	0.021***	0.011***	-0.008	-0.009	0.009
	0.001	0.002	0.006	0.007	0.007
R-Square	**0.0002**	**0.0079**	**0.0837**	**0.090**	**0.0242**
0bs					
	178478	**165896**	**165834**	**152415**	**152415**

Dependent variable: The hiring probability of an immigrant. Significance levels:*** 1%; ** 5%; * 10%. M1 includes any variables control. M2 includes: regions, years dummies, M3 includes M2 plus industry dummies, M4 includes M3 plus the interaction between region-year, M5 include M4 plus the interactions industry-year and industry-region-year dummies. Robust standard errors.

Table 9: **Robustness check**

	Latin			
	M1	**M2**	**M3**	**M4**
	Establishment Fixed Effects		**Firm Fixed Effects**	
Manager Immigrant	0.010*	0.011*	0,007	0,003
	0,005	0,005	0,005	0,005
Share of imm. in the firm		0.486***		0.602***
		0,156		0,011
Share of resident immigrants by province				
African	-0.686***	-0.686***	-0.171*	-0.532***
	0,169	0,169	0,097	0,096
EU15	0.975***	0.987***	0.914***	0.907***
	0,329	0,329	0,302	0,299
Rest of Europe	0.997***	0.991***	0.926***	0.609***
	0,222	0,222	0,202	0,2
Latin	0.808***	0.805***	0.901***	0.817***
	0,107	0,107	0,1	0,099
Constant	0,416	0,295	0,023	-0.072*
	2,891	2,892	0,039	0,039
Obs	152415	152415	152415	152415
Sigmau	0,220	0,181	0,176	0,142
Sigmae	0,217	0,217	0,220	0,217
Rho	0,507	0,409	0,390	0,299

Dependent variable: The hiring probability of an immigrant. Significance levels:*** 1%; ** 5%; * 10%. Included controls: regions, years and industry dummies. We also include these interaction terms: region–year, industry–year, region–industry–year dummies. Robust standard errors

Table 10: **Robustness check**

	EU15			
	M1	**M2**	**M3**	**M4**
	Establishment Fixed Effects		**Firm Fixed Effects**	
Manager Immigrant	0.005*	0.006*	0.005*	0.004
	0.003	0.003	0.003	0.003
Share of imm. in the firm		0.229**		0.104***
		0.093		0.006
Share of resident immigrants by province				0.006
African	0.035	0.034	0.036	-0.027
	0.102	0.102	0.058	0.058
EU15	0.146	0.152	0.119	0.083
	0.198	0.198	0.18	0.18
Rest of Europe	-0.250*	-0.253*	0.014	-0.04
	0.133	0.133	0.121	0.121
Latin	0.024	0.023	-0.152**	-0.167***
	0.064	0.064	0.06	0.06
Constant	2.573	2.516	0.028	0.012
	1.735	1.735	0.023	0.023
Obs	152415	152415	152415	152415
Sigmau	0.227	0.222	0.111	0.103
Sigmae	0.130	0.130	0.131	0.131
Rho	0.752	0.744	0.416	0.384

Dependent variable: The hiring probability of an immigrant. Significance levels:*** 1%; ** 5%; * 10%. Included controls: regions, years and industry dummies. We also include these interaction terms: region–year, industry–year, region–industry–year dummies. Robust standard errors

Table 11: **Robustness check**

Rest of Europe				
	M1	**M2**	**M3**	**M4**
	Establishment Fixed Effects		**Firm Fixed Effects**	
Manager Immigrant	0.000	0.000	-0.002	-0.002
	0.003	0.003	0.002	0.002
Share of imm. in the firm		-0.064		0.051***
		0.082		0.006
Share of resident immigrants by province				
African	0.03	0.03	-0.016	-0.047
	0.089	0.089	0.051	0.051
EU15	-0.073	-0.075	-0.193	-0.211
	0.173	0.173	0.157	0.157
Rest of Europe	0.314***	0.315***	0.380***	0.353***
	0.117	0.117	0.105	0.105
Latin	-0.096*	-0.096*	-0.028	-0.035
	0.056	0.056	0.052	0.052
Constant	11.549***	11.565***	-0.006	-0.014
	1.522	1.522	0.02	0.021
Obs	152415	152415	152415	152415
Sigmau	0.886	0.887	0.104	0.100
Sigmae	0.114	0.114	0.114	0.114
Rho	0.984	0.984	0.452	0.432

Dependent variable: The hiring probability of an immigrant. Significance levels:*** 1%; ** 5%; * 10%. Included controls: regions, years and industry dummies. We also include these interaction terms: region–year, industry–year, region–industry–year dummies. Robust standard errors

Table 12: **Robustness check**

Africans				
	M1	**M2**	**M3**	**M4**
	Establishment Fixed Effects		**Firm Fixed Effects**	
Manager Immigrant	-0.0010	-0.0010	0.0000	-0.0010
	0.003	0.003	0.003	0.003
Share of imm. in the firm		0.214**		0.178***
		0.094		0.006
Share of resident immigrants by province				
African	0.714***	0.713***	0.791***	0.683***
	0.102	0.102	0.058	0.058
EU15	0.307	0.312	0.028	-0.033
	0.198	0.198	0.181	0.181
Rest of Europe	-0.039	-0.042	-0.023	-0.117
	0.134	0.134	0.121	0.121
Latin	0.113*	0.112*	0.151**	0.126**
	0.065	0.065	0.06	0.06
Constant	3.452**	3.399*	0.002	-0.026
	1.741	1.741	0.024	0.024
Obs	152415	152415	152415	152415
Sigmau	0.316	0.309	0.111	0.103
Sigmae	0.131	0.131	0.132	0.131
Rho	0.854	0.848	0.416	0.379

Dependent variable: The hiring probability of an immigrant. Significance levels:*** 1%; ** 5%; * 10%. Included controls: regions, years and industry dummies. We also include these interaction terms: region–year, industry–year, region–industry–year dummies. Robust standard errors