Immigration, Housing Discrimination and Employment

Pellizzari, Michele; Boeri, Tito; De Philippis, Marta; Patacchini, Eleonora

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Tito Boeri† Marta De Philippis‡ Eleonora Patacchini§
Michele Pellizzari¶

This version: May, 2013
(First Version: July, 2010)

Abstract

We use a new dataset on eight Italian cities and a novel identification strategy to analyze the relationship between the employment status of migrants and the percentage of migrants living nearby. Our data contain information at the very local level (i.e. the residential block) and are representative of the population of both legal and illegal migrants. Identification is based on an instrumental variable strategy that exploits the physical characteristics of the local buildings as a source of exogenous variation in the incidence of migrants in each location. We find evidence that migrants who reside in areas with a high concentration of non-Italians are less likely to be employed compared to similar migrants who reside in more mixed areas. This penalty is higher if the migrants leaving nearby are illegal and it is not mitigated by living close to migrants who are from own's ethnic group nor who are more proficient in the Italian language. The employment prospects of natives do not appear to be affected by the vicinity of migrants.

JEL Codes: J15,J61,R23.
Keywords: Immigrant residential density, housing discrimination, ethnic networks

*We thank the European Bank for Reconstruction and Development (EBRD) for financing this project, Francesca Pissarides for her contribution to the survey design and Carlo Erminero & Co. for their professional services. We are grateful to Massimo Baldini and Marta Federici for having given us access to microdata of their experiment on discrimination in the Italian housing market. We benefited from the valuable comments of Francesco Fasani, Gianmarco Ottaviano, Giovanni Peri, Fabiano Schivardi, Stuart Rosenthal, John Yinger, and seminar participants at Bocconi University. Gaetano Basso, Vittorio Bassi, Barbara Biasi, Andrea Catania, Hristo Dachev, Rachele Poggi and Alessandro Vecchiato provided skillful research assistance. The usual disclaimer applies. *Corresponding author:* Tito Boeri, Department of Economics, Bocconi University, via Roentgen 1, 20136 Milan - Italy; phone: +39 02 5836 3323; fax: +39 02 5836 3309; email: tito.boeri@unibocconi.it

†IGIER-Bocconi University, CEPR, fRDB and IZA

‡LSE and fRDB

§Sapienza University of Rome, EIEF, IZA and CEPR

¶University of Geneva, IGIER, fRDB and IZA

1 Introduction

In the ten years predating the Great Recession Europe received twice as many immigrants (relative to the resident population) than the US and 4 to 5 times as many as Japan (OECD, 2009). The main motivation of these flows was finding a job. Family reunification and asylum seeking were fairly marginal. The main destination of migrants was Southern Europe, where the stock of foreign born increased by some 5 million in Spain and 3 million in Italy within a decade. New comers were not distributed uniformly across the board: they often found residence where other persons of the same nationality or ethnic group were already living, increasing the residential concentration of migrants in urban areas. How did these residential location patterns affect the economic integration of migrants, notably their probability to find a job? Is there scope for policies reducing residential concentration of migrants in specific urban areas?

While in the US, research related to the effects of residential concentration of migrants on their economic and social integration is long standing (Borjas, 1995; Card and Rothstein, 2007; Cutler and Glaeser, 1997; Cutler, Glaeser, and Vigdor, 1999; Ross, 1998), in Europe, notably in Southern Europe, there is a very thin scientific literature on this issue, despite the highly controversial public debate. This paucity of studies for Europe is mainly due to a lack of detailed data on ethnic minorities and migrants, especially at the city level (see Bisin, Patacchini, Verdier, and Zenou (2011)). In this context, a key issue is the relatively large share of illegal migrants in Southern Europe, who are not represented by surveys drawing from population registers.

In this paper we contribute to filling this gap by estimating the causal effect of the local concentration of immigrants on their employment prospects using a new and unique survey conducted in 2009 in eight cities located in the North of Italy. Italy is a particularly interesting case to study, as migrants appear to be highly concentrated in their residential locations. Based on official data from the 2001 census, the coefficient of variation of the number of resident migrants across census tracts is twice as large as that of natives (1.793 against 0.966 for natives). Another important feature of migration to Italy is that, due to very tight quotas on residence permits, there is a large fraction of illegal migrants. The focus on a limited group of eight cities in Northern Italy allowed us to design the sampling frame very carefully, representing also the illegal migrants, and to use a comprehensive questionnaire for the interviews.

Our study is novel along several dimensions.

First, thanks to a particular sampling frame which randomly draws blocks from the continuum of map locations within cities (see Section 3.1), our survey covers both legal and illegal migrants. Around 20% of migrants in our data are illegally resident in the country and they are far from being a random subgroup of the entire population. Compared to the legally resident, illegal migrants appear to be on average men, younger, slightly less educated, less proficient with the Italian language and more likely to rely on informal networks to look for employment.

Second, the data are available at a very detailed level of geographical disaggregation, namely we can identify the exact city block where each interviewed person resides. Hence, we can define residential concentration more accurately than in most previous studies, i.e. at the level of the individual block.

Third, by merging our survey with data from the national census, we are able to obtain information about various physical attributes of the buildings in each block, which are valid instruments for migrants' residential concentration in Italy. This is the main identification strategy used in this paper to uncover the causal effect of migrant concentration on labor market outcomes. As part of our analysis, we also develop a methodological contribution that extends to non-linear models the procedure of Chernozhukov and Hansen (2008) to construct weak-instrument robust confidence intervals from reduced-form estimates. Moreover, the fine geographical disaggregation of our data allows identifying the same parameter using an alternative approach based on the comparison of blocks within narrowly defined groups, as in Bayer, Ross, and Topa (2008).

Our main results show that migrants who reside in areas with a high concentration of non-Italians are less likely to be employed compared to similar migrants who reside in areas with a lower concentration of migrants. The magnitude of these effects is non negligible: in our preferred specification, a 1 percentage point increase in the share of immigrants residing in the block reduces the probability of being employed by 2 percentage points or about 2.3% over the average.

While our data do not allow us to evaluate which particular mechanism is behind the negative effects of residential concentration on the employment prospects of migrants, we can nevertheless assess the nature of the externalities associated with large shares of migrants living nearby. We find that residential concentration is not associated with a higher probability of finding jobs through friends. This suggests that network effects in job search may be fairly limited. Moreover, we find that a large share of illegal, as opposed to legal, migrants in the block strengthens the negative effects on employment, which is only minimally reduced by a higher proficiency in Italian of neighboring migrants.

The plan of the paper is as follows. Section 2.1 discusses the theoretical foundation for a relationship between residential proximity of individuals from the same ethnic group and the probability of finding a job, and reviews the empirical evidence. Our data are described in Section 3.1. Section 4 outlines the identification strategy, whereas Section 5 is devoted to presenting our empirical results. Finally, Section 6 briefly characterizes the normative implications of our results and concludes.

2 Theoretical mechanisms and existing evidence

In this section we briefly survey both the theoretical and the empirical literature related to our work. The purpose of this review is twofold. First, we want to describe the theoretical mechanisms that may justify the existence of a causal link between the geographical incidence of migrants and their employment. Second, we want to document the variety of empirical strategies that have been used to address the difficult identification problems of this literature.

Partly because of the large differences in the econometric methodologies, the empirical findings are mixed and particularly scant for Europe, notably in Southern Europe, where illegal migration is pervasive.

In such a context, the contribution of this paper is especially important: we develop a new identification strategy (Section 4), we compare it with those adopted by other prominent papers (Section 5.2) and we analyze a country of Southern Europe using data that also cover the population of illegal immigrants (see Section 3.1).

2.1 Theoretical mechanisms

In this section, we review the theoretical mechanisms that may explain why living in neighborhoods with a high concentration of migrants may affect their labor market outcomes. Several theories have been proposed, pointing to either positive or negative effects. The latter are generally attributed to the fact that the neighborhoods are seen as *ghettos*, spatially and socially separated from the majority society. Positive effects, on the other hand, are normally associated with the idea that migrant neighborhoods can be *launching pads*, helping the newcomers to establish themselves in the majority society.

The *ghettos* hypothesis is long-standing in the literature. The underlying mechanism operates either on the labour supply side or via the demand of employers.

On the supply side, commuting and information frictions associated with the distance of ghettos from major centres of employment reduce the effectiveness (Ihlanfeldt, 1997; Wasmer and Zenou, 2002), the intensity (Patacchini and Zenou, 2006; Smith and Zenou, 2003), and the spatial horizon (Brueckner and Zenou, 2003; Coulson, Laing, and Wang, 2001; Gautier and Zenou, 2010) of job search.

Social interactions may also be at work.[1] Ethnic minorities are over-represented among the unemployed, hence they have fewer connections to employed workers making it more difficult to access information about jobs (Hellerstein, Neumark, and McInerney, 2008). Also, infrequent interactions with natives reduce incentives to acquire host-country specific human capital (Chiswick, 1991; Chiswick and Miller, 1995; Lazear, 1999). Social distance and phys-

[1]See the excellent literature reviews by Ioannides and Loury (2004) and Ioannides (2012) (Chap. 5).

ical distance are self-reinforcing in this context, because migrants living far from business centers rely mainly on their strong ties, who are more likely to be unemployed, rather than on their weak ties, who are known to be the main source of connections to jobs (Zenou, 2013).[2] Limited access to local services, such as child care facilities, also places individuals in migrant neighborhoods at a disadvantage (Musterd and Andersson, 2005).

On the demand side, employers may discriminate against residentially segregated workers because of the stigma or prejudice associated with their residential location (Boccard and Zenou, 2000). This procedure, often labelled *redlining*, can encompass both prejudices against social or racial groups and statistical discrimination. Distant workers may also have relatively low productivity due to the long commuting, especially where the transportation system is unreliable and particularly in jobs which involve long breaks during the day (such as waiter/waitress). Firms may then choose not to hire workers residing beyond a certain distance from their locations (Wilson, 1997; Zenou, 2002). Finally, employers may also discriminate against ghetto residents to satisfy the prejudices of their local customers (Borjas and Bronars, 1989).

A positive association between large shares of resident migrants and their employment is predicted by the literature on the *cumulative causation* of migration flows (Massey, 1990; Massey and Zenteno, 1999; Massey, Arango, Hugo, Kouaouci, Pellegrino, and Taylor, 1998; Massey and Espinosa, 1997; Walker and Hannan, 1989). This theory postulates that each act of migration creates social capital among those to whom the migrant is related, inducing new people to migrate and, thus, creating a network that can be useful in job search (Ioannides and Loury, 2004; Pellizzari, 2010).

This mechanism is likely to be particularly strong within ethnic minorities, whose members often concentrate in specific jobs (Damm, 2009; Edin, Fredriksson, and Aaslund, 2003; Loury, 1977; Patacchini and Zenou, 2012). In these theories, ethnic social networks mainly play the role of facilitating the transmission of information (Phelps, 1972) and, by doing so, they help newcomers to settle down in the receiving country (Bonacich and Light, 1988; Portes, 1998; Waldinger, 1996). Ethnic niches also often provide a refuge for immigrants who are discriminated against in the primary labour market (Li, 1998) and immigrant entrepreneurs may greatly benefit through reduced risk and costs of hiring members of their same groups (Bach and Portes, 1985; Bailey and Waldinger, 1991; Newman, 1999; Wang, 2004). Additionally, ethnic social networks may play a role in disseminating information about welfare eligibility, thus increasing take-up rates among migrants (Bertrand, Luttmer, and Mullainathan, 2000; Pellizzari, 2013). Finally, ethnic networks shape the norms of individual co-ethnic members, potentially affecting their labour market outcomes through, for instance, peer group pressure

[2]According to Granovetter (1973, 1974, 1983), *weak ties* are acquaintances who are not necessarily connected with one another by family or friendship links.

(Granovetter, 1985), an effect which is likely to be more important when newcomers are more skilled and there is more human capital in the co-ethnic community (Borjas, 1995; Cutler and Glaeser, 1997; Damm, 2009; Edin et al., 2003; Kahanec, 2006).

2.2 Empirical studies

The early empirical literature on the effects of residential concentration on the employment prospects of migrants treats residential location as exogenous and documents a strong negative effect of residential segregation on labor market outcomes (Borjas, 1987; Chiswick and Miller, 2005; Kahanec, 2006). In particular, the correlation between the employment of ethnic minorities and their physical distance from major business centers, according to the *spatial mismatch hypothesis* have been extensively investigated (Ihlanfeldt and Sjoquist, 1998; Ihlanfeldt, 1991; Kain, 1968; Yves, 2008).

However, residential location is obviously endogenous and any causal inference made in this literature is questionable. Self-selection and unobserved heterogeneity, rather than distance to jobs, may explain the association of lower employment and higher residential concentration among migrants and ethnic minorities more generally. Causality might actually run from employment to job access, as better labor market outcomes of workers in some neighborhoods may attract firms into the area (Ihlanfeldt, 1991). As noted by Ihlanfeldt (1992), if the simultaneity between employment and residential location is ignored, the estimated effect of job access on employment will likely be biased toward zero.

Two main strategies have been pursued to deal with these endogeneity problems, in particular to those related to endogenous sorting into neighborhoods, one based on observational studies and one using experimental (or quasi experimental) variation.

2.2.1 Observational studies

A relatively large set of observational studies address the problem of sorting by exploiting cross-metropolitan variation in the incidence of migrants and assuming that sorting across metropolitan areas is orthogonal to the outcome under consideration (Bertrand et al., 2000; Card and Rothstein, 2007; Cutler and Glaeser, 1997; Evans, Oates, and Shwab, 1992; Gabriel and Rosenthal, 1999; Ross, 1998; Ross and Zenou, 2008; Weinberg, 2000, 2004). The common finding of these studies is a negative employment effect of residential concentration.

Another approach consists in analysing young workers residing with their parents, who are assumed to have chosen their place of residence for their children (Borjas, 1995; Raphael, 1998). These studies also find a negative link between the incidence of migrants in one's location of residence and their employment. However, if parents and children share similar unobservable traits and/or parents decide where to reside considering the employment prospects of their children, the youth approach becomes invalid.

A different identification strategy is based on instrumental variables and uses lagged immigrant density to instrument its current level. The key identification assumption in this approach is the orthogonality between the factors that influenced immigrants' settlements in the past and in the present, apart from their effect through the current presence of immigrants. Such a strategy has been extensively used in the US literature (Altonji and Card, 1991; Conley and Topa, 1999; Falcon, 2007; Falcon and Melendez, 2001; Massey and Zenteno, 1999; Mouw, 2002; Munshi, 2003; Walker and Hannan, 1989). Patacchini and Zenou (2012) used this identification strategy on data for the UK they show a positive employment effect of ethnic population density. This is one of the very few studies in Europe. Some evidence on the role of ethnic networks in finding a job can be found in Frijters, Shields, and Price (2005) and Battu, Seaman, and Zenou (2011), although these studies are not explicitly focused on residential concentration.

Bayer et al. (2008) use an alternative approach. They draw on data from the US Census, disaggregated at the level of the city block and city blocks are grouped into small sets of adjacent areas. This enables them to condition on block-group fixed effects in their regression analysis to isolate block-level variation in neighbor attributes. Their identifying (untestable) assumption is the absence of correlation in unobservables across blocks within block groups. They find evidence of significant social interactions operating at the block level: residing in the same versus nearby blocks increases the probability of working for the same employer by over 33 percent. Their results also indicate that this referral effect is stronger when individuals are similar in socio-demographic characteristics and when at least one individual is well attached to the labor market.

2.2.2 Experimental (and quasi-experimental) studies

Edin et al. (2003) and Damm (2009) make use of natural experiments in Sweden and Denmark, respectively. In both countries the residential choices of migrants were limited by governmental policies that either explicitly randomized (conditional on a set of observables) or were arguably exogenous to labour market conditions.

Edin et al. (2003) document immigrant earning gains of about 13% following a standard deviation increase in local ethnic group size. Damm (2009) finds a similar effect for earnings (about 18%), while the effect on employment is negative for high educated individuals, and virtually zero for the low educated.[3]

[3] Recently, Beckers and Borghans (2011) exploit a similar natural experiment in the Netherlands and find similar, although stronger, results.

While the use of random assignment across municipalities is attractive, these studies are not without shortcomings. These include small sample sizes, the large margin of error in the definition of the treated population and the use of municipalities as the geographical unit of interest.[4]

In the US, some papers were inspired by the two major programmes of residential mobility: the *Gautreaux* programme, implemented in Chicago (1976-1990), and the *Moving to Opportunity programme* (MTO), implemented in five major cities (Baltimore, Boston, Chicago, Los Angeles and New York) between 1994 and 1999.[5] Assessing the employment effects of the *Gautreaux* programme, Harris and Rosenbaum (2001) finds higher employment but no difference in wages or hours worked for those who moved to the suburbs compared with those who moved to the central city. Mendenhall, DeLuca, and Duncan (2006) study the effect of the programme on low income black females and find no difference between movers to suburbs and movers to the central city. Katz, Kling, and Liebman (2001) find no effect of MTO on either employment or earnings.

Finally, Holzer, Quigley, and Raphael (2003) uses exogenous variation in job access generated by the unanticipated opening of a new transit line to control for sorting across neighborhoods and he finds that employment effects are positive and greatest for those residing nearest to the origin of the new transit road.

3 Data and descriptive evidence

3.1 Data

Our analysis is based on data from a new survey of immigrants, which was carried out between October and November 2009 in eight cities in Northern Italy: Alessandria, Brescia, Bologna, Lucca, Milano, Prato, Rimini and Verona. The cities were chosen non-randomly to represent agglomerations of different sizes (large, medium-sized and small) while at the same time guaranteeing a good degree of representativeness of the entire population of the North of Italy, where more than 60% of the non-Italian residents are located.

Table A.1 in the Appendix reports some key characteristics of these cities, comparing them to the averages in the country and showing that they offer a good representation of the population of the North of Italy.

The sampling procedure of our survey was designed with the intent to reach particularly hard-to-trace segments of the population, namely immigrants, both legal and illegal. Migrants

[4]Conley and Topa (1999) and Bayer et al. (2008) show that the relevant neighbors are those in the close vicinity.

[5]The *Gautreaux* programme targeted Black families residing in poor neighbourhoods and handed them rental vouchers to move to predominantly white or racially mixed areas. The MTO programme was inspired by the *Gautreaux* programme but the target was inner-city low income families with children living in public housing.

are grouped into three macro regions of origin and the survey guarantees representative results only within these three subpopulations: European new member states (NMS)[6], Western Balkan countries (WBS)[7] and all other countries of origin[8].

The sampling strategy consists of three main steps: in the first stage, we sample neighborhoods separately in each of the eight cities and then, in the second stage, we select one block of buildings in each of the sampled neighborhoods where, in the final stage, the individuals to be interviewed are randomly chosen.

The neighborhoods are selected with sampling probabilities that are proportional to the share of legal migrants resident in the area, as measured by the official population registers. Then, a purposely designed algorithm randomly selects one point on the official map of each sampled neighborhood and the blocks that are closest to such points are included in the survey.[9] In order to increase sample size additional blocks are selected based on a proximity criterion. Namely, we also include in the survey blocks that are adjacent to one (or more) of the randomly selected blocks where the share of dwellings occupied by immigrant households is higher than a fixed threshold.[10]

In each selected block a census of residential units is carried out on the basis of a combination of conversations with the buildings' janitors and short door-to-door visits. The census provides a list of apartments for each of the four groups (NMS, WBS, other non-Italians and Italians). It is used to randomly select 4 households for each of the above population groups. One adult (older than 18 years old) in each household is randomly chosen for the interview. Hence, a maximum of 16 persons are eventually interviewed in each block. However, in most blocks there are fewer that 16 interviews because there were fewer than 4 persons in some of the population groups.[11]

Table 1 summarizes the sampling procedure. Each city is divided into 3 districts: central, mid-central and peripheral. The first three columns of the table indicate for each city and district the number of sampled neighborhoods, which, ignoring the blocks selected with the proximity criterion, is equivalent to the number of blocks. The fourth column simply sums over the first three and reports the total number of sampled neighborhoods. The average number of

[6]Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic and Slovenia.

[7]Albania, Bosnia, Croatia, Macedonia, Kosovo, Montenegro and Serbia.

[8]The focus on EU New Member States and the Western Balkan countries was imposed by the European Bank for Reconstruction and Development (EBRD), the sponsor of the study.

[9]The website http://v.controul.com/app/ shows exactly which blocks were chosen in each neighborhood. Blocks are defined as portions of urban surface that are built-up and continuous, i.e. not interrupted by areas for traffic circulation or allocated for public use (e.g. parks).

[10]Since the randomly selected blocks that satisfy the threshold criterion are usually adjacent to several other blocks, only the one adjacent block with the highest incidence of immigrants is selected.

[11]Non-response bias is very low: interviewers are asked to visit the selected households several times and at different times of the day. In case the selected individual refuses to answer or is unreachable, a replacement unit is drawn from a reserve list.

interviews/observations per neighborhood is shown in column 5. In columns 4 and 5 we also show in parentheses the total number of neighborhoods in the city (column 4) and the average population in the neighborhoods (column 5), so as to give an indication of the coverage of our sample.[12]

[insert Table 1 here]

The census of the residential units in each block is a particularly precious source of information. Official population registers from the city councils only consider legal immigrants, whereas our census includes both legal and illegal residents, living, either permanently and temporarily, in the considered blocks.

Although the survey includes both migrants and natives, for this study we only consider the subsample of migrants.[13] Interviewees are asked questions on individual and family characteristics, reasons behind migration, living and work conditions, cultural integration and compliance with immigration laws. Especially for the questions about legal status, the interviewers were very carefully instructed to insist on the fact that the survey was carried out exclusively for research purposes, that the data would remain fully anonymous and that none of the institutions involved in the organization of the survey were in any way connected with the immigration authorities, the fiscal administration, the police or the Ministry of Internal Affairs (which is the institution that issues work and residence permits).

We code as illegal migrants those who declare not to have a permit of stay or refuse to answer the question on legal status and those who declare not to have access to the Italian health system or not to have the required documents to go back to their home country (definition 1). In all cities, undocumented migrants represent a sizable proportion of total migration: from 12% in Bologna to over 29% in Brescia. Since around 6% of such individuals are from EU countries of recent access (e.g. Bulgaria and Romania) and can get the Italian permit of stay with fewer restrictions, we also consider a more restrictive definition (definition 2) that replicates the first one but excludes all immigrants from New Member States from the pool of illegal.[14]

3.2 Descriptive statistics

Given the peculiar sampling structure of our study, we start by comparing our data with other surveys that might be used to conduct studies of migration, namely the official Labour Force Surveys (LFS) and a survey of migrants carried out by the institute *Iniziative e Studi sulla*

[12]Notice that sampled blocks are much smaller than sampled neighborhoods and have, on average, a population of 208 residential units.

[13]Some information on natives will be used in Table 10.

[14]We also consider two alternative definitions that only use information on permits of stay and results are almost identical.

Multietnicità (ISMU), which is relatively popular in Italy (Dustmann, Fasani, and Speciale, 2010).

[insert Table 2 here]

While the LFS data only capture legal migrants, being sampled from the population registers, the ISMU survey also includes illegal migrants but its sampling frame is radically different from ours (Cesareo and Blangiardo, 2009). In particular, the ISMU survey was carried out between October 2008 and February 2009 in 32 cities all over Italy. Immigrants were interviewed in places where they usually meet or go to seek assistance, such as language schools, immigrant assistance centers and trade unions. The advantage of this sampling method is that it makes it much easier to reach illegal immigrants, thus allowing for larger sample sizes.[15] However, such an advantage comes at the cost of representativeness, as migrants who are likely to be found in the places covered by the ISMU survey might be very different from the rest.

By construction, migrants are over-represented in our data compared to the LFS, both overall and for each of the subgroups that we consider (NMS, WBS and others), which are equally represented (by construction).[16] Also, we find slightly more illegal migrants compared to ISMU, although the difference is minor. Female migrants are under-represented in our data compared to both the LFS and ISMU, while the education distribution is remarkably similar. Our interviewees are also more likely to be in employment, a result that is due for the most part to the presence of illegal residents, who are necessarily employed in the shadow sector.

We now focus on our data and present in Table 3 a description of the main variables used in our empirical exercise of Section 5.

[insert Table 3 here]

On average, migrants are younger than natives, with an average age of about 37 years old, which compares to about 43 for Italians. Moreover, the incidence of females is much lower than among natives (46% against 52%). Immigrants into Italy do not appear to be a particularly low-skilled group; more than half of them have at least a degree of secondary education. About 20 percent of our surveyed immigrants are illegal, according to our preferred definition (definition 1). In terms of labor market performance, roughly 87% are employed, which compares to a much lower employment rate for natives (about 50% in Northern Italy. See Table A.1). Almost 60 percent of migrants obtained their jobs through friends.

We measure migrant population density with the percentage of non-Italian households living in the considered blocks. On average there are about 17% of non-Italian households in the

[15]The ISMU survey consists of 12,000 interviews to both legal and illegal immigrants.

[16]The ISMU survey covers only immigrants.

surveyed blocks, with a standard deviation of more than 10 percentage points. We can also define segregation more restrictively as the percentage of households from one's same area in the block. The mean of this variable in our sample is just below 6%, with a standard deviation of 6 percentage points.

Moreover, Table 3 reports summary statistics for the estimated share of legal and illegal immigrants in the block. We construct these proxies by multiplying the share on non-Italians in the block, from our census, by the share of illegal and legal immigrants actually interviewed in the block.[17]

Finally, the bottom panel of the Table reports some summary statistics at the block level. We obtain house prices per square meter from the *Agenzia del territorio*, a government agency that records housing transactions and complements them with surveys of real estate agents to construct indexes of housing costs. Time-to-travel to the city center is computed by combining information on the central address of the block and the center of the city, which given the strong historical heritage of all the eight cities in our survey (as most cities in Italy) is very easy to identify.[18] We then use the online websites of the local transportation authorities to compute the time (in minutes) necessary to travel to the center by public transport.

Finally, we include some variables obtained by merging our survey with the auxiliary database of census tracts from the 2001 official census of the Italian population. Beside aggregate population variables, such database also contains a large set of descriptive characteristics of the buildings in the tract and it is the source used to construct our instrument in Section 4.[19] In Table 3 we show the share of commercial buildings in the block as a proxy for the presence of jobs in the neighborhood.[20]

In order to get a first glance at the pattern of immigrant density in our data, Table 4 reports a selected set of statistics separately for immigrants living in areas characterized by high- and low- densities of migrants, defined as blocks where the percentage of non-Italians lies in the top and bottom 25% of the observed distribution.[21] Columns 1 and 2 report the mean and the standard deviation of some immigrant characteristics in high and low density neighborhoods, respectively. Columns 3 and 4 show the difference between the first two columns, unconditional and conditional on city and district dummies, respectively.[22] Interestingly, the differences are minimal. The only few statistically significant differences show that immigrants residing in

[17]Definition 1 of illegal migrants is used for this calculation.

[18]The historical centers of the ancient roman or medieval cities still remain today the most important commercial areas in the majority of Italian cities and certainly in those that are covered in our survey.

[19]The link with our survey is based on the actual addresses of the residential units occupied by the individuals in our sample

[20]Unfortunately, the data do not include commercial square meters in the block.

[21]According to the distribution of immigrants in the considered blocks, the threshold level for the high-density neighborhoods (top 25% of the distribution) is 25.5% of foreign households and that for low-density (bottom 25%) is 7.5% of foreign households.

[22]Estimates are produced by OLS.

areas with higher migrant population density arrived in Italy more recently and are slightly older. This pattern is not related to availability of subsidized rents, as migrants typically have access to social housing after a 15 to 20 years waiting list.[23] Most notably, we do not find strong evidence indicating that more educated immigrants sort into less segregated areas.

[insert Table 4 here]

One of the most interesting features of our data is the possibility to identify illegal immigrants. Throughout our analysis we will use many alternative measures of immigrant density, including the distinction between the share of illegal or legal immigrants in the block. Table 5 provides some precious information on how legal and illegal immigrants differ. This will be useful in interpreting our results. Each cell reports the unconditional or conditional (on city and district dummies) difference between the means of the variable indicated in the first column of the table across the samples of legal and illegal immigrants. All estimates are produced by OLS.

[insert Table 5 here]

Compared to the legally resident, illegal migrants appear to be on average men, younger, slightly less educated. Moreover they are less likely to be employed and more likely to rely on informal networks to find a job. Especially when we restrict attention to the first definition, illegal immigrants also appear to be more recent migrants. Finally, their are less proficient with the Italian language. While subjective assessment of language proficiency is usually biased, our data contain an objective measure of the linguistic abilities of migrants, as a formal test of the knowledge of the Italian language was administered at the end of the personal interviews.[24]

4 Empirical model and estimation strategy

Our empirical analysis is primarily aimed at estimating the causal effect of the percentage of migrants in one's residential block on the employment status of migrants.[25]

[23]The stock of social housing (including rent-regulated housing) in Italy is very low (less than 5 per cent of the housing stock was in 2005 in social housing compared with 20 per cent in France and the UK). Inflows are very limited as the State is privatizing the stock. Thus the waiting list to get social housing requires between 10 and 15 years. Moreover, the municipalities with a stronger presence of migrants requires a relatively long minimum residence period before applications to social housing can be made. Thus, overall for a migrant family it may take no less than 15 and up to 20 years before having access to subsidized housing in Italy.

[24]The test was optional and approximately 14% of the individuals in the sample refused to take it. A small amount of 5 euros was given to individuals taking the test. The test included question on language comprehension, of growing complexity. Final scores are standardized to have average of 500 and standard deviation of 100.

[25]Unfortunately, the poor information on wages contained in our data prevents us from analyzing the effect of wages. Indeed, the number of missing values is very high and for the valid observations wages are recorded in relatively wide intervals.

Our empirical model is based on the following main equation:

$$y_{icdb} = \alpha_1 m_{cdb} + \alpha_2 X_{icdb} + \epsilon_{icdb} \quad (1)$$

where y_{icdb} is an indicator of employment for migrant i in city c residing in district d and block b; m_{cdb} is the percentage of all non-Italians residing in block b of district d and city c; X_{icdb} is a set of observable individual characteristics, including district (central, mid-central, peripheral) and city fixed effects, and ϵ_{icdb} is the error term. The sample is restricted to migrants only.

The parameter of main interest in equation 1 is α_1, whose identification is possibly impeded by the presence of unobservable factors that influence both the location decisions of migrants and their labor market outcomes. For example, one might be worried that residentially segregated migrants are negatively selected, as only the very high ability can afford to live in native-dominated neighborhoods and high ability workers also experience better labor market outcomes, regardless of where they live. Such a mechanism would bias α_1 downwards in standard OLS. Additionally, there might also be unobservable factors at the block level that affect both the migrant's probability of locating in the block as well as labor market success, such as the availability of some public services (employment services, public transport). Finally, our regressor of interest, being based on conversations with buildings' janitors and door-to-door conversations, is likely to be affected by measurement error. Although it is difficult to assess the exact extent of mis-measurement, the assumption of classical measurement error seems quite plausible in our setting, so that the resulting bias should draw the estimated parameter closer to zero.

Overall, it is hard to establish whether the total bias in simple OLS (or probit) estimates of equation 1 would be positive or negative.

We address the two issues of measurement error and omitted variable bias differently. For measurement error, we collected additional auxiliary information about the implementation of the survey, namely individual characteristics of the interviewers and their evaluations of the overall quality of each single interview. Assuming that the measurement error is a linear function of such variables, it is possible to rewrite an augmented version of equation 1 which includes interviewer' characteristics as additional explanatory variables to eliminate the bias due to measurement error in m_{cdb}.

The bias from omitted variables is the key identification issue in this literature and it has been addressed in many different ways by previous studies, as we discussed in Section 2.2. Our identification strategy rests on the use of an instrumental variable that has never been previously proposed. Moreover, in Section 5.2, we replicate our results using an alternative approach that mimics closely the prominent study by Bayer et al. (2008), which compares adjacent blocks within small groups of buildings. Given the particular sampling structure of our data, only a small subsample of our survey can be used for this purpose, so that the first approach, the instrumental variable strategy, is more powerful in our setting (see Section 3.1 for details).

Specifically, we use the building structure of the block 10 years before the survey to instrument the percentage of migrants currently residing in the area. Using the actual addresses of the residential units of the individuals in our sample, we have linked our data to an ancillary database of the 2001 Italian population census. Such an ancillary database contains a large set of descriptive characteristics of each single city block in Italy, including the total number of buildings and the total amount of square meters (i.e. the sum of the square meters of each floor in each building) in the block, broken down by residential and commercial space. We use these data to calculate the ratio of residential square meters per residential building in the block, a variable that takes high values in areas that are dominated by large residential buildings (lots of residential square meters for few buildings) and low values in areas of detached or semi-detached houses.[26]

The idea of this instrument builds on the literature on housing discrimination, which documents how migrants and other minorities find accommodation more difficultly than natives, both on the renting and the property markets (Ahmed and Hammarstedt, 2008; Baldini and Federici, 2011; Bosch, Carnero, and Farre, 2010; Hanson and Hawley, 2011; Ondrich, Stricker, and Yinger, 1999; Page, 1995; Yinger, 1986). The relevance of our instrument rests on the presumption that such type of discrimination is taste-based and that natives, who predominantly populate the supply side of the housing market, dislike close interactions with migrants. As a consequence, they are less willing to rent or sell their properties to migrants, especially so where the urban structure is conductive of close interactions among residents, such as in neighborhoods where residential space is concentrated in a small number of buildings.

The literature on housing discrimination provides numerous pieces of evidence in support of our instrumental variable strategy. Firstly, all papers find a sizable degree of discrimination against migrants, both in the United States and in Europe (Ahmed and Hammarstedt, 2008; Baldini and Federici, 2011; Bosch et al., 2010; Hanson and Hawley, 2011; Page, 1995). Second, discrimination persists even when additional information about the potential renter/buyer is available, a result that is consistent with the idea of taste-discrimination (Ahmed, Andersson, and Hammarstedt, 2010; Ondrich et al., 1999).

Discrimination in the Italian housing market has been recently documented by Baldini and Federici (2011), who selected a large sample of renting advertisements for housing units throughout Italy that were posted on the internet and sent fictitious email requests to visit such units. The only distinctive feature of the email messages was the name of the perspective ten-

[26] As far as we know, Bauer, Flake, and Sinning (2011) is the only other paper that instruments migration at the neighborhood level with some physical characteristics of the local buildings, although their specific instrument is different from ours and the context is also different.

ant, which could be either typical Italian or typical of Arab or Eastern European origin. Emails were sent to advertisers according to a random algorithm, so as to guarantee orthogonality of the characteristics of the fictitious perspective tenant and those of the apartments, a strategy that is common to other studies in this field (Ahmed et al., 2010; Carpusor and Loges, 2006). The study then records responses to the email contacts and investigates whether the probability of a positive feedback varies with the ethnicity of the fictitious names.[27] The results show clear evidence of housing discrimination in the Italian market, especially in Northern Italy which is where our sampled cities are located.

We have been kindly given access to the data of Baldini and Federici (2011) and have merged them with our instrumental variable at the level of the city to produce supporting evidence for our identification strategy.[28] We then run an OLS regression with the ratio of the average rate of positive response for migrants and natives as a dependent variable and the total amount of residential square meters over the total number of residential buildings in the city as a main regressor of interest. Additionally, we include the city average of all the controls used by Baldini and Federici (2011) as control variables, namely dummies for the week and the weekday when the email was sent, the log of the property size in square meters, the monthly rent per square meter, dummies for whether the ad was posted by an agency, whether the ad included pictures, whether the email included additional information about the perspective tenant (family composition, occupation) and whether the email included orthographic or grammar errors. There are 41 cities in the database and the regression weights them by the number of observations in the original microdata.

Figure 1 shows the partitioned regression equivalent of the above model, namely the variables on the axes are the residuals of regressions of the dependent variable (on the vertical axis) and the main regressor of interest (on the horizontal axis) on the control set. The graph indicates the existence of housing discrimination (as measured by a lower recall rate for possible renters with non-Italian names) in urban structures dominated by large residential buildings (as opposed to those populated by detached or semi-detached houses). Indeed, the results show that residential building structure is strongly and significantly correlated with discrimination against migrants in the housing market and it explains a sizable 20% of the variation in relative response rates across cities, thus providing strong support to the logic behind our instrumental variable strategy. Additional evidence of the relevance of the instrument is in the first-stage results that will be reported later in Table 7.

[insert Figure 1 here]

[27]Contacts leading to an immediate appointment for a visit or ask additional information are classified as positive responses.

[28]Unfortunately, Baldini and Federici (2011) did not record the address or the neighborhood of the advertised apartments and the city is the only geographical identifier that can be used for our purposes.

Contrary to the relevance of the instrument, its exogeneity cannot be tested. However, a direct effect of the structure of the buildings in the neighborhood on employment is hard to imagine. Alternatively, the exogeneity of our instrument might be questioned on the basis of an indirect link with some neighborhood characteristics that are omitted from equation 1.

Of course, we cannot exclude this possibility a priori but we can provide evidence that the instrument is orthogonal to some of the most obvious suspects, such as house prices or distance from the city center. Columns 1 to 6 of Table 6 report the results of a battery of OLS regressions at the level of the city block with our instrument as the dependent variable and some block characteristics that could influence the employment opportunities of local residents as explanatory variables. Specifically, we consider average house prices in the block, time to travel to the city center by public transport the share of commercial buildings in the block an the share of high skilled population in the block.[29]

The estimates in Table 6 confirm the intuition that our building structure indicator does not correlate significantly with these observable neighborhood characteristics that might affect employment. This result holds across a number of specifications, either conditioning or non conditioning on city and district dummies (columns 1 and 2, respectively) and including the explanatory variables all together (columns 1 and 2) or one by one (columns 3, 4, 5 and 6).[30]

Column 7 of Table 6 investigates whether the instrument is related to the characteristics of the immigrants living in the block. It reports results of a regression of the instrument on all exogenous (observable) characteristics, controlling for district and city fixed effects. None of the correlations is significant.

[insert Table 6 here]

Obviously, the evidence in Table 6 is by no means a formal test of exogeneity. Nevertheless, the lack of correlation of the instrument with some relevant observable neighborhood and individual characteristics is suggestive that it is likely orthogonal to other unobservables of the same nature.

In principle, we could have included the neighborhood characteristics considered in Table 6 in the control set of our main model but we prefer to exclude them as some of them may induce further endogeneity.[31] Notice also that exogeneity is further guaranteed by the lagged nature of the instrument, that is measured ten years prior to the survey generating our main data.

Our identification strategy departs significantly from the popular approach of using lagged values of the immigration-related variable in the different areas to instrument its current values

[29] Skilled people are defined as those having completed at least secondary schooling.

[30] We have also investigated the correlation of our instrument with the percentage of caretakers in the block (i.e. the share of people answering in our survey that they are occupied as: caretakers, domestic workers, housekeeper, baby-sitters or cleaners) finding no significant association.

[31] Including them, however, does not change our main findings.

(Altonji and Card, 1991). The validity of such an approach rests on very specific assumptions about the relative degree of serial correlation in the error term of the main model and in the process generating the endogenous variable (Angrist and Krueger, 2001). These assumptions are very rarely spelled out and discussed and we believe that they would be hard to justify in our setting.

5 Empirical results

Our main results are reported in Table 7, which shows probit estimates of model 1 where the dependent variable is a dummy indicator of employment and the percentage of immigrants in the block is the main regressor of interest. The basic set of controls includes a linear function of age, a gender dummy, a dummy for education at or above secondary level, a dummy for legal status, dummies for origin (New member countries, Western Balkans, other origins), dummies for years since migration in Italy (less than 5 years, 5 to 10 years, 15 to 20 years and more than 20 years) and city and district dummies.

Consistently with the dichotomous nature of the outcome variable, we adopt a probit model, although our discussion in Section 4 was framed in a linear setting in order to emphasize the fact that we do not exploit the non-linearity of the probit model for identification purposes.[32]

[insert Table 7 here]

The first column of Table 7 reports the estimates of a simple specification of our model that only includes the basic controls and does not take into account neither the potential endogeneity of the main regressor of interest nor the bias due to measurement error. The estimated coefficient is negative, but very small and imprecise.

In column 2 the control set is augmented with several variables to control, at least partly, for mis-measurement, namely dummies for interviewers of Italian and of Albanian nationality (the two most common groups), a dummy for graduate interviewers and one for professionals[33], a dummy for whether the interviewer and the interviewee are of the same gender and the self-reported evaluation of the level of understanding of the questions by the interviewee, ranging 0 to 10. The estimated coefficient is now substantially larger (-0.005 as opposed to -0.001) but still far from conventional levels of statistical significance.

Column 3 reports our preferred specification and, in addition to the interviewer's characteristics, it also instruments the percentage of non-Italians in the block with our indicator of

[32]The estimation results when using a linear probability model remain largely unchanged. The results are available upon request from the authors.

[33]About one fourth of the interviewers are regular dependent employees of the survey company while the others were hired (and trained) for this specific project, although they might have worked for the same or similar companies in the past.

residential building structure. The model is estimated by full-information maximum likelihood, thus producing jointly the estimates of the first stage and the main equation. The standard errors are clustered at the level of the census tract, which is the exact level of variation of the instrument and the same clustering is applied to all the estimates in Table 7. The first stage linear regression and the reduced form probit, obtained by replacing the first stage linear specification of the endogenous variable into the main model, are shown in columns 4 and 5, respectively.[34]

The main result of our study is the negative and significant effect of the percentage of migrants in the block on the probability of employment (column 3). In terms of size, the point estimate of the coefficient is -0.095 and it implies an average marginal effect of about 2 percentage points, over an average employment rate of 87%, for each percentage point change in the share of immigrants residing in the block.[35]

This magnitude, however, needs to be taken with care. Our approach is likely to identify a Local Average Treatment Effect (LATE, Angrist and Imbens (1994)), as our estimates are identified by the subgroup of the immigrants residing in areas where the presence of immigrants is related to discrimination in the housing market (through the residential building structure). Note that this may actually be the LATE of policy interest for populations with fragile or uncertain attachment to the native markets but it still cannot be interpreted in a global sense. In Section 5.2, we use an alternative estimation strategy and we always find a negative, albeit smaller, effect of immigrant density on employment.

5.1 Dealing with weak instruments in non-linear models

In assessing the robustness of our main finding, it is important to notice the F-test of the excluded instrument in the first stage is just above 4, which, to some readers, may indicate a problem of weak instruments.

To tackle this issue we extend to non-linear models the reduced-form approach suggested by Angrist and Krueger (2001) and further developed by Chernozhukov and Hansen (2008) for linear models. To describe our procedure, consider our IV system of two equations:

$$y^*_{icdb} = \alpha_1 m_{cdb} + \alpha_2 X_{icdb} + \epsilon_{icdb} \tag{2}$$

$$m_{cdb} = \beta_1 z_{cdb} + \beta_2 X_{icdb} + v_{icdb} \tag{3}$$

[34]In order to make the results of the reduced-form model comparable to those in column 1, we include the residuals of the first-stage regression among the regressors, otherwise the common normalization to unity of the variance of the error term in the probit model would be inconsistent with the same assumption imposed in the iv-probit model. The standard errors of the estimates in column 5 are bootstrapped (stratifying by city) to account for this generated regressor.

[35]We compute this average partial effect by first calculating the marginal effect for every observation and then averaging over the entire sample.

where equation 2 is equivalent to equation 1, with the only difference that we now explicitly consider the dependent variable as a latent outcome and we indicate it with a star, following the common convention. Equation 3 is the first stage linear regression with z_{cdb} as the instrument.

The reduced-form model is obtained by replacing equation 3 into equation 2:

$$y^*_{icdb} = [\beta_1\alpha_1]\, z_{cdb} + [\beta_2\alpha_1 + \alpha_2]\, X_{icdb} + \alpha_1 v_{icdb} + \epsilon_{icdb} \tag{4}$$

which can be simply estimated as a probit under the usual distributional assumption $\epsilon_{icdb} \sim i.i.d.\ N(0,1)$. The only minor complication is the presence of the unobservable first-stage error v_{icdb} among the explanatory variables and it can be addressed as in Rivers and Vuong (1988) by replacing it with the estimated OLS residuals and appropriately adjusting the standard errors to account for the generated regressor. This is the exact procedure used to produce the estimates reported in column 5 of Table 7.[36]

Equation 4 shows that the standard test statistics for the null hypothesis $\beta_1\alpha_1 = 0$ can be used to make inference about the statistical significance of the main parameter of interest α_1, extending the results Chernozhukov and Hansen (2008) to non-linear models.[37] In other words, one can interpret the usual z-statistics of the coefficient on the instrument in the first-stage model as a test of the statistical significance of α_1 that is robust to weak instruments, as no information about the strength of the correlation between the endogenous regressor and the instrument is used to derive it.

In our specific setting, the z-statistics of the main effect derived from the joint maximum likelihood estimation of equations 2 and 3 is 3.58 (column 3 of Table 7), whereas the same statistics in the reduced form model declines to 2.39 (column 5 of Table 7), which is approximately one third lower but still allows rejecting the null.

Furthermore, we also extend the procedure of Chernozhukov and Hansen (2008) to derive a weak-instrument robust confidence interval for α_1. Define a wide enough range of potential values for α_1, A, and for each $a \in A$ re-write equation 2 as follows:

$$y^*_{icdb} = (\alpha_1 - a)m_{cdb} + a\, m_{cdb} + \alpha_2 X_{icdb} + \epsilon_{icdb} \tag{5}$$

Then, replace the first instance of m_{cdb} with the first-stage equation 3:

$$y^*_{icdb} = [\beta_1(\alpha_1 - a)]\, z_{cdb} + a\, m_{cdb} + [\beta_2\alpha_1 + \alpha_2]\, X_{icdb} + (\alpha_1 - a)v_{icdb} + \epsilon_{icdb} \tag{6}$$

In the simple linear context, Chernozhukov and Hansen (2008) propose estimating equation 6 by moving the term $a\, m_{cdb}$ to the left-hand-side, effectively transforming the dependent

[36] The standard errors are bootstrapped (stratifying by city).

[37] Given the validity of the instrument, namely its exogeneity and relevance, the null hypothesis implies $\alpha_1 = 0$.

variable. By the same argument made above, the usual test statistics for the significance of the coefficient on the instrument in such a modified reduced-form equation tests the null $\alpha_1 = a$ and iterating over several values of a allows constructing a confidence interval for α_1 that does not use information about the strength of the correlation between the instrument and the endogenous variable.

In our setting y^*_{icdb} is not observable and it is not possible to transform the dependent variable as in Chernozhukov and Hansen (2008). However, we can leave $a\ m_{cdb}$ on the right-hand-side of equation 6 and estimate it as a constrained probit, forcing the coefficient of the endogenous variable m_{cdb} to equal a. By doing so, the endogeneity of m_{cdb} becomes irrelevant for the consistent estimation of $[\beta_1(\alpha_1 - a)]$.

In practice, we proceed as follows:

1. set A as the set of real numbers between -0.3 and 0.15, spaced 0.001;

2. estimate equation 6 for each $a \in A$ and retain the z-statistics for $[\beta_1(\alpha_1 - a)]$;[38]

3. construct the $1-p$ confidence interval as the set of a's such that the z-statistics is smaller than $c(1-p)$ where $c(1-p)$ is the $(1-p)^{th}$ percentile of a χ^2_1 distribution.

Applying this procedure to our setting yields a 95% confidence interval for α_1 of $[-0.300, -0.019]$, which compares with the narrower interval derived from the usual maximum likelihood asymptotics of $[-0.147, -0.043]$. What is important for our purposes is that, in both cases, the entire interval lies on the negative side of the real line and excludes the zero, thus reassuring about the robustness of our finding.

5.2 Alternative identification strategy

In this section we compare our identification strategy with that of Bayer et al. (2008), which rests on the comparison of blocks within narrowly defined groups using a fixed-effect model.

In practice we estimate models similar to equation 1 including a set of fixed effects for narrowly defined groups of blocks and excluding observations in isolated blocks. In terms of econometric identification, the fixed effects are meant to control for local unobservables and, thus, play exactly the same role of our instruments for identification purposes.

The groups of blocks are defined on the basis of a geographical criterion within a circle of ray 1.5 km. Beside being simple, such a criterion allows us to use for this analysis all the blocks selected through the proximity criterion (see Section 3.1) as well as others that were randomly selected but happen to be very close to each other.[39]

[38]Notice that, under the null the term $(\alpha_1 - a)v_{icdb}$ disappears from 5, thus simplifying its estimation.

[39]In particular, two block belongs to the same group if they are included in a circle of ray 1.5 km from the centroid of the census tract that contains the exact address of the building.

Once we include group fixed effects, the regressor of interest - immigration density - only varies within non-isolated blocks, that are blocks with a non-empty set of adjacent sampled blocks within a circle of ray 1.5 km. Unfortunately, in our survey only 46 blocks are non isolated. Therefore, this fixed-effect approach comes at the cost of reducing the size of the sample to 244 individuals. The 46 non-isolated blocks are coded into 27 groups, with on average 9 observations per group.

[insert Table 8 here.]

In Table 8 we report results obtained using this alternative fixed-effect strategy.[40] Given the smaller sample size, the control set needs to be modified slightly to make the model more parsimonious otherwise the outcome would be perfectly predicted for too many individuals. In the footnote to the table we describe the new set of controls and, for brevity, in the table we only report the coefficients of interest. For comparison, columns 1 and 2 of Table 8 replicate our main results in columns 2 and 3 of Table 7 conditioning on the more parsimonious set of controls. Columns 3 and 4 show results from the alternative identification strategy. In column 3 we do not include block-groups fixed effects, while in column 4 we do include them. In this sense, the results in column 4 should be compared with those in column 2.

We find that the estimated effects of residential segregation are still negative. Moreover, as in Table 7, the bias in α_1 seems to be positive. The magnitude of the estimated effect, however, is smaller. Indeed, the average marginal effect is of about 0.9 percentage points, about half the size of our IV estimates.

5.3 Additional evidence and discussion

Table 7 shows that the IV coefficient on our regressor of interest is, in absolute value, significantly larger that its non-IV counterpart, hence the overall endogeneity bias seems to be positive. This is the combined outcome of the many potential sources of endogeneity in our model, such as individual sorting, unobserved neighborhood shocks or measurement error (see Section 4). Once these factors have been taken into consideration, we uncover a negative relationship between employment and immigrant residential density. As discussed in Section 2.1, this finding can be rationalized by several alternative mechanisms and it is extremely difficult to discriminate between the various explanations.

Even though we cannot test here any particular mechanism, we present some additional results in Table 9 that provide further insights. Table 9 shows results obtained using alternative measures of immigrant residential density. For comparison, our baseline specification is

[40]We report results from probit models. Results obtained using a logistic distribution, which is robust to the incidental parameter problem (Neyman and Scott, 1948), remain qualitatively unchanged.

reported in column 1 (see Table 7). In column 2 we replace the share of non-Italians residing in the block with the share of households belonging to the same ethnic group, which is the common proxy for ethnic networks used in the literature (see Section 2.1). If ethnic groups find employment in particular jobs and industries in which own-ethnics are over-represented, one should expect a positive and significant effect from such a modified specification. Table 9 shows, instead, a negative effect that is even larger than our benchmark.[41] This finding is consistent with the descriptive evidence in Table 4, which suggests that informal hiring networks do not seem to play a major role in our setting, as those living in areas with higher shares of migrants are not (significantly) more likely to find jobs through friends.

At the same time, though, Table 5 shows that illegal immigrants are more likely to rely on informal networks to look for employment and in the last two columns of Table 9 we further investigate this issue. In particular, we estimate separately the employment effect of the share of legal and illegal migrants residing in the block.[42] The results show that the density of illegal immigrants living nearby exercises a more negative effect on employment (of all migrants) compared to the density of legal migrants. One possible explanation for this finding, which would also be supported by the evidence in Table 4, is that the ethnic network used by illegal immigrant is mostly composed by legal immigrants residing nearby, consistently with a simple integration process by which the more recent and younger immigrants are more likely to be illegal (see Table 5) and also more likely to rely on the existing (established) networks of social contacts, most of whom are legal.

The last column on the right-hand-side reports the effect on employment of the share of non-Italians residing in the block, adjusted by their relative language skills. Specifically, we divide the number of immigrants in the block by the average score obtained by those migrants who took the language test in the block and, similarly, we divide the number of Italians in the block by the maximum test score. Hence, if all immigrants in the block were perfectly proficient in Italian, the adjusted and unadjusted immigrant shares would be equal. The lower the average immigrants' language proficiency, the larger the adjusted share of immigrants in the block.

When using this indicator we still find a negative effect on the employment prospect of migrants. However, the estimated average treatment effect is smaller (in absolute value) than in our baseline model. A possible interpretation is these findings is related to the idea that more language proficient migrants are better integrated into the labor market and constitute a better network for the transmission of job-related information.

[41] All IV estimates in Table 9 are statistically significant and all the corresponding 95% weak instrument robust confidence intervals lay entirely on the negative side of the real line.

[42] We have experimented with several alternative definitions of illegal immigrants and results change only marginally.

[insert Table 9 here]

Finally, in Table 10 we also document that the share of immigrants living nearby does not matter for the employment of natives, a result that is consistent with many papers (Angrist and Kugler, 2003; Bodvarsson, Van den Berg, and Lewer, 2008; Card, 1990, 2005; Friedberg and Hunt, 1995; Ottaviano and Peri, 2011).

[insert Table 10 here]

The above analysis does not provide direct support for any of the theoretical mechanisms outlined in section 2.1. In particular, the fact that the employment prospects of Italians are not affected by the concentration of migrants in their blocks is not consistent with the redlining of some areas by the employers. Moreover, the fact that concentrations of illegal migrants have a stronger negative effect on employment than concentrations of legal migrants does not lend support to the view that there are important congestion externalities in job search associated with residential concentration. Indeed, illegal migrants cannot compete with other migrants in the legal labour market.

6 Conclusions

Europe, notably Southern Europe, experienced very sizeable inflows of immigrants in the decade before the Great Recession. Policies to promote the economic and social integration of newcomers are not supported by an analysis of the relationship between residential patterns and employment prospects of migrants. Moreover, data on residential concentration of migrants typically do not capture illegal migration, which is quite sizeable in Southern Europe, and do not generally permit identification of causal effects of residential concentration on labor market outcomes.

In this paper we take advantage of the information gathered by a survey covering both legal and illegal migrants in eight cities in the North of Italy, providing detailed information on residential patterns of migrants, that can be matched with Census data to obtain instruments allowing for identification of causal effects in the relationship between the employment status of migrants and the percentage of migrants living nearby.

Our analysis uncovers a negative externality, which is higher if the immigrants living nearby are illegal. The effect is sizeable. Our results suggest that if the incidence of migrants in the block increased from its median value (approx. 15%) to the 75th percentile of its distribution (approx. 25%), the employment rate of migrants in such a median block would drop by between 10 and 20 percentage points (from 85% to 75-65%), depending to the model specification and estimation strategy.

The relationship between residential proximity of individuals from the same ethnic group and the probability of finding a job is extremely complex and our findings can be rationalized by several alternative mechanisms. While our data do not allow us to evaluate which particular mechanism is behind our main results, we can nevertheless rule out some of the explanations provided by the literature for the externalities associated with a large share of migrants in the block.

For example,we do not find neither evidence of significant informational network effects in job search, nor support to the view that residential concentration is a source of congestion externalities in job search. Redlining by employers of areas with a large concentration of migrants is likewise not supported by our analysis. Understanding the exact theoretical foundations of the negative effect of immigrants' concentration on employment remains a key area of future research.

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Tables

Table 1: Sampled neighborhoods by city and district

	Central [1]	Mid-central [2]	Peripheral [3]	Total[a] [4]	Observations (mean)[b] [5]
Alessandria	2	3	1	6 (23)	5.1 (4073)
Bologna	2	5	7	14 (90)	6.5 (4135)
Brescia	2	3	0	5 (30)	4.8 (6482)
Lucca	2	2	6	10 (79)	4.3 (1093)
Milano	4	8	19	31 (87)	6.3 (14879)
Prato	0	2	4	6 (35)	2.8 (5334)
Rimini	2	3	1	6 (57)	6.7 (2455)
Verona	0	4	5	9 (23)	3.8 (11528)
Total	14	30	43	87 (424)	5.5 (6247)

[a] Total number of neighborhoods in the city in parentheses.
[b] Average number of residents per neighborhood (from city registers) in parentheses.

Table 2: Comparison with other data sources

Variable	fRDB-EBRD[a] [1]	LFS[b] [2]	ISMU[c] [3]
Share of migrants	0.75	0.07	1.00
Share of migrants from New Member States	0.25	0.17	0.13
Share of migrants from Western Balkans	0.25	0.19	0.17
1=illegal migrant (def. 1)	0.20	0.00	0.11
1=female migrants	0.47	0.51	0.51
1=primary education	0.38	0.46	0.30
1=secondary education	0.48	0.39	0.45
1=tertiary education	0.10	0.10	0.21
1=employed	0.85	0.47	0.68

[a] These statistics refer to the whole sample (1,137 obs), not just to the sample used for the empirical results.
[b] The LFS data, being sampled from the population registers, only capture legal migrants. Moreover, it is not representative at the level of the single municipality. For these calculations the sample has been restricted to the regions of the North of Italy.
[c] The ISMU data include both regular and irregular immigrants. It is based on 12,000 interviews conducted between Oct 2008 and Feb 2009 at popular social venues for migrants, such as language schools, assistance centers, etc.

Table 3: Descriptive statistics

Variable	Mean [1]	Std. Dev. [2]	Obs. [3]
Socio-demographic characteristics:			
Age	37.40	8.47	478
1=female	0.46	-	478
years living in Italy	9.87	7.30	478
1=at least secondary educ.	0.57	-	478
1=illegal immigrant	0.19	-	478
Labour market outcomes:			
1=employed	0.87	-	478
1=found work through friends	0.58	-	406
Residential population (at the block level):			
% of non-Italians	16.65	10.20	478
% of immigrants from same origin	5.94	5.58	478
% of illegal immigrants[a]	3.17	4.11	478
% of legal immigrants[b]	13.49	8.97	478
Block Characteristics:			
Time to city center (min.)[c]	28.21	13.02	467
House price[d]	2396	658	468
% commercial buildings[e]	0.059	0.105	478

[a] Computed as the share of immigrants in the block times the share of illegal immigrants interviewed in the block.
[b] Computed as the share of immigrants in the block times the share of legal immigrants interviewed in the block.
[c] Source: local transportation authorities.
[d] Euro per square meter. Source: *Agenzia del Territorio*.
[e] Number of commercial buildings over total number of buildings in the census tract.

Table 4: Immigrants by residential area type

Variable	High density[a]	Low density[a]	Difference	
			unconditional	conditional
	[1]	[2]	[3]	[4]
1=female	0.474	0.474	0.000	0.109
	(0.046)	(0.046)	(0.063)	(0.094)
Age	39.198	36.707	2.491*	-0.214
	(0.820)	(0.798)	(1.265)	(1.684)
Years in Italy	8.310	11.069	-2.759***	-3.338**
	(0.468)	(0.727)	(1.047)	(1.509)
1=at least secondary	0.646	0.569	0.078	0.122
education	(0.044)	(0.046)	(0.072)	(0.084)
1=illegal migrant	0.198	0.233	-0.034	-0.236***
	(0.037)	(0.039)	(0.071)	(0.055)
1=employed	0.914	0.810	0.103**	0.081
	(0.026)	(0.036)	(0.050)	(0.060)
1=found work	0.606	0.569	0.036	0.132
through friends	(0.048)	(0.051)	(0.083)	(0.096)

[a] High- and low-density blocks are those where the percentage of non-italians lies in the top and bottom 25% of the observed distribution, respectively.
The first two columns report the means (std. deviations in parentheses) of the indicated variable in the two samples. The last two columns report the unconditional or conditional (on city and district dummies) difference. Estimates are produced by OLS (robust standard errors, clustered by census tract, in parenthesis). * p<0.10, ** p<0.05, *** p<0.01.

Table 5: Legal vs. illegal differences in observable characteristics

	Definition 1[a]		Definition 2[b]	
Variable	unconditional	conditional	unconditional	conditional
	[1]	[2]	[3]	[4]
1=female	-0.139**	-0.118*	-0.256***	-0.236***
	(0.058)	(0.060)	(0.054)	(0.055)
Age	-2.705**	-2.735**	-2.894**	-2.757**
	(1.098)	(1.060)	(1.319)	(1.291)
Years in Italy	-1.194	-0.792	-0.687	-0.116
	(0.894)	(0.896)	(1.072)	(1.081)
1=at least sec education	-0.099*	-0.093*	-0.217***	-0.198***
	(0.060)	(0.054)	(0.068)	(0.065)
knowledge of Italian[c]	-52.898***	-47.578***	-65.856***	-56.381***
	(12.810)	(11.270)	(14.408)	(13.252)
1=found work through friends	0.177***	0.166***	0.225***	0.214***
	(0.060)	(0.062)	(0.067)	(0.069)
1=employed	-0.125***	-0.118**	-0.164***	-0.161***
	(0.045)	(0.049)	(0.051)	(0.054)
% non-Italians in their block	-0.241	-1.074	0.325	-0.106
	(1.523)	(1.130)	(1.822)	(1.362)

[a] Respondents are coded as illegal if either (i) they do not have a permit of stay or do not answer the question, or (ii) they declare not to have access to the Italian health system or (iii) they declare not to have the documents required to go back to their country more often.

[b] The same as definition 1 but excluding all EU-27 citizens.

[c] Score in the Italian test, standardized to have mean 500 and standard deviation 100.

Each cell reports the unconditional or conditional (on city and district dummies) difference between the means of the variable indicated in the first column across the samples of illegal and legal immigrants. Robust standard errors, clustered by census tract, in parentheses. * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table 6: Residential building structure and other block characteristics

Variables	Dep. variable: Building Structure[a]						
	[1]	[2]	[3]	[4]	[5]	[6]	[7]
House prices[b]	-0.000	-0.000	-0.000	-	-	-	-
	(0.000)	(0.000)	(0.000)				
Travel time to	0.002	0.004	-	0.002	-	-	-
city center[c]	(0.006)	(0.009)		(0.007)			
% of commercial	0.016	0.022	-	-	0.033	-	-
buildings[d]	(0.084)	(0.087)			(0.086)		
% skilled people[e]	0.742	0.747	-	-	-	0.385	-
	(0.582)	(0.707)				(0.578)	
Average characteristics of the immigrants:							
Age	-	-	-	-	-	-	0.009
							(0.048)
% female	-	-	-	-	-	-	-0.352
							(0.276)
% skilled people	-	-	-	-	-	-	-0.074
							(0.171)
% illegal	-	-	-	-	-	-	-0.092
							(0.233)
District fixed effect	no	yes	yes	yes	yes	yes	yes
Observations	168	168	168	168	168	168	168
F stat. joint sign	0.45	0.39	-	-	-	-	0.91

[a] Ratio of total residential square meters to number of residential buildings in the block.
[b] Source: *Agenzia del Territorio*.
[c] Time to travel is measured in minutes by public transport and it is computed from the websites of the local transportation authorities.
[d] Ratio of commercial buildings over the total number of buildings in the block, normalised at the city level.
[e] Share of population in the block with at least secondary education.
All controls of equation 1 in column (7). Robust standard errors in parentheses. * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table 7: The effect of the local share of resident migrants on migrants' employment

Variables	Dependent variable: 1=employed				
	Probit	Probit	IV-Probit	First stage	RF-Probit
	[1]	[2]	[3]	[4]	[5]
% of non-Italians	-0.001	-0.005	-0.095***	-	-
	(0.010)	(0.011)	(0.026)		
Building structure[a]	-	-	-	-1.377**	0.196**
				(0.687)	(0.082)
Characteristics of the interviewee:					
Age	0.263***	0.279***	0.165*	-0.229	0.280***
	(0.054)	(0.057)	(0.087)	(0.302)	(0.071)
1=female	-0.446**	-0.681	-1.097***	-6.832***	-0.677
	(0.175)	(0.471)	(0.389)	(1.903)	(0.430)
1=at least sec. edu	-0.068	-0.193	-0.109	0.164	-0.188
	(0.199)	(0.224)	(0.165)	(0.792)	(0.185)
1=illegal immigrant	-0.605***	-0.522**	-0.489**	-1.711*	-0.492*
	(0.223)	(0.221)	(0.211)	(1.031)	(0.264)
Characteristics of the interviewer:					
1=Italian	-	-0.199	-0.594	-5.314	-0.136
		(0.445)	(0.585)	(4.500)	(1.367)
1=Albanian	-	-0.572	-1.136	-8.873*	-0.445
		(0.573)	(0.700)	(5.345)	(1.374)
1=graduate	-	0.229	-0.011	-2.105	0.283
		(0.390)	(0.428)	(3.161)	(0.359)
1=professional[b]	-	0.354	0.256	0.093	0.372
		(0.285)	(0.298)	(1.921)	(0.378)
1=interviewer-interviewee	-	0.238	0.874**	7.751***	0.211
same gender		(0.456)	(0.410)	(2.063)	(0.383)
Quality of interview[c]	-	0.160***	0.109*	0.021	0.161**
		(0.062)	(0.062)	(0.258)	(0.063)
Observations	478	478	478	478	478

[a] Ratio of total residential square meters to number of residential buildings in the block. Source: 2001 Census

[b] Interviewer is a dependent employee of the survey company.

[c] Interviewers self-reported evaluation of the level of understanding of the questions by the interviewee (0 to 10).

Robust standard errors in parentheses, clustered by census tract. * p<0.10, ** p<0.05, *** p<0.01. Additional controls: city and district dummies, dummies for years since migration in Italy (less than 5 years, 5 to 10 years, 15 to 20 years and more than 20 years), dummies for origin (New member countries, Western Balkans, other origins). RF=Reduced Form.

Table 8: Estimates with neighborhood fixed effects

Variables	Dependent variable: 1=employed			
	all sample		adjacent blocks [a]	
	Probit	IV-Probit	Probit	Probit
	[1]	[2]	[3]	[4]
% of non-Italians	-0.001	-0.091***	-0.031**	-0.051**
	(0.010)	(0.027)	(0.013)	(0.024)
Block-pair fixed effects	no	no	no	yes
Observations	478	478	244	244

[a] The sample is limited to individual residing in neighborhoods where two buildings, belonging to census tracts whose centroid is no more than 1.5 Km far apart, have been sampled.
Additional controls: age, gender education, legal status, year of arrival in Italy (categorical), whether from NMS or from Balcans, district and city fixed effects, interviewer evaluation of interviewed, whether interviewer is Italian or Albanian. Robust standard errors, clustered by census tract, in parenthesis. * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table 9: Extensions with different measures of immigrant density

	Dependent variable: 1=employed				
	benchmark	same origin[a]	illegal[b]	legal[c]	language adjusted[d]
	[1]	[2]	[3]	[4]	[5]
Immigrant density	-0.095***	-0.160***	-0.299***	-0.107***	-0.080***
	(0.026)	(0.041)	(0.056)	(0.026)	(0.024)
Observations	478	478	478	478	478

[a] Share of immigrants in the block belonging to one's same origin (European New Member States, Western Balkans, and Other countries).
[b] Computed as the share of immigrants in the block times the share of illegal immigrants interviewed in the block.
[c] Computed as the share of immigrants in the block times the share of legal immigrants interviewed in the block.
[d] See text.
Additional controls: age, age squared, gender, a dummy equal 1 if the immigrant has at least a secondary education diploma, city and district dummies, dummies for years since migration in Italy (less than 5 years, 5 to 10 years, 15 to 20 years and more than 20 years), dummies for origin (New member countries, Western Balkans, other origins). Robust standard errors in parentheses, clustered by census tract. * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table 10: The effect of the local share of resident migrants on natives' employment

Variables	Dependent variable: 1=employed				
	Probit	Probit	IV-Probit	First stage	RF-Probit
	[1]	[2]	[3]	[4]	[5]
% of non-Italians	0.005	0.006	-0.022	-	-
	(0.012)	(0.014)	(0.066)		
Building structure[a]	-	-	-	-1.573*	0.036
				(0.868)	(0.201)
Characteristics of the interviewee:					
Age	0.375***	0.399***	0.385***	-0.190	0.401**
	(0.081)	(0.083)	(0.104)	(0.378)	(0.164)
1=female	-0.899***	-0.989*	-1.303	-12.403***	-1.062
	(0.314)	(0.564)	(0.888)	(4.488)	(1.627)
1=at least sec. edu.	-0.231	-0.367	-0.316	1.343	-0.356
	(0.283)	(0.315)	(0.348)	(1.584)	(0.485)
Characteristics of the interviewer:					
1=Albanian	-	-0.486	-0.976	-16.758**	-0.626
		(0.848)	(1.402)	(7.796)	(2.730)
1=Italian	-	0.204	-0.213	-12.645*	0.066
		(0.725)	(1.227)	(6.939)	(2.798)
1=graduate	-	-1.051*	-1.015*	0.378	-1.054
		(0.541)	(0.584)	(5.103)	(1.963)
1=professional[b]	-	0.307	0.402	3.380	0.337
		(0.354)	(0.380)	(2.447)	(0.481)
1=interviewer-interviewee	-	-0.005	0.403	14.870***	0.079
same gender		(0.525)	(1.129)	(4.626)	(1.716)
Quality of interview [c]	-	0.289**	0.233	-1.573*	0.275*
		(0.114)	(0.165)	(0.875)	(0.153)
Observations	179	179	179	179	179

[a] Ratio of total residential square meters to number of residential buildings in the block.
[b] Interviewer is a dependent employee of the survey company.
[c] Interviewers self-reported evaluation of the level of understanding of the questions by the interviewee (0 to 10).
Additional controls: city and district dummies. On the subsample of Italians only. Robust standard errors in parentheses, clustered by census tract. * p<0.10, ** p<0.05, *** p<0.01.

Figures

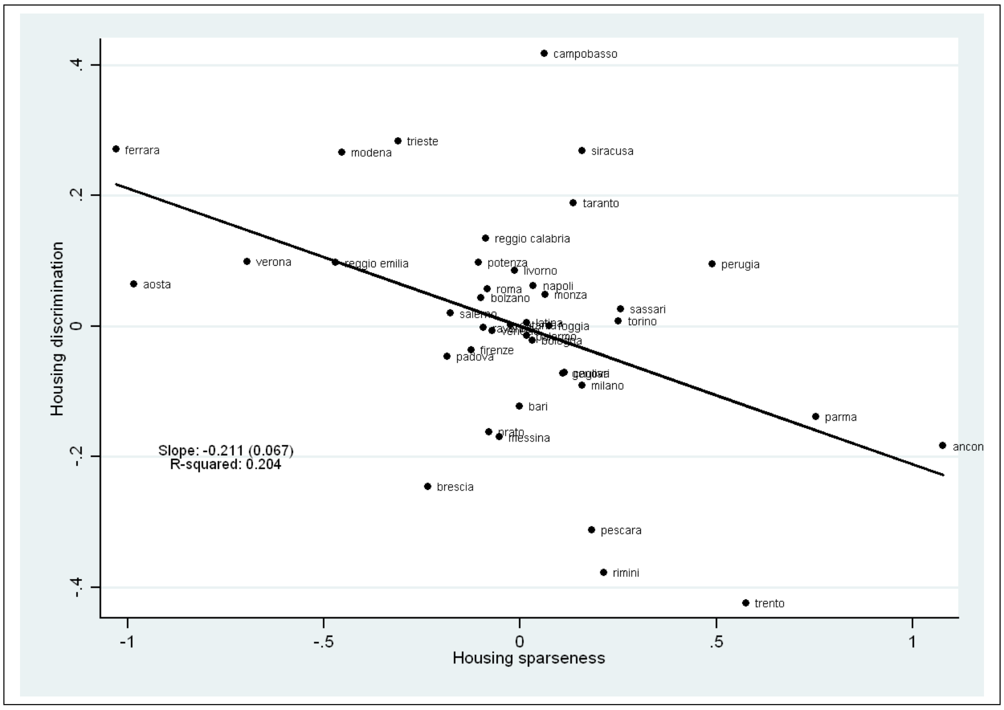

Figure 1: Housing discrimination and Residential building structure

Appendix

Table A.1: Characteristics of the sampled cities

City	Size[a]	Income per capita[b]	Average age[c]	Unemployment rate[d]	Employment rate[d]	Share of immigrants[e]
	[1]	[2]	[3]	[4]	[5]	[6]
Alessandria	93,676	13,648	46	0.065	0.45	0.11
Bologna	374,944	18,771	47	0.044	0.48	0.09
Brescia	190,844	15,812	45	0.048	0.48	0.16
Lucca	89,640	14,920	45	0.065	0.46	0.08
Milano	1,295,705	21,358	45	0.044	0.49	0.14
Prato	185,091	12,446	43[f]	0.057	0.51	0.14
Rimini	140,137	12,059	45[g]	0.070	0.46	0.09
Verona	265,368	15,220	44	0.049	0.48	0.13
Italy	60,045,068	12,953	43	0.112	0.43	0.06
Northern Italy[h]	27,390,496	15,529	44	0.049	0.49	0.09

[a] Number of residents. Source: ISTAT, 2009.
[b] Annual gross taxable income. Source: Tax declarations, 2007.
[c] Source: ISTAT, 2007.
[d] Source: ISTAT, 2001 Population Census.
[e] Source: Population registers of city councils, ISTAT, 2009. Legal immigrants only.
[f] Source: City Population Register, 2005.
[g] Source: City Population Register, 2009.
[h] Norther Italy includes the following regions: Piemonte, Valle D'Aosta, Lombardia, Trentino Alto Adige, Veneto, Friuli Venezia Giulia, Liguria, Emilia Romagna.