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Abstract

This article proposes a framework for the analysis of experienced discrimination in home mortgages. It addresses the problem of home mortgage lending discrimination in one of the richest areas of northern Italy. Employees of a local hospital were interviewed to study their perception (or experience) of discriminatory behavior related to home financing. The analysis follows two steps. The first evaluates self-selection (the probability that individuals apply) and the second focuses on the likelihood that applications are accepted by the bank. Findings show that discrimination is likely to appear when the applicant's nationality is considered. In addition to its findings, the study (a) provides an original econometric model on a two-step procedure to test perceived discrimination and (b) suggests a method and approach that may constitute a point of reference for those willing to study perceived discrimination.

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Keywords

discrimination, home mortgage lending, northern Italy, Varese, perceived discrimination, experienced discrimination, banking

Europe is undergoing a new wave of xenophobia and racism, as witnessed by the rise of radical right-wing political parties (Akkerman, 2005; Rydgren, 2008; Taras, 2009). For example, the Italian Northern League (Lega Nord) “is widely criticised in Italy for being racist and xenophobic” (Bartlett, Birdwell, & Littler, 2011, p. 106; see also Randall, 2009; Semier, 2001) and “has incurred the ire of human rights organisations concerned about party leader Umberto Bossi’s suggestion that the Italian navy fire on all boats with illegal immigrants heading for the Italian coast” (Bartlett et al., 2011, p. 106). This party happened to sit in the Italian government 3 times in the last 20 years and seems to build its strong support on the areas from where its leaders come (see Woods, 2009).

One of these areas—the one where the above-quoted party was born—is the environs of Varese, a city located in the Italian northwest, not far from the Swiss border. Are minorities living in areas that allegedly support xenophobic and racist parties affected by unfair economic conditions? Are xenophobia and racism reflected in the market?

In the winter of 2006-2007, employees of the Varese City Hospital ($N = 278$) were asked to report their experiences with home mortgage loans. Contrary to most of the literature on discrimination in housing and the credit market (Pager & Shepherd, 2008, p. 188ff.), this study focuses on “perceived” or “experienced” discrimination (Brüß, 2008; Pager & Shepherd, 2008; Schuman, Steeh, Bobo, & Krysan, 2001) due to (a) the lack of official data (see below), and (b) the fact that this method has been vastly overlooked although it reveals very insightful aspects of discrimination (Kessler, Mickelson, & Williams, 1999). The study is exploratory in its nature as it appears to be one of the first on discrimination in the Italian home mortgage lending market. For this reason, findings from this study will help scholars, managers, and policy makers to better understand the problem of discrimination in this significant market sector.

This article follows the path of most empirical studies: Hypotheses are based on assumptions that, in turn, are based on theory. The theoretical framework is not linked to any ideology in that it reflects a positive approach to behavioral science. The article has four sections. The section “The Italian Credit Market at the Time of the Study” describes how the Italian mortgage market worked at the time of the study. The model used to analyze the data is

based on hypotheses presented in the section “Theoretical Framework and Hypotheses.” Methodology and results are given in the “Method” and “Results” sections. The discussion of findings is the final section.

The Italian Credit Market at the Time of the Study

Description of the Home Mortgage Process¹

The procedure for mortgage approval starts with someone who applies for a loan (applicant) to buy, build, or renovate real estate property. While the borrower often is already a client of the bank, it may not always be the case. After a preliminary verification of the “sustainability” of the mortgage (obtained by comparing income with the requested installments), the bank asks for an estimate of the value of the property by an independent registered real estate agent. Following this valuation, further verifications are made through a notary to find potential hidden problems (such as existing or previous mortgages, succession problems, and rights of way, etc.). In the case where no issues are found, a procedure for a line of credit is opened. The applicant must provide official documents regarding economic and social status (e.g., tax returns, payrolls, dependents), as well as information on possible loans by installments that he or she may have previously contracted. If he or she is a foreigner, the procedure requires some information concerning his or her length of stay in Italy. The whole procedure is simplified if the borrower is already a client of the bank, as the checking account provides indisputable information concerning stability of earnings; otherwise, such information has to be obtained through official documents. Sometimes, the procedure is filled in before the estimate of the value of the property is obtained. Finally, the procedure provides an “internal rating measure.”² Measures are currently disclosed to the client, but they had not been disclosed to clients for a long time. It is worth noting that the percentage of banks with a credit scoring system has increased from 26% in 2003 to 51% in 2006 (Rossi, 2008). This increase means that, at the time of data collection, the likelihood for a mortgage applicant to be evaluated on the basis of a credit score was particularly low.

The bank officer fills in the form, provides a synopsis, and sends it to the branch manager. If the value of the mortgage is below a certain threshold and risk is limited, the decision is taken directly by the manager. If one of the two conditions does not hold, then the application is sent to a central office of the bank that specializes in loan granting decisions. When forwarding the file, the local branch manager can mitigate negative elements or emphasize positive ones: This adjustment is generally aimed at correcting anomalies in the

rating software and seldom contributes to a bias in the procedure. The managing director may face criminal charges for potential misconduct. Nevertheless, adjustment leaves room for discretionary decisions.

When a mortgage holder faces bankruptcy, the initial lending is paid back through foreclosure of the property. This may not be enough to cover the value of the mortgage because of fluctuations in real estate markets and legal expenses, and so on. For this reason, the mortgage covers only a percentage (about 80%) of the minimum between the value of the property according to the contract and the value of the estimate; the ratio between the loan and the value of the property is called loan-to-value ratio.

There is a significant probability that even the choice of a low loan-to-value ratio may not be able to guarantee break-even. To achieve this objective, banks can modify the interest rate, increasing the spread with the official discount rate. Up to few years ago, and surprisingly enough, Italian banks did not use this instrument a lot. After Basel II, spread variation has been increasingly used. This increased use implies that, at the time of the study, the spread in the loan interest rate was only marginally used as an instrument to balance low creditworthiness, rejection being the main option available. More recently, some companies have entered the market with loan offers to clients traditionally neglected by banks. However, at the time of the study, applying to a traditional bank was, in all likelihood, the only alternative that a person interested in a loan could practice.

Applicant characteristics usually screened during the procedure are (a) age, as a proxy for creditworthiness; (b) job stability, again as a proxy for creditworthiness; (c) loan-to-value ratio; (d) net income, after adjustment for other loans and weighted on the number of family members; (e) nationality, length of residence in Italy, and length of residence in the current house or flat; (f) length of the requested loan period; and (g) collaterals (e.g., properties, in form of mortgages or pledges/pawns) and/or personal guarantees (bail bond).

There are also some other less objective factors considered as “informal” guarantees such as, for example, whether members of the applicant’s family have several checking accounts with the bank, or the length of the business relation between the client (or a client’s relative) and the bank.

Discretion in Mortgage Approval

The word “redlining” indicates discrimination of minorities in the home mortgage market (Graves, 2004, p. 132). The term was coined by human rights activists in Chicago, Illinois, in the late 1960s and originally designated the identification (through the drawing of a red line on a map) of urban

areas where the banks would not grant loans, thus de facto discriminating against people of similar ethnic background. It is not the objective of this article to review the history of redlining; nevertheless, it is important to acknowledge that today the word “redlining” indicates generic discrimination operated by banks toward a homogeneous group of individuals.

The U.S. Congress enacted the Equal Credit Opportunity Act (ECOA) in 1974, but discrimination in bank lending practices remained alive as some studies pointed out (Peterson, 1981). In the early 1990s, the Federal Reserve Bank of Boston (Munnell, Browne, McEneaney, & Tootell, 1992; Munnell, Tootell, Browne, & McEneaney, 1996) identified “some banks that . . . contributed to urban decay by figuratively marking off areas on city maps in a process known as redlining” (Boatright, 1999, p. 99). Documents from the Federal Reserve showed that there were banks that rejected home mortgage loans on the basis of discrimination: That is, some of the rejections were not due to economic conditions of the applicants. The study of the Federal Reserve Bank of Boston (Munnell, Tootell, Browne, & McEneaney, 1996) received criticism (Becker, 1993; Macey, 1994), but helped scholars, communities, and bankers think of contemporary discrimination more seriously.

Several studies dealt with discriminatory issues in the banking industry (Becker, 1971; Block, Snow, & Stringham, 2008; Ferguson & Peters, 1995; Shaffer, 1996) and provided institutions and the scientific community with operative tools for isolating discrimination in banking practices. Most of the studies on discrimination in home mortgages focus on two basic issues: (a) gender (Peterson, 1981) and (b) race (Holmes & Horvitz, 1994; Holmes, Horvitz, & James, 1997; Tootell, 1996). The studies also lead to definitions of discrimination on the basis of (a) higher rejection rates and (b) higher interest rates for minority applicants (Boatright, 1999). A recent study on the closing costs for Federal Housing Administration (FHA) mortgages finds evidence of such higher interest rates (Woodward, 2008).

Theoretical Framework and Hypotheses

Peterson (1981) distinguishes between “economic discrimination” and “prejudicial” or “uneconomic” discrimination. The former “is based on relative credit risk and returns” and “is essential if a creditor wishes to avoid excessive credit losses” (Peterson, 1981, p. 548). The latter “systematically causes the expected present value of loans made to members of one group to exceed the expected present value of equivalent loans made to other groups” (Peterson, 1981, p. 548).

Statistical discrimination (Arrow, 1973; Phelps, 1972) is the selection of categories/groups of people based on their characteristics and can be referred

to as “true stereotyping” (Schwab, 1986, p. 228). This stereotyping is somewhat similar to Peterson’s “economic” discrimination as it refers to information about the perception of what the group average looks like. The problem is that the “mean” is then used to evaluate single cases. In the present work, the focus is on “uneconomic” discrimination that occurs when banks reject applications on a non-economic basis. This phenomenon occurs when two applicants’ same (or similar) economic conditions yield different results in terms of rejection, approval, or interest rate.

There is a distinction between (a) voluntary discrimination and (b) de facto or experienced discrimination. The former arises when the banker rejects or accepts mortgage requests with the precise willingness to adopt a different attitude toward different applicants. Voluntary discrimination can only be identified in studies conducted on the supply side; this identification requires that bankers are willing to tell if, how, and why they discriminated against somebody. This admission is a very unlikely occurrence, even if anonymous surveys are used. With no data from the supply side, splitting experienced and voluntary discrimination would be no more than a guess. To overcome this problem, research has focused on experimental audit data on paired tests of applicants (Massey & Lundy 2001; Turner & Ross, 2003a, 2003b; Turner, Ross, Gaister, & Yinger, 2002).

Instead, experienced discrimination is paradoxically simpler to observe as it is a demand-side phenomenon resulting in the existence of different probabilities of mortgage acceptance for different individuals (possibly belonging to a well-defined social, ethnic, or cultural group) with the same creditworthiness. This observation does not require any voluntary discriminatory effort on the part of the banker, either in the form of active discrimination (if the banker discriminates because of his or her own prejudices), nor in the form of passive discrimination (if the banker discriminates because of bank orders).

Moreover, experienced discrimination offers a safe way out of another subtler problem. The classic article by Schelling (1971) on spatial segregation contains a stimulating discussion on the “collectively enforced” macrophenomena that can arise from several forms of “organized” or “economically induced” discrimination. Schelling argues that it is difficult to disentangle these forms of discrimination because of the interactions between individuals in the population. This consideration supports the choice of making explicit reference to a demand-side phenomenon that is observed on an individual basis such as experienced discrimination. Indeed, whether discrimination is voluntary or involuntary, active or passive, the most relevant type for applicants is experienced discrimination, as it may reveal aspects that affect human personality (if related to negative affectivity, for example; Digman, 1990),

and it has been shown to relate to health conditions, especially in elderly people (Barnes et al., 2008).

As far as this study is concerned, official data on the home mortgage lending market were unavailable at the time when data were collected. Financial institutions, the Italian Association of Banks (ABI), and supervising bodies (including Banca d'Italia [Bank of Italy], the Italian central bank) provide scarce data on loan applications, rejections, interest rates, and so forth. As no other alternative is available, the study is limited to measurable and observable characteristics of the applicant. Therefore, the focus is on *de facto* or experienced discrimination. On one hand, experienced discrimination is precisely the kind of phenomenon in which borrowers are interested as it implies that the probability of receiving mortgages depends on their creditworthiness and on other non-economic variables. On the other hand, this phenomenon is simpler to analyze if data on mortgage acceptance and rejection is collected using the applicant as the sampling unit. Although the banker's individual beliefs are important information, the article addresses only the final outcome of the process (acceptance or rejection) as a function of the characteristics of the applicant. To take into consideration the varying degree of creditworthiness, an empirical study should record data on (a) level of income, (b) job, and (c) expected life span of the individual.³ In a world without discrimination, the probability of mortgage acceptance would not depend on variables other than creditworthiness. As a test for the presence of discrimination is the objective of the article, the above-mentioned economic factors become control variables.

Prejudices and biases affect society and banks are no exception. Put differently, if prejudices and biases have a given distribution in a population (the society), there is a legitimate expectation to find them distributed similarly in a sample extracted from that population (e.g., the banking industry). There is no evidence to support the hypothesis that discrimination within the banking industry occurs for reasons other than those of the remainder of society. Therefore, discrimination against applicants may appear because of gender, nationality, and other "standard" discriminatory variables (Rodriguez, 2008).⁴ However, individual behavior is socio-culturally biased and the intensity of discrimination with respect to a variable may depend on the general socio-cultural conditions of a specific area. For example, in a recent study, Brüß (2008) compares perceived discrimination of Turkish, Moroccan, and Bangladeshi Muslims in three European cities and finds that discrimination varies depending on which ethnic group is considered.

The study is retrospective with data collected on an individual basis by interviewing hospital employees and asking whether they applied for mortgage requests and, in the cases where they did, whether their requests were

accepted. The statistical analysis is divided into two steps as well as all the hypotheses. The first step is the evaluation of the probability of requesting a loan as a function of the characteristics of the individual. First, this accounts for the so-called “self-selection” – i.e. the fact that people do not ask for loans because they think they will not get them – thus anticipating the refusal (Longhofer & Peters, 2005). This self-selection is not overt discrimination, but is a particularly serious and perverse consequence of discrimination. Second, there is a need to acknowledge that somebody may decide to stay out of the market for reasons other than this by-product of discrimination. In particular, the expectation is that some categories have a lower probability of applying for mortgages because of alternative financing sources. For example, women may choose not to ask for loans because their husbands (or partners) do, and Muslims may too because religious interdictions compel them to apply to Islam banking institutions (Belkaïd, 2008; Warde, 2000). The second step analyzes rejection rates, once home loans are requested, as functions of both creditworthiness and membership to potentially discriminated groups. Hypotheses reflect this two-step analytical process.

The study does not have a particular orientation as far as theory is concerned; however, the assumption is that simple market mechanisms (Block et al., 2008) fail to provide a viable explanation to the issue of discrimination (see Secchi, 2011).

In summary, the analysis of the two steps is based on six variables: gender, nation, family dimension, age, personal income, and profession. Income, profession, and age are the control variables. Variables are defined on the basis of the UN Universal Declaration of Human Rights.

Gender

Italy records one of the lowest scores on equal opportunities issues among European countries (European Commission, 2008). Although the role of women in society is slightly changing, this cultural process seems to be particularly slow. Traditionally, men tend to be the economic and financial home managers, even in cases where their wives earn more.

All other economic variables being equal, women do not apply for home mortgages and, when they do, they find it harder to get approval.

Hypothesis 1.1 (H1.1): Home mortgage requests are less frequent for women than for men.

Hypothesis 1.2 (H1.2): The rejection rate is likely to be higher for women than for men.

Nationality

Ethnicity is another factor of discrimination (Munnell et al., 1996). The word “race” is voluntarily avoided as it has no biological meaning when referred to human beings (Graves, 2004); it has a social meaning which is not supported in this article (Formoso, 2001; Gallissot, Kilani, & Rivera, 2001). The term *nation* offers a safe alternative as it refers to differences in ethnicity, habits, language, and other related variables. This term fits particularly well with the Italian case where “state” is not the same as “nation.” The latter point deserves some explanation. Italy is a puzzle, both in economic and cultural/social terms (Putnam, 1994). Many nations are represented under the same state flag: For example, Sicilians speak a different Italian language from Lombards, and have different social habits, ethics, and culture. These differences are comparable with the ones observed in France or in Spain, but Italy reached unity as one state only about 150 years ago and this circumstance reflects citizens’ feelings of belongingness to different “national” sub-areas of the country. In the past (especially during the 1960s and the 1970s), many southern Italians faced brutal discrimination when they went north to find jobs (Gallissot et al., 2001, pp. 203-204; Ginsborg, 1989, p. 293ff.; Merrill, 2006, p. 98ff.). They were described as lazy, and allegations that they are short of intellectual capabilities have been reiterated recently from the newspaper *La Padania* (Oneto, 1998; Riboni, 1998; Stagnaro, 1999), which is financed by Lega Nord (Northern League), a political party of the extreme right (Randall, 2009; Semier, 2001). This “xenophobic” party— as the international press (“Sing a Song of Xenophobia,” 2006; “Rome v Roma,” 2008) defines it—has its origins in northern Italy and was very popular in the area where data were collected. Racism and xenophobia appear to be widespread so that Italians moving from south to north are sometimes treated as “foreigners” (Oneto, 1998). Hence, if the study analyzes discrimination in northern Italy, then there is a need to understand that it might be based on these subtle distinctions that are part of Italian history that may be difficult to understand for foreign observers.

Therefore, the variable nationality indicates a wide variety of conditions in this study: (a) people coming from a foreign country irrespective of inside or outside the European Union (EU) and (b) Italians coming from different areas of the country, typically the economically underdeveloped south. Because of low wages and high cost of living in the region of Varese, it was expected that most of the foreigners interviewed come from poor countries. The large majority of Italian households (about 75%) own their house (Istat, Istituto Nazionale di Statistica, 2007c). From the second generation on, local people own one (or more) home(s) as opposed to immigrants (southerners

and foreigners) who need to buy one. The decision was to test whether foreigners and Italian-foreigners (from elsewhere in Italy) receive different treatments. There is an expectation that foreigners face tougher conditions than Italians, and that the same scheme can be applied for southern versus northern Italians.

Hypothesis 2.1 (H2.1): Home mortgage requests are more frequent for southern than for northern Italians.

Hypothesis 2.2 (H2.2): The rejection rate is likely to be higher for southern than for northern Italians.

In the last 10 to 15 years, Italy has faced an unexpected flow of immigrants. The National Institute of Statistics (Istat) estimates the increase of legal immigrants (called “foreigners” in the Istat report) at a dramatic 342% in the decade 1996-2006, from 0.8 million to 2.77 million (Istat, Istituto Nazionale di Statistica, 2007a). That number almost doubled in 2010: A report from Caritas-Migrantes (2010), respectively a Catholic nongovernmental organization (NGO) and a foundation, estimates that there are now five million immigrants. Emotional responses and prejudicial positions, also on part of the local authorities, have increased altogether with this population increase (Woods, 2009). International authorities called on the Italian government to stop discrimination and racism against minorities (European Commission Against Racism and Intolerance, 2008), with very limited or no response at all. On a smaller scale, several local administrations, especially when supported by the Lega Nord (Northern League), have appealed to the population to refrain from renting houses to immigrants, often passing special ordinances to enforce the request (Del Frate, 2009). Whether Italian banks fall in line with these governmental practices is unknown, but it is interesting to check if a similar evidence can be found. Foreigners often come from poor countries and are in extreme need of money and work. It is likely they would ask for home mortgages, at least those who decided to live in Italy.

Hypothesis 2.3 (H2.3): Home mortgage requests are more frequent for foreigners than for Italians.

Hypothesis 2.4 (H2.4): The rejection rate is likely to be higher for foreigners than for Italians.

Family Dimension

Italian fertility rate—number of children per woman—was 1.29 between 2000 and 2005, and the population is projected to decrease by 7.2% in the

next 40 years (Istat, Istituto Nazionale di Statistica, 2007b; UN Department of Economic and Social Affairs, Population Division, 2007, pp. 56,75).

In the Italian case, large families have more than three members. Given this scenario, these exceptionally large families are not interested in mortgage applications as they probably already applied for them when their families were smaller. However, when large families submit their applications for the loans, the likelihood of rejection is higher because (a) the income each partner needs to sustain the family is higher compared with small families, and (b) they are perceived as social “deviations” from the standard small family. When both members of the small family work—which is the most likely scenario—it seems likely that their applications get accepted. The following hypotheses are developed:

Hypothesis 3.1 (H3.1): Home mortgage requests are more frequent for smaller than for larger families.

Hypothesis 3.2 (H3.2): The rejection rate is likely to be higher for larger than for smaller families.

Method

The studies mentioned in the previous sections analyze the U.S. mortgage market where transparency is the rule and researchers are granted access to official data on rejections and interest rates. The Italian Central Bank publishes monthly and yearly studies on the state-of-the-art of mortgage lending in the country (Banca d'Italia, 2006). Therefore, there is evidence that, for example, the same commercial bank applies different rates depending on the residency of the applicant (north or south Italy). However, access to public data on mortgage rejection rates is limited due to the lack of modernization of the banking system (McCann, 2007). Without law enforcement, banks are reluctant to provide data, so it was impossible to get official data. Informal statements were collected from middle managers of Italian banks who stated that they do use creditworthiness criteria and expected default risk rates per each customer category, but access to the actual rejection rates was denied. The Italian Association of Banks (ABI) is no different and provides no information on this topic. Also, recent articles on the Italian mortgage market (Bonaccorsi di Patti & Felici, 2008; Felici, Manzoli, & Pico, 2012; Rossi, 2008) have limited their analysis to accepted mortgage requests.

For these reasons, as a preliminary and exploratory analysis on discrimination in the Italian home mortgage lending market, the study focuses on the individual experience of discriminatory practices. No study on this specific topic has been found; thus, this work takes the nature of a pilot study and serves to define the worthiness of the issue for the Italian banking industry.

The study was conducted in Varese, Lombardy, one of the richest areas of the country and of the European continent.⁵ Immigration from poorer and extra-European countries is higher here (Caritas-Migrantes, 2005, 2010) as compared with the rest of Italy, and discrimination seems to be “institutionalized.” In fact,

although the Consolidated Text on Immigration provides the right of foreign citizens to have access to low-rent public housing (ERP) under the same conditions as Italian citizens, . . . the regulations of the Lombardy Region which require at least five years residence for a person to qualify for public housing are still in use despite the fact that they have been declared discriminatory and unconstitutional by the Regional Administrative Court (TAR) of Lombardy. (European Union Agency for Fundamental Rights, 2008, p. 58)

These housing solutions are available only to extremely poor individuals, hence this case is not related to the mortgage market but it may be read as a symptom of a diffused attitude toward diversity.

The Sample

The study focuses on a single large organization to make the analysis easier and to take into account a wide range of salaries, professions, and all the above-mentioned variables. The City Hospital of Varese is an organization large enough and presents a wide set of variables and conditions that can be tested against the hypotheses. It has four main locations with 3,995 employees (2001), 1,467 beds, and 59,240 clients (see Table 1).

The choice of a hospital for the analysis is consistent with two key elements. First, the goal is to analyze if there is discrimination in the selected area. The analysis presented in this study is valuable if—checking for personal income, social roles and status, gender, nationality, and professions—somebody has experienced some form of discrimination. The hospital (see Table 1) fits this criterion very well. If discrimination is found, then further analyses on a broader level are needed. Being the first of its kind, the present study is a preliminary analysis of perceived discrimination in Italy. Second, approval from the hospital’s Human Resources (HR) Department brought two important results: (a) a very low non-response rate (4%) and (b) a random sample of the hospital’s employees. These two facts (and especially point [a]) have significant statistical impacts. The choice of an organization with this variety of factors—or sampling frame, such as income, gender, ethnicity, and age, and so on—seems consistent with the scope of the analysis (Groves et al., 2009, p. 70ff.).

Table 1. Sample Distribution (% , Professions).

Professions	Sample	%	Hospital ^a	%
Doctors	43	15.47	633	15.84
Top managers	9	3.24	20	0.50
Other employees	55	19.78	1,005	25.16
Middle management, security, and other laborers	84	30.22	741	18.55
Nurses and lab technicians	87	31.29	1,596	39.95
Grand total	278	100	3,995	100

^aThese are cumulative data that include workers of the five hospitals of the system. Data retrieved online (http://www.ospedativarese.net/index.php?url=hazosp_dati_per).

Interviews took place in the recreational/dining area and in the parking lot to minimize interference with employees' working procedures. According to the HR Department, differences in shifts among employees gave good probability of randomizing the sample. To avoid interviewer bias (Groves et al., 2009), 290 interviews were collected in three different times and locations. Participant anonymity and confidentiality were guaranteed throughout the entire process. After the usual data adjusting and polishing (Cohen, Cohen, West, & Aiken, 2003), the final sample is $N = 278$. Data were collected during the winter of 2006-2007.

Table 1 shows discrepancies between official employee data and the selected sample. These differences are due to the fact that the participants were employees of the administrative headquarters, where there are higher numbers of middle managers and other administrators. The only number that seems to be affected is that of nurses and lab technicians (which appear below the level of the population percentage in the sample). Beside this discrepancy, the sample is a consistent representation of the hospital's population.

Measures

The set of questions used in the interview is divided in two sections. The first collects general biographical data, whereas the second is dedicated to mortgage-related discriminatory issues. Sample questions include items such as "Have you ever asked for a home mortgage loan?" "Have you ever been denied a home mortgage loan?" or "Do you have the perception that the loan has been rejected on the basis of your area/region/country of origin?" The last question above was included as a check on illegitimate questions (on prejudicial or non-economic issues) that the banker might have asked when discussing the application, but was not used as a control variable in the estimation of

the model. All information gathered is self-reported data, meaning that participants describe themselves to the interviewer. Nationality means the place of birth or culture of reference.

As in every research based on survey data, there is the risk that participants provide dishonest answers (Clark & Desharnais, 1998). This phenomenon increases its likelihood when people are asked about sensitive issues and when there is a mismatch in characteristics of interviewers and interviewees (Christensen & Rosenthal, 1982; Flores-Macias & Lawson, 2008; Fuchs, 2009). Interview questions were designed to reduce potential discomfort of participants. The topic “discrimination” does not appear among sensitive issues in the literature on interviewer’s gender effect (Fuchs, 2009). However, the team of interviewers was sufficiently diverse in terms of gender and other personal characteristics. Overall, there is no reason to believe that dishonest were more probable than honest answers. Acronyms, definitions, and descriptive statistics are presented in Table 2, while Table 3 shows correlation coefficients.

About 54% of interviewees (149 out of 278) applied for mortgages and only 11% (16 out of 149) were rejected, so at a first glance it seems very hard not to get financed for a home mortgage in the study area (Table 3). It is important, however, to study the determinants of both the application process and its acceptability to potential customers. Ideally, there should be no discrimination on non-economic criteria in mortgage lending, which should directly reflect sound creditworthiness standards only. A high rejection rate strongly correlated with applicant non-economic characteristics would be solid evidence of explicit redlining, but in the absence of explicit redlining discrimination is unlikely to occur in readily detectable ways. Discrimination may be instead a subtle and socially embedded phenomenon.

Data are analyzed with a model that is called sequential logit (Gouriéroux, 2000, Section 3.4.1) and is used to study two sequential decisions such that, as in the present situation, the second decision is faced only when the first one has a positive result (see the mathematical appendix for details). Estimation has been performed using maximum likelihood estimation in R (R Development Core Team, 2008). The variance of the parameters is computed using the observed Hessian. The estimated variances are checked comparing confidence intervals (CIs) using these variances with other ones based on the likelihood ratio principle (Meeker & Escobar, 1995) that yielded almost the same results. As an alternative to the classical maximum likelihood estimator, the same logistic model was estimated using Firth’s (1993) penalized maximum likelihood estimators, which is known to remove first-order bias and correct for other problems arising in small samples (Heinze, 2006). Results were virtually unchanged so that we only provide classical maximum likelihood estimates.

Table 2. Descriptive Statistics of the Sample.

Variable	Description	M	SD
Y_1	Request of mortgage	0.536	0.499
Y_2	Acceptance of mortgage request	0.478	0.500
FEM	Dummy variable: 1 if female	0.522	0.500
AGE1834	Dummy variable: 1 if age is between 18 and 34	0.263	0.440
AGE3550	Dummy variable: 1 if age is between 35 and 50	0.550	0.497
AGE51+	Dummy variable: 1 if age is 51 or more	0.187	0.390
NITA	Dummy variable: 1 if from Northern Italy	0.640	0.480
SITA	Dummy variable: 1 if from Central or Southern Italy	0.291	0.454
ABR	Dummy variable: 1 if from abroad	0.069	0.253
FAM1	Dummy variable: 1 if family composed of 1 person	0.112	0.315
FAM2	Dummy variable: 1 if family composed of 2 people	0.187	0.390
FAM3	Dummy variable: 1 if family composed of 3 people	0.291	0.454
FAM4	Dummy variable: 1 if family composed of 4 people	0.335	0.472
FAM5	Dummy variable: 1 if family composed of 5 people or more	0.075	0.263
INC0015	Dummy variable: 1 if income between 0 and 15,000 €	0.259	0.438
INC1530	Dummy variable: 1 if income between 15,000 and 30,000 €	0.446	0.497
INC3050	Dummy variable: 1 if income between 30,000 and 50,000 €	0.176	0.381
INC50+	Dummy variable: 1 if income of 50,000 € or more	0.119	0.324
DOC	Dummy variable: 1 if doctor	0.155	0.362
MAN	Dummy variable: 1 if manager	0.032	0.176
EMP	Dummy variable: 1 if employee	0.198	0.398
SEC	Dummy variable: 1 if security or laborer	0.302	0.459
TEC	Dummy variable: 1 if laboratory technician or nurse	0.313	0.464
NTJ	Dummy variable: 1 if non-tenure job	0.194	0.395

Note. The mean and the standard deviation are computed over 278 observations. NTJ = non-tenure job.

Table 3. Correlation Coefficients Within Variables.

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1 Y ₁																								
2 Y ₂	.89***																							
3 FEM	.05	.07																						
4 AGE1834	-.10*	-.13**	.02																					
5 AGE3550	.12**	.16***	.09	-.66***																				
6 AGE51+	-.04	-.05	-.13***	-.29***	-.53***																			
7 NITA	-.04	.04	-.10*	.12**	-.02	-.12**																		
8 SITA	.12**	.07	.06	-.24***	.09	.16***	-.86***																	
9 ABR	-.15**	-.20***	.09	.20***	-.13	-.06	-.36***	-.17***																
10 FAM1	.06	.03	-.07	.05	-.02	-.02	.03	-.05	.04															
11 FAM2	-.05	-.05	.11*	.01	-.10	.13	.03	-.02	-.02	-.17***														
12 FAM3	-.04	-.04	.00	-.06	.07	-.02	.13**	-.12**	-.05	-.23***	-.31***													
13 FAM4	.06	.08	.02	.03	.06	-.11*	-.10	.12**	-.01	-.25***	-.34***	-.46***												
14 FAM5	-.03	-.03	-.11*	-.02	-.04	.07	-.13**	.09	.08	-.10	-.14**	-.18***	-.20***											
15 INC0015	-.06	-.07	.14**	.11*	-.09	-.01	-.09	-.05	.26***	.05	.07	-.04	-.02	-.08										
16 INC15300	.10*	.07	-.04	-.01	.10*	-.12**	-.07	.13**	-.10*	.05	.03	-.10	.02	.02	-.53***									
17 INC3500	-.02	-.01	-.01	-.04	.00	.04	.09	-.05	.09	-.13**	-.03	.14**	-.01	-.03	-.27***	-.42***								
18 INC50+	-.04	.01	-.12	-.09	-.03	.14**	.11	-.06	-.10*	.01	-.12**	.03	.00	.11	-.22***	-.33***	-.17***							
19 DOC	-.06	-.01	-.13**	.13**	-.17***	.08	.11*	-.12**	.00	.07	.00	-.06	-.07	.14**	-.12**	-.16***	-.02	.43***						
20 MAN	-.07	-.05	-.07	-.06	-.04	.12**	.10*	-.07	-.05	-.07	.12**	.06	-.09	-.05	-.11*	-.16***	.13	.25***	-.08					
21 ENP	.01	.03	.11*	-.13**	.20***	-.10*	.09	-.06	-.06	-.09	.09	.10*	-.05	-.11*	-.13**	.12**	.13**	-.15**	-.21***	-.09				
22 SEC	.00	-.03	-.11*	-.05	.04	.01	-.13**	.04	.16***	.04	.03	-.09	.02	.05	.38***	-.09	-.16***	-.19***	-.28***	-.12**	-.33***			
23 TEC	.07	.04	.13**	.09	-.06	-.03	-.08	.13**	-.09	.01	-.15**	.03	.11*	-.05	-.13**	.18	.01	-.10*	-.29***	-.12*	-.34***	-.44***		
24 NTJ	-.13**	-.12**	.09	.27***	-.16***	-.10*	.10*	-.12**	.01	-.06	.02	.01	.04	-.04	-.06	-.06***	-.04	.05	.17***	.06	-.15**	.03	-.06	

*p value between .05 and .1. **p value between .01 and .05. ***p value between 0 and .01.

Results

The two models presented below are quite parsimonious in terms of parameters. For this reason, the study includes some marginally significant variables that may have an interest in terms of interpretation, consistently with Gigerenzer (2004) and Davidson (2000, Section 7.5.2).

Determinants of Mortgage Application

The starting point is the analysis of the determinants of mortgage application, variable $Y_{i,t}$. The section follows a general-to-specific formulation: From the complete model (Model 1) in which the vector x_i contains all the variables (apart from AGE51+, ABR, FAM5, INC50+, TEC, as they would raise a collinearity problem) a parsimonious model (Model 2) is obtained through progressive elimination of the variables. This emphasis on the variable selection procedure is not superfluous as, as shown below, special attention to variable selection is needed to analyze determinants of mortgage acceptance.⁶

Table 4 provides results of the estimation procedure. The likelihood ratio test for the restriction from Model 1 to Model 2 takes the value 3.5587 with 14 degrees of freedom and a p value equal to .9986, strongly failing to reject the restriction. The study also considers a test for the restriction from Model 2 to a model without regressors (Model 3). The likelihood ratio test of this restriction yields a value of 12.61882 with 3 degrees of freedom and a p value equal to .0055. Therefore, this restriction is rejected. In an attempt to improve explanatory power, other models were introduced including subsets of the regressors, but Model 2 seems to be the best one. In the following, hypotheses acceptance and rejection are discussed as they relate to Model 2 only.

The restricted model (Model 2) discards variables related to gender and family size. Data do not support the fact that women request mortgage loans less frequently than men (H1.1), nor that the probability to apply is higher for smaller than for larger families (H3.1).

Table 4 also shows that variable non-tenure job (NTJ) has a negative and strongly significant effect, supporting the idea that employees with NTJs have a lower probability of applying for mortgages. Although this circumstance has not been taken into consideration during the hypotheses-building phase, the analysis provides evidence that NTJ is positively correlated to FEM (females), AGE1834 (individuals of age 18-34), NITA (northern Italians), and DOC (doctors), while it is negatively correlated with AGE3550 (individuals of age 35-50), SITA (southern Italians), and EMP (generic employees). NTJ is a control variable as it discounts effects related to other variables; this variable is related to creditworthiness, hence, its statistical

Table 4. Regression Model for Y_{it} .

Variable	Model 1				Model 2				Model 3			
	Coefficient	SE	t stat	p value	Coefficient	SE	t stat	p value	Coefficient	SE	t stat	p value
Constant	-0.39766	0.85966	-0.46258	.64367	-0.91669	0.52587	-1.74318	.0813*	0.14453	0.12027	1.20176	.22946
FEM	0.22879	0.26878	0.85121	.39465								
AGE1834	-0.16612	0.4101	-0.40508	.68542								
AGE3550	0.17284	0.34765	0.49716	.61908								
NITA	0.24232	0.53123	0.45615	.64828	1.14182	0.54516	2.09446	.03622**				
SITA	0.51303	0.56666	0.90536	.36528	1.52541	0.5723	2.66541	.00769***				
FAM1	0.70822	0.59793	1.18445	.23623								
FAM2	-0.04569	0.55787	-0.0819	.93472								
FAM3	0.08368	0.52233	0.1602	.87272								
FAM4	0.34048	0.50896	0.66897	.50351								
INC0015	-0.19277	0.54098	-0.35634	.72159								
INC1530	0.19825	0.48909	0.40534	.68523								
INC3050	-0.10169	0.50882	-0.19986	.84159								
DOC	-0.14594	0.4485	-0.32539	.74489								
MAN	-0.3595	0.80783	-0.44502	.65631								
EMP	-0.16137	0.36988	-0.43629	.66263								
SEC	-0.02395	0.35085	-0.06827	.94557								
NTJ	-0.57489	0.33877	-1.697	.0897*	-0.60285	0.31341	-1.92353	.05441*				
Parameters		18					4					
Log likelihood		-183.886097084772					-185.665465807328					-191.974875286333

*p value between .05 and .1. **p value between .01 and .05. ***p value between 0 and .01.

Table 5. Mortgage Application Rate.

Variables	Probability	SD	Lower bound	Upper bound
Non-tenured, foreigner	17.952989%	8.627393%	6.491732%	40.816629%
Non-tenured, southern Italian	50.146838%	8.915838%	33.333622%	66.926912%
Non-tenured, northern Italian	40.66770%	6.93122%	28.07507%	54.61933%
Tenured, foreigner	28.56334%	10.73023%	12.48379%	52.84740%
Tenured, southern Italian	64.764932%	5.362688%	53.696314%	74.446797
Tenured, northern Italian	55.604578%	4.105671%	47.480855%	63.439299%

significance cannot be associated with discrimination. It is highly correlated to variables related to residency, age, and gender, but not to family size. Therefore, it can be argued that discrimination customarily attributed in casual speaking to age and gender is indeed related, at least in the case of hospital employees, to NTJs. It comes as no surprise that Model 2 includes this variable.

Variables NITA and SITA have positive and strongly significant impacts on the probability of applying for a mortgage; for the hypothesis that the impact of NITA and SITA is the same, the likelihood ratio test takes the value 1.9322 with 1 degree of freedom and a p value of .1645. This suggests that, while foreigners (ABR) have a much lower probability of applying for mortgages, there is no difference between northern and southern Italians. Therefore, both H2.1 and H2.3 are rejected. However, it is difficult to interpret unambiguously the statistical significance of these variables as a sign of self-selection due to mortgage refusal. As an example, Muslims may not ask for mortgages from classical Western banks because of religious interdictions. Moreover, in Model 2 there is no effect of variables related to family size, hence H3.1 cannot be accepted as formulated.

Table 5 presents the probabilities of mortgage application as a function of the statistically significant characteristics of the individuals. Along with these probabilities, Table 5 also provides the standard deviation of the probability (based on the variance of the estimators) and the lower and the upper bounds of a 95% CI computed using the logit transform of the probabilities (so to avoid nonsensical values outside the interval $[0, 1]$). Table 6 shows a measure of the variation of the probability when a regressor varies and the other ones stay constant. The effects of the significant variables are quite strong in

Table 6. Differences in Mortgage Application Rate.

Variable	Fixed variables	Difference	SD
Between tenured and non-tenured	For foreigner	10.610356%	5.733076%
Between tenured and non-tenured	For northern Italian	14.936879%	7.601249%
Between tenured and non-tenured	For southern Italian	14.618094%	7.760207%
Between northern Italian and foreigner	For non-tenured	22.71471%	8.76637%
Between northern Italian and foreigner	For tenured	27.04123%	11.33436%
Between southern Italian and foreigner	For non-tenured	32.19385%	10.06825%
Between southern Italian and foreigner	For tenured	36.20159%	11.91312%
Between northern and southern Italian	For non-tenured	-9.479139%	6.894677%
Between northern and southern Italian	For tenured	-9.160354%	6.507618%

Note. The column "Variable" shows the varied regressor.

practice: For people with tenure, the probabilities of applying for mortgages are, respectively, 55.60%, 64.76%, and 28.56% for northern Italians, southern Italians, and foreigners; for non-tenured people, the same probabilities are 40.67%, 50.15%, and 17.95%.

Determinants of Mortgage Acceptance

This section is dedicated to the analysis of variable $Y_{2,i}$, mortgage acceptance. In this case, there is a problem related to there being only 16 participants out of 149 with rejected applications. This low count is a serious limit to the number of regressors that can be introduced in the model to be reduced. All the procedures implemented to obtain a manageable result seem to converge at the same final model (Model 1, Table 7). The first procedure was to follow a specific-to-general procedure where variables were added so to obtain a well-balanced model (this path is similar to Drzewiecki & Andersen, 1982, pp. 2415-2416). This procedure is the opposite of the one followed in the first step, and depends on the fact that the observations available to test the hypotheses in the second step are highly unbalanced between acceptance

Table 7. Regression Model for Y_2 .

Variable	Model 1				Model 2			
	Coefficient	SE	t stat	p value	Coefficient	SE	t stat	p value
Constant	-0.59054	0.93569	-0.63113	.52795	2.11758	0.26459	8.00319	0***
FEM								
AGE1834								
AGE3550	0.89479	0.58023	1.54213	.12304				
NITA	2.99742	1.04336	2.87284	.0041***				
SITA	1.77575	1.01864	1.74325	.08129*				
FAM1								
FAM2								
FAM3								
FAM4								
INC0015								
INC1530								
INC3050								
DOC								
MAN								
EMP								
SEC								
NTJ								
Parameters		4				1		
Log likelihood		-43.7928469545917				-50.8101462138224		

*p value between .05 and .1. **p value between .01 and .05. ***p value between 0 and .01.

and refusal. The second procedure used an automatic backward elimination algorithm to test the validity of variables included in the final model. Table 7 shows results of the estimation.

The likelihood ratio test for the restriction of Model 1 to a model containing only the intercept as a regressor (Model 2) yields 14.0346 with 3 degrees of freedom and a p value equal to .0029, thus leading to rejection of the simpler model.

The variable AGE3550 has a positive and marginally significant impact: The probability of mortgage acceptance is lower for younger and older individuals. This result can be linked to creditworthiness, as younger individuals have usually wages too low to guarantee a mortgage, whereas older individuals have lower creditworthiness because of their shorter expected life spans. None of the variables related to gender or family size are significant in the model, hence all related hypotheses (H1.2, H3.2) have to be rejected. However, it is apparent that AGE3550 has a positive correlation with FAM3

Table 8. Mortgage Acceptance Rate.

Variables	Probability (%)	SD (%)	Lower bound (%)	Upper bound (%)
Middle-aged, foreigner	57.54798	25.27799	15.13867	91.15134
Middle-aged, southern Italian	88.894336	4.865917	75.286246	95.461164
Middle-aged, northern Italian	96.448577	1.961745	89.835925	98.815809
Non-middle-aged, foreigner	35.651031	21.465639	8.132437	77.615557
Non-middle-aged, southern Italian	76.588250	8.603654	56.088137	89.337338
Non-middle-aged, northern Italian	91.734998	3.955211	79.969844	96.860892

and FAM4 and a negative correlation with FAM1, FAM2, and FAM5 (see Table 3). This fact suggests that the study should have focused on families with or without children rather than small and large families. This distinction would probably have carried more support for H3.2.

The other variables in Model 2 relate to the nationality of the participants: They are both positive and strongly significant. It is interesting in this case to check whether the impact of NITA and SITA is the same: The likelihood ratio test has the value 4.2069 with 1 degree of freedom and a p value of .0403. Therefore, northern Italians seem to have a higher probability of acceptance than southern Italians, and Italians in general have a higher probability than foreigners. Both H2.2 and H2.4 are therefore accepted.

Tables 8 and 9 show mortgage acceptance rates and they should be read similarly to those in Tables 5 and 6. For a customer aged between 35 and 50, the probability of receiving an acceptance is 96.45%, 88.89%, and 57.55%, respectively, for northern Italians, southern Italians, and foreigners. For customers of different age groups, the same probabilities drop to 91.73%, 76.59%, and 35.65%.

Implications

When related to nationality issues, all hypotheses tested in the second step—that is, H2.2 and H2.4 with respect to rejection—are accepted, whereas all hypotheses in the first step—that is, H2.1 and H2.3 with respect to home mortgage requests—are rejected.

Table 9. Differences in Mortgage Acceptance Rate.

Variable	Fixed variables	Difference (%)	SD (%)
Between non-middle-aged and middle-aged	For foreigner	21.89695	14.06147
Between non-middle-aged and middle-aged	For northern Italian	4.713579	3.556606
Between non-middle-aged and middle-aged	For southern Italian	12.306086	8.575291
Between northern Italian and foreigner	For middle-aged	38.90059	24.83714
Between northern Italian and foreigner	For non-middle-aged	56.08397	21.59048
Between southern Italian and foreigner	For middle-aged	31.34635	24.41535
Between southern Italian and foreigner	For non-middle-aged	40.93722	22.51173
Between northern and southern Italian	For middle-aged	7.554241	4.542933
Between northern and southern Italian	For non-middle-aged	15.14675	8.44395

The two-step model suggests that all hypotheses related to gender (H1.1 and H1.2) and family discrimination (H3.1 and H3.2) are rejected. The following pages are dedicated to the discussion of findings for each of the variables on which hypotheses have been based. General discussion and conclusion follow.

Nationality

Differences between northern and southern Italy continue to feed people’s prejudices. Southern Italians speak with an accent and phrasing that sound completely different from those spoken in the northern part of the country. At the time of the study, the traditional process of in-person applications was accepted. Therefore, it was easy for a banker to recognize where the person sitting in front of him or her came from. This recognition ease may explain the disparities in rejection rates.

The most interesting result that can be found in the data stresses how foreigners receive differential treatment when applying for home mortgages. Most of the foreigners in the sample described themselves as Muslims. H2.2 and H2.4 may be related to the phenomenon of discrimination against

religious minorities. If this link to the religious character is maintained, results found in this northern Italian area are in line with what Brüß (2008) discusses in his article on discrimination of Muslims in Berlin, London, and Madrid.

However, this point raises more than one question. First, it is unclear whether the less probable recourse to mortgages for foreigners (H2.2) is due to the use of alternative sources of financing (Islamic banking for Muslims), or to the anticipation of a probable refusal. This option may also be available, to some extent, to Italians too in the form of the “wait and pay cash” or the “friend exploitation” strategy (Secchi, 2011, p. 75) whereas alternative finance is probably more tied to culture and religion, as it is the case for Muslims. However, as argued elsewhere, “[t]hese are all secondary and very limited cases where people decide not to access a regular credit institution” (Secchi, 2011, p. 75). The case for alternative sources is extremely welcome in a pluralistic society, whereas the second factor—that of self-selection—may be connected to perceived discrimination through the tendency to anticipate a refusal because the individual feels that it is most likely to happen. The first reason for self-selection due to anticipation of a probable refusal is due to the peculiarities of the Italian mortgage market.

In Italy a mortgage application is not as common as it may be in the Anglo-American markets and is still perceived as an exceptional event. Some people simply do not even contemplate applying for a loan because they do not consider themselves eligible for it, and this possibility is witnessed by the high rate of acceptance among applicants (89% in the sample). Moreover, applying for a mortgage in the Italian system involves the disclosure of a certain number of sensitive information to a bank clerk and to the manager of the subsidiary. This disclosure, especially if followed by a refusal, can be perceived by the applicant as an intrusion into one’s private life. The second reason is less dependent on the country and more deeply linked to perceived discrimination. Several studies have shown that perceived discrimination is connected to anxiety, psychological distress (Kessler et al., 1999), and hypertension (St. Jean & Feagin, 1998); rational individuals tend to avoid these forms of physical and psychological deficiency.

The identification of a low application rate with the phenomenon of self-selection receives some support from the second set of hypotheses, those related to rejection. Findings suggest that foreigners are far more penalized in terms of rejection rates; age also contributes to expand the gap. The percentage of foreigners between 35 and 50 years of age that have their applications approved is 38% lower than that of Italians, and this number becomes 58% lower for young or old applicants. This information may explain the phenomenon that has been defined as self-selection: Individuals prefer not to get discriminated against by (a) choosing other sources of financing, and/or by (b) not applying for home mortgages.

It has also been suggested that foreigners keep strong ties with their native countries and behave as if their lengths of stay in the host country is shorter than what it will turn out to be in reality, thus avoiding any act that can link them too deeply with the immigration country. However, recent studies (Brüß, 2008) suggest an opposite trend, that of the immigrants and especially of their children that consider the hosting country their “home.”

A recent study (Bonaccorsi di Patti & Felici, 2008) provides some evidence that immigrants might have higher mortgage default probabilities than Italians. As that article has no proxy for income, family size, and job stability, it is probable that this difference is due to the fact that immigrants, in general, are prone to accept more precarious jobs and thus have lower income than Italians. This difference in mortgage defaults may serve as an explanation for these results. However, job instability is hardly an explanation of higher default and rejection rates in the selected sample as it is composed of public sector employees; also, in the measures there is a proxy for NTJ. The analysis also features several measures of creditworthiness that were absent in the study mentioned above. It may therefore be the case that mortgage rejection rates observed in the study are partly due to statistical discrimination, namely, to the identification of immigrants as a high default class, irrespective of their actual creditworthiness.

Last, it may be that the observed discrimination is in reality due to an unequal sampling probability for Italians and foreigners. This problem may be a consequence of a sampling frame bias: the fact that the sampling frame is not representative of the population. Or it may be caused by sampling error, that is, fluctuations in the number of individuals belonging to a particular category; as often happens in retrospective studies, it may be that small categories, such as immigrants, are under- or over-sampled. In both situations, it is of interest to re-estimate the model for mortgage acceptance, namely $Y_{2,i}$, varying the sampling probability of immigrants. The model was rewritten in an equivalent form in which the ABR regressor appears explicitly. Then, the sampling probability was computed so that it would yield a test for the nullity of the ABR coefficient whose p value is exactly 5%, and the test is marginally significant at 95%. This significance holds if immigrants were sampled at least 2.503129 times more than non-immigrants. As immigrants are 6.8% of the total sample, this line of reasoning would lead to a very low percentage of immigrants in the population (below 2.85%) that is not compatible with common sense.

Gender

The Italian social model is known for being based on males, showing a tradition of overt and accepted discrimination toward women. The fact that

findings show no evidence of this aspect may be related to many different factors (Dinev et al., 2006, p. 391ff.).

First, Italian social habits are under continuous change such that women are no longer marginal in the economic and social lives. Second, the role of women in the economy is changing too, as their employment rate has grown higher and higher (European Commission, 2008).

However, as national statistics show, salaries are, in most of the cases, much lower for women than for men, especially when related to the European average (European Commission, 2008). This salary difference is also captured by the model when the positive correlation (.088) between the variable for NTJ and gender is considered. As women accept to work without tenure more often than men, there may be that discrimination is likely to be found more often in the job market than in the banking industry.

Broadly speaking, findings can be interpreted as a good signal. They suggest that something is changing in this traditional Mediterranean country, and that women have credibility when they get access to credit.

Family, Income, and Age

The inability of variables related to family, income, and work to capture differences in the probability of mortgage applications (and acceptance) is at first puzzling. It may be argued that several confounding factors—which were not accounted for in this study—could enter both choices and could bias the actual effect of these regressors. As an example, high-income customers may have a higher probability of mortgage acceptance (thus not experiencing self-selection) but may have a lower probability of applying. Moreover, customers with no collaterals could be helped by someone else in their families who provide what the bank needs to fill in the applications.

It is very difficult to capture these effects in a retrospective study, avoiding arbitrariness in the recorded values of the variables. Nevertheless, the total absence of any effect of regressors related to family, income, and work is hardly affected by confounding factors; probably other factors are paramount in mortgage application and acceptance. The following short notes can help develop the analysis furthermore:

1. Hypotheses were built on the assumption that bigger size families are those where an “age effect” could be seen. When it is argued that families of three or more members asked for home mortgages in the past, it means that their age is higher than one and two-member families. Table 3 shows very limited support to this hypothesis: Age and family size cannot be linked.

2. There might be an effect related to nationality. Increases in Italian demographics are sustained by foreigners who move to improve their living conditions. These families (Istat, Istituto Nazionale di Statistica, 2007a) show fertility rates and average size which are higher than the average Italian family. According to this information, Hypotheses 3.1 and 3.2 could be affected by the fact that foreigners tend to have larger families. Correlation coefficients for FAM4 and FAM5 on one hand, and SITA, NITA, and ABR on the other hand present limited support to this argument. There seems to be no systematic relation between nationality and family size. In summary, family dimension is not related to diverse treatments for mortgage applications or rejection rates.
3. Income is an interesting variable to consider too. Table 3 confirms that higher incomes are slightly related to larger families and supports the rejection of family-related hypotheses. The data do not support any useful result when income and family size are considered together. No additional information is gained by splitting results to deal with income only.

Conclusion

This study was conducted in the winter of 2006-2007, before the financial crisis of September to October, 2008. Therefore, the situation today could be significantly different. There are three elements of the home mortgage market in Varese prior to the 2008 financial crisis that emerge from this study:

1. The market is fair as far as gender differences are considered. The number of women applying for mortgages is still lower than that of men. The study suggests that disparities in the job market (such as wage differentials) or in the social structure of the family may occur and explain the perceived difficulty for women and the occurrence of self-selection.
2. Members of large and small families are not discriminated against by bankers in the sense that there is no apparent disparity in their acceptance rates. The economic factor seems to be important here as larger families tend to have higher cumulative incomes, offsetting any bias against large families.
3. In line with the literature on home mortgage discrimination, this study does provide some evidence that ethnicity plays a role in discrimination and explains differentials in both application and rejection rates for non-Italians. Foreigners' applications are more likely to be rejected

than the ones from Italians; the difference in probability varies between 38% and 58%, weighted by age. Findings also show that southern Italians experience discrimination when compared with northern Italians. While the relatively few cases of rejection strictly limit how strongly these findings can be asserted, the evidence of discrimination does not disappear in the analysis.

Limitations and Future Research

Some of the limitations of this research relate to structure and findings. The study provides evidence of ethnic discrimination; nevertheless, more data are needed to make results more robust. Also, an exploratory study such as this one should indicate the route for the analysis whereas future studies may assess the quality of these first preliminary results. If a generalized trend is to be found, more data and different methods should be used. For example, surveys conducted specifically on immigrants who work for different organizations, as well as qualitative studies, are extremely useful when analyzing perceived or experienced discrimination.

The more traditional approach to discrimination tends to overlook the problem of non-captured consumer characteristics that manifest themselves in gender, ethnicity/nationality, and age, and so on. As Pager and Shepherd (2008) point out,

[t]he main liability of this approach is that it is difficult to effectively account for the multitude of factors relevant to unequal outcomes, leaving open the possibility that disparities attributed to discrimination may in fact be explained by some other unmeasured cause(s). (p. 184)

This problem is not only a risk for more traditional studies but remains an issue for the present study too. Although this research takes the perspective of *de facto* or perceived discrimination and matches it with proxies for credit-worthiness, there are other relevant aspects that have not been addressed: motivation, satisfaction, lifestyle, culture, and personal values, and so on. This study shares this limit with other research on discrimination.

There are two more points that may serve as basis for future research. On one hand, even the limited evidence for discrimination found in home mortgages is an invitation to bank executives and managers to address this topic more consistently than they did in the past. If discrimination has really taken place in the market for mortgages, this discrimination cannot have taken place without the lack of action, or even the implicit agreement, of bankers that refrained from altering the status quo. The very procedures for mortgage

approval (discussed earlier) seem to be tailored to the average Italian customer in a way that makes it harder for others to access. More recently, some companies have started to target the excluded segment of the market. While it is not appropriate to address policy issues in this article, there is some ground to strongly encourage the Italian banking industry to avoid discrimination. Why is avoidance in their interests? How can Italian banks limit discriminatory behaviors? Should the EU regulate the market of home mortgages more heavily?

On the other hand, discrimination is an important topic for Italy. As mentioned at the beginning of the article, the rise of xenophobic and racist right-wing parties is a motive of concern for European politics. Although it is not possible to draw a clear connection between the two phenomena from this study, the two issues of xenophobia and discrimination are certainly matters of concern in the ways they seem to emerge together (Pager & Shepherd, 2008; Quillian, 2006). Due to the exploratory nature of this study, further investigations are needed. If the political vote is transferred on (or it is due to) unfair and illicit business practices, institutional bodies should take action before the phenomenon becomes widespread.

In summary, there are two major contributions of this study: (a) it provides an original econometric model (see Appendix) on a two-step procedure to test for perceived discrimination and (b) the method of inquiry may constitute a starting point for future studies on perceived discrimination in conditions where other approaches to identify discrimination are not feasible.

Mathematical Appendix

Let $Y_{1,i}$ be a variable that takes the value 1 if the individual i applied for a mortgage and 0 otherwise. Let $Y_{2,i}$ be a variable that takes the value 1 if the request of the individual i was accepted and 0 otherwise: clearly, $Y_{2,i}$ is defined only when $Y_{1,i} = 1$. Let x_i be the set of regressors for individual i .

Therefore, the probability that individual i does not apply for a mortgage is the probability of observing $Y_{1,i} = 0$, that is,

$$Pr(Y_{1,i} = 0 | x_i). \quad (1)$$

The probability that individual i applies for a mortgage and receives a refusal is the probability of observing $Y_{1,i} = 1$ and $Y_{2,i} = 0$, that is,

$$Pr(Y_{1,i} = 1, Y_{2,i} = 0 | x_i) = Pr(Y_{1,i} = 1 | x_i) \times Pr(Y_{2,i} = 0 | Y_{1,i} = 1, x_i). \quad (2)$$

The probability that individual i applies for a mortgage and is accepted is the probability of observing $Y_{1,i} = 1$ and $Y_{2,i} = 1$, that is,

$$Pr(Y_{1,i} = 1, Y_{2,i} = 1 | x_i) = Pr(Y_{1,i} = 1 | x_i) \times Pr(Y_{2,i} = 1 | Y_{1,i} = 1, x_i). \quad (3)$$

Variables $Y_{1,i}$ and $Y_{2,i}$ are modeled through logit regression models, conditionally on the vector of observed regressors x_i . This modeling approach means that

$$Pr(Y_{1,i} = 1 | x_i) = \frac{\exp\{\beta_1' x_i\}}{1 + \exp\{\beta_1' x_i\}}, \quad (4)$$

$$Pr(Y_{1,i} = 0 | x_i) = \frac{1}{1 + \exp\{\beta_1' x_i\}}, \quad (5)$$

and

$$Pr(Y_{2,i} = 1 | Y_{1,i} = 1, x_i) = \frac{\exp\{\beta_2' x_i\}}{1 + \exp\{\beta_2' x_i\}}. \quad (6)$$

$$Pr(Y_{2,i} = 0 | Y_{1,i} = 1, x_i) = \frac{1}{1 + \exp\{\beta_2' x_i\}}. \quad (7)$$

The reader should remark that the regressors need not be the same in the two steps as some of the coefficients can be equal to 0.

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Notes

1. This description is a result of a short round of interviews with Italian bankers located in Varese and Como, Italy. Results were compared with official documents found in the Bank of Italy's website although the level of detail presented in this subsection is not reached in any text of the authors' knowledge.
2. These credit scoring measures were mainly introduced with the Basel II (Basel Committee on Banking Supervision, 2004) reform and have been constantly improved ever since; they were intended only for internal use at the time this study was conducted.
3. Another relevant variable may be the credit history of the individual, but as explained in the subsection "Description of the Home Mortgage Process," credit scoring was unevenly used in Italy at the time the data were collected.
4. In September 2008, the bank CheBanca!, owned by Mediobanca, one of the largest Italian investment bank, hit the news because it explicitly refused to provide products and services to immigrants, irrespective of their length of residency in Italy (Giannotti, 2008). In March 2012, the President and the CEO of Extrabanca, the first Italian bank explicitly designed for immigrants, were condemned for racial harassment of an employee.
5. Lombardy's GDP per-capita in the years of the survey (2006-2007) was around €27,800 (Istat), given the EU-27 average of €23,500 and the euro-area average being €26,600 (Eurostat, 2008).
6. The authors have also tried to aggregate income, family size, and job variables in categories with a higher number of individuals, but this aggregation yielded no improvement with respect to the model specified in terms of the variables collected in the survey.

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