The Social Effects of Ethnic Diversity at the Local Level: A Natural Experiment with Exogenous Residential Allocation

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Abstract

Relying on diversity measures computed at the apartment block level under conditions of exogenous allocation of public housing in France, this paper identifies the effects of ethnic diversity on social relationships and housing quality. Housing Survey data reveal that diversity induces social anomie. Through the channel of anomie, diversity accounts for the inability of residents to sanction others for vandalism, and to act collectively to demand proper building maintenance. However, anomie also lowers opportunities for violent confrontations, which are not related to diversity.

JEL Classification: H10, H41

1   Introduction

Recent research has drawn an ominous picture of the implications of cultural heterogeneity on social peace and economic growth. A large literature shows a negative relationship, though not always robust, between ethnic diversity and the quality of public goods (Alesina et al., 1999; Alesina and La Ferrara, 2000; Miguel, 2004; Miguel and Gugerty, 2005), welfare spending (Luttmer, 2001), civil conflict and trust (Fearon and Laitin, 2000; Putnam, 2007; Alesina and La Ferrara, 2002) and economic growth (Alesina et al., 1999). The leading explanations of why ethnic fragmentation affects those outcomes are the heterogeneity of preferences and the free-rider problem which undermines collective action. The literature thus views the problem of fractionalization in terms of voting behavior on aggregate outcomes such as public goods provision at the country or county level. Yet, little is known on how diversity directly affects social relationships and well-being at the neighborhood level. Our paper fills this gap by looking at the effect of ethnic diversity on the quality of common spaces through social relations within local communities at the housing block level. Moreover, we provide a new identification strategy to overcome the endogeneity problem raised by residential self-selection. We rely on a natural experiment of exogenous spatial allocation in the French public housing sector to identify the causal effect of diversity on those outcomes.

The main contribution of our paper is to identify the effect of ethnic diversity on social relationships and the quality of public goods at a very local block level. We use micro data on housing conditions where the units of observation are public housing blocks, defined as sets of houses or apartments buildings delimited by the surrounding streets.[1] This is a key improvement for the analysis of how diversity shapes social relationships compared to the previous literature which is based on aggregated data at the county, regional or country levels. Diversity might matter for various reasons at different levels and the channels through which diversity operates are likely to depend on the size of the unit of observation. By focusing on the provision of public goods at an aggregate level, the previous literature is mainly interested in the effect of diversity on collective action through lobbying or patronage (see Alesina and La Ferrara (2005) for a survey). Instead, we analyze in this paper how diversity within a small community affects individual well-being and satisfaction with housing conditions through relationships among neighbors. We exploit the French Housing Survey that reports specific information about the neglect and voluntary degradations of the public areas, the quality of the housing, and interpersonal conflicts between neighbors. This data makes it possible for the first time to identify various effects of diversity on local social relationships and public goods outcomes, and to explore the possible channels explaining this link.

When residents of more diverse blocks report that neglect and voluntary degradations are rife in their housing unit, we interpret this as a result of the residents' failure to develop social norms and other regarding preferences. When they report the breakdown and the poor quality of basic facilities (such as heating and soundproofing), we interpret this as a result of a diminished capacity for collective action for social improvement. Those goods are of course not directly degraded by diversity. But diversity might be associated with lower ability for collective action, explaining the

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[1]Our units of analysis, called *ilots* in French, are in fact defined similarly to US census blocks.

irregularity of maintenance and the absence of repairs in more diverse blocks. In this case, the result could be supported in equilibrium if the landlords reckon that they can neglect facilities in ethnically heterogeneous housing projects, knowing that they will not face collective action from their tenants demanding better services. Finally, when residents report incidents of direct interpersonal conflicts, we can interpret this as an effect of diversity on cultural enmity. We test these channels by using indirect and objective measures of the quality of social relationships and common spaces, such as the number of repairs and the upkeep of the security equipment. We also exploit data on municipal police and show that local police resources are higher in more diverse area. We find that diversity decreases the quality of local common spaces, but has no effect on public safety. We also show that individuals are more likely to report the absence of any social relationship with their neighbors than interpersonal conflicts with them. We thus conclude that diversity leads to social anomie, preventing the emergence of social norms and collective action.

In order to make unbiased causal inferences, we provide a new strategy for identifying the causal effect of diversity on economic and social outcomes. The general concern in this literature is that the endogenous residential sorting of individuals on ethnic grounds biases the estimate of the impact of diversity. We address this issue by using a natural experiment in which households in France are allocated to public housing blocks without taking their ethnic origin or their preference for diversity into account. Due to a strongly republican ideology, the French public housing system allocates state planned moderate cost rental apartments (HLMs - *Habitations à Loyer Modéré*) to natives and immigrants without concern for their cultural and ethnic background, mixing people indiscriminately. Some HLM neighborhoods are consequently quite diverse, and others quite homogeneous. Furthermore, HLM inhabitants rarely move, as the rents are much lower than market rates. Consequently, residents cannot choose whether to live near people like themselves. Rather, they accept their placement, whether next to co-ethnics or strangers. Methodologically, this means that we can take the degree of diversity in any one HLM block as exogenous, connect the level of diversity with the housing situation, and examine whether greater heterogeneity leads to poorer provision of public goods or more troubled social relationships in French communities. We extensively document the actual process of allocation of households within the public housing sector. We show that legal rules prohibit housing allocation based on ethnic backgrounds and that in practice, the characteristics of the public housing sector make it very complicated to bypass the law.

We also conduct a variety of formal statistical tests to verify the absence of self-sorting on ethnic characteristics. In particular, we run various placebo tests at the housing block level on housing characteristics that logically cannot be related to diversity, *i.e.* fixed characteristics over which residents cannot have any control. We show that diversity does not correlate with measures of exogenous characteristics of the distribution of public housing characteristics. We perform a variety of alternative tests. Focusing on households that moved into a public housing unit in the previous year, we do not find any evidence of self-segregation along ethnic lines. We also examine potential self-selection prior to the move and show that households that have refused an offer end up living in public housing blocks that display the same ethnic diversity as those who accepted their first offer. Thus even if some households were willing to be choosy with respect to the ethnic

composition of their neighborhoods, they cannot self-segregate in the public housing sector due to the allocation process and the tight supply constraints of dwellings.

Naturally, this paper is not the first one to try to overcome this identification issue. But other attempts to establish causality rely mainly on instrumental variables.[2] However convincing the instruments might be, this strategy cannot overcome the concern as to whether the instruments fulfill the exclusion restriction and do not have a direct effect on public goods. For instance, Miguel (2004) and Miguel and Gugerty (2005) use the pre-colonial patterns of settlement as instruments, assuming that these variables have no direct impact on present-day ethnic relations. More recently Glennerster et al. (2013) have also relied on historical data of fractionalization as an instrument. But since past settlement patterns are likely to have at least some direct impact on present-day ethnic relations, the exclusion restriction might still be technically violated. Using a natural experiment with exogenous allocation of ethnic groups is thus an alternative strategy to deal with these traditional caveats. The paper which is the closest to ours is Dahlberg et al. (2012), which uses a nation-wide policy intervention program that exogenously placed refugees coming to Sweden across Swedish municipalities. However, their paper examines in-group bias in preferences for redistribution rather than the effect of diversity on local public goods and social relationships.

Our paper is related to the large literature on the effects of ethnic diversity on economic and social outcomes. In US cities, higher ethnic diversity has been found to be associated with lower social capital (Putnam, 2007; Alesina and La Ferrara, 2000, 2002), lower welfare spending (Luttmer, 2001), and poorer quality of public goods (Alesina et al., 1999). In Western Kenya, the greater the mixing of tribes, the less people have public spiritedness, and the lower the contributions to public goods (Miguel, 2004; Miguel and Gugerty, 2005). In cross-national surveys, diversity correlates with low growth in GDP and low quality of institutions (Easterly and Levine, 1997; Alesina et al., 2003). Alesina and Zhuravskaya (2011) show that islands of homogeneity amid a broadly diverse country do not decrease the negative effects of diversity on the quality of government.[3] Theoretical contributions, in particular on ethnic conflicts, can be found in Caselli and Coleman (2013) and Esteban and Ray (2011). These findings are depressing, in a normative sense, for those who herald gains from diversity (Page, 2007); and depressing, in an empirical sense, as in our globalized world, local cultural diversity is increasingly common (Dancygier, 2010). However, the robustness of the relationship and the channels at work remain to be determined. Putnam (2007) is careful to underline that his data allow him only to claim short run correlation between diversity and trust.

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[2]In their seminal contribution to the literature, Alesina et al. (1999) provide a first attempt to deal with this endogeneity issue by collecting data at different levels of aggregation (cities, metropolitan areas and counties). Their assumption is that different levels of aggregation allow for the correction of the potential biases introduced by Tiebout sorting.

[3]The magnitude of the relationship between those outcomes and ethnic diversity is substantial. Putnam (2007) finds that the difference between living in a highly homogeneous city (Bismarck, North Dakota) and heterogeneous Los Angeles is as great as the difference between an area with a poverty rate of 7 percent and one with a poverty rate of 23 percent. Alesina et al. (1999) show that moving from complete homogeneity to complete heterogeneity is associated with a reduction in spending on roads by nine percentage points. Luttmer (2001) finds that interpersonal preferences based on negative exposure and racial group loyalty of recipients are associated with 33 percent of the cross-state variation in the support for welfare spending. Alesina et al. (2003) show that moving from perfect homogeneity to maximum heterogeneity would be associated with a reduction in a country's growth rate by two percentage points per year.

Miguel (2004) finds no diversity impacts on local outcomes in Tanzania, a country in which the ruling authorities have sought to ameliorate ethnic cleavages by promoting a common language. Posner (2004) shows that changed electoral rules can create broader ethnic identities thereby reducing fragmentation. Dunning and Harrison (2010) show that inter-tribal polarization in Mali is reduced with cross-cutting cleavages. Glennerster et al. (2013) also argue that the presence of strong chiefs at the local level, although reinforcing the salience of ethnicity, translates into effective inter-ethnic cooperation.[4] Finally, Alesina and La Ferrara (2005) document the potential positive effect of diversity on productivity through complementarity in skills.

Our paper is also incidentally related to empirical works examining neighborhood effects on social and economic outcomes. So far, the literature has mainly focused on the neighborhood effects on physical and mental health, economic self-sufficiency, risky and criminal behavior, or educational outcomes (see among many others Katz et al., 2001; Oreopoulos, 2003; Goux and Maurin, 2007; Kling et al., 2007). In particular, Katz et al. (2001) and subsequent contributions use the Moving to Opportunity program to estimate the externalities from neighbors. To avoid the problem of endogenous neighborhood selection, those authors use data from this randomized experiment in which some families living in high-poverty U.S. housing projects were offered housing vouchers to move to higher income areas. While our paper is not based on a randomized experiment, we also avoid the inferential issues of residential endogenous selection by using the exogenous spatial allocation of households with respect to ethnic characteristics. We enlarge the dimensions analyzed in this literature by looking at how immediate neighborhood diversity affects well-being and the quality of the local environment.

The remainder of this paper is organized as follows. Section 2 describes the data. Section 3 presents our identifying assumption on the absence of residential self-sorting in public housing: we document the allocation process in the French public housing market, providing institutional support for our assumption. We then demonstrate that at the block level, diversity does not correlate with measures of exogenous characteristics of the distribution of public housing characteristics. Section 4 shows our main results. We document the effects of ethnic diversity on residents' satisfaction with their housing conditions, local public goods quality and social relationships. We discuss the various dimensions and channels through which diversity might matter for households' well-being at the local level in Section 5. Section 6 provides robustness tests on the validity of self-reported outcomes. Section 7 concludes.

2 Presentation of the data

2.1 Data sets

We rely on two representative French national surveys to estimate the relationship between ethnic diversity and the quality of public space within the housing block.[5] In each survey, we focus on the

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[4] Varshney (2003) and Jha (2013) also show how local institutions can ameliorate communal violence in India.

[5] A third survey, the Labor Force Survey, is used to perform some of the tests presented in the on-line appendix, and hence described in this appendix.

sub-sample of public housing population in order to identify the causal effect of diversity and control for self-sorting. Our main data source is the French housing survey of 2002 (*Enquête Logement*, INSEE, hereafter HS), which provides detailed information on the intensity and quality of social relationships with neighbors and on the quality of local public spaces, ranging from vandalism in the common areas, to housing quality and conflicts in the neighborhood. The HS also reports detailed information about the ethnic, economic and social backgrounds of surveyed households.[6] The 2002 wave of the HS surveys more than 32,000 households, out of which about 16 percent live in the public housing sector. Our sample thus contains 5,189 observations (households) living in about 2,500 different blocks. The sampling of the HS is such that all the individuals living in a given block are not systematically surveyed and are randomly drawn instead. Therefore, we cannot compute any representative measure of block-level characteristics (in particular, diversity) using the HS data. We overcome this concern by using a second database, the 1999 French Population Census, which is an exhaustive survey covering the entire population living in France. Each HS sample is drawn from the most recent Census and the geographical units of the HS are a subsample of those of the census. There are on average 2,895 blocks with public housing tenants per *département* in the census (the median number is 741). The mean (respectively median) number of public housing tenants in these blocks is 18.4 (respectively 8). The census provides variables such as birth country or nationality at birth, from which we compute a representative measure of diversity at the housing block level, which we are then able to match with the corresponding housing block in the HS. The census also provides some information about buildings characteristics that will be used in Section 3.2 to test our identifying assumption.

2.2   Fractionalization indexes and sample characteristics

We measure ethnic diversity with the standard fractionalization index (hereafter DIV) used in the literature (e.g. Alesina et al. (2003) for a detailed description).[7] This index reflects the probability that two randomly drawn individuals from a given population belong to different groups (previous studies looked at ethno-linguistic or religious groups, while we focus on diversity in terms of national origins). More formally, the basic fractionalization index is computed as one minus the Herfindahl index of group shares:[8]

$$DIV_l = \sum_{i=1}^{i=N} s_{il}\left(1 - s_{il}\right) = 1 - \sum_{i=1}^{i=N} s_{il}^2 \tag{1}$$

where s_{il} is the share of group *i (i=1, ..., N)* in area *l*. If the population living in area *l* is fully homogeneous, DIV_l equals 0 and it converges to 1 as the population heterogeneity increases. Note that DIV_l can increase for two reasons: it will increase with the number of groups, and it will increase the more equal the size of the groups. As mentioned above, the census provides information about the country of birth and the nationality at birth of individuals, allowing us to construct two different measures of diversity. In the remainder of the paper, we focus on diversity

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[6]Some of the key variables for our study are not public. The French Statistical Institute (INSEE) made their access possible as part of a convention between the INSEE and Sciences Po. We were required to make use of the "sensitive" data within the confines of the INSEE.

[7]We have also tried alternative indices such as polarization indicators, yielding similar results.

[8]These groups can be defined *inter alia* by ethnicity, language, nationality or country of origin.

by nationality at birth, computed at the block level. The distribution of diversity faced by tenants living in public housing blocks is presented in Table A.1 (Appendix A). The average public housing tenant surveyed in the 1999 Census lives in a block with 28 percent of diversity. After matching this measure of diversity to the corresponding public housing blocks in the HS, we obtain that the average public housing tenant lives in a block with 25 percent of diversity. The highest level of diversity observed in a public housing block is 87.5 percent in the Census and 80.2 percent in the HS.

Table A.2 (Appendix A) presents the main socio-demographic characteristics of the public housing sample from the 2002 Housing Survey. Foreigners (or immigrants) are over-represented in the public housing population compared to the private housing population. Public housing neighborhoods are also characterized by a poor socio-economic environment, where individuals have low education levels and earn low incomes: around one third of adults have no diploma at all, and the share of individuals having achieved graduate studies is 12 percent, less than half the corresponding share in the private housing sector. The bottom of Table A.2 also reports some characteristics of the living environment of the surveyed public housing families: slightly more than half of households live in buildings built between 1949 and 1974, and the average household lives in a block where there is a 22 percent unemployment rate, more than twice as large as the national average in 1999, the year in which the block unemployment rate was computed.

3 The exogeneity of diversity in the public housing sector

This section addresses the main identification issue raised by the estimation of the causal impact of ethnic diversity on social interactions and the quality of public goods. The issue, common to all the literature on ethnic diversity, is that fractionalization presents a high risk of endogeneity. Individuals generally tend to self segregate: they prefer forming links with others like themselves, with whom they share common interests, and in particular people of the same ethnicity or the same social background.[9] If people can choose the area where they live, diversity would be an outcome of strategic choices, and attempts at measuring the effects of diversity would be confounded. If all people would rather move into neighborhoods where people are similar to themselves, and richer people could better afford to move, we would observe a (spurious) relationship of diversity and wealth. But if wealthy families that live in diverse settings are those that have a taste for diversity, the true effect of diversity on social outcomes would be an underestimate. Therefore, the level of diversity of the neighborhoods is probably endogenous and any estimates on the implications of diversity will be biased.[10]

To identify the effect of ethnic diversity, one must therefore study individuals who are assigned to their place of residence without consideration of ethnic characteristics. The purpose of this section is to bring forth evidence that spatial allocation of households across public housing blocks in France can be considered as exogenous with respect to ethnic characteristics due to French regulation.

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[9]Self-sorting is most typically based on race or ethnicity.

[10]Combes et al. (2012) use customer discrimination theory to show that landlords will tend to discriminate against ethnic minorities when renting their apartment, bringing new evidence as to why any causal claim of ethnic diversity on public goods in the private housing market would be biased.

Naturally, the sample of households that apply for public housing dwellings is endogenous with respect to economic, social or cultural characteristics. But among the pool of selected households, we show that their spatial allocation across the public housing blocks of a given *département* is exogenous with respect to their ethnic characteristics, conditional on their other characteristics.

Note that the mere fact of working at the block level already decreases the extent of endogenous sorting. First, although households can generally choose the neighborhood in which they move, they may not be able to select a particular block in this selected neighborhood. Second, while it is possible to have an idea of the socio-economic and demographic characteristics of a given neighborhood, it is much more difficult to observe such characteristics in a specific block prior to moving. Bayer et al. (2008) rely on this key assumption and provide empirical evidence that individuals' characteristics are not correlated within blocks. We present a more formal discussion and a statistical test of the exogeneity of the allocation process with respect to ethnic characteristics below.

3.1 An ethnically-blind allocation process built into law

We first document the actual process of allocation of households across public housing dwellings. This gives a legal basis to our identifying assumption of the absence of self-sorting on ethnic characteristics in the public housing sector.[11] In France, the only eligibility requirements for admittance into the public housing sector are to be legally living in France (as a French citizen or migrant with a valid residence permit) and to be living under a certain threshold of income per equivalent household member.[12] This income ceiling is rather high: in 2009, this threshold was between 36,748 and 50,999 euros per year for a four-person family, depending on the region of residence (the upper figure being nearly 3,000 euros higher than the average disposable income of four-person households in 2007). Using the 2002 Housing Survey data, Jacquot (2007) estimates that given their income, between two thirds and four fifths of households living in continental France could apply for a public housing unit. As a consequence, the population eligible for public housing is about three times as large as the available space in vacant dwellings. Due to the boom in housing prices in the private sector during the mid-90s and the 2000s, the public housing market became even more attractive, luring new categories of people who could no longer afford to live in the private housing market. This inflow increased further the applicants-to vacant units ratio. This implies that other criteria must be taken into account in the selection process. First, household size is considered to ensure a suitable match with the characteristics of vacant dwellings. More importantly, the degree of emergency of the application is taken into account. To administer this, five priority criteria are defined by law at the national level to ensure that vacant housing will first be attributed to households with obvious social difficulties: those in which there is a mentally or physically disabled person; those living in precarious or hazardous shelters due to financial constraints; those living in

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[11]The process of allocation across public housing blocks in France was mainly inspired by theories from Le Corbusier (1887-1965). Le Corbusier insisted that France must avoid the homogeneous ghettos of the urban landscapes elsewhere, and should therefore allocate housing blind to ethnicity, not permitting family networks to grow within housing establishments. These ideas were translated into state regulation (Bernardot, 2008).

[12]To compute the income per equivalent household member, the French statistical institute weights each household member as follows: 1 for the first adult, 0.5 for any other person of 14 years old or older, and 0.3 for any other person younger than 14 years old.

a temporary accommodation; individuals living in a precarious shelter who recently found a job after a long unemployment spell; and spouse-abused individuals.[13]

To get on the queue for a housing unit, households submit a form containing the following information: name, date of birth, family situation, employment status, resources of the household, reasons for applying to the public housing sector (currently or soon to be homeless, or reasons related to a health situation, family situation, job situation, inappropriate current housing, or unpleasant environment), type of housing looked for, whether the applicant is disabled and whether this is the first application. It is important to stress the fact that the application form contains very limited information about the ethnicity of the applicants: they only need to inform about their nationality, which is limited to three possible categories (French, European Union, or non European Union).

Entering a public housing unit results in the cancellation (*radiation*) of the application. Therefore, when public housing tenants want to move to another public housing unit, they have to go through the same whole procedure as if this were the first demand, and are given a new application number. The application form is the same for everyone, independently of whether the household is already a public housing tenant or not, and simply includes a box indicating whether the current unit is in a public housing or not. Since both public-housing and private-housing applicants go in the same pool of applicants, the same criteria apply: resources, family structure, and the five priority criteria (although the criteria of living in a precarious shelter or in a temporary accommodation are unlikely to apply for applicants already living in the public housing sector).

We now document the selection process of the applicants. The commissions in charge of allocating households to vacant public housing dwellings are held at the *département* level (or at the city level in the case of Paris which is both a city and a *département* due to its size).[14] Their composition is regulated by law: a commission includes six members of the public housing offices board, a representative of associations promoting integration and housing for disadvantaged people,[15] mayors of the municipalities in which vacant housings are to be allocated, and a representative of any association defending tenants' rights. An additional *département* representative may be part of the commission. For each vacant housing unit, at least three households must be considered by the commissioners, who finally decide which household will be allocated to the vacant housing unit considered, according to the eligibility and priority criteria detailed above. Other criteria such as the number of children in the household are also taken into account in order to allocate suitable dwellings.[16]

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[13] Article L441-1 of law relative to construction and housing - *Code pour la Construction et l'Habitat*

[14] Continental France is divided into 22 large administrative areas, called *régions* (regions henceforth), and into 96 smaller administrative areas, called *départements*. Each *département* is hence a subdivision of a region, and several *départements* can belong to the same region. Each *département* is administered by an elected General Council (*Conseil Général*) and its President, whose main areas of responsibility include the management of a number of social and welfare programs, primary and secondary schools, buildings and technical staff, local roads, rural buses, and municipal infrastructure.

[15] These associations are officially approved by the administrative head of the *département*, the *préfet*.

[16] Public housing allocation in Paris serves as a useful concrete example. We draw on the official audit of *Observatoire du Logement et de l'Habitat de Paris* (Observatoire, 2011). Paris is a special case as it is, due to its size, a *département* as well as a city. The application form, the commission, and the allocation process thus take place in Paris, at the city level. As of January 2010, there were 186,017 public housing dwellings in Paris. Public housing buildings are scattered across all Parisian areas, with a high concentration (69 percent) in six districts (the 13th, 14th, 15th, 18th, 19th and 20th *arrondissements*). Within Paris, 48.7 percent of households are under the income ceiling and could be theoretically eligible. In practice, only households with very modest incomes apply (71 percent have an income lower

With the allocation process regulated by legal rules at the national level, it seems unlikely that households can be allocated according to their origin. The main concern of the commissions is to favor socially endangered households, as shown by the priority criteria. Finally and most importantly perhaps, any decision based on the origin of an applicant, i.e. discriminating on this basis, is prohibited in France. Public housing offices are regularly audited: if evidence of discrimination is detected, they are judged and punished accordingly. This is why the lawyers Rouquette and Lipietz (1991) stress that the rules of allocation of public housing units that prohibit "localism", and the high administrative barriers that effectively prevent exchanges of lodgings except for changing spatial needs of families, make the allocation of public housing units largely exogenous with respect to the ethnic origins of the applicants.

Despite this legal process of allocation, one might still be worried about the possibility of self-sorting of households that refuse the residential allocation proposed by the commission. In theory, households can refuse up to three offers. However, self-sorting, especially on ethnic characteristics, seems unlikely to be a common practice.[17] Residential mobility within the public housing sector is very low, due to the strong shortage of vacant public housing dwellings. This makes it unlikely that the selected households could be really picky about the diversity of their neighborhood (see the study by Simon, 2003). Moreover, rents are considerably lower in public housing than in private housing, increasing the opportunity cost of moving, and assuring low turnover: the mobility rate in the public housing sector is even lower than for recent owners. Using data from the 2002 Housing Survey, Debrand and Taffin (2005) give precise measures of the 2002 annual mobility rates: it amounted to 10.3 percent for new owners, to 15.9 percent for tenants in the private housing sector, but only to 9.9 percent for tenants in the public housing sector. While 9.9 percent may seem high, we show that when households move in a public housing block, they almost never achieve a placement in a less diverse setting (this is reported in the first section of the on-line appendix devoted to further tests of the identifying assumption). A corollary of subsidized rents and low mobility is low vacancy rates. Around 2.75 percent of public housing units were vacant (1.75 percent for vacancies of more than three months) in the early 2000s as reported by the 2002 HS and the Social Union for Housing (*Union Sociale pour l'Habitat*) in its 2011 annual report. In comparison, the vacancy rate for all types of housing units, public and private alike was 7.9 percent during this period.

than the minimum ceiling for all France, equivalent to 2,345 euros per month for a household with two children). On the 31st of December 2010, there were 121,937 ongoing applications, to be compared with 12,500 public housing units allocated over the year 2010. The breakdown of the households that were granted a public housing unit in 2010 is the following. 67.7 percent came from precarious housing, 28.8 percent came from the private rental sector, and 2.3 percent came from the public housing sector. In the latter case, those are people who moved for larger space following an increase in their household size (only 12 percent of the public housing dwellings have more than three rooms). The mobility rate (defined as the ratio of new entrants over the total number of public housing dwellings) is particularly low: it reaches 5.5 percent in 2010. It is formally possible to indicate a precise neighborhood in the application form, but in practice, very few applicants (6.6 percent) do provide this information. More than half of the 121,937 applicants (52.9 percent) did not mention any particular area at all, probably due to the fear of being rejected on this ground. Among those who indicated an area of preference, 91.2 percent mentioned the area where they were already living.

[17]In practice, the share of households refusing a public housing offer is not negligible, but we show that such behavior does not reflect selection based on preferences for or against diversity. See Section 1.3 of the online appendix.

This has obvious implications for waiting time. The Paris Region Public Housing Office (DRIHL) provides information on the average waiting time in the *départements* of this region. In Paris, the average waiting time is 6 years for a one-room flat, 9 years for a two-room or three-room flat and 10 years for a flat of more than 4 rooms. In the Hauts de Seine *département* (south-west of Paris), the average waiting time is 4 years, taking all types of flats together. The corresponding figure for the other *départements* of the Paris region (Seine Saint Denis, Val de Marne, Seine et Marne, Yvelines, Essonne and Val d'Oise) is 3 years. The Q&A section of this website also indicates that "if you refuse an offer that is adapted to your situation, you will probably not get another offer before a long time period." Importantly, for persons engaged in an emergency process in order to get a public housing unit due to unfavorable living conditions, refusing a proposal excludes them from the emergency procedure. Corroborating anecdotal evidence beyond the Paris region comes from information gathered by the *Journal du Dimanche* (a generalist weekly French newspaper) in December 2013. It requested from 15 cities for the average waiting time to get a public housing unit there. The article reveals that "people already living in public housing often wait more than others," as is explicitly indicated in the response forms from Lyon, Lille and Nantes. For instance, in Nantes (the only city providing precise figures), public-housing tenants wait on average 34.7 months versus 21.2 months for the first-time applicants.

All of these considerations imply that households seeking public housing have very limited control over the precise place where they will be located, or of the degree of diversity within the block to which they will be assigned. This gives some initial support to our assumption that the distribution of households across public housing blocks is blind to households' ethnic characteristics and to their preferences for diversity.

3.2 Test of the exogeneity of diversity in public housing blocks

We now provide a more formal statistical test for our identifying assumption: we test whether, at the level of the block, diversity correlates with measures of the distribution of exogenous public housing buildings characteristics. We focus on building characteristics that are fixed in the sense that residents have no control over them. This strategy is very intuitive: if the assignments are random, then knowing the fixed characteristics of the block should reveal nothing about block-level diversity. More specifically, we run the following regression:

$$DIV_l = \alpha + \beta_1 Z_l + \text{FEmunic} + \varepsilon_l \tag{2}$$

where Z_l are the exogenous characteristics of public housing in each block l. The correlation between these characteristics and block-level diversity (DIV_l) is measured conditionally on municipality fixed effects (FEmunic), which are the smallest geographic level after housing blocks that we can control for (France is divided into more than 36,000 municipalities). We use the 1999 Census data to measure the following buildings' characteristics, representative at the block-level: the share of buildings with an elevator, the share of buildings with a sewage system and the median number of apartments per building. One may *a priori* think that the median date of construction of the buildings, or any block characteristic related to a building's age, could be considered as fixed

characteristics. The age of the building is actually highly correlated with the waves of immigration and therefore with diversity, as we discuss at the end of this section. For this reason, note upfront that we do not perform the proposed test on variables related to a building's construction date, but that we use building age as a control variable in the main regressions of the paper. The regressions are run on the 2,492 blocks for which we observe public housing buildings in the Housing Survey.

The results of this test are presented in Table 1. Columns 1 to 3 show the coefficients associated with each characteristic in separate regressions. All the characteristics are then included at once in column 4. The F-test for the null hypothesis $\beta_1 = 0$ cannot be rejected at the 1 percent level for all coefficients of the three fixed characteristics that are expected to be totally unrelated to DIV. This simple test is in line with the idea that the public housing offices allocate dwellings to households without taking their origins into account, hence supporting our assumption of exogeneity of diversity in the public housing sector.

As mentioned above, any block characteristics related to buildings age could have been considered as a fixed characteristic over which residents do not have control, if it was not highly correlated with the various waves of immigration. The oldest and first public housing units were built before World War II to welcome both native French workers and immigrants from Southern Europe (Italy and Spain in particular). The vast majority of public housing structures were built post World War II to welcome native French leaving the agricultural sector as they moved to industrial agglomerations. Shortly thereafter, these new structures housed the very large inflows of immigration from the Maghreb that took place between 1950 (post-war reconstruction period) and 1974 to help boost this industrial development. After 1974, the French government decided to reduce immigration drastically, limiting it to family reunification. Since mobility rates are almost nil in public housing, the ethnic composition is largely shaped by those various immigration waves. From the HS survey, we do observe a peak in the level of diversity in public housing buildings built between 1949 and 1974.[18] Therefore, when we regress block diversity on block characteristics related to the age of the buildings (median date of construction or share of buildings constructed after 1974), we unsurprisingly obtain a significantly negative coefficient. Yet, as explained, this does not come as a contradiction to our assumption. In addition, when we replicate the regression of column 4, controlling for the median date of construction, the p-value for the F-test of joint significance of the three fixed characteristics considered above is larger than 0.7, as reported in column 5. This suggests that diversity in the public housing sector is exogenous conditional on the age of the building, which is therefore a key variable to be included in our analysis.

Our identifying assumption is supported by a variety of alternative tests presented in Section 1 of the on-line appendix, and that we briefly summarize here. First, we run additional placebo tests but at the individual level. We estimate the effect of DIV_l on individual outcome variables that logically cannot be related to diversity, such as the perception of the quality of public goods that are financed and managed at a more aggregate level (e.g. by the municipality) rather than locally by the public housing offices. Likewise, we find that the DIV_l coefficient is not statistically

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[18]The average level of diversity is 22 percent for buildings constructed before 1948, 28 percent for buildings constructed between 1949 and 1974, and then continuously declining from .20 for buildings built between 1975 and 1981 to .15 for those built after 1999.

significantly different from zero for those outcomes (section 1.1). Second, we test the exogeneity of the different steps in the allocation process during the application and the refusal decision process. We show the absence of any self-sorting along ethnic lines focusing on movers into public housing blocks (section 1.2). Since self-selection could still occur prior to the move, we also focus on households that have refused a public housing dwelling offer. We show that households having declined an offer end up living in public housing blocks that display the same level of diversity as those who directly accepted their first offer. Thus even if households try to be choosy with respect to the ethnic composition of their neighborhoods, they eventually do not self-segregate in the public housing sector due to the allocation process and the tight supply constraints of dwellings (section 1.3). Finally, we compare the observed distribution of diversity across blocks within each *département* with a randomly simulated distribution of households, and find that the equality between the two distributions cannot be rejected in most *départements*, supporting further our identification assumption (section 1.4). To sum up, all those tests point in the direction of diversity being exogenous in the public housing sector.

4 Analysis

4.1 Specification

This section estimates the impact of diversity on social relationships and public goods at the local housing block level. We identify the causal impact of diversity by focusing on the public housing sector where households are exogenously allocated with respect to ethnic characteristics. Let j, k and l indicate respectively households, buildings and blocks. For each outcome, we estimate the following equation:

$$Y_k = \alpha + DIV_l\beta + X_j\gamma + Z_k\delta + W_l\mu + FEmunic + \varepsilon_{jkl} \tag{3}$$

where Y_k denotes the housing outcome we are interested in, as stated by household j living in building k and block l. Most of the outcomes we consider pertain to the building, but some of them refer to the neighborhood (in which case we consider a Y_l). DIV_l is the level of ethnic diversity in the block, X_j is a vector of household characteristics, Z_k a vector of building characteristics and W_l a vector of socio-economic characteristics of the block.[19]

The vector of controls includes first the household characteristics that are related to the selection criteria into the public housing sector (X_j), in particular household size and (log) household income per member.[20] Second, we control for block level characteristics Z_k that could be confounding factors and be spuriously correlated with DIV_l. This includes the date of construction of the building (in six categories), since it might be a strong predictor of housing quality and explain part of the degradations observed. But this variable is also spuriously correlated with diversity since

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[19]Section 4 of the online Appendix tests the robustness of our results to alternative specifications. First, we control for ethnic group shares in addition to fractionalization. Second, we try using an alternative measure of diversity based on a proxy for French speaking. Our main results remain unchanged in both cases.

[20]We have tested alternative specifications including age, gender, education, employment status and nationality of the household head since those characteristics could also influence the opinion on housing conditions. Yet these variables have a very limited explanatory power and do not change our main results.

it captures the different immigration cohorts, as suggested by the results presented in section 3.2. Third, we add two variables to control for the social and economic background of the neigborhood (W_l). One is a detailed classification in 27 categories of the socio-economic environment of each neighborhood, constructed by Tabard (2002) from the INSEE. This classification characterizes each neighborhood according to the socio-economic category and the occupation of all male inhabitants. We use the classification that was built using the 1999 census data. This is the most detailed variable available in French national surveys to capture the socio-economic background of a neighborhood. Indeed, an important issue is whether the degree of fractionalization is picking up various dimensions of the environment where people are living, including the extent of inequality and the unemployment rate or the socio-economic background of the neighborhood (Alesina and La Ferrara, 2002). The other is block unemployment rate (computed using the 1999 Census) since this is a potential confounding factor for explaining criminality and other socio-economic outcomes, as shown by Hémet (2013) and Fougère et al. (2009). Finally, all the regressions include municipality fixed effects, which is the smallest geographic level after housing blocks that we can control for in French national databases. They correspond to *arrondissements* in large cities (Paris, Lyon and Marseille), and are otherwise small cities. All results derive from OLS estimates, with robust standard errors clustered at the housing block level.[21]

4.2 The various effects of diversity

The HS covers a large variety of questions documenting housing conditions, from social relationships with neighbors to the quality of the housing environment. Table 2 reports the descriptive statistics of our main outcomes of interest. To organize the discussion, we distinguish three main dimensions: (a) the neglect or voluntary degradations that are directly under the control of the tenants, *i.e.* for which they can be held responsible, (b) the poor quality of basic housing facilities that are under the control of the public housing offices (the landlords), due to a lack of maintenance and repairs and (c) public safety outcomes such as personal aggression and robberies, reflecting interpersonal or inter-ethnic conflict. We have also run an exploratory factor analysis that yields similar, if not identical, categories. The results obtained with the three indices resulting from factor analysis are reported in section 1 of the online Appendix.

The first dimension of housing quality refers to actions or goods that are largely under the control of the tenants. In this category, we include all the variables reporting neglect or voluntary deterioration in the common areas of the building. First, households are asked a general question on degradations: *"Were the common areas of your building (lobby, staircase, floors) vandalized or neglected (destruction, deterioration) over the last twelve months?"*. The answers are 1 for "Never", 2 for "Minor degradations" and 3 for "Major or very frequent degradations". Households are then asked to mention which kind of degradations they observed over the previous year. They can choose several possible answers from the following list: *graffiti or degradations of the walls (or on the floor), trash and litter on the floor, broken windows, broken doors, broken light bulbs, degradation of mail boxes, degradation of the entry phone or entry code, deterioration of the elevator.* For each outcome,

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[21]Logistic regressions on dummy outcomes yield similar results. To ease the interpretation of the coefficients, we will report the OLS estimates henceforth.

the variable is coded as 1 in case of a degradation, and 0 otherwise. All those items refer more or less directly to willful degradation. We will thus refer to this set of questions as the category *Vandalism*. We also include in this category a question about noise pollution:[22] *"How frequently are you disturbed by the noise in your housing during the day?", "During the night?".* The answers are 1 for "Infrequently or never", 2 for "Rather frequently", and 3 for "Very frequently".

The second main dimension of housing quality refers to goods that are not directly produced or altered by residents. But they might be related to diversity by the lack of maintenance and repairs by the public housing office to improve the housing quality. We will henceforth label this category *Poor Housing Quality*. We include in it variables corresponding to housing problems that can neither be caused nor solved by the tenants, but for which public housing offices are responsible. The households are first asked: *"How would you qualify the way the common areas of your building are maintained and taken care of (cleaning, maintenance of collective facilities: lighting, trash cans,...)?".* The answer ranges from 1 for good, to 2 for average, and 3 for bad. More specific questions are also asked: *"How does the façade of your building look?",*[23] *"What is the quality of the soundproofing of your housing?",*[24] *"Was the elevator out of order during more than 24 hours over the past three months?",*[25] *"Did you experience toilet issues (leaks, flush breakdown, drainage problems) over the last three months?",* or *"Did you experience coldness in your apartment during more than 24 hours over the past twelve months?".* We also include more detailed questions concerning the origin of coldness: *"Did you experience coldness because of bad insulation?", "Did you experience coldness because the heating equipment broke down ?"* and *"Did you experience coldness because of poor heating equipment?".* For all the previous questions, the variable is 1 when the answer is "Yes" and 0 otherwise.

The last dimension of housing quality refers to interpersonal aggression and criminality. We will label this category *Public Safety*. Three questions correspond to this category: *"Have you, or a member of your household, been a victim of or a witness to physical aggression in your neighborhood during the last twelve months?", "Have you, or a member of your household, been a victim of or a witness to a robbery in your neighborhood during the last twelve months?",* and *"Have you been victim of a burglary (or any attempt) over the past twelve months?".* For these three questions, the variable equals 1 in case of the event, and zero otherwise.

Finally, we look at the impact of diversity on the overall satisfaction about housing conditions, using the question: *"In general how do you judge the quality of your housing conditions?".* The variable takes on values from 1, for very good, to 5 for very bad. This question on well-being related to housing conditions is rather general, and summarizes in a way the various dimensions in which housing conditions could be affected by ethnic fractionalization.

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[22]The underlying assumption is that the source of the noise in the hallways and apartments of the building is not due to poor soundproofing. As a matter of fact, we see in the following sections that more diversity increases the disturbance related to noise, but fails to explain the quality of soundproofing.

[23]There are five possible answers: 1=As new, 2=Good, 3=Average, 4=Dirty, 5= Bad, with cracks, 6=Very bad, the building is threatened with collapse.

[24]The possible answers are: 1=Good, 2=Average, 3=Bad.

[25]In contrast, the question mentioned in the *Vandalism* section refers to the interior status of the elevator rather than its mechanical breakdown.

4.3 Results

Table 3 shows the effect of ethnic fractionalization on the various outcomes related to the three different dimensions: *Vandalism*, *Poor Housing Quality* and *Public Safety*, and on the respondent's general level of satisfaction with housing conditions. For each outcome, we run a separate regression of the form of equation 3, controlling for household selection characteristics, age of the building and the socio-economic background of the neighborhood and including municipality fixed effects. The estimated coefficients for controls are presented in Table B.1, Appendix B.

The first part of Table 3 (Panel A) reports the effect of ethnic diversity on outcomes related to voluntary degradations and vandalism. For almost all the outcomes considered, the estimated effect of ethnic diversity is statistically significant at the 1 percent level,[26] and is sizeable. Take for instance the results for graffiti: a one standard deviation increase in ethnic diversity is associated with a rise by 9.2 percentage points in the probability of observing graffiti, which represents 21 percent of the total standard deviation of this outcome. The effect of ethnic diversity is twice as large as the effect of local unemployment: a one standard deviation increase in block unemployment rate is associated with a rise by 5 percentage points in the probability of observing graffiti, which corresponds to 11.5 percent of a standard deviation of this outcome. Regarding deterioration, a one standard deviation increase in ethnic diversity induces a 4.2 percentage points increase in the probability of observing degradation of the elevator, which represents 14.9 percent of the total standard deviation of this outcome. This effect is three times as large as that of the local unemployment rate.

The second set of regressions (Panel B) shows the effect of diversity on outcomes signaling poor quality of housing. The coefficient associated with ethnic diversity is positive and significant at the 1 percent level for problems related to elevator maintenance. It is also significant at the 5 percent level for the maintenance of the common areas and for coldness in the apartment. Diversity, has, however, no significant impact on soundproofing quality and toilet malfunction. The estimated effects of diversity, while significant, are somewhat lower than those found for outcomes associated with vandalism. Consider the probability for the elevator to be out of order. A one standard deviation increase in diversity is associated with a 4.7 percentage point increase in the probability that the elevator was out of order during at least 24 hours over the last three months, which is 13.1 percent of the standard deviation of this outcome. If we now turn to heating issues, our estimates imply that a one standard deviation increase in ethnic diversity is associated with a rise by 4 percentage points in the probability of experiencing insufficient heat in the apartment during more than 24 hours over the past year, which is 10.7 percent of the outcome's standard deviation. The bottom of Table 3 (Panel C) reports the results for outcomes related to public safety, capturing direct aggression, robberies and burglaries. Remarkably, it shows that ethnic diversity does not have a significant impact on any of these outcome variables. We offer an interpretation of this result in the next section.

We finally look at the general level of satisfaction with housing conditions. Panel D shows that ethnic diversity has a negative effect on satisfaction with housing condition, statistically significant at the 10 percent level. A one standard deviation increase in ethnic diversity generates an increase in

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[26]The exception is for the indicator for broken doors and noise during the day, for which the effect of diversity is only significant at the 5 percent level.

the dissatisfaction with housing conditions that amounts to 6.1 percent of its standard deviation. To get a better sense of the magnitude of this effect, we can say that the increase in the dissatisfaction with housing conditions generated by a one standard deviation increase in block unemployment rate corresponds to 15.5 percent of its standard deviation.

In sum, and taking advantage of data at a more micro level than has heretofore been available, we see that fractionalization operates with different degrees of impact for different sorts of public goods.[27] Fractionalization at the local level increases vandalism by a great deal, decreases building maintenance by a moderate (but overall significant) degree, and has no effect on security. The general negative impact of diversity on the various outcomes is thus consistent with the negative effect found on the general satisfaction with housing conditions. These findings allow us to propose in the next section the various channels through which fractionalization affects the provision of public goods.

5 The channels of impact of ethnic diversity at the local level

5.1 Rationalization of the channels

To rationalize our findings, we propose different interpretations of the channels through which fractionalization could affects local public goods related to living conditions and housing quality. The category "Vandalism" refers to the neglect or voluntary degradations of the common areas of the building, such as damaging common property, graffiti, or depositing trash on the floor. These are outcomes over which public housing residents have control and for which they can be held responsible.[28] The category "Quality of housing" includes variables such as quality of soundproofing or coldness in the apartment. Those variables are more of the responsibility of the public housing managers. Finally, the "Public Safety" category represents outcomes that are less under the control of local public housing managers than of the police.

Our interpretation for the results on "Vandalism" is that diversity prevents the creation of social norms to punish defectors, as the threat of social sanctions is lower across groups. Other-regarding preferences are less effective in more diverse areas. This has been a standard result in the literature since the seminal work of Coleman (1988), and it helps explain why we observe more voluntary degradations with diversity. Supporting our intuition, many households living in the public housing sector do not generally report having "bad" or "very bad relationships" with their neighbors. Rather they are more likely to report "no relationship at all" with their neighbors, which prevents the creation of other-regarding social norms. The increase in graffiti in more diverse areas might also illustrate the need to mark one's territory in a context where several groups co-exist. In any case, cross-group sanctioning to prevent vandalism has been ineffective compared to what we see in more homogeneous blocks.

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[27]Our findings are unchanged with regressions on aggregated indices obtained with a principal component analysis and with a mean effect analysis, as shown in sections 1 and 2 of the online Appendix.

[28]Given that residents need to enter a code in order to gain entry into their building, it is unlikely these degradations are coming from outsiders.

We understand the result on "Quality of housing" as the inability of more heterogeneous communities to undertake collective action that would pressure the public housing office into improving housing quality. This could be sustained (though we have no direct evidence to support this) by beliefs in the housing directorate that it need not maintain public goods to high standards in heterogeneous housing projects because the likelihood of collective action against it is minimal. In this sense, the resulting poor housing quality associated with ethnic diversity can be seen as an equilibrium in which the lack of expectations of collective action would fail to give incentives to the housing directorate to make costly improvements.[29] The results concerning heating provides support for this assumption: we find that households living in more diverse neighborhoods not only report more heating failures, but also that this is due to the poor quality of the heating equipment, an appliance typically under the control of the public housing office.

Finally, we can think of three possible interpretations of the absence of any diversity effect on aggressions and robberies. First, the data presented in the following subsection suggests that managers in more diverse environments invest more in security equipment than in building quality. Second, the absence of any impact of diversity on public safety outcomes could result from more physical security provided by a higher level of administration not subject to the constraints of local diversity, such as national or municipal police forces. To test this interpretation, we use data on municipal police, i.e police forces that are managed by the mayor at the municipality level, hence being more closely related to local concerns.[30] Although the municipal police is only one part of the police force working in a given municipality (the rest of it being the national police), its main role is to maintain peace, security, safety, health and tranquility in the municipality (article L2212-5 of the general code of local territories), and is therefore more relevant for our analysis than national police. The Ministry of Interior has made available (on the government open-data webpage) the 2012 number of municipal police officers in the 4,202 municipalities providing this service. From this source, we can check how local police forces relate to the level of diversity at the municipality level. Table 4 presents correlations between the (log) number of municipal policemen per 1,000 inhabitants in a given municipality, and the level of diversity in this municipality, measured in 2011. The first column shows that the raw correlation between the two is significantly positive: the more diverse a municipality is, the larger the number of policemen per inhabitant. The coefficient is still strongly positive in columns 2 and 3 where we progressively control for city size and *département* fixed effects. This evidence supports our second interpretation of a higher presence of police preventing criminal activities. A third explanation, one that encompasses findings for all three broad types of outcomes, would be that individuals living in the public housing sector experience social anomie. In fact, one third (32.7 percent) of the public housing population, irrespective of diversity, declares to have no relationship at all with individuals living in their same neighborhood. In addition, we find that individuals living in a more diverse neighborhood tend to have slightly

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[29]The collective action could also influence mayor's office. But the political logic of public housing support is beyond the scope of the paper.

[30]By contrast, the national police depend on the *préfecture*, at the *département* level. Information on national police at a very local level is not available.

fewer relationships with their neighbors.[31]

Given the nature of social relations in public housing, the most plausible interpretation is that diversity generates social anomie, i.e. the absence of common rules and social norms. As a consequence of anomie, there are (a) weaker other-regarding preferences and a lack of credible threats of social sanctions, hence more neglect and vandalism, (b) a failure to generate collective action to pressure the public housing offices into improving housing quality, and (c) fewer opportunities for violent confrontation where diversity might have increased incentives.

5.2   Interpretation of the channels based on repairs

We bring additional evidence about the channels based on the repairs performed in the building. The heterogeneous effect of diversity on repairs depending on the type of public good allows us to tease out the different channels through which diversity operates. Besides, maintenance and repair provide an objective interpretation to the previous subjective questions.

The Housing Survey asks whether elevators, staircase, windows, heating equipment, security equipment, and so on, have been repaired or installed during the previous year. We build three measures of repairs, corresponding to our three general outcomes. We define a first variable tracking repairs that usually come in response to degradation imputable to the tenants. Those repairs concern staircase, windows, doors and lights of the commons, i.e repairs related to neglect or voluntary degradations. A second variable indicates repairs that can be fixed only by the external intervention of the public housing office. Those repairs include revamping of the façade, or interventions to improve, among other things, the heating system or insulation quality, i.e. repairs related to the general quality of housing. Finally, we build a third variable accounting for the installation of security equipment in the building, which can be related to public safety outcomes. We then regress each of these three variables (as well as less aggregated indicators of repairs) on the level of diversity at the block level.

The OLS estimates are reported in the upper part (a) of Table 5. Column 1 shows a positive and statistically significant correlation between the probability of repairs inside the building (windows, doors and lights in the common areas) and local diversity. In the baseline regressions, (section 4.3 (Panel A, Table 3), we already found that voluntary degradations increased with diversity. This implies that the larger number of repairs results from a greater need to fix things destroyed by the lack of publicly spirited social norms, rather than from greater responsiveness by the housing authorities to regular maintenance.

Column 2 shows a negative and statistically significant correlation between the number of substantial works in the building (façade, heating, and insulation) and local diversity: the higher the diversity is, the less the work performed by the HLM offices for improving the general quality of housing. In the baseline regressions (Panel B, Table 3), we found that more diversity implies a lower quality of housing. This result thus suggests that more diverse neighborhoods are deprived of

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[31]Our findings are consistent with Fearon and Laitin (1996) who argue that despite inter-ethnic relations being generally tenser, in-group policing mechanisms emerge endogenously that keep violence off of the equilibrium path. However, in this case social anomie appears to be a more plausible mechanism sustaining peace as in-group policing is not likely to emerge where within-group collective action is not observed.

such substantial work, although the inhabitants actually complain (individually to survey enumerators) about the quality of housing. This supports our interpretation that tenants in more diverse neighborhoods are unable to engage in collective action to pressure the public housing offices into undertaking important works.

Finally Column 3 shows a positive and statistically significant relationship between the existence of security equipment and local diversity. In the main regressions (Panel C, Table 3) we found no impact of diversity on aggression and robberies. The presence of security equipment in more diverse neighborhoods can partly explain the absence of diversity effect on burglaries, as mentioned in the previous subsection. Public housing managers may invest more of their budget in security equipment than in basic maintenance if they fear security threats.

6 Robustness checks

The analysis has been based so far on self-reported subjective outcomes. A potential concern is that subjective perceptions could reflect personal bias rather than objective measures of public good provision. People might just be happier when they are surrounded by people more like themselves, and this is reflected in their answers to the quality of housing. We conduct several tests challenging this alternative explanation of personal bias.

First, we can exploit the various types of repairs and work done in the building or in the housing unit over the previous year. These variables have the advantage of being objective. The lower part (b) of Table 5 reports simple correlations between the various outcomes and the associated repairs. Note that because this test aims at testing for the relevance and objectivity of our outcome variables, it is performed on the full HS sample. We find that almost all the subjective outcomes are strongly and positively correlated with the existence of repairs, i.e. objective outcomes, especially for the variables related to vandalism.[32] This is our first evidence of the reliability of our subjective measures of housing quality and well-being.

We then conduct more formal tests, reported in Appendix C. In the following we focus on the question about dissatisfaction with housing conditions, which is the most subjective of all the outcomes considered, but the other outcomes yield similar results. We start by regressing this variable on diversity with our baseline specification, and we add the respondent's nationality and interaction terms between diversity and nationality. We can test whether different groups react in different ways to the level of diversity of their neighborhood. Column 1 of Table C.1 shows that there is no different effect for the various groups, and the coefficient for diversity remains unchanged. Then we concentrate on differences between native French households'[33] and fully Maghrebian households' dissatisfaction with housing conditions. In particular, we interact the dummies of being in a fully native French household or being in a fully Maghrebian household with DIV_l: none of the coefficients is significant, as reported in column 2. Thus for any given level of diversity, there is no significant difference in the answers given by fully French and fully Maghrebian

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[32]An exception is the condition of the outside walls, which is negatively correlated with the probability that façade work was done. This is not surprising as the assessment of the façade's condition is provided at the time of the survey, while repairs concern the previous year.

[33]Both children and parents were born French in France.

households. In other words, the idea that bad opinions of housing conditions are driven by average bad feelings due to being surrounded by foreigners can be rejected.

We also look at within-housing project variation in perceptions by regressing self-reported perception on block fixed effects. Assuming there is no within-block variation in public goods, the remainder of the variation tells us if certain ethnic or socio-demographic groups are more likely to be positively or negatively biased. If perceptions have a high signal-to-noise ratio, there should be less within-block variation because perceptions would be a good signal of project level public goods. Table C.2 shows the result for dissatisfaction about housing conditions. Column 1 shows the within-block estimates by including block fixed effects. The only individual characteristics statistically significantly correlated with within-project variation in perceptions is household size. Income, education, age or the country of origin of the household head are uncorrelated with perceptions of the environment. We also compute the standard deviation in the perception of the quality of housing between public housing projects and within public housing projects. The standard deviation is almost twice as high across blocks (80.1 percent) than within blocks (43.5 percent), and this difference is statistically significant. This low level of within block variation on perceptions adds confidence that there is an objective foundation for tenants' subjective reports.

We finally test the robustness of the previous results with respect to potential confounding factors in Section 2 of the on-line appendix. We check how the inclusion of each control variable separately alters the effect of diversity on the various outcomes, and test for an additional potential confounding factor: the average duration of tenancy of households in the block. On average, the various control variables do not significantly affect the estimated effect of diversity, suggesting little bias from confounding factors in our context.

7   Conclusion

This paper exploits French public housing policy as a natural experiment to identify the causal effect of diversity on the quality of local public goods related to well-being, living conditions and housing quality. The French Housing Survey provides a unique micro level of analysis of social interactions among adjacent neighbors within housing blocks. We provide a detailed analysis of the channels through which diversity operates at the local level while the previous literature focused so far on aggregate outcomes and channels. We use the exogenous allocation of households within public housing with respect to ethnic characteristics in France to address the bias from endogenous residential sorting that reduces the confidence in previous empirical findings on fractionalization. We find that fractionalization has a negative impact on other-regarding preferences, leading to higher neglect and vandalism in the housing commons. Fractionalization also undermines collective action for the improvement of the quality of housing. But in our context, fractionalization has no effect on public safety, diversity being associated with social anomie within the housing blocks rather than violent confrontations among neighbors - helped as well by an increase in municipal policing in municipalities of high diversity.

This natural experiment calls for future research on the specific role of national, local and

informal institutions in mitigating or magnifying the effect of ethnic diversity on the provision of public goods. France is a country with a republican tradition that resolutely refuses to reify ethnic identification as a strategy to prevent the ethnification of everyday life. Yet we find a significant negative effect of diversity on local public goods in its public housing sector, comparable to the association found in the US localities where multiculturalist institutions regulate ethnic relations (Putnam, 2007) and in cases where public institutions are weak (Alesina and La Ferrara, 2005). However, on issues of physical security in French public housing, the costs to ethnic diversity disappear. This may be due to the emergence of informal institutions (such as in-group policing as in Fearon and Laitin, 1996) or the supremacy of state-level institutions in which local diversity plays no role in the supply of order. Our evidence points to a possible third explanation, viz. that the social anomie resulting from diversity yields no contacts among neighbors rather than hostile ones. In any event, the results raise a puzzle, to be addressed in future research, on the general power of institutional arrangements in overcoming the negative implications of ethnic heterogeneity on the provision of public goods.

Tables

Table 1: Regression of Diversity on Exogenous Building Characteristics

Dependent Variable:	Neighborhood Diversity by Nationality				
	(1)	(2)	(3)	(4)	(5)
Share buildings w/ elevator	-0.012			-0.027	-0.005
	(0.017)			(0.017)	(0.016)
Share buildings w/ sewage		0.064		0.014	0.049
		(0.071)		(0.095)	(0.101)
Median number of units			0.001	0.001*	0.000
			(0.000)	(0.001)	(0.001)
Median date of construction					-0.019***
					(0.004)
Intercept	0.232***	0.149**	0.205***	0.214**	0.258***
	(0.005)	(0.069)	(0.005)	(0.092)	(0.097)
Adj. R^2	0.444	0.438	0.442	0.445	0.465
N	2,155	2,492	2,450	2,137	2,137
p-value	0.487	0.371	0.118	0.219	0.731

Each column corresponds to a separate regression of neighborhood diversity on the block-level building characteristics listed in the first column. Each regression includes municipality fixed effects. Standard errors clustered at the municipality level are reported in parentheses. The last line reports p-values: in columns 1 to 3, it corresponds to the significance test of each of the three fixed characteristic; in columns 4 and 5, it corresponds to the F-test of joint significance of the the three fixed characteristics. Significance levels: * $p<0.10$, ** $p<0.05$, *** $p<0.001$

Table 2: Descriptive statistics for each outcome

	Mean	(Std Dev)	[Range]
A. Degradation of the common areas due to vandalism			
Damaging the premises	1.637	(0.778)	[1 - 3]
Graffiti	0.257	(0.437)	[0 - 1]
Garbage on the floor	0.188	(0.391)	[0 - 1]
Broken windows	0.136	(0.343)	[0 - 1]
Broken doors	0.127	(0.333)	[0 - 1]
Broken light bulbs	0.094	(0.291)	[0 - 1]
Broken mailboxes	0.154	(0.361)	[0 - 1]
Vandalism on the elevator	0.085	(0.279)	[0 - 1]
Noise in daytime	1.595	(0.748)	[1 - 3]
Noise at night	1.374	(0.627)	[1 - 3]
B. Poor quality of housing due to low maintenance			
Low care of the common areas	1.593	(0.752)	[1 - 3]
Poor condition of the façade	2.433	(0.962)	[1 - 5]
Cold in the apartment	0.175	(0.380)	[0 - 1]
Cold due to bad insulation	0.065	(0.246)	[0 - 1]
Cold due to breakdown in heating equipment	0.045	(0.207)	[0 - 1]
Cold due to poor equipment	0.059	(0.236)	[0 - 1]
Poor quality of soundproofing	1.981	(0.823)	[1 - 3]
Breakdown of the elevator	0.155	(0.362)	[0 - 1]
Toilet malfunction	0.153	(0.360)	[0 - 1]
C. Low Public Safety			
Robberies	0.095	(0.293)	[0 - 1]
Aggressions	0.081	(0.273)	[0 - 1]
Burglary (or attempt)	0.041	(0.198)	[0 - 1]
D. Dissatisfaction with housing conditions			
	2.502	(0.983)	[1 - 5]

Depending on the outcome, we have between 4,310 and 5,189 observations

Table 3: The Effect of Diversity on Housing Conditions: Summary of the Results

	Estimated Effect of Neighborhood Diversity on All Considered Outcomes									

A. Neglect in the Common Areas:

Damaged premises	Graffiti	Garbage on the floor	Broken windows	Broken doors	Broken light bulbs	Broken mailboxes	Vandalism on the elevator	Noise: daytime	Noise: nighttime
0.749***	0.510***	0.391***	0.377***	0.185**	0.371***	0.397***	0.231***	0.316**	0.452***
(0.169)	(0.082)	(0.077)	(0.070)	(0.066)	(0.059)	(0.076)	(0.062)	(0.139)	(0.126)

B. Poor Quality of Housing:

Care of the commons	Façade condition	Cold in apartment	Cold: bad insulation	Cold: equipment breakdown	Cold: poor equipment	Soundproofing Quality	Elevator Breakdown	Toilet malfunction
0.360**	0.192	0.225**	0.033	0.019	0.098*	0.162	0.264***	0.058
(0.155)	(0.194)	(0.076)	(0.050)	(0.041)	(0.051)	(0.156)	(0.068)	(0.066)

C. Public Safety:

Robberies	Aggressions	Burglary
0.049	0.003	-0.011
(0.049)	(0.050)	(0.032)

D. Dissatisfaction with housing conditions:

0.335*
(0.173)

The estimates presented in this table are obtained from the regression of for each considered outcome using the new baseline specification. The controls are the following: date of construction of the building (6 categories), neighborhood socio-economic characteristics (unemployment rate and Tabard index), variables of selection in the public housing allocation process of the household (household size and annual income per equivalent household member, in log) and municipality fixed effects. The estimates for the other covariates are available upon request. Standard errors clustered at the block level are reported in parentheses. Significance levels: * p<0.10, ** p<0.05, *** p<0.001

Table 4: Municipal Police Officers and Diversity

Dep. Var.:	Number of municipal police officers per 1,000 inhabitants (log)		
	(1)	(2)	(3)
Municipality diversity by nationality	0.559***	1.368***	0.700***
	(0.110)	(0.112)	(0.145)
Number of inhabitants (log)		-0.235***	-0.169***
		(0.012)	(0.012)
Intercept	-0.882***	1.027***	0.557***
	(0.021)	(0.099)	(0.099)
Adj. R^2	0.008	0.113	0.265
N	3,239	3,239	3,239
Département F.E.	No	No	Yes

Significance levels: * $p<0.10$, ** $p<0.05$, *** $p<0.001$

Table 5: Rationalization of the channels based on repairs

Repairs related to:	*Vandalism* Work in the commons: staircase, doors, lights, glass (1)	*Housing Quality* Major works: façade, heating, toilets (2)	*Public Safety* Security Equipment: entry code, locks (3)
a. Relationship between diversity and type of repairs			
Diversity	0.131**	-0.192**	0.138***
	(0.054)	(0.070)	(0.040)
Adj. R^2	0.022	0.007	0.006
N	2,247	2,247	2,247
b. Correlation between reported degradation and corresponding repairs (%)			
Vandalism			
Damaging the premises	5.79***		
Graffiti	16.94***		
Garbage on the floor	14.35***		
Broken windows	11.86***		
Broken doors	13.74***		
Broken light bulbs	12.24***		
Broken mailboxes	13.10***		
Vandalism on the elevator	13.54***		
Poor Housing Quality			
Poor condition of the façade		-3.46***	
Cold in the apartment		3.89***	
Cold: bad insulation		1.29	
Cold: equipment breakdown		4.70***	
Cold: poor equipment		0.012	
Breakdown of the elevator		-0.001	
Toilet malfunction		4.31***	
Low Public Safety			
Robberies			2.52***
Aggressions			4.15***
Burglary (or attempt)			2.35***

Part a. The dependent variables displayed in the first line are defined as follows. (1) Repairs related to vandalism: those likely to be done in response to neglect or voluntary degradation: repairs of staircase, windows, doors and lights of the commons. (2) Repairs related to poor housing quality: those taken care of by the public housing office: revamping of the façade, interventions to improve, among other things, the heating system or insulation quality. (3) Repairs related to low public safety: installation of security equipment in the building. These three composite outcomes are regressed on block diversity, controlling for the number of dwellings in the building and its date of construction (in 6 categories). Robust standard errors adjusted for block clustering are in parentheses. Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Part b. The table presents the correlation between each outcome variable and the corresponding composite measure of repairs, using the full HS sample. For instance, for broken windows, we report the correlation with repairs related to vandalism, while for robberies we report the correlation with repairs related to low public safety.

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Appendix

A   Descriptive Statistics

Table A.1: Fractionalization by nationality at birth for tenants in Public Housing blocks

	1999 Census	2002 Housing Survey
Mean	0.28	0.25
Median	0.26	0.23
Std Dev	0.19	0.18
Minimum	0	0
Maximum	0.875	0.802

Reading: The average public housing tenant surveyed in the 1999 Census lives in a block with 28% of diversity. The average public housing tenant surveyed in the HS lives in a block with 25% of diversity. The highest level of diversity observed in a public housing block is .875 in the Census and .802 in the HS.

Table A.2: Sample Characteristics: public housing population (2002 HS)

	Mean	Std. Dev
Household characteristics		
Annual income per member*	12,226	7,923.83
Household size*	2.55	1.47
Household head characteristics		
Age	47.09	17.13
Nationality		
Native French	0.82	0.38
Naturalized French	0.06	0.23
Maghrebian	0.07	0.26
Other African	0.01	0.12
Employment status		
Employed	0.58	0.49
Unemployed	0.11	0.31
Inactive	0.31	0.46
Level of education		
No diploma	0.28	0.45
Lower education	0.51	0.50
Baccalaureate	0.09	0.29
Higher education	0.12	0.32
Socio-economic category		
Craftsman, Shopkeeper	0.01	0.12
Executive	0.04	0.19
Intermediate occupation	0.12	0.33
Employee	0.20	0.40
Blue-collar worker	0.31	0.46
Building characteristics		
Number of units in the building	35.83	55.01
*Date of construction of the building**		
t ≤ 1948	0.06	0.23
1949 ≤ t < 1974	0.52	0.50
1975 ≤ t < 1981	0.15	0.36
1982 ≤ t < 1989	0.11	0.31
1990 ≤ t < 1998	0.12	0.32
1999 ≤ t	0.04	0.19
Block unemployment rate*	0.22	0.13

Statistics obtained from the 5,189 public housing observations in the 2002 Housing Survey. Variables marked with a star are used as controls in our baseline specification.

B Detailed Regression

Table B.1: Baseline Specification: Detailed Regression

Outcome:	Dissatisfaction with housing conditions
Diversity	0.335*
	(0.173)
Household selection variables:	
Income (log)	-0.050
	(0.032)
Household size	0.116***
	(0.012)
Date of construction of the building (ref: before 1948):	
$1949 \leq$ t < 1974	0.039
	(0.092)
$1975 \leq$ t < 1981	-0.086
	(0.098)
$1982 \leq$ t < 1989	-0.105
	(0.098)
$1990 \leq$ t < 1998	-0.443***
	(0.109)
$1999 \leq$ t	-0.657**
	(0.269)
Neighborhood characteristics:	
Block unempl. rate	1.175***
	(0.226)
Socio-economic background (Tabard)	Yes
Intercept	2.279***
	(0.345)
Adj. R^2	0.139
Observations	4451

The coefficients correspond to the baseline specification, estimated for the "Dissatisfaction with housing conditions" outcome. The regression controls for municipality fixed effects. Robust standard errors clustered at the block level are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1

C Robustness checks

Table C.1: Are results driven by some major ethnic groups disliking being around foreigners?

Dependent Variable:	Dissatisfaction with housing condition	
	(1)	(2)
Diversity	0.414**	0.369*
	(0.187)	(0.209)
*1. **Nationalities**(ref: French at birth)*		
Naturalized French	0.005	
	(0.186)	
DIV_l * naturalized French	-0.300	
	(0.491)	
European	0.048	
	(0.232)	
DIV_l * European	-0.036	
	(0.651)	
Maghrebian	-0.223	
	(0.229)	
DIV_l * Maghrebian	0.160	
	(0.499)	
African	-0.100	
	(0.368)	
DIV_l * African	0.531	
	(0.886)	
Asian	-0.102	
	(0.989)	
DIV_l * Asian	-1.324	
	(1.650)	
Other nationality	1.163	
	(1.510)	
DIV_l * Other nationality	-3.386	
	(6.227)	
*2. **Major groups in HLM: Native French and Maghrebians***		
Native French household		-0.066
		(0.067)
DIV_l * Native French household		-0.045
		(0.203)
Maghrebian household		0.005
		(0.304)
DIV_l * Maghrebian household		-0.200
		(0.668)
Intercept	2.347***	2.296***
	(0.350)	(0.349)
Adj. R^2	0.140	0.139
N	4,451	4,451

Each column presents the results of the regression of the dissatisfaction with housing conditions variables on different specifications. Each regression controls for the set of controls included in the baseline specification: household selection variables (income and size), date of construction of the building, block socio-economic characteristics (unemployment rate and Tabard index) and municipality fixed effects. Robust standard errors adjusted for block clustering are in parentheses. For the sake of comparability, we remind that the diversity coefficient in the baseline specification is 0.335, significant at the 10% level. *** p<0.01, ** p<0.05, * p<0.1

Table C.2: Variation in Perception of Housing quality: Within and Between Public Housing Blocks

	Dissatisfaction with Housing conditions	
	Within correlation	Between correlation
	(1)	(2)
Characteristics of the household head:		
Male	0.017	-0.014
	(0.065)	(0.031)
Age	-0.003	-0.003**
	(0.003)	(0.001)
Diploma	0.008	-0.031***
	(0.014)	(0.007)
Household income (log)	-0.077	-0.146***
	(0.062)	(0.030)
Unemployed	0.046	0.085*
	(0.105)	(0.050)
Inactive	-0.082	-0.063
	(0.101)	(0.047)
Household size	0.092***	0.107***
	(0.025)	(0.012)
Naturalized French	-0.111	-0.022
	(0.114)	(0.062)
European	-0.028	0.105
	(0.177)	(0.086)
Maghrebian	-0.089	0.019
	(0.135)	(0.061)
Other African	-0.066	0.187
	(0.223)	(0.143)
Asian	-0.342	-0.183
	(0.790)	(0.365)
Other nationality	-0.097	0.409
	(1.197)	(0.520)
Building size (log)	0.031	0.077***
	(0.044)	(0.010)
Intercept	3.002***	3.618***
	(0.605)	(0.284)
Block Fixed Effect	Yes	No
Départements F.E.	No	Yes
Adj. R^2	0.184	0.081
Observations	5,188	5,188

Robust standard errors adjusted for block clustering are in parentheses
***p<0.01, ** p<0.05, * p<0.1