Can Public Housing Decrease Segregation?

Lessons and Challenges from Non-European Immigration in France[*]

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Abstract

Recent decades have seen a rapid increase in the flows of non-European immigrants into public housing in Europe, which led to concern regarding the rise of "ghettos" in large cities. Using French census data over three decades, we examine how this increase in public housing participation affected segregation. While segregation levels increased only moderately on average, we find that the number of immigrant enclaves has grown. The growth of enclaves is driven by the large increase in non-European immigrants in the census tracts where the largest housing projects are located, both in public and private housing. As a result, contemporary differences in segregation levels across metropolitan areas are shaped by the spatial distribution of housing projects within cities and by the share of immigrants who live in large projects. Nevertheless, the overall effect of public housing on segregation has been ambiguous. While large projects increased segregation, the inflows of non-European immigrants into small housing projects brought many immigrants into census tracts where they have previously been rare and thus diminished segregation levels. However, the characteristics of non-European immigrants vary across projects, and those observed in the less segregated housing projects have a higher socio-economic status.

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I. Introduction

The rise of non-European immigration in the last several decades has greatly diversified the population in European countries. According to Eurostat (Vasileva, 2011), in 2010, the population of individuals who were born outside the European Union represents on average 8% of the population in these countries. This new immigration poses challenges that are different than the intra-European migration that long prevailed in Europe. Non-European immigrants encounter substantial barriers in the labor markets that are associated with higher levels of residential segregation (Glitz, 2014; Moraga et al., 2015; Musterd, 2005; Préteceille, 2009; Quillian and Lagrange, 2016; Safi, 2009; Tammaru et al., 2016). This leads to concern over the consequences of the isolation of these groups from the rest of the population, in particular for the children of immigrants (Bolt et al., 2013). Furthermore, a large and increasing share of non-European immigrants live in public housing, whose impact on segregation levels is as-yet under-studied.

In this paper, we use restricted access census data over the last three decades in France to document how the growth of the non-European immigrant population in public housing has affected their spatial segregation. France is an interesting country to study with regard to these questions because its non-European population is large, diverse and has grown rapidly. Between 1968 and 2012, the share of non-European immigrants in the population multiplied by four, at first fueled by immigration from Maghreb and, increasingly since the 1980s, by immigration from Sub-Saharan Africa and Asia. As in many European countries, the French welfare state offers a wide range of social programs that could influence the assimilation of immigrants. In particular, public housing remains a cornerstone of urban policies in France, as it does more broadly in Europe. In 2011, public housing accounted for more than 32% of the total housing

stock in the Netherlands; 24% in Austria and Scotland, and approximately 18% in England, France, Sweden and Denmark (Musterd, 2014; Priemus and Dieleman, 2002; Scanlon et al., 2014).

There is overwhelming evidence that, in recent years, non-European immigrants disproportionately settled into public housing. In Amsterdam, more than 80% of Turkish and Moroccan immigrants lived in public housing in the 1990s (Musterd and Deurloo, 1997). In 2008, in London, 40% of foreign-born residents were "social tenants" (Rutter and Latorre, 2008). In France, we document below that approximately 50% of immigrants from Maghreb and sub-Saharan Africa lived in public housing in 2012, which is up from 35% in 1982.

In the European context, which is characterized by a large social housing supply and a relatively diverse population that lives in the projects, the influence of public housing on segregation might be a priori ambiguous. In accordance with models of segregation that emphasize natives' nonlinear response to inflows of minorities in neighborhoods (Card et al., 2008), we expect the consequences of the inflows of immigrants into public housing for segregation to vary with the size of the housing projects. Segregation might decrease when projects are small as an inflow of immigrants into a small project might be less likely to trigger an outflow of natives from the census tract. Furthermore, such small projects may be more likely to be located in low-immigration and more desirable neighborhoods. However, if large housing projects hold a rising concentration of immigrants, segregation will increase even more if, at the same time, natives leave the private housing in the census tract in response.

We examine these dynamics at three different levels: first, at the metro area level, we study how public housing characteristics influence the dissimilarity and isolation indexes of non-European immigrants; second, at the neighborhood level, we trace how inflows of immigrants

are distributed across census tracts and housing projects; and, finally, at the individual level, we examine the sorting of immigrants by origin and by the socio-economic characteristics among public housing projects.

In accordance with the previous research (Pan Ké Shon and Verdugo, 2015; Préteceille, 2009; Safi, 2009), we find that the average segregation levels of non-European immigrants have increased slightly in recent years but remained moderate, even if higher than those of European immigrants. In contrast, the share of non-Europeans who live in an immigrant enclave – which is defined as a census tract where the proportion of immigrant heads of households is above 30% - has increased threefold in thirty years. Consistent with our hypotheses, we find that the effect of public housing on segregation depends largely on the size of the housing projects in the metro area. While the share of non-European immigrants in small projects does not affect segregation levels, a similar share in large projects is associated with dramatically higher segregation levels and in particular a high concentration of immigrants in enclaves.

Examining tract level trends, we find that the incoming non-European immigrants are relatively evenly spread across public housing projects within the metro areas, even if the share of non-European immigrants progressed one-third more rapidly in large housing projects. In contrast, the progression of non-Europeans in private housing was three times larger next to the largest projects than next to the smaller-scale projects. Overall, we interpret our findings as evidence that small-scale public housing projects enabled non-European immigrants to enter neighborhoods where they were previously rare, thus potentially decreasing segregation. At the same time, the disproportionate growth of the immigrant population both *within* large public housing projects as well as *around* them has contributed to the rise of immigrant enclaves.

This paper thus contributes to the literature by offering a systematic account of the ambivalent role of public housing in the evolution of segregation patterns. The prior research, which mostly focused on the North American context where government-subsidized housing represents a very small share of the market, has paid little attention to this factor. In addition to quantifying the impact of public housing in segregation patterns, we uncover the mechanisms through which it operates. We argue here that to understand contemporary segregation patterns in France, and in Europe more broadly, the morphology and composition of public housing need to be taken into account. Most notably, the concentration of public housing can have important spillover effects on private housing inhabitants' behavior, which thus amplifies the influence of project size on segregation.

The paper is organized as follows: section two provides an overview of the main theoretical models that explain immigrant segregation and discusses how the functioning of the French public housing sector may shape segregation patterns in that context. Section three presents the data and the methods that we employ, while sections four and five introduce some descriptive statistics about the evolution of the composition of public housing and segregation patterns in France. Sections six, seven and eight present the core of our empirical analysis and discuss the results, while the final section advances our conclusions.

II. Theoretical background

Two main theoretical models have been put forward to explain the residential segregation of immigrants and minorities: spatial assimilation and place stratification (Charles, 2003). These models were developed and tested in the North American context (Crowder et al., 2012; Iceland and Scopilliti, 2008; Iceland and Wilkes, 2006; Logan et al., 2002, 2004; Logan and Alba, 1993; South et al., 2008; Wagmiller et al., 2017); however, they have only recently been examined in

Europe (Bolt et al., 2008; Friedrichs, 1998; Glitz, 2014; Mcavay, 2016; Musterd, 2005; Musterd and Ostendorf, 2009; Pan Ké Shon and Verdugo, 2014, 2015; Peach, 1996; Rathelot and Safi, 2014; Schönwälder and Söhn, 2009; Simpson and Finney, 2009).

The spatial assimilation model (Alba and Logan, 1993; Massey and Denton, 1985) predicts that as immigrants and their descendants experience acculturation and upward socio-economic mobility, they gradually move out of concentrated areas and into more diverse neighborhoods. As a result, the differences in segregation levels across immigrant groups should be accounted for by compositional differences, in terms of socio-economic standing, nativity, language proficiency and length-of-stay. Neighborhoods of high immigrant concentration – termed immigrant enclaves – are thus conceptualized as port-of-entry types of neighborhoods, mostly situated in inner cities and characterized by a well-developed ethnic economy and infrastructure, and transitory along immigrants' residential trajectories.

To explain the persistence of segregation, proponents of the place stratification model (Logan, 1978; Logan and Molotch, 1987) have emphasized the role of prejudice and discrimination (Massey and Denton, 1985; Yinger, 1995) as well as racial residential preferences (Boschman and Ham, 2015; Krysan et al., 2009; Krysan and Farley, 2002). High and persistent levels of segregation may reflect discriminatory practices in the private housing market by real estate agents and landlords as well as white tenants who 'flee' neighborhoods in response to immigrant concentration (Bobo and Zubrinsky, 1996; Hall and Crowder, 2014; Ross and Turner, 2005). They may also partly reflect immigrants' preferences for living in neighborhoods with a higher share of co-ethnics (Rathelot and Safi, 2014; Vigdor, 2003).

France offers an interesting context in which to examine the drivers of immigrant segregation. In addition to their different migration histories and urban forms, a notable

difference between the US and France is the high prevalence of government-assisted housing in the latter context, particularly among non-European immigrants. In the presence of discrimination in private housing, the large public housing sector in France may distribute immigrants across a wider range of neighborhoods, without concern for their origin or socio-economic status (Algan et al., 2016; Kesteloot and Cortie, 1998; Oberti and Préteceille, 2016; Quillian and Lagrange, 2016). Public housing may thus provide an escape from the more discriminatory private housing market (Bonnet et al., 2016; Combes et al., 2012; Dietrich-Ragon, 2013) and relax the structural barriers to immigrants' spatial incorporation, thus decreasing their segregation.

Assuming that the objectives of housing authorities are to diminish segregation, Schmutz (2013) demonstrates that their ability to do so is constrained by the responses of the inhabitants of private housing. The theoretical models of segregation emphasize that the equilibrium in neighborhoods characterized by ethnic diversity may be unstable and characterized by "tipping points" in the share of a minority in the neighborhood, above which members of the majority start to leave the neighborhood en masse (Card et al., 2008). A disproportionate increase in the share of immigrants who live in large housing projects may deter natives and attract immigrants in private housing in the neighborhood, which thus reinforces the homogeneity of the neighborhood and increases segregation. However, the progression of immigration in small projects may be less problematic for segregation because the share of minorities remains far from the tipping point and thus does not change the equilibrium of the neighborhood.

The prior qualitative research also raises some doubts with respect to the desegregation potential of public housing in Europe due to discriminatory practices in the allocation of housing.

Studies show substantial segmentation across housing projects, with non-European minorities being disproportionately allocated to the largest and least desirable housing projects (Bourgeois, 2013; Masclet, 2006; Sala Pala, 2005; Tissot, 2006), while better housing projects are reserved for loyal constituents. The prior findings reveal a clear hierarchy of projects that are based on their real estate value, their localization and their occupation, with housing authorities limiting the access of certain immigrant groups to the most desired places. This resonates closely with the tenets of the place stratification model.

Based on the discussion above, we draw three main hypotheses that we test empirically in the rest of the paper:

H1: First, we examine under what conditions the growth of immigration in public housing will affect segregation indexes and the prevalence of immigrant enclaves. We expect the consequences to depend on the size of the projects in the census tract. More precisely, we expect that a larger share of non-European immigrants in large projects will increase segregation. In contrast, we expect that a larger share of non-European immigrants in small projects will have no influence or even decrease segregation.

H2. Second, we examine *how* public housing contributes to rising segregation and to the growth of enclaves. We expect that the differential effect of public housing by size on segregation is compounded by the responses of the private housing inhabitants in the census tract. We expect census tracts with larger housing projects to attract higher inflows of non-European migrants, not only in the public housing sector but also in private housing.

H3. Finally, we test whether public housing allocation depends on origin and socio-economic status, as has been argued by the prior qualitative research. We expect non-European

immigrants and individuals of a lower socio-economic status to have higher chances of entering larger projects than smaller ones.

III. Data and methods

The empirical analysis exploits restricted-access census data from the French Census over three decades using the 1982, 1990, 1999 and 2012 census years.[4] We use detailed individual files that contain information on location and nationality at the census block level (approximately 500 inhabitants) for all of the years. We had access to extremely large samples as we exploit 25% sample extracts for almost all of the years. Such consistently large samples allow for the precise measurement of the composition of the population across neighborhoods, and they are less vulnerable to the measurement types of errors that may affect segregation trends. An immigrant is defined as a person who is born abroad without being of French nationality at birth, which thus includes foreigners and naturalized immigrants. We classify immigrants across origins using the country of birth. As is often the case in continental Europe, the data do not contain any variables to measure segregation along racial or ethnic lines. In addition, the children of immigrants – the second-generation – cannot be identified in the data. The paper focuses on non-Europeans because the segregation levels of European immigrants are low and declining (Pan Ké Shon and Verdugo, 2014; Préteceille, 2009) and they are much less likely to live in public housing. Finally, while the census contains detailed information on labor force status and occupation, it does not include any measure of income.

We follow Quillian and Lagrange (2016) by using "metro areas" as the local unit of analysis. Defined by the French statistical institute, they consist of a set of municipalities

[4] We do not include the 1968 and 1975 censuses in the analysis as they do not contain information on public housing participation.

characterized by a continuous built-up area.[5] To ensure comparability over time, the boundaries of metro areas are fixed using the definition of these metro areas from the 1999 census.

We measure segregation and change in neighborhood characteristics at the level of the French equivalent of the census tract, the "*Ilots Regroupés pour l'Information Statistique*" (IRIS). The IRIS is a socio-spatial division that was introduced by the French statistical institute with the 1999 census. IRISs are half the size of average US census tracts, and they delineate geographic areas with an average of 2,500 inhabitants following natural boundaries such as major streets, railway lines and watercourses.[6] For the 1990 and 1982 censuses, we use information at the census block level to recover the IRISs.[7] Pan-Ké-Shon and Verdugo (2015) demonstrate that using such "pseudo-IRISs" instead of using actual IRISs has little effect on the measurement of segregation. For simplicity's sake, we refer to the IRIS as census tracts in the rest of the paper.

Following Cutler et al. (2008) and several studies, we measure segregation at the census tract level through two standard indexes: dissimilarity and isolation, which are related to the crucial dimensions of segregation, evenness and exposure (Massey and Denton, 1988). The formula of these indexes is reproduced in the Appendix. The index of dissimilarity (henceforth, ID) can be interpreted as the proportion of individuals from a particular group who would need to change residence for each census tract to have the same percentage of their group as the metropolitan area overall. The index of isolation follows Bell (1954) and reports the percentage of the immigrant group in the census tract that is occupied by the average immigrant from the

[5] This corresponds to the definition of "*unites urbaines*."
[6] Quillian and Lagrange (2016) demonstrate that, as a consequence of these differences in scale, segregation measures are inflated in France in comparison with the US.
[7] For the 1990 Census, we use a correspondence table that was provided by the French statistical institute that aggregates census blocks into IRISs. However, such matching does not exist for the 1982 Census. For 1982, we constructed "pseudo-IRISs" by aggregating contiguous census blocks to create a zone with a population of approximately 2,500 inhabitants.

group. Following Cutler et al. (2008), we calculate indexes of segregation with respect to the rest of the population, not only natives. Furthermore, the indexes are estimated using only the population of heads of households[8] to avoid the risk that the segregation indexes of immigrants might be lowered by the presence of the children of immigrants in the sample. We carried out the same analyses with indices calculated for all individuals (not only heads of household) with similar results (available upon request).

IV. Basic facts on public housing and immigration

Both in Europe and the US, the initial ambitions of public housing programs were to eliminate slums around metro areas and to improve housing conditions. In Europe, most of the programs emerged after the Second World War in reaction to housing shortages and the demographic pressures of the baby boom.[9] Initially, in both continents, the targeted population was quite large. To avoid poverty concentration, the programs were conceived for various segments of the working class, not only for the "poorest of the poor." However, with less than 1% of US households living in public housing in 2017[10], the supply of public housing remains extremely low relative to Europe, where public housing aims to cover a large share of the population (Scanlon et al., 2014) and to ensure a "social mix" (Blanc, 2010; Deschamps, 2001). In France, while 15% of the population lived in public housing in 2012, nearly 70% of the population was eligible for it.

These objectives of diversity are challenged by the increase in non-European immigration and its over-representation in the public housing sector. Panels A and B in Table 1 show that

[8] We categorize a household as immigrant if the head of household is an immigrant.
[9] This discussion focuses on Western Europe. Eastern Europe had a different experience under planned economies and communist regimes.
[10] According to figures from the US department of Housing and Urban Development. See https://portal.hud.gov/hudportal/HUD?src=/program_offices/public_indian_housing/programs/ph (accessed 14th April 2017)

non-European immigrants have progressively become the majority of immigrants since 1982, and they are increasingly concentrated in public housing. While the proportion of native households that live in public housing remained stable at the 13% level, for immigrant households that proportion increased from 21% to 30% from 1982 to 2012. This increase is even more marked for immigrant heads of households from Maghreb and sub-Saharan Africa, as almost half lived in public housing in 2012, which is up from 33% and 26%, respectively, in 1982. However, even if immigrants are overrepresented in housing projects, the large supply of public housing guarantees that they remain far from being the majority of the inhabitants (Musterd, 2014). Panel C shows that non-European immigrants accounted for only 18% of heads of households on average in public housing in 2012, which is a proportion that has increased by 10 p.p. since 1982.

A crucial factor for segregation is that the size and concentration of housing projects vary widely within and across cities. To distinguish housing projects by size, we construct quartiles of the share of public housing inhabitants in the census tract. We define large housing projects as projects in tracts where more than 37% of the inhabitants live in public housing – which is the threshold of the last quartile. Panel A of Table 2 shows that 47% of households in public housing live in a large project. Clearly, non-European households in public housing are even more likely to live in large projects as 61% of them live in the census tracts of the last quartile. Panels C and D more systematically document the trends in segregation of housing projects over time using the indexes of dissimilarity and isolation, respectively. Over the period, public housing segregation remains important; however, it declined moderately from 1982 to 2012, as both the dissimilarity and isolation indexes of public housing inhabitants declined by 7 p.p. and 4 p.p., respectively.

The table also illustrates that the segregation of housing projects varies substantially across metro areas. Panel B shows that there are quite large disparities across metro areas in the distribution of the population between small and large projects. In Paris, non-European households in public housing are three times as likely to live in large housing projects, while in Marseille, they are only twice as likely. Panel C shows that the dissimilarity level of public housing inhabitants in Marseille was 60% in 2012, which is 10 p.p. and 5 p.p. higher than it is in Lyon or Paris, respectively.

V. Patterns of immigrant segregation 1982 to 2012

Table 3 and 4 presents the evolution of segregation of non-European immigrants in major French metro areas over the period from 1982 to 2012 measured by dissimilarity and isolation indexes. In the first rows, following Cutler et al. (2008), we report the average of the IDs using the number of non-European immigrants per metro area as weights.[11] For comparison, the average dissimilarity level of European immigrants is reported in the second row. Clearly, non-Europeans are more segregated than European immigrants. In 2012, the average dissimilarity level was 34% for non-Europeans against only 18% for European immigrants. These levels are moderate with respect to the US: Iceland and Scopilliti (2008) report dissimilarity indexes of 44% for foreign-born people and of 60% for foreign-born Hispanics with respect to white natives in 2000.[12]

An important result is that, in spite of the large growth of the non-European population and its inflows into public housing, the average dissimilarity indexes increased only by approximately 1 p.p. over this thirty-year period. Panel B of the table shows considerable disparities in segregation trends and levels across metro areas. In 2012, the dissimilarity indexes

[11] We include only metro areas with a population of non-European migrants larger than 500 individuals.
[12] A limitation of these comparisons is that our dissimilarity indexes are calculated using all non-group members instead of white natives. We calculated dissimilarity indexes using only natives with our data and found that it only marginally changed the indexes. Our data does not allow us to use *white* natives as a comparison group.

were close to 33% in Paris and Nice, while they were higher by 8 p.p. in Marseille and Lille. The dissimilarity trends have also varied across metro areas. From 1982 to 2012, while the dissimilarity levels declined in Nantes and Douai by 7 p.p., they increased by 5 p.p. in Lyon and Marseilles and by 12 p.p. in Nice (albeit from a low level in the latter case).

Table 4 further reports the isolation indexes across metro areas. To some extent reflecting the growth in the non-European population, the isolation indexes increased in the last thirty years. In Paris and Lyon, the indexes increased by 12 and 9 p.p., respectively. In Montpellier, the index has doubled. These levels are large given that the share of non-European households in the French population was 6.4% in 2012. However, it is well-known that the isolation indexes are sensitive to the size of the group in the population. To account for the growth of the population, the last two columns show the difference between the isolation index and the proportion of non-European households in the metro area population in 1982 and 2012. By definition, this difference would be zero when the share of immigrants in the population is the same across all of the census tracts of the metro area. We find that approximately half of the increase in isolation can be explained by the increase in the share of the population with non-European origins. The 'residual' isolation levels are comprised of between 7% and 11%, and they increased by approximately 5 p.p. over the period. Such an increase is substantial but clearly not massive.

Rise of immigrant enclaves

The finding that segregation remained moderate in the last several decades might surprise the readers of ethnographic accounts which alerted to the formation of "urban ghettos" since the early 1990s (Delarue, 1991; Dubet, 1987; Lapeyronnie, 2008; Lepoutre, 2001). Most of these works describe the life in segregated housing projects as being plagued by poverty and as places where the majority of the population is of immigrant origins. Clearly, the previous figures

indicate that such situations are far from representative of the census tracts where most immigrants live. However, the indexes of dissimilarity and isolation are averages of very diverse census tracts that do not effectively capture what occurs at the tails of the distribution. As demonstrated by Bell and Machin (2013) in the case of the U.K. and Préteceille (2009) for France, stable dissimilarity indexes can hide an increase in the number of high immigrant census tracts if the growth of the latter is mitigated by the diffusion of immigration in tracts where they were previously rare.

Panel A of Table 5 shows the distribution of census tracts with varying proportions of immigrants in their population, while Panel B shows the distribution of non-European immigrants across these types of tracts. The figures show considerable changes in the proportions of the census tracts with both very few or many immigrants. First, the proportion of census tracts with less than 1% of immigrants declined rapidly, which clearly contributed to decreasing the segregation levels. In 2012, it is basically impossible to find a census tract with no or very few immigrants in the population. At the opposite tail of the distribution, the share of immigrants in census tracts where more than 30% of household heads are immigrants – tracts that we refer to as 'immigrant enclaves', following Wilson and Portes (1980) or Logan et al (2002) - increased by 10 p.p. both in the 1990s and the 2000s. In 2012, approximately one-third of non-European households lived in these high immigrant census tracts.

Not only have the enclaves grown since the 1990s, but they appear to be quite different from enclaves of 30 years earlier. First, the enclaves are increasingly tied to the presence of large housing projects: among those who live in an immigrant enclave, the median proportion of inhabitants in public housing was 50% in 2012 against 15% in 1982. A substantial fraction of enclaves is plagued by high unemployment rates: the unemployment rate of prime age non-

European heads of households in enclaves increased by 10 p.p. from 14% to 24% on average from 1982 to 2012. Also, in 15% of enclaves in 2012, the unemployment rate of prime-age non-European immigrant heads of households is superior to 40%, which is a situation that was observed in only 5% of enclaves in 1982.

VI. How much does public housing influence segregation?

What explains differences in the segregation levels across metro areas and their evolution? To assess how different factors predict segregation across metro areas, we follow Iceland and Scopilliti (2008) and Cutler et al. (2008), among others, and use regression models that relate the dissimilarity or isolation index to characteristics of the groups of immigrants and of public housing across metro areas. Using the 1982 and 2012 census years, we estimate:

$$S_{lt} = PH_{lt}\beta_t + X_{lt}\gamma_t + Z_{lt}\phi_t + u_{lt}$$

where S_{lt} is a segregation index, dissimilarity or isolation, for non-European immigrants in metro area l and census year t. The vector PH_{lt} contains variables that describe the characteristics of the public housing supply. Depending on the dependent variable, we include either the dissimilarity or the isolation index of the public housing inhabitants in the metro area. Also included are the shares of the non-European immigrants and of the overall population that lives in public housing. Importantly, in some specifications, we introduce separately the share of immigrants and natives in large housing projects to test the hypothesis that the share of the population in each type of project has a different effect on segregation.

The vector X_{lt} accounts for the differences in the composition of non-European immigrants across metro areas and includes variables related to economic assimilation. It includes the share of managers, blue-collar workers and unemployed workers among the heads

of households of the group.[13] The model also includes the share of the group in the metro area population, the share of the group that arrived since the last census and, after 1999, the average length of stay of the group in France. Finally, the vector Z_{lt} includes the metro areas characteristics that have been shown to influence segregation in other studies (Pais et al., 2012) such as the log of the population, the share of immigrants in the city and the share of managers, blue-collar and unemployed among the city population. These variables capture the economic specialization and social composition of the population.

Before turning to the results, it is useful to note that while this model identifies how different factors are correlated with segregation levels, it does not provide a causal interpretation. Among other issues, reverse causality is possible in the sense that economic assimilation might be influenced by geographical segregation.[14] In addition, the characteristics of immigrants might be affected by the characteristics of the public housing in the city (Verdugo, 2016).

Table 6 shows the estimation results of the models for the dissimilarity and the adjusted isolation indexes which is defined as the difference between the isolation index and the proportion of non-European households in the metro area population. For each index, we report the results using 2012 data in cross-section but also estimates obtained from long-differences from 1982 to 2012. This last specification identifies the coefficients using within-city variations over time, and it accounts for the effects of the metro-area-level factors that are constant over time and that influence segregation. The model is estimated based on a sample of 192 metro areas with at least 500 non-European immigrants in both 1982 and 2012. To save space, only the

[13] We use occupation instead of education as it is a better proxy for economic assimilation in the host society than education. It is well known that for immigrants the returns to education that is acquired abroad are lower (Friedberg, 2000), and as a results immigrants tend to downgrade (Akresh, 2008). Notwithstanding, the results are similar when controlling for education instead of occupation.

[14] A large body of literature on spatial mismatch shows how segregation could influence labor market outcomes and as a result the socio-economic status of immigrants (Gobillon et al., 2007).

coefficients of public housing variables are displayed, while the estimates for other covariates are reproduced in the supplementary appendix Table A1 and A2.

The results show that in 2012, the dissimilarity of public housing is positively and substantially associated with non-European immigrants' ID. In column (1), the model predicts that an increase in the dissimilarity of public housing by 10 p.p. increases by 2.4 p.p. the dissimilarity of immigrants. Similarly, column (5) shows that the isolation of public housing is strongly related to the isolation of immigrants in 2012 but not in first-difference regression. Another important result is that a higher share of non-Europeans in public housing is associated with higher dissimilarity and isolation levels in both 1982 and 2012. In contrast, segregation levels decline as the share of the overall population in public housing in the metropolitan area increases.

In columns 2 and 4, for dissimilarity and 6 and 8 for isolation, the model introduces separately the share of the population and of non-European immigrants who live in large housing projects. The results strongly support our first hypothesis that large projects have a negative effect on segregation in contrast to smaller projects. When introduced separately, the coefficients of the share of immigrants in large projects are large and statistically significant. At the same time, the effect of the overall share of non-European immigrants or of the metro area population in all types of projects is no longer statistically significant.

Columns 9-12 of Table 6 show the regression results of models where the dependent variable is the share of non-European immigrants who live in an immigrant enclave. The results indicate that the share of non-European immigrants and of the metro area population in large public housing are strong predictors of the share of non-European immigrants who live in

enclaves. In particular, the share of non-European immigrants in large public housing is a strong predictor of the share of immigrants in enclaves, with a coefficient that is close to 0.85.

The rest of the table in the supplementary appendix shows how the differences in the average characteristics of the groups across cities relate to the differences in segregation levels. Consistent with assimilation theory, dissimilarity and isolation are higher when there are more blue-collar workers and unemployed persons in the group. Finally, both dissimilarity and isolation levels tend to be larger in more populated metro areas. There is also some evidence that segregation levels were higher in 2012 in metro areas with a larger share of immigrants who arrived in the last ten years.

VII. Project size and immigrant inflows

Next, we turn to the census tract data to assess how the increase in non-European immigration across metro areas affected different types of housing projects and their neighborhoods. In particular, we investigate whether the increase in the share of non-Europeans has been more rapid in the census tracts of large housing projects and how the population in private housing next to each type of housing project responded to the inflows of immigrants. Using the data from the 1990, 1999 and 2012 censuses that allow us to follow census tracts over time, we consider the following model[15]:

$$\Delta p_{nlt} = \Delta p_{lt}\alpha_q + e_{nlt}$$

where $\Delta p_{nlt} = \Delta\left(\frac{I_{nlt}}{L_{nlt}}\right)$ is the change in the share of non-European immigrants in the census tract n between two censuses (either 1990-99 and 1999-2014) in metro areas l with I_{nlt} the number

[15] As discussed above, we cannot track census tracts from the 1982 census over time, thus the sample is restricted to the period from 1990 to 2012.

of non-European immigrants in the census tract and L_{nlt} the total population of the tract. The term Δp_{lt} is defined similarly; however, it refers to the change in the share of non-European immigrants in the overall population of the metro area.[16] To assess the differences across housing projects of different scale, we estimate the model separately across the quartiles q of the initial distribution of the share of public housing across the census tracts.[17] We also examine separately what occurred in neighborhoods with no public housing inhabitants (approximately 8% of the census tracts).

One concern with the previous regression is that the increase in the immigrant share at the city level might be endogenous. Among other issues, reverse causality is possible if, for example, natives leave the less desirable housing projects for the suburbs for reasons that are unrelated to immigration, and immigrants respond to vacancies in public housing by moving to the metro area.[18] In that case, the increase in immigration in the metro area would be driven by the decision of natives to leave the projects. To isolate the causal effect of immigrant inflows, we construct an instrumental variable. As in Card (2001) and Cortes (2008), our instrument is based on ethnic networks. The idea that underlies this widely used instrument is that, to some extent, the location choice of immigrants in their destination country depends on the pre-existing presence of networks that are unrelated to unobserved city-specific factors that might bias our regressions. To construct the instrument, we use the most distant distribution of network that is available from the 1968 census.[19] Specifically, we predict $\hat{I}_{lct}$ the number of immigrants from country *c* in

[16] We do not add any other covariates to this model as they are all potentially endogenous.
[17] The distribution is taken conditionally on having at least some inhabitants in public housing.
[18] See, e.g., Verdugo (2016) for evidence that immigrants have been attracted to cities with a large supply of public housing.
[19] A crucial advantage of using 1968 as a reference year is that the 1960s were a period during which the access of immigrants to public housing was very restricted (see Verdugo, 2016, and the references therein). This ensures that

metro area k in 1990, 1999 and 2012 by multiplying the total number of immigrants I_{ct} from that country in year t with the proportion of immigrants of that nationality who were observed in the metro area in the 1968 census $\lambda_{cl,68} = \frac{I_{cl,68}}{I_{c,68}}$. Adding up across the countries of origin, the predicted total number of immigrants in metro area k is then given by $\hat{I}_{lt} = \sum_c \hat{I}_{lct} = \sum_c \lambda_{cl,68} I_{ct}$. Given the large sample size, we exploit the 54 different countries of birth that are available in the data. Because the endogenous variable is a percentage, our final instrument $\Delta\hat{p}_{lt}$ is defined by using changes in the number of predicted immigrants in the location divided by the initial population of the metro area L_{kt-1}, i.e., $\Delta\hat{p}_{lt} = \frac{\hat{I}_{lt} - \hat{I}_{lt-1}}{L_{lt-1}}$.

Table 7 shows the regression results. To ensure representativeness, we weight each regression by the number of inhabitants in the census tract. Below each panel for the 2SLS estimates, the first stage Fisher statistics indicates that our instrument is reasonably strong, with a F-stat that is superior to 10 in most of the specifications. Panel A shows the results where the dependent variable is the share of non-European households in the census tract, in all types of housing. Column 1 reports that the share of non-European households increases by 1 p.p. on average across the census tracts in response to an increase by 1 p.p. of non-European immigrants in the metro area population, as expected.[20] Other columns show the extent to which the share of non-European immigrants progressed across the census tracts with a varying share of public housing.

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the initial distribution of immigrants across metro areas is not related to their presence in public housing or the initial characteristics of the public housing stock.

[20] The coefficient is slightly above one because our census tract sample does not include a small number of recently created census tracts for which changes cannot be observed as well as census tracts for which the boundaries have changed.

Unambiguously, the census tracts with large housing projects received much larger inflows of non-European immigrants. We find that an increase by 1 p.p. in the share of non-European immigrants in the metro area translates into an increase of 1.7 p.p of the share of non-Europeans in the census tracts in the last quartile but by only 0.6 p.p. in the first quartile. Note that, even if immigration progressed twice as rapidly in the census tracts with large projects, the patterns of segregation are not extreme as the share of non-European immigrants progressed substantially across all of the census tracts. Finally, the results are very similar across the OLS and 2SLS models.

In panels B and C, we separately examine what occurred in public and private housing, respectively, across these census tracts. Column (1) in panel B shows that an increase in 1 p.p. of non-European immigration at the metro area level increased by 1.9 p.p. on average the share of non-European immigrants among public housing inhabitants across tracts, which indicates that non-European households were more likely to enter the public housing sector rather than the private one. Other columns indicate the extent to which immigration progressed across housing projects of different sizes. The coefficients tend to increase across quartiles in the OLS estimates, with a coefficient of 1.6 for the first quartile against 2.0 in the last quartile. The 2SLS estimates report a substantially higher coefficient for the census tracts in the first quartile. However, because the 2SLS estimates have particularly large standard errors, we cannot reject the hypothesis of equality across the coefficients for each type of census tract in these specifications.

Panel C examines how the share of immigrants progressed in private housing in response to immigrant inflows. As discussed above, an inflow of immigrants in public housing might affect the value of living in the census tract and deter natives if the latter have preferences for neighborhoods with a more homogenous population. These effects are more likely to be

observed when public housing inhabitants represent a very large share of the population in the census tract. Clearly, the results are consistent with this hypothesis. The share of immigrants in private housing progressed much more rapidly in tracts where the largest housing projects were situated. An increase by 1 p.p. of the immigrant share translates into an increase by 1.5 p.p. of the share of non-European immigrants in the census tracts of the last quartile, where large housing projects are located, in contrast to only 0.5 p.p. for the census tracts with no public housing inhabitants.

These results suggest that public housing plays an ambiguous role in segregation dynamics. On the one hand, the non-negligible progression of non-European immigrants in small housing projects may decrease segregation as they live in census tracts where the share of immigrants in private housing progressed much less rapidly. On the other hand, the progression of non-European immigrants in the largest public housing projects was compounded by their disproportionate growth in private housing. In line with our second hypothesis, this combination of large inflows of non-European immigrants into census tracts where large projects are located in both public housing and private housing contributes in the explanation of persisting segregation and the growth of enclaves.

VIII. Are immigrants segregated across housing projects?

While the number of non-European immigrants progressed across all of the housing projects, an important question is whether the immigrants who were allocated to projects of different size are systematically different. Qualitative work from Masclet (2006) and Sala Pala (2005) among others describes how housing authorities make a clear hierarchy of projects based on their real estate value, which varies with their localization and leads to the concentration of non-European immigrants in projects that are ‘sacrificed’ to protect more ‘valuable’ projects. In contrast, Algan

and al (2016) argue that because of the French republican ideology, housing authorities allocate applicants across projects without concern for their socio-economic status or origin.

To test for sorting along origin and socio-economic lines, we investigate how the characteristics of new entrants in public housing are correlated with the size of the project as measured by the share of inhabitants in public housing in the census tract. Using the 2012 census, we estimate the following model:

$$PH_{nl} = X_{inl}\beta + \gamma_l + u_{inl}$$

where PH_{nl} is the share of inhabitants in public housing in census tract n and metro area l while the vector X_{inl} contains a set of characteristics for individual i who is observed in public housing in the 2012 census but who reports to have lived in another dwelling the year previous to the census. The vector of individual covariates includes years of education, labor force status, non-European origin, whether the household is a single-parent family or a two-parent household with children. The model also includes metro area fixed effects γ_l that takes into account systematic differences in immigrant characteristics across metro areas.

A concern is that differences in sorting across projects at the metro area level might largely reflect the sorting of immigrants across the municipalities that form the metro area. Indeed, French metro areas are highly fragmented. For example, the metro area of Paris, Lyon and Marseille include 396, 102, and 38 municipalities, respectively. Most of the time, each municipality possesses its own independent housing authority that manages the projects that are located in the municipality. To test for a sorting *within* municipalities, we also estimate models with municipality fixed effects instead of metro area fixed effects.

Table 8 reports the estimation results of the model. In Columns 1 and 2, we start with a sample of new-entrants that includes both natives and immigrants of all origins. Consistent with

the previous results, immigrants, in particular non-European immigrants, are more likely to be observed in larger housing projects within metro areas or municipalities. Column 1 indicates that being an immigrant increases by 4 p.p. the share of public housing inhabitants in the census tract, with an additional 4 p.p. effect for non-European immigrants. We also find that individuals with the least favorable socio-economic characteristics tend to enter larger projects: having 10 additional years of education decreases the share of public housing inhabitants in the neighborhood by approximately 9 p.p. with respect to other new entrants in the metro area or the municipality. In addition, being unemployed during the census year is correlated with a share of public housing inhabitants in a census tract that is larger by 4 p.p.[21] Column 2 reports the regression results of the model that include municipality fixed effect. The coefficients are lower by 10% on average, which indicates that some of the sorting that has previously been identified occurs across municipalities. However, the coefficients are still large and indicate substantial sorting along origin and socio-demographic lines across projects within municipalities. In Columns 3 and 4, we restrict our sample to non-European immigrants to identify sorting among the members of that group. We find very similar results, with a strong effect of education and employment status among individuals from that group.[22]

Overall, our findings support our third hypothesis, with regard to a sorting of individuals across projects by origin and socio-economic status. However, it is important to keep in mind that such an empirical test cannot definitively prove that housing authorities discriminate. While the previous results are consistent with discrimination, they could also be explained by refusals of proposals from housing authorities by households with higher outside opportunities in the

[21] One issue is that employment status might be affected by the characteristics of the housing project. However, the results are very similar if that variable is omitted from the model.
[22] We also estimated a model where the dependent variable was the probability of living in a large project instead of the share of public housing in the census tract. The results were qualitatively very similar.

private market. Algan et al. (2016: 708) report that many households refuse an offer from housing authorities, which implies that some households are ready to wait several years before receiving another offer to be able to choose another neighborhood. A relationship between the characteristics of recently arrived inhabitants and the size of the project is consistent with a systematic refusal of offers in large and segregated housing projects by well-off applicants.

IX. Conclusions

This paper has documented how the increasing participation of non-European immigrants in public housing has influenced their segregation. While average segregation levels rose only moderately, we find that differences in segregation patterns across cities reflect the spatial dispersion of public housing, in particular to the share of very large housing projects. In addition, a novelty of recent segregation patterns has been the increase in the number of immigrant enclaves in census tracts where large housing projects are located. We also find evidence of segregation along immigrant origin and socio-economic lines among new-entrants across projects. Not only are there more non-European immigrants in census tracts with large projects, but the inhabitants of these projects tend to have a lower socio-economic status, which adds an additional socio-economic dimension to the segregation of non-European immigrants.

Overall, the consequences of public housing on segregation are notably ambiguous because of the effects of the progression of the share of immigrants into small housing projects. The results clearly suggest that the construction of small-scale and more dispersed housing projects might prevent the formation of enclaves in public housing and thus decrease the segregation of immigrants. However, constructing smaller projects is more costly and often meets the opposition of local inhabitants in the more desirable census tracts.

X. References

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XI. Tables

Table 1: Immigration and public housing in France, 1982-2012

A. Composition of immigration				
	1982	1990	1999	2012
Immigrants to population	7.4	7.4	7.4	8.8
Immigrant households to population	9.1	9.0	9.1	10.5
Among immigrants households share of:				
Non-Europeans (all origins)	37.9	43.7	51.6	60.6
Maghrebis	26.2	27.1	30.0	31.3
Sub-Saharan Africans	3.5	4.8	8.1	13.0
Asians	6.8	9.8	11.2	12.6
B. Share of households from the group living in public housing				
Natives	12.7	13.5	14.7	12.7
Immigrants	20.8	24.1	28.9	30.3
Non-Europeans	30.2	36.6	41.1	41.3
Maghrebis	32.9	39.1	45.9	46.9
Sub-Saharan Africans	26.1	31.8	42.2	48.0
C. Share of the group among households in public housing				
Immigrants	14.1	14.9	16.4	21.7
Non-Europeans	7.8	9.4	12.0	17.9
Maghrebis	5.9	6.6	7.8	10.5
Sub-Saharan Africans	0.6	1.0	1.9	4.5

Source: 1982, 1990, 1999, 2012 Censuses. Notes: Tabulations from the authors. We categorize a household as immigrant if the head of household is an immigrant.

Table 2: How segregated are public housing projects?

A. Distribution of households in public housing according to the share of public housing inhabitants in the census tract in 2012				
	Q1: Share Public Housing in (0;5%]	Q2: Share Public Housing in (5;16%]	Q3: Share Public Housing in (16;37%]	Q4: Share Public Housing>37%
Households in public housing	4.4	19.5	29.8	47.2
Immigrant households in public housing	2.2	12.1	24.7	61.0
Non-European households in public housing	1.9	10.8	23.7	63.5
B. Share of natives and immigrants households across projects in 2012				
	All households		Non-European immigrants	
	Small projects	Large projects	Small projects	Large projects
France	7.6	7.6	13.5	26.9
Paris	8.5	17.6	10.6	29.2
Lyon	10.1	11.0	19.5	30.1
Marseille	7.4	11.2	10.2	24.4
Lille	10.5	12.9	14.5	31.1
C. Dissimilarity Index of households in public housing by years				
	1982	1990	1999	2012
France	57.9	55.6	54.9	51.4
Paris	60.7	63.4	59.2	55.8
Lyon	58.8	61.2	54.0	50.1
Marseille	68.8	68.2	61.9	60.7
Lille	55.5	56.3	52.0	48.7
D. Isolation index of households in public housing by years				
France	49.2	48.8	51.1	46.9
Paris	48.9	54.6	54.6	50.6
Lyon	47.8	51.4	47.7	42.7
Marseille	51.4	53.0	49.5	47.6
Lille	49.7	50.9	49.1	45.1

Source: 1982, 1990, 1999, 2012 Censuses. Notes: Tabulations from the authors. Large projects are projects located in census tracts where the share of households in public housing is superior to 37%. We categorize a household as Non-European if the head of household is a Non-European immigrant.

Table 3: Dissimilarity Indexes across Metro Areas, 1982-2012

	1982	1990	1999	2012
A. Weighted average by group				
European households	20	18	18	18
Non-European households	33	33	34	34
B. Dissimilarity Indexes of Non-European households across major metro areas				
Paris	31	30	32	33
Lyon	31	33	36	36
Marseille	35	33	36	41
Nice	21	22	26	33
Lille	42	42	43	41
Toulouse	31	32	32	30
Bordeaux	37	35	37	35
Nantes	43	45	41	38
Toulon	36	37	36	45
Douai	40	39	36	33
Strasbourg	32	35	39	35
Grenoble	31	32	34	33
Rouen	36	39	37	35
Montpellier	28	28	27	30
Nancy	36	40	37	35
Standard deviation	*4.4*	*4.3*	*3.3*	*3.1*

Source: 1982, 1990, 1999, 2012 Censuses. Note: Panel A shows the weighted average dissimilarity index of European and non-European households across French metro areas using the population of the group in the metro area as weights. Only metro areas with more than 500 immigrants have been included in the calculation of the average. We categorize a household as Non-European if the head of household is a Non-European immigrant.

Table 4: Isolation Indexes across Metro Areas, 1982-2012

	Isolation index				Difference (Isolation index - Share of the Group in Metro Area Population)	
	1982	1990	1999	2012	1982	2012
	A. Weighted average by group					
European household	7.6	6.5	5.8	6.0	2.3	2.0
Non-European households	11.5	13.0	16.0	20.7	5.9	10.7
	B. Non-Europeans households across major metro areas					
Paris	13.0	15.0	18.8	25.4	5.0	8.4
Lyon	10.2	12.5	15.4	19.3	4.0	8.8
Marseille	16.3	15.3	17.1	20.5	8.6	10.7
Nice	7.9	8.5	10.2	14.6	2.1	6.8
Lille	10.2	11.8	14.4	17.2	5.7	8.9
Toulouse	7.7	9.8	14.0	15.8	3.7	7.9
Bordeaux	5.0	5.9	8.2	11.2	2.5	5.5
Nantes	3.9	6.2	8.2	12.4	2.4	7.1
Toulon	13.0	12.0	11.0	12.8	8.1	8.4
Douai	6.2	6.2	5.8	6.1	3.3	2.5
Strasbourg	8.6	12.9	17.5	21.3	3.6	8.7
Grenoble	10.0	10.8	13.6	15.9	3.9	6.9
Rouen	5.3	8.1	10.5	14.3	2.7	7.1
Montpellier	9.1	11.6	15.3	20.1	3.1	8.9
Nancy	6.5	8.0	8.7	12.6	3.2	6.7
Standard deviation	*2.6*	*2.6*	*3.4*	*3.7*	*1.5*	*1.4*

Source: 1982, 1990, 1999, 2012 Censuses. Note: Panel A shows the weighted average isolation index of European and non-European immigrants across French metro areas. Only metro areas with more 500 immigrants in the group have been included in the calculation of the weighted average. The last two columns show the difference between the isolation index and the share of the immigrant group in the population of the metro area. We categorize a household as Non-European if the head of household is a Non-European immigrant.

Table 5: Distribution of census tracts and non-European households by the share of immigrant households in the population

A. Distribution of census tracts								
Share of immigrant households in the census tract population								
	00-01	01-05	06-10	10-15	16-20	21-25	26-30	>30
1982	9.9	24.7	25.8	18.6	10.8	5.2	2.5	2.5
1990	9.2	26.2	26.2	18.2	10.1	5.2	2.4	2.6
1999	7.2	28.7	27.3	16	9.0	4.7	2.8	4.2
2012	4.7	29.8	26.1	14.6	8.8	4.9	3.3	7.9
B. Distribution of non-European immigrant households across census tracts								
Share of immigrant households in the census tract population								
	00-01	02-05	06-10	10-15	16-20	21-25	26-30	>30
1982	0.2	4.9	15.4	23.2	21.1	14.3	9.1	11.7
1990	0.2	5.2	15.9	22.3	20.3	14.2	8.4	13.3
1999	0.2	5.6	15.2	18.9	16.9	12.7	9.6	21.0
2012	0.1	4.8	13.1	15.2	14.3	11	9.1	32.5

Source: 1982, 1990, 1999, 2012 Censuses. Notes: Panel A shows the distribution of census tracts by the share of immigrant in the population of the tract. Panel B shows how non-European immigrant household are distributed across these census tracts. We categorize a household as Non-European if the head of household is a Non-European immigrant.

Table 6: What explain differences in segregation levels across metro areas?

Dependent variable	A. Dissimilarity				B. Adjusted Isolation				C. Share of non-Europeans in enclaves			
	2012 Cross-section		Long Differences 1982-2012		2012 Cross-section		Long Differences 1982-2012		2012 Cross-section		Long Differences 1982-2012	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Dissimilarity of public housing	0.242***	0.200***	0.109*	0.007					0.180	0.378	0.137	0.272
	(0.042)	(0.067)	(0.058)	(0.074)					(0.201)	(0.243)	(0.207)	(0.233)
Isolation of public housing					0.095***	0.010	0.019	0.035	0.145	-0.183	-0.331	-0.301
					(0.030)	(0.038)	(0.034)	(0.037)	(0.245)	(0.243)	(0.254)	(0.247)
Share non-Europeans	0.246***	0.033	0.347***	0.161**	0.092***	-0.046	0.084***	-0.016	0.458***	-0.125	0.387***	0.072
in public housing	(0.047)	(0.072)	(0.051)	(0.065)	(0.028)	(0.040)	(0.024)	(0.031)	(0.117)	(0.164)	(0.108)	(0.138)
Share non-Europeans		0.295***		0.321***		0.222***		0.160***		0.845***		0.479***
in ***large*** public housing projects		(0.079)		(0.070)		(0.046)		(0.033)		(0.184)		(0.151)
Share metro area population	-0.073	0.217	-0.371**	-0.350	-0.135***	-0.004	-0.260***	0.029	-0.482*	0.939	-0.722*	0.755
in public housing	(0.079)	(0.222)	(0.153)	(0.279)	(0.051)	(0.099)	(0.075)	(0.0108)	(0.252)	(0.585)	(0.413)	(0.356)
Share metro area population		-0.515**		-0.255		-0.238**		-0.438***		-1.849***		-1.936***
in ***large*** public housing projects		(0.230)		(0.269)		(0.113)		(0.118)		(0.546)		(0.574)
Controls for												
Characteristics of non-European households	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Characteristics of metro area	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R2	0.64	0.67	0.43	0.49	0.57	0.63	0.22	0.31	0.91	0.90	0.78	0.76
N	192	192	192	192	192	192	192	192	192	192	192	192

Source: 1982 and 2012 Censuses. Note: The table shows regression results of the dissimilarity index (columns 1-4), the isolation index (columns 5-8), the share of non-Europeans in enclaves (columns 9-12) on the indicated variables. The segregation indexes are measured for non-European immigrants at the metro area level. The sample includes 192 metro areas with at least 500 non-European immigrants both in 1982 and in 2012. Columns 1 & 2, 5 & 6 and 9 & 10 estimate the model using the cross-section of metro areas in 2012. Columns 3 & 4, 7 & 8 and 11 & 12 estimate the model using long-differences between 1982 and 2012. Large projects are projects located in census tracts where the share of households in public housing is superior to 37%. Robust standard errors are displayed in parenthesis. (*), (**), and (***) denote statistical significance at, respectively, 10%, 5% level, and 1% level.

Table 7: Which census tracts absorbed the increase in non-European immigration within metro areas?

Census Tracts	All tracts	Tracts with no Public housing	Q1: Share Public Housing in (0;5%]	Q2: Share Public Housing in (5;16%]	Q3: Share Public Housing in (16;37%]	Q4: Share Public Housing>37%
	(1)	(2)	(3)	(4)	(5)	(6)
	A. Dependent variable: Δ share of non-European households in the census tract					
	OLS Estimates					
Δ Share non-Europeans	1.077***	0.575***	0.548***	0.711***	1.078***	1.703***
in metro area	(0.012)	(0.045)	(0.045)	(0.023)	(0.023)	(0.080)
	2SLS Estimates					
Δ Share non-Europeans	1.090***	0.523***	0.463***	0.744***	1.161***	1.707***
in metro area	(0.014)	(0.075)	(0.023)	(0.021)	(0.051)	(0.0923)
First Stage Fisher	14	7	9	13	19	25
N	26 580	2 231	5 995	6 003	6 151	6 200
	B. Dependent variable: Δ share of non-European households in the census tract ***among public housing inhabitants***					
	OLS Estimates					
Δ Share non-Europeans	1.858***		1.622***	1.705***	1.886***	2.040***
in metro area	(0.073)		(0.151)	(0.094)	(0.072)	(0.087)
	2SLS Estimates					
Δ Share non-Europeans	2.114***		2.301***	1.899***	1.976***	2.047***
in metro area	(0.164)		(0.441)	(0.120)	(0.091)	(0.110)
First Stage Fisher	16		9	13	20	25
N	24 349		5 995	6 003	6 151	6 200
	C. Dependent variable: Δ share of non-European households in the census tract ***among private housing inhabitants***					
	OLS Estimates					
Δ Share non-Europeans	0.924***	0.575***	0.530***	0.626***	0.863***	1.479**
in metro area	(0.026)	(0.045)	(0.048)	(0.019)	(0.023)	(0.107)
	2SLS Estimates					
Δ Share	0.922***	0.523***	0.442***	0.637***	0.922***	1.443***
non-Europeans	(0.021)	(0.075)	(0.021)	(0.019)	(0.045)	(0.094)
First Stage Fisher	14	7	9	13	20	25
N	26 580	2 231	5 995	6 003	6 151	6 200

Source: 1990, 1999, 2012 Censuses. Note: The table shows regression results where the dependent variable is the change in the share of non-European immigrants in the census tract (Panel A), among public housing inhabitants in the census tract (Panel B) and among private housing inhabitants in the census tract (Panel C). The independent variable is the change in the share of non-European immigrants in the metro area. Within each panel the model is estimated alternatively with OLS and with 2SLS using a shift-share instrument based on the distribution of immigrants in 1968. Column 1 reports estimates using all census tracts and column 2 estimates obtained from census tracts with no public housing inhabitants. Column 3 to 6 estimate the model on different quartile of the distribution of the share of public housing in the population

across census tracts. Regressions are weighted by the number of inhabitants in the census tract in panel A, the number of inhabitants in public housing in panel B, and in private housing in panel C. Standard errors are clustered at the metro area level within each panel. (*), (**), and (***) denote statistical significance at, respectively, 10%, 5% level, and 1% level.

Table 8: Is there a sorting of new entrants in public housing across projects within metro areas or municipalities?

	Dependent variable :			
	Share public housing inhabitants in the population of the census tract			
	(1)	(2)	(3)	(4)
Years of education	-0.878***	-0.728***	-0.920***	-0.683***
	(0.043)	(0.060)	(0.058)	(0.120)
Unemployed	3.979***	3.131***	1.382***	1.322***
	(0.285)	(0.264)	(0.396)	(0.318)
Immigrant	4.113***	3.235***		
	(1.024)	(0.673)		
Non-European	4.949***	2.768***		
Immigrant	(0.449)	(0.638)		
Single-parent	1.115***	1.765***	0.076	0.479
family	(0.374)	(0.300)	(0.832)	(0.778)
Couple	0.013	0.677***	0.334	0.384
with children	(0.402)	(0.222)	(0.868)	(0.504)
Sample	Natives and immigrants from all origins		Non-European Immigrants	
Metro area fixed effects	Yes	No	Yes	No
Municipality fixed effects	No	Yes	No	Yes
N	170 069	170 069	32 658	32 658

Source: 2012 Census. Note: The table shows OLS regression results of models relating the share of public housing of the neighborhood with characteristics of new entrants in public housing in 2012. The sample includes new inhabitants in public housing that declared to have arrived in the dwelling the year before the census year. Standard errors are clustered at the metro area level. Columns 1 & 3 include metro area fixed effects. Columns 2 & 8 include municipality fixed effects. (*), (**), and (***) denote statistical significance at, respectively, 10%, 5% level, and 1% level.

XII. Supplementary Appendix for online publication

Indexes of Segregation

The index of dissimilarity (henceforth, ID) is given by:

$$ID_u = \frac{1}{2}\sum_{i \in u}\left|\frac{G_{iu}}{G_u} - \frac{N_{iu}}{N_u}\right|$$

where for each urban unit u, the IDs are calculated at the IRIS level i, using immigrants of a given origin with respect to the rest of the population. The term G_{iu} denotes the number of immigrants living in census tract i, and G_u is the total number of immigrants in the urban unit. The terms N_{iu} and N_u refer to the number of inhabitants in the census tract and in the metro area, respectively who do not belong to the immigrant group, which by definition might includes immigrants from other groups.

The index of isolation follows Bell (1954) and reports the percentage of the immigrant group in the area occupied by the average immigrant from the group:

$$I_u = \sum_{i \in u}\frac{G_{iu}}{G_u} \times \frac{G_{iu}}{population_{iu}}$$

where $population_{iu}$ refers to the total population of tract u. An immigrant group concentration is assessed as the share of the group in the census tract of a member of the group in question.

Appendix Table A1: Additional coefficients of the model of Table 7

Dependent variable	Dissimilarity				Adjusted Isolation				Share of non-Europeans in enclaves			
	2012 Cross-section		Long Differences 1982-2012		2012 Cross-section		Long Differences 1982-2012		2012 Cross-section		Long Differences 1982-2012	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Characteristics of non-European immigrants												
Share of the group in the	-0.174	-0.062	0.176	0.072	0.178*	0.305***	0.153	0.131	2.047***	1.507***	2.556***	2.543***
metro area population	(0.161)	(0.158)	(0.220)	(0.211)	(0.098)	(0.096)	(0.106)	(0.101)	(0.397)	(0.403)	(0.459)	(0.469)
Share blue-collar workers	0.275***	0.219***	0.160**	0.169**	0.222***	0.164***	-0.010	0.005	0.132	0.350*	-0.004	-0.069
	(0.083)	(0.082)	(0.078)	(0.075)	(0.048)	(0.047)	(0.037)	(0.035)	(0.192)	(0.198)	(0.160)	(0.165)
Share managers	0.089	0.009	-0.070	-0.030	-0.010	-0.065	0.007	0.018	0.268	0.522	0.127	0.116
	(0.151)	(0.147)	(0.198)	(0.188)	(0.087)	(0.083)	(0.095)	(0.089)	(0.334)	(0.350)	(0.403)	(0.417)
Share unemployed	0.091	0.074	0.148	0.151*	0.077	0.071	0.089*	0.096*	0.418*	0.413	0.453**	0.412**
	(0.108)	(0.104)	(0.095)	(0.090)	(0.062)	(0.058)	(0.045)	(0.043)	(0.239)	(0.252)	(0.195)	(0.201)
Share arrived since last census	0.197**	0.203**	0.173***	0.126**	0.061	0.076	0.016	0.006	-0.001	-0.010	-0.019	-0.015
	(0.099)	(0.097)	(0.057)	(0.055)	(0.057)	(0.054)	(0.027)	(0.026)	(0.219)	(0.231)	(0.119)	(0.120)
Average length of stay in France (in years)	0.594***	0.669***	na	na	0.185*	0.278***	na	na	0.539	0.326		
	(0.180)	(0.179)			(0.103)	(0.101)			(0.406)	(0.420)		

Note: See text and Table 6.

Appendix Table A2: Additional coefficients of the model of Table 7

Dependent variable	Dissimilarity				Adjusted Isolation				Share of non-Europeans in enclaves			
	2012 Cross-section		Long Differences 1982-2012		2012 Cross-section		Long Differences 1982-2012		2012 Cross-section		Long Differences 1982-2012	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Metro area characteristics												
Log population	1.976***	1.775***	1.784	1.019	0.457**	0.377*	5.222***	5.192***	1.539*	2.112	-0.600	-1.382
	(0.367)	(0.363)	(2.793)	(2.670)	(0.213)	(0.204)	(1.822)	(1.205)	(0.824)	(0.858)	(5.722)	(5.927)
Share immigrants in population	-0.090	-0.113	-0.292	-0.161	0.057	0.012	0.108	0.138	2.149***	2.361***	2.778***	2.771***
	(0.128)	(0.124)	(0.247)	(0.238)	(0.076)	(0.073)	(0.118)	(0.111)	(0.300)	(0.314)	(0.513)	(0.524)
Share managers	-0.290*	-0.239	-0.208	-0.205	-0.012	0.027	-0.035	-0.014	-0.592	-0.765**	-0.193	-0.300
	(0.166)	(0.162)	(0.179)	(0.170)	(0.095)	(0.090)	(0.085)	(0.080)	(0.367)	(0.386)	(0.364)	(0.376)
Share blue-collard	-0.266*	-0.223	-0.081	-0.092	-0.352***	-0.286***	0.087	0.111	-0.377	-0.605*	0.380	0.262
	(0.152)	(0.147)	(0.176)	(0.168)	(0.082)	(0.080)	(0.084)	(0.080)	(0.343)	(0.360)	(0.361)	(0.372)
Share unemployed	0.447**	0.369*	0.042	0.142	0.321***	0.267**	0.175	0.181	-0.109	0.186	-0.720	-0.646
	(0.208)	(0.203)	(0.254)	(0.243)	(0.120)	(0.114)	(0.121)	(0.115)	(0.462)	(0.484)	(0.520)	(0.532)

Note: See text and Table 6