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Cities

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CAN URBAN RENEWAL POLICIES REVERSE NEIGHBORHOOD ETHNIC DYNAMICS? *

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ABSTRACT: This paper assesses the impact on neighborhood population dynamics of a major urban renewal policy implemented in Catalonia (Spain) between 2004 and 2010. Some of the most deprived neighborhoods in the region received large investments in their public spaces and facilities with the aim of attracting natives and high income individuals and of reducing the concentration of poverty and immigration. The control group comprises rejected projects and projects accepted towards the end of the program that, due to a fall in public tax revenues, were never executed. The results suggest that the urban renewal projects had little (if any) effects on population dynamics, suggesting that substantial investment in deprived neighborhoods is insufficient to attract natives and/or high income households. Interestingly, the sole exception were the interventions made in Barcelona's historic districts, where the policy seems to have augmented ongoing processes of urban revival into its most deprived neighborhoods furthering processes of gentrification.

JEL Codes: R23, R30, R58

Keywords: Place-based policies, income mixing, neighborhood segregation

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1 Introduction

There are large differences in income across cities (Moretti, 2012); yet, at the same time, all cities, be they vibrant or lagging, present evidence of substantial inequality across their neighborhoods. Indeed, it would appear that in some regions of the world income differences are greater within than they are across cities. For example, Rosenthal and Ross (2015) report that while the interquartile range in the distribution of city income in the US is about 25%, the corresponding figure for neighborhood income within these cities is as high as 55%. Moreover, evidence suggests that within city income inequality is increasing both in the US (Watson, 2009) and in Europe (Tammaru et al., 2016). Partly because income correlates with racial and ethnic backgrounds, and partly due to social interactions in relation to the demand for housing (Card, Mas and Rothstein, 2008), a salient feature of the urban landscape is residential segregation along lines of race and ethnicity (Cutler, Glaeser and Vigdor, 1999; Boustan, 2011).

Various reasons can be forwarded for seeking to reduce income and ethnic segregation at the city level. The first corresponds to reasons of local externalities. The socioeconomic characteristics of neighborhoods have been found to affect individual performance in both education (Chetty, Hendren and Katz, 2016) and the labor market (Bayer, Ross and Topa, 2008; Chetty, Hendren and Katz, 2016) and to impact both criminal behavior (Damm and Dustmann, 2014) and welfare use (Olof Åslund and Peter Fredriksson, 2009). Exploiting variation in racial segregation across US cities, Cutler, Glaeser and Vigdor (1999) and Ananat (2011) further show that minorities perform worse in more segregated cities. Hence, residential segregation could contribute to amplify performance differences between income and ethnic groups. Second, multiple equilibria are a prominent feature of neighborhood ethnic composition (Schelling, 1971; Card, Mas and Rothstein, 2008) and, thus, public policies aimed at deconcentrating poverty can potentially be welfare enhancing.

Policies aimed at deconcentrating poverty and minority population groups abound in OECD countries (Cheshire, 2009). These initiatives, often known as income-mixing policies, fall into two broad categories (Boustan, 2011). The first encompasses policies that encourage low income households to move into more affluent neighborhoods and include, for example, the Section 8 and the Moving to Opportunity programs in the US. The second category consists of policies that seek to improve deprived neighborhoods so as to attract higher income individuals. Major programs falling into this category include the HOPE VI and the Community Development Block Grant in the US and the URBAN projects in the EU[1]. While the reasons outlined above are used to justify measures aimed at reducing segregation, income-mixing policies are

[1] Sweden and Denmark, in a policy more explicitly related to ethnic enclaves, adopted refugee dispersal measures in the late 80s to reduce the concentration of immigrants in specific neighborhoods and urban areas (Edin, Fredriksson and Åslund, 2003; Damm and Dustmann, 2014). Around the same time, Singapore introduced ethnic quotas at the neighborhood level, limiting housing transactions that could further increase segregation (Wong, 2013).

controversial for three reasons (Cheshire, 2009)[2]. First, neighborhood effects are much smaller than the raw correlations suggest (Topa and Zenou, 2015). Second, if income-mixing policies work, investing in deprived neighborhoods will increase housing prices and cause gentrification, suggesting that such policies might end up hurting (rather than helping) the low income residents of the targeted neighborhoods. Finally, while income-mixing policies are costly, the effectiveness of such initiatives is unclear. The goal of this paper, therefore, is to assess the effectiveness of place-based policies that invest in deprived neighborhoods in order to deconcentrate poverty and immigration. To this end, we evaluate the effects on population dynamics at the neighborhood level of a prominent place-based policy implemented in the Spanish region of Catalonia.

The Catalan Neighborhoods Act was passed in 2004 by the regional government with the objective of deconcentrating poverty and immigration through the improvement of public spaces and public use facilities in some of the region's most deprived neighborhoods. The policy was adopted in the middle of the Spanish immigration wave, when the share of immigrant population was rising rapidly, especially in low income urban neighborhoods (Fernández-Huertas, Ferrer and Saiz, 2015). In the areas we study, immigration rose by more than 8.5 percentage points in the three-year period preceding the start of the policy. The intervention was implemented through annual calls for proposals, with an annual budget of 99 million EUR between 2004 and 2010. However, note that due to the fall in public sector revenues and the project length (4 years), the degree of execution was low among those projects accepted in the 2008-2010 calls for funding. For this reason, we focus on the 39 interventions corresponding to the 2004-2007 calls, with an average investment of 3,065 EUR per inhabitant. The intervention areas present an average population of 13,000 inhabitants, reflecting one of the policy guidelines, namely that of concentrating large investments in specific locations.

The selection process consisted of two rounds. In the first round, a deprivation index was calculated for each application made, using 20 socioeconomic indicators of neighborhood characteristics. Neighborhoods scoring above a certain threshold were included in the second round, when the projects were ranked according to a final score determined by this deprivation index (with a weight of 40%) and an assessment of the projects' characteristics. Our pool of control neighborhoods comprises the rejected projects and the projects accepted in the 2008-2010 calls that were never executed. As the most deprived neighborhoods were treated first, the projects accepted at the initial calls differ significantly from the control neighborhoods. Moreover, these differences translate into differential pre-treatment trends in neighborhood population dynamics, making it inappropriate to apply standard differences-in-differences estimators. We therefore adopt the Oaxaca-Blinder estimator, as developed by Kline (2011) and as recently used in Busso, Gregory and Kline (2014) and Kline and Moretti (2014), to evaluate place-based policies.

[2]An additional cost of income-mixing policies might be the disruptive effects of mobility on teenagers (Gibbons, Silva and Weinhardt, 2016; Chetty, Hendren and Katz, 2016).

Interestingly, here, we have access to all the neighborhood indicators used by the policy-makers when selecting the treated, which reduces the risk that unobserved neighborhood characteristics confound our treatment estimates.

The results suggest that the urban renewal projects had no effects on the population dynamics of the intervention areas, indicating that substantial investment in public spaces and facilities is insufficient to attract native and/or high income households to deprived neighborhoods. The one notable exception are the urban renewal projects carried out in the historic districts of Barcelona, the one large metropolitan area in the region. Here, the policy attracted native and EU15 college graduates. Overall, the policy reduced the share of non-EU15 immigrants by more than 5 percentage points and increased the share of population with a college degree by 16 percentage points. Since the late 1990s, the Barcelona city center has experienced an urban revival process and our findings suggest that the Neighborhoods Act intensified this process in some of the city's most deprived historic districts.

To guide the empirical findings, we develop a residential choice model with two neighborhoods and two population groups: natives and (low-income) immigrants. Native and immigrant neighborhood valuations rise in line with increased urban renewal investment, and the two groups present idiosyncratic residential preferences with regard to neighborhoods. Additionally, native utility is decreasing with the (square of the) immigrant share in the neighborhood, giving rise to multiple equilibria in a one-sided tipping model to use the terminology of Card, Mas and Rothstein (2008). In mixed equilibria, investment in the neighborhood increases native willingness to pay more than immigrants can pay and, so, the place-based policy reduces the immigrant share in the neighborhood. However, when the minority share lies beyond the tipping point, urban renewal investment might be insufficient to attract natives to the neighborhood and the policy will have no impact on the neighborhood's ethnic composition. Our results are consistent with this latter scenario in which the urban renewal policy is unable to reverse the tipping process.

Rossi-Hansberg, Sarte and Owens (2010), Ahlfeldt, Maennig and Richter (2016) and Koster and Van Ommeren (2015) estimate housing externalities arising from urban renewal policies. Rossi-Hansberg, Sarte and Owens (2010) study a policy implemented in Richmond (Virginia) while Ahlfeldt, Maennig and Richter (2016) examine interventions in Berlin following re-unification. Using housing prices for renovated and non-renovated dwellings, these two studies estimate housing externalities in terms of the extent to which the value of a property depends on the quality of the nearby housing stock. While both papers analyze policies aimed at renovating the private housing stock, Koster and Van Ommeren (2015) analyze a Dutch program that targeted the public housing stock. They estimate the housing externalities caused by the policy in terms of both prices and sales times. Our paper differs from these studies in two respects. First, instead of estimating housing externalities, we assess the effectiveness of urban renewal measures for reducing income and ethnic segregation in cities, the primary goals of these policies. Second, while the above papers study programs targeting the housing stock, we examine an intervention that improved public spaces and public use facilities.

Our paper is closely related to Baum-Snow and Marion (2009) and Diamond and McQuade (2016), who study the effects of affordable housing developments in the US financed by the Low Income Housing Tax Credit (LIHTC). Although this policy is not strictly an urban regeneration program, some of the investments target disadvantaged neighborhoods. When focusing on developments in the least attractive locations, Baum-Snow and Marion (2009) find that these interventions increase local housing prices, reflecting either *better* neighbors or the conversion into new housing units of vacant buildings or unsightly empty lots. Similarly, Diamond and McQuade (2016)'s findings indicate that developments in disadvantaged areas cause a rise in local housing prices as well as in the income and the non-minority share in the neighborhood[3]. The results in this latter paper suggest that building affordable housing in disadvantaged areas can be a more effective tool for reducing income and ethnic segregation than simply improving the public spaces and facilities of these areas.

Our paper is also related to the literature (surveyed in Neumark and Simpson (2015)) that analyzes the effects of enterprise zones, focused mainly on the US and France[4]. Although enterprise zones are also place-based policies that target deprived neighborhoods, they differ from the urban renewal policy studied here in that they focus on tax incentives aimed at boosting local employment.

The paper is structured as follows. In section 2 we develop a theoretical framework to understand the potential effects of urban renewal policies on the composition of the population in a neighborhood. Section 3 describes the urban renewal policy studied here, while section 4 introduces the data and the variables used. In section 5 we explain the empirical approach adopted in the paper. The results are presented in section 6 and section 7 concludes.

2 Theoretical framework

In this section, we develop a residential choice model with two neighborhoods and two population groups (natives and immigrants). The model is a variant of those developed in Banzhaf and Walsh (2013) and in Glaeser (2008) to examine racial segregation. The model's key elements include idiosyncratic residential preferences for neighborhoods, social interactions in housing demand (endogenous amenities) as well as an exogenous amenity, whose value increases with neighborhood investments. We use the model to study the neighborhood population responses

[3]In contrast, Baum-Snow and Marion (2009) and Diamond and McQuade (2016) find that LIHTC developments in more affluent neighborhoods decrease housing prices, reflecting a lower willingness to pay to live with lower income neighbors.

[4]Studies of enterprise zones in the US include Hanson (2009), Neumark and Kolko (2010), Hanson and Rohlin (2013) and Busso, Gregory and Kline (2014); while studies of the French experience include Gobillon, Magnac and Selod (2012), Givord, Rathelot and Sillard (2013), Briant, Lafourcade and Schmutz (2015) and Mayer, Mayneris and Py (2015).

to an urban renewal policy.

2.1 Model set-up

There are two neighborhoods in the city. The size of neighborhoods 1 and 2 are fixed and given by S and $1-S$, respectively. In turn, there are two population groups, natives (N) and immigrants (I), respectively. Each individual consumes one unit of housing and overall city population is normalized to one, with P denoting the city-wide immigrant share. P_1 and P_2 are the immigrant shares in neighborhoods 1 and 2, with $P = SP_1 + (1-S)P_2$. We restrict our analysis to equilibria in which $P_1 \geq P_2$. We further assume that $S \leq P < 0.5$, to allow the possibility that neighborhood 1 becomes a ghetto ($P_1 = 1$).

If residing in community 1, natives' utility is given by $U_1^N = Y^N - Q - \alpha(P_1) + \gamma^N G + a_n$, where Y^N is income and Q is the price of housing in the neighborhood. The term $\alpha(P_1)$ reflects that natives care about the ethnic composition of the neighborhood. We return to the nature of the function α below. Natives also value the exogenous amenity G where $\gamma^N > 0$. The amenity value is assumed to increase as a consequence of urban renewal investments. The only individual-specific utility component is a_n, which reflects the attachment of individual n to neighborhood 1, and it is uniformly distributed in the unit interval, i.e. $a_n \sim U(0,1)$. In neighborhood 2, the values of Q and G are normalized to zero, implying that natives' utility in neighborhood 2 is given by $U_2^N = Y^N - \alpha(P_2)$.

Similarly, immigrants' utilities in neighborhoods 1 and 2 are $U_1^I = Y^I - Q + \gamma^I G + a_i$ and $U_2^I = Y^I$, respectively, with $a_i \sim U(0,1)$. Note that unlike natives, immigrants' utility does not depend directly on the neighborhood ethnic composition. This assumption is based on evidence that suggests racial segregation is (largely) driven by the desire of non-minority residents to avoid neighborhoods with a high minority share (Cutler, Glaeser and Vigdor, 1999; Card, Mas and Rothstein, 2008; Boustan, 2011). We further assume that the natives' income is higher than that of immigrants ($Y^N > Y^I$) and that $\gamma^N > \gamma^I \geq 0$, as higher income is associated with a higher willingness to pay for amenities (Kuminoff, Smith and Timmins, 2013; Kahn and Walsh, 2015)[5].

To study the effects of investment on the population composition of the neighborhoods, we focus on the minority share in neighborhood 1, which fully determines the proportions of both groups in the two neighborhoods[6]. There are two types of equilibrium. In a mixed equilibrium, neighborhood 1 is inhabited by both natives and immigrants ($P_1 < 1$) while in a ghetto, neighborhood 1 only hosts immigrants ($P_1 = 1$).

Note that there are always immigrants in the two neighborhoods, implying that there is an immigrant who is indifferent between neighborhoods, with a willingness to pay for neighborhood 1 given by $Q(a_{i^*}) = \gamma^I G + a_{i^*}$. In a mixed equilibrium, there is also an indifferent na-

[5] Koster, van Ommeren and Rietveld (2016) provide empirical evidence regarding this assumption for the case of historic amenities in Dutch cities.

[6] Note that $P_2 = (P - S P_1)/(1-S)$, while the proportion of natives in neighborhoods 1 and 2 are $N_1 = 1 - P_1$ and $N_2 = 1 - P_2$, respectively.

tive, whose willingness to pay to live in neighborhood 1 amounts to $Q(a_{n^*}) = -\alpha(P_1) + \alpha(P_2) + \gamma^N G + a_{n^*}$. In equilibrium, the two marginal residents' willingness to pay must be equal, i.e. $Q(a_{i^*}) = Q(a_{n^*})$. Solving this equation gives us the equilibrium immigrant share and housing price in neighborhood 1[7]:

$$P_1 = P + \frac{P(1-P)}{S}\left(\alpha(P_1) - \alpha(P_2) + (\gamma^I - \gamma^N)G\right) \tag{1}$$

and:

$$Q = 1 - S + (1-P)\left(-\alpha(P_1) + \alpha(P_2) + \gamma^N G\right) + P\gamma^I G \tag{2}$$

If we assume that α is a linear function with $\alpha > 0$, then there is a unique mixed equilibrium. This equilibrium will be stable if social interactions are moderate. Specifically, the equilibrium will be stable if $\alpha P(1-P) < S(1-S)$. Otherwise, the mixed equilibrium is unstable and the neighborhood will be either in $P^1 = 0$ or in $P^1 = 1$[8]. If the mixed equilibria is unstable, then the resulting outcome is a two-sided tipping model to the use Card, Mas and Rothstein (2008)'s terminology. In a two-sided model of this type, neighborhoods to the left of the mixed equilibrium evolve towards $P^1 = 0$ while those that to the right of it evolve towards $P^1 = 1$. This type of equilibrium is inconsistent with the neighborhood dynamics documented in Card, Mas and Rothstein (2008) and in Card, Mas and Rothstein (2011). In fact, the evidence supports one-sided tipping models, which predict that mixed neighborhoods are dynamically stable for low minority shares but that they quickly evolve towards a full minority equilibrium ($P^1 = 1$) once they surpass the tipping point.

In order to obtain a one-sided tipping model, we assume that α is quadratic, i.e. $\alpha(P_i) = \alpha {P_i}^2$ with $\alpha > 0$.[9] If social interactions are sufficiently strong, i.e. α is sufficiently large, the model can present two mixed equilibria. Then, the first of these (with the lower minority share) will be stable while the second will be unstable, as illustrated in Figure 1(a)[10]. The solid line is the natives' willingness to pay curve. When the minority share is low, the willingness to pay increases with P_1 as preference heterogeneity dominates the social interaction effect. However, for higher minority shares, the social interaction becomes relatively more important and the curve slopes

[7]We have used the fact $a_{i^*} = 1 - S(P_1/P)$, $a_{n^*} = 1 - S((1-P_1)/(1-P))$ and $P_2 = (P - SP_1)/(1-S)$.

[8]Specifically, if α is a linear function it turns out that

$$P_1 = P + \left(\frac{(1-S)P(1-P)}{S(1-S) - \alpha P(1-P)}\right)(\gamma^I - \gamma^N)G$$

[9]We obtain the same qualitative results if instead we assume that natives prefer to live in neighborhoods with a minority share that is not too different from that of the city-average, i.e. $\alpha(P_i) = \alpha(P_i - P)^2$.

[10]Formally, note that expression 1 is a function that maps into itself, i.e. $P_1 = H(P_1)$, where mixed equilibria are the values of P_1 in which H intersects the 45 degree line. If H crosses the 45 degrees line from above (below), then $H' < 1$ ($H' > 1$) and the equilibrium is stable (unstable). If $\alpha(P_i)$ is quadratic, then H is an increasing and convex function of P_1. If α is sufficiently low, the model has one mixed (and stable) equilibrium. If α is sufficiently high, then two mixed equilibria arise with the first (second) equilibrium being stable (unstable). The stability condition, i.e. $H' < 1$, implies $S/(P(1-P)) > (2\alpha P_1 + 2\alpha P_2(S/(1-S)))$.

downwards. Since immigrants' willingness to pay curve (dashed line) slopes downwards due to preference heterogeneity, two mixed equilibria arise. Consider the low minority share equilibrium depicted in point A. If a shock decreases the minority share, the immigrants' willingness to pay curve exceeds that of natives and equilibrium is restored. Similarly, if there is a shock that increases the minority share, the natives' willingness to pay curve exceeds that of immigrants, subsequently reducing the minority share. Hence, point A equilibrium is stable. The opposite is true in the second equilibrium (point B), where any shock takes the minority share away from the initial equilibrium.

Insert Figure 1(a) here

Models that feature social interactions in housing demand typically exhibit multiple equilibria. Here, note that point C in Figure 1(a) is also a stable equilibrium in which neighborhood 1 only hosts immigrants ($P_1 = 1$). In such an equilibrium, no native wants to enter the neighborhood, which is guaranteed by the following condition:

$$\frac{S}{P} - \alpha(1) + \alpha(P_2) + (\gamma^N - \gamma^I)G < 0 \tag{3}$$

The housing price is determined by the marginal immigrant. Specifically:

$$Q = 1 - \frac{S}{P} + \gamma^I G \tag{4}$$

Finally, point D in Figure 1(a) is the model's tipping point, which is the highest minority share that can sustain a stable equilibrium[11]. With α quadratic, the tipping point (${P^t}_1$) is:

$${P^t}_1 = \frac{1}{1-2S}\left(\frac{S(1-S)^2}{2\alpha P(1-P)} - SP\right) \tag{5}$$

No stable neighborhood can exist between point D (the tipping point) and $P_1 = 1$, implying that neighborhoods to the left of the tipping point are transitioning towards the ghetto equilibrium.

2.2 Impact of urban renewal policy on neighborhood ethnic composition

An urban renewal policy increases the neighborhood amenity level G; however, the effects of the policy will differ depending on the nature of the equilibrium considered. We first study the policy effects in a mixed (and stable equilibrium). Then, we study the impacts of investing in a ghetto. Finally, we discuss the role of the urban renewal policy as a "big push" policy that might reverse the dynamics of neighborhoods that are tipping.

In a mixed (and stable equilibrium), the effects of increasing G on the minority share and housing price of neighborhood 1 are given by:

[11] Formally, the tipping point satisfies $H' = 1$.

$$\frac{dP_1}{dG} = \frac{\gamma^I - \gamma^N}{\frac{S}{P(1-P)} - \left(2\alpha P_1 + 2\alpha P_2 \frac{S}{1-S}\right)} < 0 \tag{6}$$

and

$$\frac{dQ}{dG} = \left((1-P)\gamma^N + P\gamma^I\right) - (1-P)\left(2\alpha P_1 + 2\alpha P_2 \frac{S}{1-S}\right)\frac{dP_1}{dG} > 0 \tag{7}$$

Expression 6 indicates that investments in the neighborhood decrease the neighborhood minority share. To see this, note that the numerator is a negative term as the natives' willingness to pay for G exceeds that of immigrants ($\gamma^I < \gamma^N$). In turn, the denominator is a positive term. In fact, this is the same condition that guarantees that the mixed equilibrium is stable (see footnote 10). In terms of the housing price, expression 7 shows that investing in the neighborhood increases it. The first part of the expression is the city-level (weighted) average willingness to pay for G, i.e. $(1-P)\gamma^N + P\gamma^I$. The second part indicates that higher G decreases the proportion of immigrants in the neighborhood, which further contributes to the increase in the price of housing. Hence, the housing price increase exceeds the willingness to pay for G as it also incorporates the value that natives attach to the shift in the neighborhood's ethnic composition.

Figure 1(b) illustrates the effects of such an intervention in the specific case where $\gamma^I = 0$[12]. Starting from a stable mixed equilibrium (point A), investing in the neighborhood increases the natives' willingness to pay to live in neighborhood 1, which shifts from the dashed to the dotted curve. In the new equilibrium (point B), the minority share is lower and the price of housing is higher. The arrival of native residents and the increase in housing prices in the intervened neighborhoods are actually among the policy's stated goals. This is also why income mixing policies are controversial. Investments in the neighborhood might eventually harm the low income residents of the treated neighborhoods. Note that higher amenities generate a price increase that exceeds the immigrants' willingness to pay. In our model, increasing G reduces immigrants' welfare as inframarginal immigrants in neighborhood 1 experience a housing price increase that exceeds the direct utility gain of higher amenities[13].

Insert Figure 1(b) here

The effects of the policy, however, may differ greatly if the minority share is very high in the first place. In fact, in a ghetto equilibrium, small increases in G have no impact on the minority share in the neighborhood as long as condition 3 continues to hold. This suggests that once a neighborhood minority share is high, investments in the neighborhood are unlikely to attract natives since the value that they attach to a high immigrant share offsets any utility gain from a higher G. Despite there being no change in the ethnic composition of the neighborhood, the

[12] If $\gamma^I = 0$, then increasing G does not affect the immigrants' willingness to pay.

[13] Of course, this model overstates the negative welfare effects of the policy since homeowners in the neighborhood would be protected from the housing price increase.

fact that there is a marginal immigrant implies that higher G increases the price of housing. Specifically, inspecting 7 reveals that rasing G by one unit increases the price of housing by γ^I units, which is the immigrants' willingness to pay for G.

An important feature of urban renewal policies is that they are not intended to be marginal interventions. Rather, the purpose of such policies is to bring about substantial changes in targeted neighborhoods. Consider a neighborhood that is in a stable mixed equilibrium such as point A in Graph 1(c) where, again, we have assumed $\gamma^I = 0$. Suppose that there is an increase in the city-level minority share (P increases), which reflects the context in which the Neighborhoods act was passed. As a consequence, the immigrants' willingness to pay curve moves upwards (solid gray line) and, as a result, this curve (solid line) exceeds that of the natives for all values of P_1. This neighborhood has tipped, and starts to lose natives until it reaches point B where $P_1 = 1$. Card, Mas and Rothstein (2008) have shown that unstable neighborhood dynamics are not rapid. Hence, urban renewal policies that are implemented when tipping has already started but has not yet been finalized can restore the neighborhood's stability. Specifically, investing in the neighborhood will shift the natives' willingness to pay curve upwards (gray dashed line). Hence, the policy might bring the neighborhood back to the left of the tipping point (equilibrium C in this example). This seems to be the rationale underpinning the Neighborhoods Act, as the policy's goal was to deconcentrate poverty and immigration in a context where the immigrant share in deprived areas was growing rapidly.

Insert Figure 1(c) here

3 The urban renewal policy: the Neighborhoods Act

The regional government of Catalonia introduced the Neighborhoods Act (*Lei de Barris*) in 2004, with the aim of revitalizing neighborhoods deserving of 'special attention'. By means of massive, geographically concentrated investments, the policy sought to improve public spaces and facilities in the targeted neighborhoods, with the specific policy goal of deconcentrating poverty and immigration and, ultimately, reducing income and ethnic segregation (Nello, 2009).

Between 2004 and 2010, there was an annual call for funding with an assigned yearly budget of 99 million EUR, to be distributed among the selected projects submitted by the local councils[14]. The length of the projects was fixed at 4 years. The funds were channeled as transfers from the regional government to the local councils. As a rule, the regional transfer could account for just 50% of the project, meaning that local governments had to cover the remaining 50%, possibly with transfers from other tiers of government. As discussed, the policy was clearly focused on investing in public spaces. As much as 80% of the funds was spent on public spaces and public use facilities, while an additional 10% was devoted to renovating the existing stock

[14] Each municipality could only be awarded one project per call (two in the case of Barcelona).

of apartment buildings. Finally, the remaining 10% was spent on social services aimed at improving the labor market performance of the neighborhoods' residents. By way of example, Appendix A shows the investments funded through the *Santa Caterina & Sant Pere* project, a 15 million EUR intervention carried out in Barcelona's city center.

Across the seven calls for funding, of the 450 applications received 143 were granted. However, owing to the fall in regional and local government revenues, the degree of execution is low among the projects accepted in the last calls. All projects from the 2004 to 2006 calls (46 in total) were completed while, from the 2007 call, only 17 out of the 24 accepted projects were completed. Thus a total of 63 projects were executed (corresponding to the 2004 to 2007 calls) and completed between 2008 and 2011. We exclude (what are mostly small) projects in municipalities with less than 10,000 inhabitants. We do so because census tracts in these municipalities (which is the finest geographical detail for which data are available) do not provide a realistic approximation to neighborhoods. We also exclude a few cases in which the municipality underwent a complete redrawing of its census tract borders in the period under study. Finally, we focus on 39 interventions with an average investment of 3,065 EUR per inhabitant. The intervention areas have an average population of 13,000 inhabitants, indicating that investments were quite localized.

The selection process consisted of two rounds. In the first round, a deprivation index was calculated for each application. The index considers a large number of indicators measuring the following items: property value, characteristics of the housing stock (share of ≥ 4-storey apartment buildings without elevator, share of apartments without piped water or sewerage connection), high density, drastic population growth or decline, concentration of young and old people, non-EU immigration, proportion of welfare benefit users, unemployment rate, percentage of low-educated inhabitants, percentage of people at risk of social exclusion, deficit of public transportation, lack of parking space, lack of parks and green areas and a high vacancy rate in commercial property. The areas with a score above a certain threshold were considered in the second round.

In the second round, projects were ranked according to a final score determined by this deprivation index (with a weight of around 40%), the population size of the treated area together with more qualitative aspects of the project, including, the financial effort of the municipality, the type of project (historic district renovation or not), the involvement of the local community, and the adequacy of the project to policy goals. After ranking the projects on the basis of their final score, the budget limit of 99 million EUR implicitly defined a 'cut-off', which varied across calls depending on the proposed budget of the applicants at the top of the ranking.

The first column in Table 1 shows the average values of all indicators used in the deprivation index as well as the population size of the 39 projects analyzed here. As explained above, the projects were implemented in under-performing neighborhoods. Unemployment is about three percentage points higher than the regional average (12.8 vs. 10.2%), while the share of individuals (above 10 years) with no high-school diploma (or equivalent) is remarkably high (76% compared to the regional average of 40%). Treated neighborhoods also show a high presence of foreigners. In 2003, the share of non-EU15 immigrants was already high compared to the regional average (13.9 vs. 4.9%). Moreover, it was rising rapidly as the share of non-EU15 immigrants increased by 8.5 percentage points between 2001 and 2004. This dramatic increase is a consequence of the Spanish immigration wave, which meant Spain received almost 5 million immigrants between 1998 and 2008[15]. The increases in immigrant density experienced by the treated neighborhoods are particularly high as immigrants tended to concentrate in low-income urban areas (Fernández-Huertas, Ferrer and Saiz, 2015)), that is, the locations specifically targeted by the Neighborhoods Act[16]. In fact, the massive immigration wave, coupled with its unequal impact across the neighborhoods in the region, was one of the main reasons why the Neighborhoods Act was introduced in 2004 (Nello, 2009).

Insert Table 1 here

The control group consists of 68 rejected projects and 35 projects accepted during the 2008, 2009 and 2010 calls that, due to the fall in public tax revenues, present a degree of budget execution below 20%. The second column in Table 1 shows the average values of all the quantitative indicators used in the program. The fourth column in the table reports differences between treatments and controls. Overall, the treatment group scores higher on most of the indicators, reflecting greater needs. For instance, unemployment is almost 4 percentage points higher in treated than in control neighborhoods. In terms of immigration, in 2003 the treated areas presented a non-EU15 immigrant share that was 7.0 percentage points higher than that of the control neighborhoods.

The Neighborhoods Act does not overlap in space and time with any other major urban interventions, which means that the estimated policy effects are not be confounded by concurrent urban policies. The EU URBAN projects are very similar in goals and nature with the interventions studied here. However, only two such projects have been implemented in Catalonia and neither coincide with the neighborhoods studied here. Likewise, Plan-E was a stimulus investment plan launched by the Spanish Government in the midst of the great recession (2008) and operationalized as transfers to local governments for investment. We analyzed all Plan-E projects and confirmed that none of the accepted or rejected neighborhoods considered herein receives investments of any significant quantitative importance in relation to the Neighborhoods Act investments[17].

[15] The largest inflows of (mostly low-skilled) immigrants originated primarily from Ecuador, Morocco, Romania and Colombia. See Fernández-Huertas, Ferrer and Saiz (2015) and Jofre-Monseny, Sorribas-Navarro and Vázquez-Grenno (2016) for a detailed description of the Spanish immigration wave.

[16] Public housing is quantitatively unimportant in Spain, hosting only 2 percent of households. In contrast to other European countries, public housing is not an important factor driving immigrants' locations decisions.

[17] Typically, Plan-E consists of many small projects scattered around the municipality.

4 Data and variables

We combine official data from the projects accepted and rejected under the Neighborhoods Act with data on population characteristics at the neighborhood level. In the case of the accepted projects, we have scores for all the indicators considered in the selection process (see Table 1), the amount invested, the timing of the execution, as well as the project boundaries and the exact location of all investments within these boundaries. One such project is illustrated in Appendix B, where the solid line depicts the boundaries of the *Santa Caterina & Sant Pere* project, while the colored areas indicate the specific location of all investments. In the case of the rejected projects, we also know the scores for all the selection indicators, the budget proposal as well as the project boundaries.

As for our outcome variables, namely, population characteristics at the neighborhood level, we use yearly data from the municipal population register (*Padrón municipal de habitantes*) and data drawn from the 2001 and 2011 Population Censuses[18]. The population register is a yearly population count (with base date January 1st) containing information on an individual's age, gender and country of birth. The (decennial) population census contains further information, including, the educational level attained by the individual. Both the Census and the population register data are available at the census tract level (*Sección censal*), which is the most disaggregated geographical level existing in Spain. Unfortunately, some information for the Census is not disclosed in all tracts for reasons of confidentiality.

The intervention areas are typically made up of several census tracts. For the 142 treatment and control neighborhoods, the average number of tracts is 7.2, while the average census tract hosts 1,417 inhabitants. Although most project boundaries match the census tract borders, this is not always the case. For example, the dashed lines in Appendix B identify the census tracts in the *Santa Caterina & Sant Pere* project in Barcelona. Note that the project boundaries (solid line) generally follow the census tract borders. However, in the north-eastern corner, there is a census tract that is only partially included in the intervention area. In such instances, to compute the population of the intervened area, we resort to imputations. Specifically, we do so based on the share of developed land of each tract that belongs to the intervention area[19].

In the case of the outcome variables, we are interested in the long-run population dynamics at the neighborhood level. In terms of ethnic composition, we decompose the population into three groups: Natives, non-EU15 immigrants, and EU-15 immigrants. We divide the immigrants into these two groups as the policy goal is to reduce the concentration of non-EU15 immigrants in the treated neighborhoods (Nello, 2009)[20]. For each of these three groups, we examine two

[18]See Foremny, Jofre-Monseny and Solé-Ollé (2015) for a detailed explanation of the workings of the municipal population register.

[19]To compute these shares, we use the SIOSE 2005 (Sistema de Información sobre Ocupación del Suelo de España).

[20]According to the 2001 Census, immigrants born in EU15 countries have a higher level of education than both non-EU15 migrants and natives. Therefore, individuals from EU15 countries can be seen as natives belonging to

outcome variables by tracking changes that occurred between 2004 and 2013. The first of these is the difference between the logged population levels in 2003 and 2014 and, thus, it approximates the growth rate of each population group between these two years. The second is the change in the percentage of each group over the same time window. We also study the population dynamics of college graduates as this proxies high-income individuals. This information is only available from the Census and, thus, we study the changes occurring between 2001 and 2011. Specifically, we examine differences in the logged stock of college graduates as well as the changes in the percentage of this group in the neighborhood. Since the population by level of education is not disclosed for all tracts in the 2001 and 2011 censuses, in a few cases, the areas of intervention do not coincide exactly with the outcomes measuring changes in the population by ethnic and educational backgrounds.

5 Empirical approach

The main equation of interest is:

$$\Delta Y_i = \alpha T_i + X_i^{'} \beta + \epsilon_i \tag{8}$$

where ΔY_i is a measure of population change in neighborhood i, T_i is a treatment indicator while $X_i^{'}$ is a vector containing the neighborhood characteristics used by policy-makers to determine treatment. We focus here on long-differences. Specifically, we examine changes in native, EU15 and non-EU15 populations between 2004 and 2013 and changes in the population of college-graduates between 2001 and 2011.

As reported in Table 1, accepted projects between 2004 and 2007 differ from those that were rejected and those that were accepted in the 2008-2010 calls but that were never executed. In the bottom panel of Table 1, we test if treated and control neighborhoods also differ in pre-treatment trends. Specifically, we check if treatments and controls are balanced in terms of the outcomes of interest measured between 2001 and 2004. Prior to treatment, treated neighborhoods experienced larger increases in the share of non-EU15 immigrants. As a result, treated neighborhoods experienced more marked compositional changes, in which the share of natives (non-EU15 immigrants) decreased (increased) more in the intervention neighborhoods. This implies that the underlying assumption in the differences-in-differences setting, namely, the parallel trends assumption, does not hold in our application. As a result, we adopt the Oaxaca-Blinder approach developed in Kline (2011). The estimator procedure involves two steps. In the first step, the control units are used to estimate the following auxiliary regression:

$$\Delta Y_i = X_i^{'} \beta + \epsilon_i \tag{9}$$

the upper tail of the income distribution.

where the outcomes of interest, ΔY_i, is regressed on X_i, the vector containing all the indicators listed in the top panel of Table 1. In some specifications, we also include the lagged outcome measured during the pre-treatment period 2001-2004. In a second step, using the coefficients estimated in 9, namely $\hat{\beta}$, the average treatment effect is given by:

$$\widehat{ATT} = \hat{\mu} - \frac{1}{N_T} \sum^{N_T} \left(X_i' \hat{\beta} \right) \tag{10}$$

The first term of this estimator ($\hat{\mu}$) is the unconditional mean of the treated units while the second term is the counterfactual mean (for the treated units) obtained when using the estimated coefficients in 9, while N_T is the number of treated neighborhoods. Note that this is the estimator of counterfactual means developed by Oaxaca (1973) and Blinder (1973). Writing the counterfactual mean for treated units in matrix form and replacing the coefficient estimates by the Ordinary Least Squares (OLS) formula yields:

$$\frac{1}{N_T} D' X (X' W X)^{-1} X' W Y = wY \tag{11}$$

where D is a vector weighting the treated observations while W is a matrix that only weights the control observations. The expression preceding Y in equation 11 turns out to be a vector of weights, denoted by w. Hence, the counterfactual mean for the treated units is a weighted average of the control outcomes. These weights have two important properties. First, they guarantee that the mean of each and every control variable included in X is exactly the same in treated and re-weighted control samples, as reflected in the third column of Table 1. Second, the w's can be interpreted as those of a propensity score re-weighting estimator in which the weights are proportional to the conditional odds of treatment. This estimator is particularly desirable in settings, such as ours, in which the number of controls exceeds that of treatments and the vector X contains a large number of variables (Kline, 2011). Moreover, in our application, the vector of controls X contains all neighborhood features that have been selected by policy-makers to determine treatment, reducing the risk that unobservable variables confound our estimates of interest.

The dotted lines in Figure 2 illustrate the weighted averages for the shares of natives, non-EU15 immigrants and EU-15 immigrants obtained from a specification in which the first step (specification 9) only includes the indicators listed in the top panel of Table 1. While the treated and the unweighted control samples show clearly diverging pre-treatment neighborhood dynamics, the treated and the re-weighted control samples show very similar pre-treatment trends. This is formally shown in the last columns of the bottom panel of Table 1.

Insert Figure 2 here

6 Results

6.1 Baseline results

In Table 2, we present the baseline results for Equation 10 including different sets of controls. Each row corresponds to a different estimation and shows the effect of the urban renewal policy on a different outcome variable. Column 1 presents the results obtained when all variables shown in the top panel of Table 1 are used as controls. Note that these are all neighborhood characteristics used by policy-makers to select the treated neighborhoods. The estimates for all the outcome variables are small and statistically insignificant. This evidence suggests that, on average, the urban renewal policy had no effects on the population dynamics and educational composition of the intervention areas. The results for the shares of natives, non-EU15 and EU-15 immigrants are illustrated in Figure 2. Each dotted line represents the evolution of each variable for the reweighted control sample. Hence, the policy effect is the vertical difference between the treated (solid line) and the reweighted control sample. The graphs also indicate that the urban renewal policy had little (if any) effect on population dynamics. Similarly, the graphs show that the results do not hinge on the time window specified in the regression analyses.

Insert Table 2 here

As detailed in Table 1, the variables used for the treatment selection are drawn from three different sources: 1) the 2001 census; 2) the population registers; and, 3) data provided by the municipalities when completing the project application. The variables corresponding to sources 2) and 3) refer to different points in time depending on the specific call for funding in question. The variables built from annual population registers, including the population level and the share of non-EU15 immigrants in the neighborhood, can be measured prior to 2004 and we do so throughout the analysis. Specifically, we measure these variables in 2003, which correspond to the data used for treatment selection in the first (2004) call of the Neighborhoods Act. The third group of variables cannot be measured at different points in time and, so, we include controls that are not strictly pre-determined with respect to our outcomes. Thus, in column 2, we show the results obtained when we re-run the main analysis excluding these controls when estimating equation 10. Fortunately, the results do not change substantially when these variables are excluded. In column 3, we report the results obtained when, in addition to all the variables used in column 1, we add the lagged outcome measured between 2001 and 2004. Although the bottom panel in Table 1 suggests that treatment and the reweighted control groups show similar pre-trends, there might be efficiency gains by directly matching on pre-treatment trends in the outcome variable[21]. This is the most complete and, therefore, our preferred specification. The results are similar to those above, pointing once again to the null effects of the urban renewal policy on neighborhood population dynamics. For the sake of completeness, column 4 reports

[21] Busso, Gregory and Kline (2014) also match on pre-treatment outcomes.

the OLS estimation. It should be noted that these results are very similar to those obtained with the OB procedure.

6.2 Heterogeneous analyses

Although the baseline results indicate that, on average, there are no significant effects of the urban renewal policy on the population dynamics of the treated area, it could well be that these results are heterogeneous with respect to the characteristics of projects and neighborhoods. In Table 3 we focus on project heterogeneity while in Tables 4 and 5 we analyze the effects of interest by different neighborhood characteristics. The estimates reported throughout this section correspond to the more complete specification (column 3 in Table 2), which includes the 2001-2004 lagged outcome, and, as a result, pre-treatment trends between the treated and the reweighted control samples are exactly matched by construction[22]. Exploring these heterogeneous patterns can also shed light on the reasons why the policy was, on average, ineffective.

6.2.1 Effects by project size

One prediction of the model developed in Section 2 is that, if the minority share is relatively high, the policy will only be effective if the investment (G) is large enough to reverse the tipping point. In Table 3, we present the estimations after dividing the interventions between those with low and high levels of investment. We use three criteria to divide the projects by size: Total amount invested, per capita investment, and per area investment. In the case of total investment (columns 1 and 2), we consider projects above and below the median (14 million EUR). The results indicate that the impact of the urban renewal initiatives on neighborhood population dynamics are null even for the sub-sample of large projects in which the average investment is just above 16 million EUR. The same picture emerges when we consider investment per capita (above and below the median - 2,459 EUR) in columns 3 and 4, and when we consider investment per area (above and below the median - 0.46 million EUR per hectare) in columns 5 and 6. These results indicate that investment in urban renewal has no effects on population dynamics even in the case of those projects that concentrate the highest sums of money.

Insert Table 3 here

6.2.2 Effects by neighborhood type

The results reported in Table 3 are consistent with the model's prediction when a neighborhood has surpassed the tipping point. Since neighborhoods are also heterogeneous with respect to the initial minority share, we next test if the policy has been effective in settings where the initial minority share was lower ($P<P^t$ in terms of the model). Since the exact location of the tipping

[22] Thus, the analogous graphs to Figure 2 are not reported.

point is empirically unknown, we split the sample according to the percentage of immigrants in the neighborhood in 2003[23]. The results are reported in 4. Columns 1 and 2 show the results for treated neighborhoods with a non-EU15 immigrant share below and above the median (12 percent), respectively. The results for the two sub-samples are qualitatively similar, corroborating the conclusion that the policy had no effects on neighborhood dynamics. Since the average non-EU15 immigrant share is 6.6 percent in the sample with low immigration, the results suggest that a high minority share is unlikely to account for the policy's total lack of impact.

Insert Table 4 here

In the model presented in section 2 we considered two population groups, natives and immigrants. The two key elements in that model are that the natives' income is higher than that of the immigrants and, at the same time, the natives prefer neighborhoods where the share of immigrants is low. Note, however, that preferences for neighbors might not be restricted to ethnicity. Bayer, Ferreira and McMillan (2007) have shown for the San Francisco Bay area that, besides race, households prefer college-educated and rich neighbors. Hence, the two population groups in the model could alternatively be interpreted as poor and rich, or neighbors with high vs. low education (Glaeser, 2008). In columns 3 and 4 of Table 4 we explore heterogenous patterns with respect to the level of education. Specifically, we consider treated units with a population share (≥10 years of age) without a high-school diploma below and above the median (76.6%). The results also remain close to zero for the two sub-samples. Finally, in columns 5 and 6 we divided the sample considering treated units with a deprivation index below and above the median (44.4), respectively. This index is a function of all the deprivation indicators shown in the upper panel of Table 1 and, thus, the highest values indicate the greatest social needs. Again, the results indicate no policy effects for the two sub-samples. Note, however, that all the treated neighborhoods score above the deprivation index threshold set by policy-makers in order to exclude non-deprived neighborhoods. In fact, most of the treated neighborhoods are low-income neighborhoods that share a history of bad reputation and stigma (Nello, 2009). Thus, the hypothesis that the ineffectiveness of the policy can be attributed to the unfavorable social mix in the treated neighborhoods does not strike us as implausible.

The characteristics and location of the treated neighborhoods may also affect the impact of the policy. In the model developed in Section 2, we only consider one exogenous amenity G, which reflects the quality of public spaces and facilities in the neighborhood. The policy guidelines distinguish between interventions in suburbs and historic districts; thus, it might be the case that people value more highly investments in public spaces in historic districts given their more central location and the (potential) historical-architectural value of the intervention areas. To explore this dimension of heterogeneity, in columns 1 and 2 in Table 5 we report the

[23] Card, Mas and Rothstein (2008) estimate tipping points for US cities and find a large degree of heterogeneity across cities and over time. This finding suggests that tipping points are context specific and that they are not generalizable.

results for the impact of the urban renewal policy in suburbs (24 projects) and historic districts (15 projects). In order to adapt the matching strategy to this analysis, we further include as control variables, an indicator for suburbs and historic districts in columns 1 and 2, respectively.[24] Column 1 shows the estimates for the 24 suburbs, which indicate that there are no policy effects in these deprived areas. Column 2 presents the results for the urban renewal projects in the historic districts. Here, in contrast to all previous estimates, the results suggest that the urban renewal policy did have some impact on population dynamics. Specifically, for this subset of projects, interventions caused a 43% increase in the population of EU15 immigrants over the nine-year period between 2004 and 2013. Given the moderate size of this population group, this results in a modest .72 percentage point increase in the share of EU-15 immigrants in the treated historic districts.

Insert Table 5 here

6.2.3 Interventions in Barcelona's historic districts

Baum-Snow and Hartley (2016) and Couture and Handbury (2016) document that, between 2000 and 2010, city centers in US cities experienced a process of urban revival, with relative increases in income and in the share of college graduates. A similar gentrification process has occurred in Barcelona, the only large metropolitan area in the region. In the historic city center, *Ciutat Vella*, the share of college graduates has increased by more than 16 percentage points between 2001 and 2011, increasing from 13.7 to 30.4%[25]. Hence, one possible hypothesis to emerge is that urban renewal projects in Barcelona's historic districts have had significant impacts. To test this, we split the sample between historic districts in Barcelona and those located elsewhere. In column 4 in Table 5, we report the results for the three interventions in Barcelona while in column 3 we show the results for the remaining 12 interventions[26]. Given that there are only three treated neighborhoods, statistical inference based on the analytical standard errors provided by Busso, Gregory and Kline (2014) might be misleading. To address this issue, and following Gobillon and Magnac (2016), we build parameter estimates with 95% confidence intervals based on the following bootstrap procedure. We draw three units from the entire population of treatments and controls and consider them as treated units, while the remaining units correspond to the control group. We then estimate the treatment coefficients and replicate this exercise 1,000 times. The 95% confidence interval is obtained as the 2.5th and 97.5th percentiles of the empirical distribution of these estimates.

[24]Note that these adjustments were not necessary for the exercises conducted in Table 4. There, the share of non-EU15 immigrants, the population share without a college degree and all the variables entering the deprivation index are already included among the controls considered when estimating equation 9. Hence, for the sample splits in Table 4, treatments and controls are properly matched with respect to the variables used to split the samples.

[25]During the same period, the city-level share of college graduates also increased, but to a lesser extent, rising from 21.2 to 32%.

[26]The three interventions in Barceona's historic districts correspond to *Santa Caterina i Sant Pau*, *Poble Sec* and *La bordeta*.

The results show that, when considering the treated areas located in historic districts, excluding those in the city of Barcelona, the urban renewal policies have no significant effects on population dynamics. This suggests that the results obtained in column 2 were entirely driven by the projects in Barcelona. The results in column 4 confirm that this is indeed the case. Taken at face value, the impact of the urban renewal projects in the historic districts of Barcelona are quite large. Over the period 2004 to 2013, the policy increased the native and EU15 immigrant populations by 13.4 and 70%, respectively. The point estimates, which are not statistically different from zero, also imply that overall population increased by 9.3%, while the count of non-EU15 immigrants fell by 25.2%. These different population growth rates meant considerable changes in the composition of these neighborhoods with the share of natives and EU15 immigrants increasing by 3.4 and 2.5 percentage points, respectively, and the percentage of non-EU15 immigrants falling by 5.8 percentage points. These changes in the ethnic composition of neighborhoods involved a sizable increase in the share of college graduates in the neighborhood. Specifically, between 2001 and 2011, the urban renewal policy increased the population of college graduates by 98%, increasing the proportion of college graduates (among individuals aged 16 or more) by 16.2 percentage points. All in all, this indicates that the urban renewal projects implemented in the city of Barcelona have intensified the ongoing gentrification of its city center in the deprived historic neighborhoods targeted under the policy.

The effects recorded in Barcelona's three historic districts coupled with the policy's general ineffectiveness elsewhere is consistent with a tipping story in which the policy is unable to surpass the tipping point if the "big push" is of insufficient size. The share of non-EU15 immigrants is not especially low in the treated neighborhoods of Barcelona's historic districts. In fact, the 2003 (average) share of non-EU15 immigrants for these three projects is higher than the average recorded for all the treated neighborhoods (16.6 vs 14.0%). Hence, the low immigrant share is unlikely to explain why the policy was effective there. Although we are unable to test this hypothesis, the high historical-architectural value of these neighborhoods together with their central location might explain the effectiveness of the Neighborhoods Act in Barcelona's historic districts. In their study of enterprise zones, Briant, Lafourcade and Schmutz (2015) also document a high degree of heterogeneity with regards the effects of the policy and they show that differences in accessibility across the treated neighborhoods may account for these heterogeneous policy effects.

One valid concern is the possibility that Barcelona's historic districts might experience contemporaneous shocks in their population dynamics that may confound our estimates. To partly address these concerns, we conduct a placebo test using Madrid, given that its city center also underwent a process of urban revival in the period studied here. We select the three neighborhoods in Madrid's city center that are most similar to the three treated neighborhoods in Barcelona in terms of their probability of being treated[27]. The pre-treatment population dy-

[27]To identify these three neighborhoods, we pool the sample of (121) controls and all the neighborhoods in

namics of the three units selected in Madrid are reasonably similar to those of their Barcelona counterparts. Figure 3 shows the evolution in population of the three treated units in Barcelona's historic districts (left panels) and of the three placebo units in Madrid (right panel). In contrast to the results reported in columns 5 and 6 in Table 5, these figures correspond to estimates in which the lagged outcome is not included. Specifically, the specification of equation 9 corresponds to that of column 2 in Table 2. The figure shows similar pre-treatment patterns, especially for the population shares of natives and non-EU15 immigrants. Admittedly, the share of EU15 immigrants is growing in both cities albeit at a higher rate in Barcelona. Note, however, that the estimates reported in Table 5 correspond to a specification in which treatments and controls are exactly matched in terms of their pre-treatment outcomes, too. Reassuringly, the estimates reported in the last column of Table 5 for Madrid indicate no effects.

6.3 Results at the census tract level

In the analyses reported above, the geographical unit of analysis has been the intervention area as designated in the Neighborhoods Act grant applications. In many cases, however, there is substantial heterogeneity in the amounts invested within these areas. For example, under *Santa Caterina i Sant Pere* project (see map in Appendix B), the works carried out in the *Pou de la Figuera* area (see top panel in Figure A.1) concentrated the lion's share of funding (corresponding to the largest colored area on the map). Since we know the exact location of all the investments made, we are able to re-run the analysis at the tract level (i.e. the areas delineated by dashed lines on the map), which is the finest geographical detail for which our outcome variables are available. The estimations are presented in Table 6. For the baseline analysis (column 1), we have 412 treated and 317 non-treated tracts, reflecting the fact that the treated tracts (39) are larger in area than the controls (103). One limitation of undertaking this analysis is that some observations are lost when analyzing the educational composition of neighborhoods, given that for reasons of statistical confidentiality the population by level of education is not disclosed for all census tracts. Since tracts belonging to the same intervention area are not independent observations, we cluster the standard errors at this level of the intervention area. Moreover, as in some of the exercises we conduct the number of clusters is low, we supplement the results with p-values obtained with the clustered wild bootstrap procedure developed by Cameron, Gelbach and Miller (2008)[28].

Insert Table 6 here

(the municipality of) Madrid. With these data, we calculate the Oaxaca-Blinder weights as defined in Kline (2011), reflecting the probability of treatment. The specification used includes the variables considered in column 2 of Table 2, as well as an indicator for historic district. The probabilities of receiving treatment are plotted for all the neighborhoods of Madrid in Appendix C. The highest probabilities are those of *Embajadores*, *La Chopera* and *Palos de Moguer* which are the placebo treatments considered here.

[28]See Cameron and Miller (2015) for a discussion of standard errors clustering.

The first column shows the baseline estimates. These correspond closely to the results reported in the third column of Table 2, and indicate that the policy effects are, on average, null. When we re-run the analysis considering only very large and localized projects (column 2), the results indicate no effects, even when we focus specifically on the 30 tracts receiving the largest sums of funding (above 3.5 million euros at the tract level). As for the characteristics of the treated area, columns 3 and 4 report the estimates for interventions in the suburbs and the historic districts, respectively. Since the results obtained in Table 5 indicated that the effects found for historic districts were entirely driven by three interventions in Barcelona, in column 5 we report the results excluding Barcelona. Finally, column 6 shows the treatment effects estimated for the 42 census tracts belonging to the three projects carried out in historic districts in Barcelona. Overall, our results are broadly consistent with those obtained when working with the intervention areas. First, the policy has no impact on the population dynamics of the suburbs. Second, when focusing on interventions in historic districts, the policy is found to reduce the share of non-EU15 immigrants in the intervention tracts by almost 3 percentage points. Third, when excluding the three projects in the historic districts of Barcelona, the result becomes statistically insignificant. Fourth, according to the (point) estimates, the urban renewal policies implemented in the historic districts of Barcelona have had marked impacts on the population dynamics of these neighborhoods. In the period 2004 to 2013, the policy increased the overall, native and EU15 immigrant populations by 4, 8.9 and 50%, respectively, although the effect is only statistically significant for this last variable. As a result, the share of natives and EU15 immigrants increased by 4.4 (non-significant) and 1.8 percentage points, while the percentage of non-EU15 immigrants fell by 5.3 percentage points. As for changes in the educational composition, the policy increased the share of neighbors (with 16 years of age or more) with college education by 10.6 percentage points.

7 Summary and concluding remarks

This paper has analyzed the impact on the population dynamics at the neighborhood level of a prominent place-based policy (the Neighborhoods Act) implemented in some of the most deprived neighborhoods of the Spanish region of Catalonia in the period 2004-2010. The goal of the policy was, by investing heavily in public spaces and facilities, to attract natives and high income individuals and to reduce the concentration of poverty and immigration. The policy has had little (if any) impact on the population composition and dynamics of the treated neighborhoods. One notable exception, however, is that of the interventions that targeted the historic districts of the city of Barcelona. There, the policy significantly increased the native and EU-15 immigrant populations, reduced the non-EU15 immigrant share of the population and increased the share of college graduates. Given that the city center is experiencing an ongoing process of urban revival, the policy seems to have augmented this process into these deprived neighborhoods.

The results of this paper indicate that income-mixing policies dependent on investments in public spaces and facilities in neighborhoods in which poverty and immigration concentrate are generally not effective, even in the case of high-cost projects. This finding contrasts with the fact that, in the historic districts of Barcelona, the same policy has had a marked impact on the population dynamics of the treated neighborhoods. This outcome is in line with previous studies showing that the effects of place-based policies can be highly heterogeneous (Becker, Egger and von Ehrlich, 2013; Briant, Lafourcade and Schmutz, 2015) and that successful policy experiences cannot always be generalized to other urban contexts.

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Tables

Table 1: Sample balance: average of pre-treatment characteristics

	Treated (1)	Non-treated (2)	Non-treated reweighted (3)	Difference (1) - (2)	Difference (1) - (3)
Matching variables (used in the Oaxaca-Blinder estimator)					
Property value, relative to municipal average = 100, t-1	70.705	90.423	70.705	-19.718*	0.000
% of buildings in poor condition, 2001	5.192	3.372	5.192	1.820***	0.000
% of buildings without pipe water, 2001	0.654	0.717	0.654	-0.063	0.000
% of buildings without sewerage connection, 2001	0.634	1.201	0.634	-0.567***	0.000
% of >= 4 storey-buildings without elevator, 2001	65.507	66.038	65.507	-0.531	0.000
Density in 2003 (inhabitants per hectare, logged)	5.482	4.194	5.482	1.288***	0.000
Population growth rate (2003 - 2001, %)	9.978	7.038	9.978	2.940	0.000
% of population 0-16 years, 2001	15.135	14.307	15.135	0.827	0.000
% of population >65 years, 2001	17.211	20.349	17.211	-3.138***	0.000
% of non-EU15 immigrants in 2003	13.972	6.985	13.972	6.987***	0.000
% of welfare benefits users, t-1	1.804	1.440	1.804	0.363	0.000
% unemployment, 2001	12.784	8.953	12.784	3.831***	0.000
% of residents > 10 yrs, without a high-school diploma, 2001	75.653	73.867	75.653	1.786	0.000
% of people at risk of social exclusion, t-1	28.509	17.461	28.509	11.049	0.000
Public transportation: Presence, t-1	0.769	0.388	0.769	0.381***	0.000
Public transportation: Freq. >= 30', working hours, t-1	0.308	0.398	0.308	-0.090	0.000
Presence of public parking lots, t-1	0.359	0.194	0.359	0.165*	0.000
< 50 of buildings with private parking, t-1	0.897	0.612	0.897	0.286***	0.000
Lack of parks and green areas, t-1	58.057	46.081	58.057	11.976**	0.000
% vacant commercial property, 2001	29.207	26.271	29.207	2.936	0.000
Population in 2003 (logged)	8.663	6.593	8.663	2.069***	0.000
Variables not used in the matching procedure					
Δ log natives (2004 - 2001)	-0.023	0.002	-0.037	-0.025	0.014
Δ log non-EU15 immigrants (2004 - 2001)	1.090	0.840	1.033	0.250***	0.057
Δ log EU15 immigrants (2004 - 2001)	0.186	0.139	0.107	0.047	0.079
Δ share of natives (2004 - 2001)	-9.700	-4.580	-8.320	-5.120***	-1.380
Δ share of non-EU15 immigrants (2004 - 2001)	8.509	3.845	7.861	4.665***	0.648
Δ share of EU15 immigrants (2004 - 2001)	0.105	0.122	-0.032	-0.017	0.137
Number of observations	39	103			

Notes: Variables measured in 2001 drawn from the Census while variables measured in 2003 and 2004 are from population registers. Variables referred to t-1 are provided by local councils through the project's proposal.

Table 2: Impact of the urban renewal policy on ethnic and educational composition

	Oaxaca-Blinder (OB)			OLS
	(I)	**(II)**	**(III)**	**(IV)**
Ethnic composition, 2004-2013				
Δ log population	0.022	0.054	0.002	0.016
	(0.028)	(0.039)	(0.030)	(0.027)
Δ log natives	-0.006	0.017	-0.011	-0.010
	(0.030)	(0.040)	(0.030)	(0.026)
Δ log non-EU15 immigrants	0.087	0.116	0.082	0.080
	(0.081)	(0.081)	(0.080)	(0.068)
Δ log EU15 immigrants	0.042	0.084	0.078	0.039
	(0.109)	(0.108)	(0.107)	(0.089)
Δ % of natives	-1.398	-2.137	-0.871	-0.832
	(1.235)	(1.178)*	(1.257)	(1.018)
Δ % of non-EU15 immigrants	0.783	1.485	0.266	0.499
	(1.137)	(1.061)	(1.086)	(0.886)
Δ % of EU15 immigrants	0.307	0.224	0.269	0.077
	(0.210)	(0.209)	(0.212)	(0.132)
Educational composition, 2001-2011				
Δ log pop. with college degree	-0.161	-0.186	-.-	-0.086
	(0.180)	(0.185)		(0.171)
Δ % of pop- with college degree	-0.069	-0.288	-.-	-0.194
	(1.374)	(1.389)		(1.192)
Control variables				
2001 census indicators	Y	Y	Y	Y
2003 population registers indicators	Y	Y	Y	Y
Other indicators	Y	N	Y	Y
Lagged outcome, 2001-2004	N	N	Y	Y^{a}
Number of observations		142		
Number of treated observations		39		

Notes: Each entry represents an outcome variable. Control variables enter the first step in the Oaxaca-Blinder estimator (equation 9). 2001 census and 2003 population registers indicators as shown in Table 1. Other indicators are the remaining variables in the top panel of Table 1 used by policy-makers to determine treatment. *a*) The lagged outcome is not included in the regressions of college-graduates as we do not have this information. Robust standard errors in parenthesis. *** significant at 1% level, ** significant at 5% level, * significant at 10% level.

Table 3: Impact of the urban renewal policy on ethnic and educational composition by level of investment.

	Total investment < the median	**Total investment > the median**	**Investment per capita < the median**	**Investment per capita > the median**	**Investment per He < the median**	**Investment per He > the median**
Ethnic composition, 2004-2013						
Δ log population	0.028	-0.022	0.026	-0.021	0.010	-0.005
	(0.038)	(0.041)	(0.036)	(0.040)	(0.035)	(0.042)
Δ log natives	0.025	-0.045	-0.005	-0.017	-0.026	0.003
	(0.041)	(0.039)	(0.033)	(0.044)	(0.032)	(0.046)
Δ log non-EU15 immigrants	0.073	0.091	0.075	0.090	0.088	0.077
	(0.101)	(0.106)	(0.115)	(0.087)	(0.115)	(0.088)
Δ log EU15 immigrants	0.095	0.061	0.045	0.109	0.043	0.111
	(0.131)	(0.147)	(0.141)	(0.131)	(0.142)	(0.132)
Δ % of natives	-0.152	-1.554	-2.035	0.235	-2.358	0.542
	(1.589)	(1.544)	(1.428)	(1.665)	(1.478)	(1.581)
Δ % of non-EU15 immigrants	-0.173	0.684	0.554	-0.008	0.836	-0.275
	(1.392)	(1.380)	(1.251)	(1.529)	(1.307)	(1.458)
Δ % of EU15 immigrants	0.079	0.451	0.496	0.054	0.495	0.055
	(0.141)	(0.373)	(0.380)	(0.154)	(0.380)	(0.158)
Educational composition, 2001-2011						
Δ log pop. with college degree	0.039	-0.351	-0.078	-0.239	-0.186	-0.137
	(0.236)	(0.244)	(0.253)	(0.232)	(0.248)	(0.239)
Δ % pop. with college degree	0.555	-0.662	0.618	-0.721	0.191	-0.315
	(1.434)	(2.100)	(2.046)	(1.613)	(2.062)	(1.614)
Number of observations	122	123	122	123	122	123
Number of treated observations	19	20	19	20	19	20

Notes: OB estimates, with each entry representing one outcome variable. Control variables include all variables in Table 1, as well as the 2001-2004 lagged outcome in the ethnic composition outcomes. Robust standard errors in parenthesis. *** significant at 1% level, ** significant at 5% level, * significant at 10% level.

Table 4: Impact of the urban renewal policy on ethnic and educational composition by neighborhood characteristics

	Initial % of non-EU15 < the median	**Initial % of non-EU15 > the median**	**% of low educated residents > the median**	**% of low educated residents < the median**	**Treated with deprivation index < the median**	**Treated with deprivation index > the median**
Ethnic composition, 2004-2013						
Δ log population	0.030	-0.014	-0.038	0.044	0.038	-0.032
	(0.037)	(0.076)	(0.040)	(0.044)	(0.035)	(0.047)
Δ log natives	0.014	-0.046	-0.071	0.052	0.018	-0.039
	(0.039)	(0.069)	(0.044)	(0.044)	(0.035)	(0.047)
Δ log non-EU15 immigrants	0.030	0.117	0.144	0.017	0.080	0.085
	(0.101)	(0.151)	(0.108)	(0.108)	(0.098)	(0.106)
Δ log EU15 immigrants	0.036	0.118	-0.166	0.334	0.033	0.120
	(0.108)	(0.220)	(0.111)	(0.162)**	(0.096)	(0.167)
Δ % of natives	-1.536	-2.232	-2.022	0.341	-1.525	-0.249
	(1.436)	(1.935)	(1.815)	(1.524)	(1.384)	(1.852)
Δ % of non-EU15 immigrants	0.938	1.179	1.452	-0.982	0.779	-0.221
	(1.174)	(1.924)	(1.521)	(1.353)	(1.104)	(1.679)
Δ % of EU15 immigrants	0.093	0.497	0.009	0.543	0.171	0.363
	(0.141)	(0.457)	(0.137)	(0.390)	(0.134)	(0.376)
Educational composition, 2001-2011						
Δ log pop. with college degree	0.193	-0.277	-0.267	-0.049	0.140	-0.446
	(0.155)	(0.320)	(0.232)	(0.262)	(0.183)	(0.273)
Δ % of pop- with college degree	1.542	-0.966	-1.880	1.838	1.727	-1.775
	(1.436)	(2.530)	(1.368)	(2.226)	(1.372)	(2.173)
Number of observations	122	123	123	122	122	123
Number of treated observation	19	20	20	19	19	20

Notes: OB estimates, with each entry representing one outcome variable. Control variables include all variables in Table 1, as well as the 2001-2004 lagged outcome in the ethnic composition outcomes. Robust standard errors in parenthesis. *** significant at 1% level, ** significant at 5% level, * significant at 10% level.

Table 5: Impact of the urban renewal policy on demographic variables and education outcomes: Suburbs versus historic districts

	Suburbs	Historic districts	Historic districts, without Barcelona	Historic districts in Barcelona	Historic districts, Madrid placebo test
Ethnic composition, 2004-2013					
Δ log population	-0.039	0.027	0.015	0.093	-0.060
	(0.047)	(0.049)	(0.052)	(0.073)	(0.051)
	[-0.160 ; 0.049]	[-0.137 ; 0.119]	[-0.151 ; 0.132]	[-1.026 ; 0.270]	
Δ log natives	-0.072	0.053	0.041	0.134	-0.065
	(0.049)	(0.047)	(0.052)	(0.079)*	(0.051)
	[-0.153 ; 0.007]	[-0.097 ; 0.150]	[-0.124 ; 0.144]	[-0.404 ; 0.313]	
Δ log non-EU15 immigrants	0.033	0.021	0.060	-0.252	-0.029
	(0.105)	(0.128)	(0.136)	(0.222)	(0.100)
	[-0.138 ; 0.223]	[-0.270 ; 0.235]	[-0.232 ; 0.340]	[-1.015 ; 0.280]	
Δ log EU15 immigrants	-0.142	0.427	0.330	0.702	-0.211
	(0.130)	(0.194)**	(0.201)	(0.301)**	(0.139)
	[-0.422 ; 0.085]	**[0.036 ; 0.702]**	[-0.092 ; 0.660]	[-0.182 ; 1.375]	
Δ % of natives	-2.063	1.924	1.756	3.379	-0.431
	(1.464)	(1.948)	(2.223)	(2.860)	(0.964)
	[-4.108 ; -0.385]	[-0.588 ; 4.156]	[-0.827 ; 4.564]	[-1.599 ; 11.262]	
Δ % of non-EU15 immigrants	0.948	-1.573	-0.705	-5.786	0.340
	(1.221)	(1.792)	(1.983)	(2.990)*	(2.067)
	[-.401 ; 2.747]	[-3.385 ; 0.775]	[-2.964 ; 1.790]	**[-9.932 ; -0.666]**	
Δ % of EU15 immigrants	0.003	0.722	0.193	2.523	-0.603
	(0.163)	(0.474)	(0.210)	(1.361)*	(0.587)
	[-0.350 ; 0.371]	**[0.062 ; 1.255]**	[-0.276 ; 0.582]	**[1.512 ; 3.744]**	
Educational composition, 2001-2011					
Δ log pop. with college degree	-0.330	-0.019	-0.241	0.978	-0.178
	(0.215)	(0.330)	(0.380)	(0.303)***	(0.183)
	[-0.687 ; -0.003]	[-0.549 ; 0.340]	[-0.976 ; 0.221]	[-1.135 ; 1.580]	
Δ % pop. with college degree	-1.692	2.249	-1.003	16.176	1.009
	(1.254)	(2.810)	(2.497)	(3.638)***	(3.765)
	[-3.863 ; 0.620]	[-1.980 ; 5.825]	[-5.477 ; 2.939]	**[4.604 ; 25.901]**	
Number of observations	127	118	115	106	128
Number of treated observations	24	15	12	3	3

Notes: OB estimates, with each entry representing one outcome variable. Control variables include i) all variables in Table 1, ii) the 2001-2004 lagged outcome in the ethnic composition outcomes, and iii) an indicator for suburbs (column 1), an indicator for historic district (columns 2 and 3), and two indicators for historic district and municipality of Barcelona (column 4). Analytical robust standard errors in parenthesis where ***, ** and * denote statistical significance at the 1, 5 and 10% level. In brackets, bootstrapped 95% confidence intervals based on 1,000 replications. In each column, each replica draws the corresponding number of treated observations (e.g. 3 for Barcelona's historic districts) and considers the rest as control units.

Table 6: Impact of the urban renewal policy on demographic variables and education. Results at the tract level

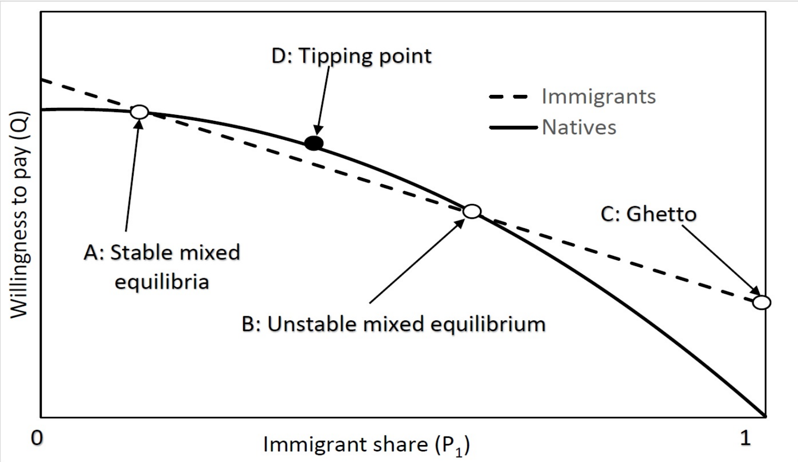
	Baseline	Investment in the tract > 90th pctile 3.5M Euros	Suburbs	Historic districts	Historic districts, without Barcelona	Historic districts in Barcelona
Ethnic composition, 2004-2013						
Δ log population	0.021	-0.071	-0.003	0.049	0.047	0.040
	(0.026)	(0.037)	(0.029)	(0.043)	(0.047)	(0.060)
	[.731]	[.110]	[.950]	[.455]	[.521]	[.555]
Δ log natives	0.030	-0.038	-0.014	0.097	0.094	0.089
	(0.023)	(0.036)	(0.026)	(0.039)	(0.041)	(0.063)
	[.796]	[.449]	[.954]	[.178]	[.277]	[.234]
Δ log non-EU15 immigrants	0.052	-0.111	0.032	0.084	0.137	-0.206
	(0.079)	(0.111)	(0.089)	(0.124)	(0.131)	(0.184)
	[.611]	[.333]	[.756]	[.567]	[.421]	[.265]
Δ log EU15 immigrants	0.102	0.168	-0.056	0.313	0.239	0.502
	(0.097)	(0.159)	(0.085)	(0.180)	(0.163)	(0.273)*
	[.473]	[.269]	[.687]	[.172]	[.297]	[.054]^{c}
Δ % of natives	0.401	1.968	-0.911	3.223	2.943	4.383
	(1.139)	(1.733)	(1.350)	(1.594)	(1.761)	(2.896)
	[.842]	[.261]	[.511]	[.124]	[.202]	[.138]
Δ % of non-EU15 immigrants	-0.957	-2.106	0.050	-2.963	-2.537	-5.285
	(0.931)	(1.622)	(1.071)	(1.342)**	(1.496)	(2.181)**
	[.423]	[.202]	[.970]	[.046]^{b}	[.114]	[.026]^{b}
Δ % of EU15 immigrants	0.232	0.401	0.012	0.452	0.118	1.828
	(0.211)	(0.351)	(0.137)	(0.436)	(0.197)	(1.275)**
	[.347]	[.299]	[.940]	[.371]	[.655]	[.050]^{b}
Number of observations	729	347	572	474	432	359
Number of treated observations	412	30	255	157	115	42
Educational composition						
Δ log pop. with college degree	-0.068	-0.271	-0.303	0.063	-0.079	0.505
	(0.182)	(0.340)	(0.188)	(0.371)	(0.425)	(0.410)
	[.794]	[.437]	[.148]	[.876]	[.890]	[.281]
Δ % pop. with college degree	-0.043	-0.396	-1.219	1.693	-1.090	10.590
	(1.254)	(2.277)	(1.164)	(2.501)	(1.993)	(3.715)***
	[.982]	[.852]	[.277]	[.561]	[.627]	[.008]^{a}
Number of observations	609	311	474	423	381	330
Number of treated observations	412	30	255	157	115	42

Notes: OB estimates, with each entry representing one outcome variable. Control variables are all 2001 census variables listed in 2. Clustered standard errors at the proposed area of intervention in parenthesis where ***, ** and * denote statistical significance at the 1, 5 and 10% level. Alternatively, p-value in squared brackets from a clustered wild bootstrap procedure (with 1000 replications) developed by (Cameron, Gelbach and Miller, 2008) where ^{a}, ^{b} and ^{c} denote statistical significance at the 1, 5 and 10% levels.

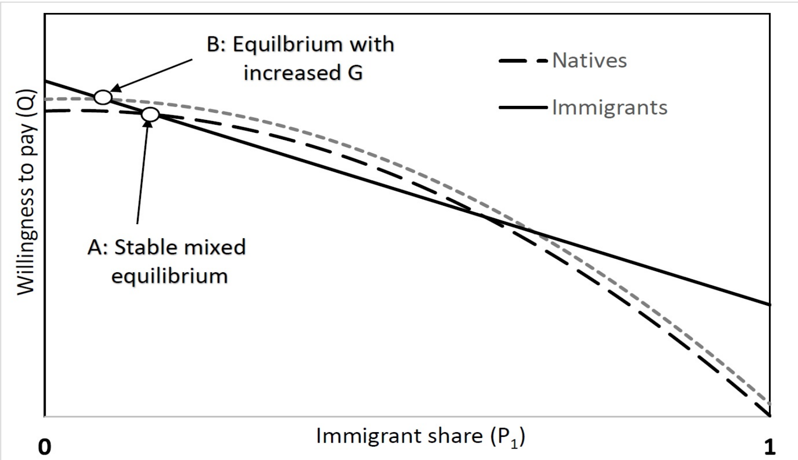
Figures

Figure 1: Model illustrations

(a) Immigrant share equilibria

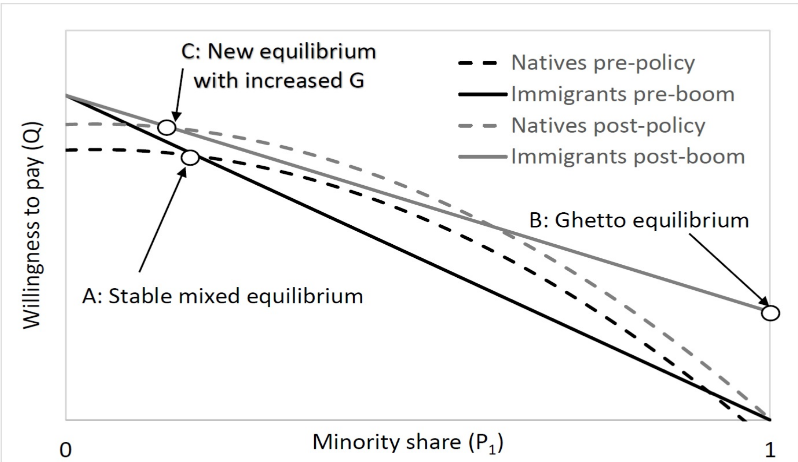


(b) The effect of the urban renewal policy on the minority share



The urban renewal policy is modelled as an increase in the neighborhood's amenity (↑ G). In this illustration, we assume that $\gamma^I = 0$, implying that increasing G does not affect the immigrants' willingness to pay. B is the post-intervention new minority share.

(c) Urban renewal policy and tipping reversal



Starting from A, there is an increase in the city-wide minority share P, shifting immigrants' willingness to pay upwards (gray solid line). As a result, B is the new ghetto equilibrium. The urban renewal policy is then implemented (↑ G) which shifts natives' willingness to pay upwards (gray dashed line). In this illustration, we assume $\gamma^I = 0$, implying that higher G does not shift immigrants' willingness to pay. Hence, the post intervention equilibrium is point C.

Figure 2: Evolution of demographic outcome variables

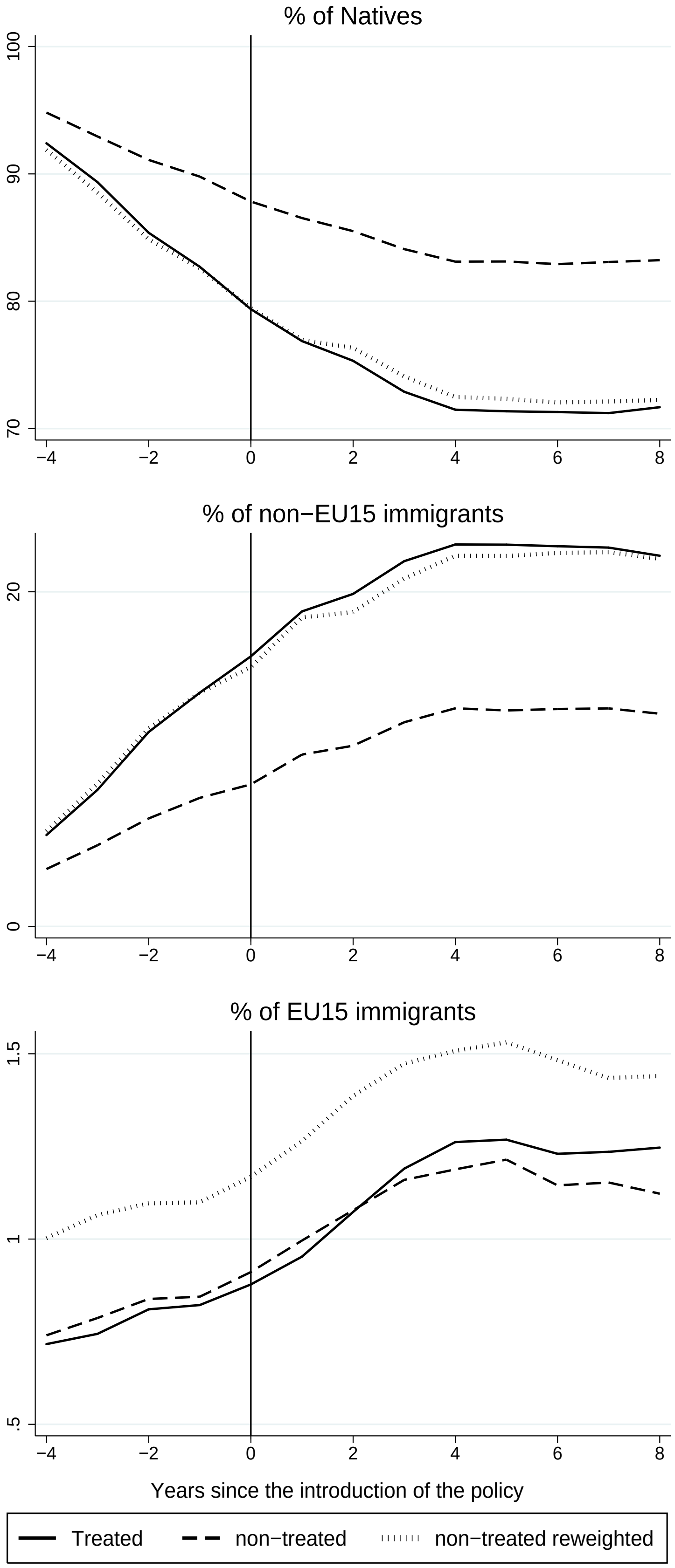
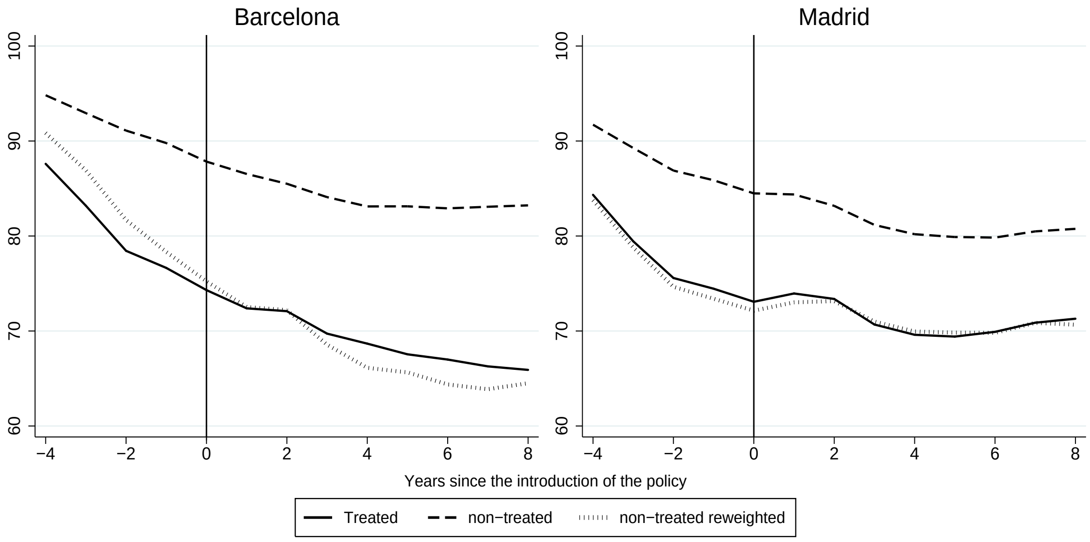
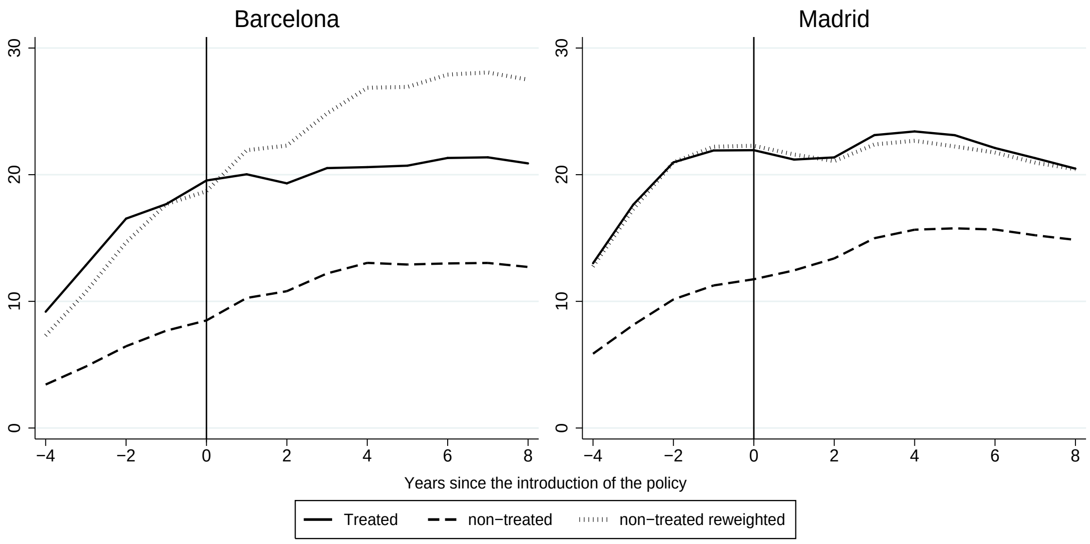


Figure 3: Evolution of demographic outcome variables. Historic districts in Barcelona vs historic districts in Madrid.

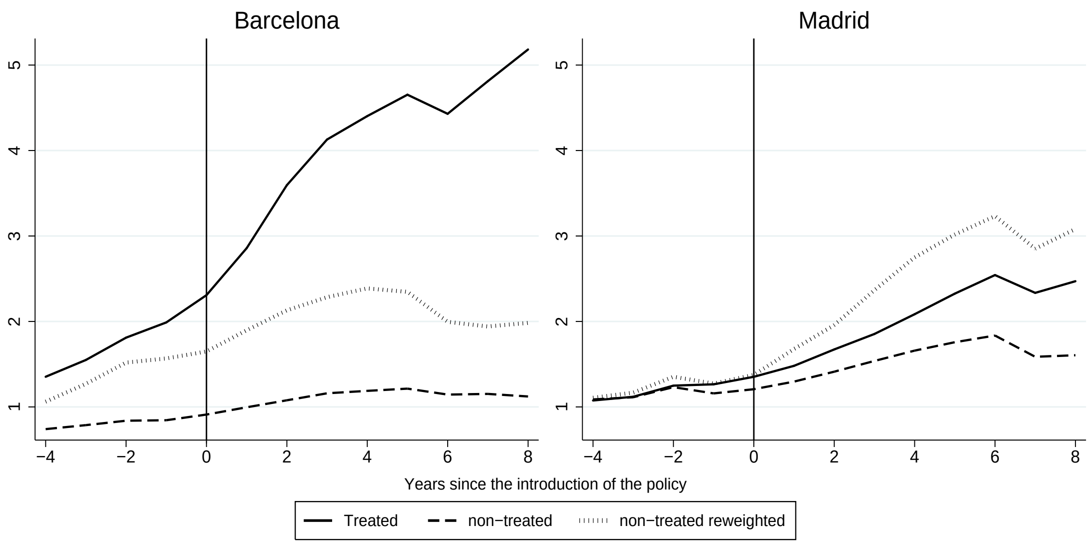
(a) % of natives



(b) % of non-EU15



(c) % of EU15

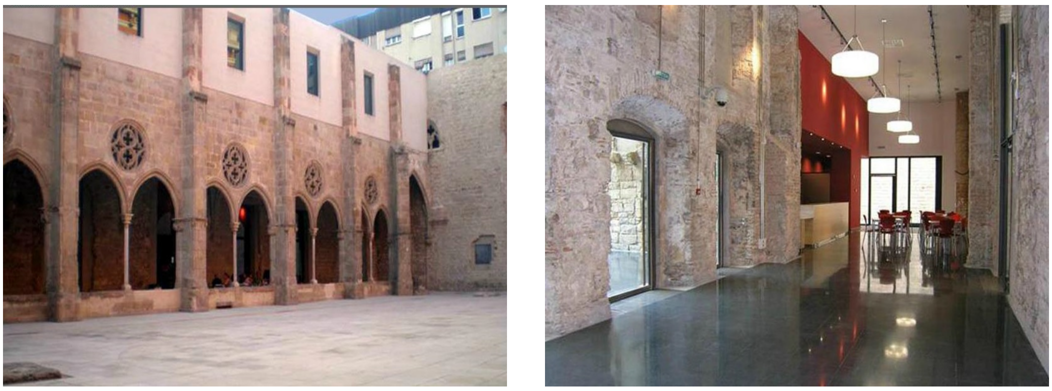


Appendix A Example of an urban renewal policy

Figure A.1: Santa Caterina i Sant Pere, Barcelona, 15MER

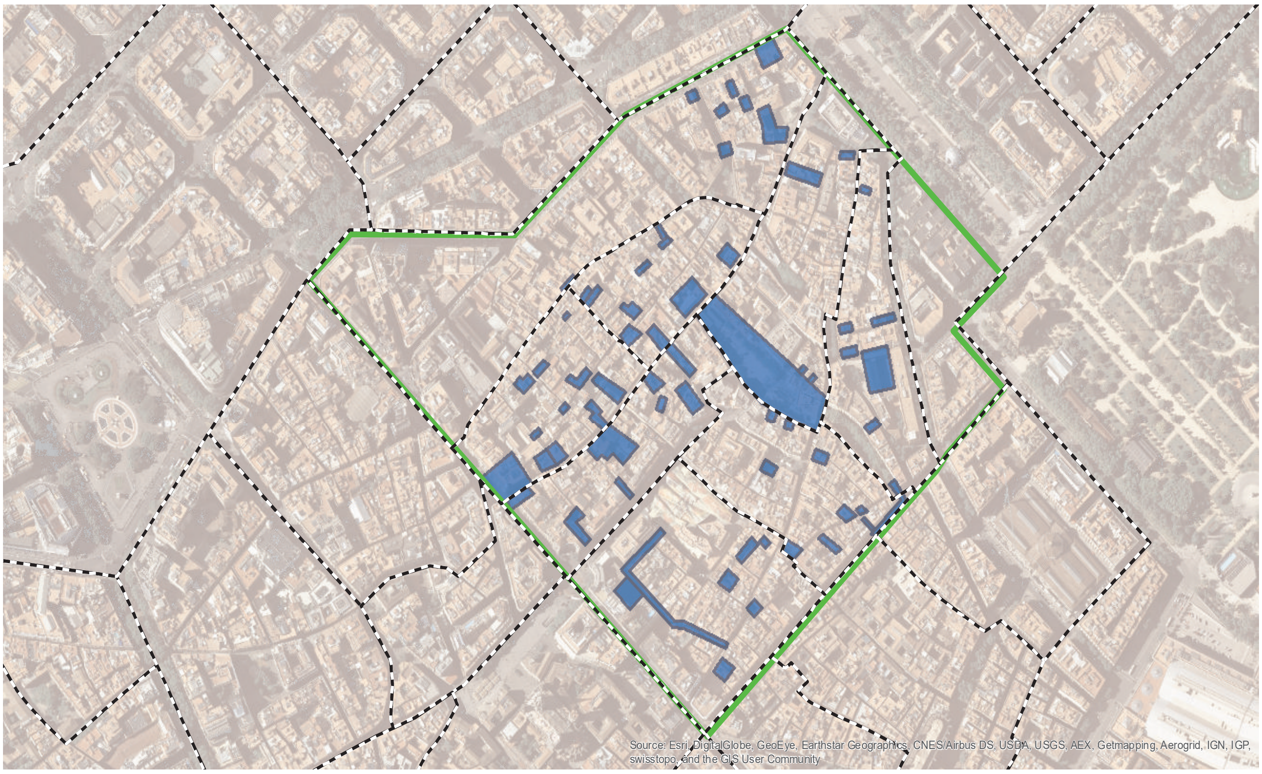
(a) Public spaces: *Pou de la Figuera*

(b) Public facilities: *Convent de Sant Agustí*



Appendix B Consolidating intervention areas with census tracts: An example

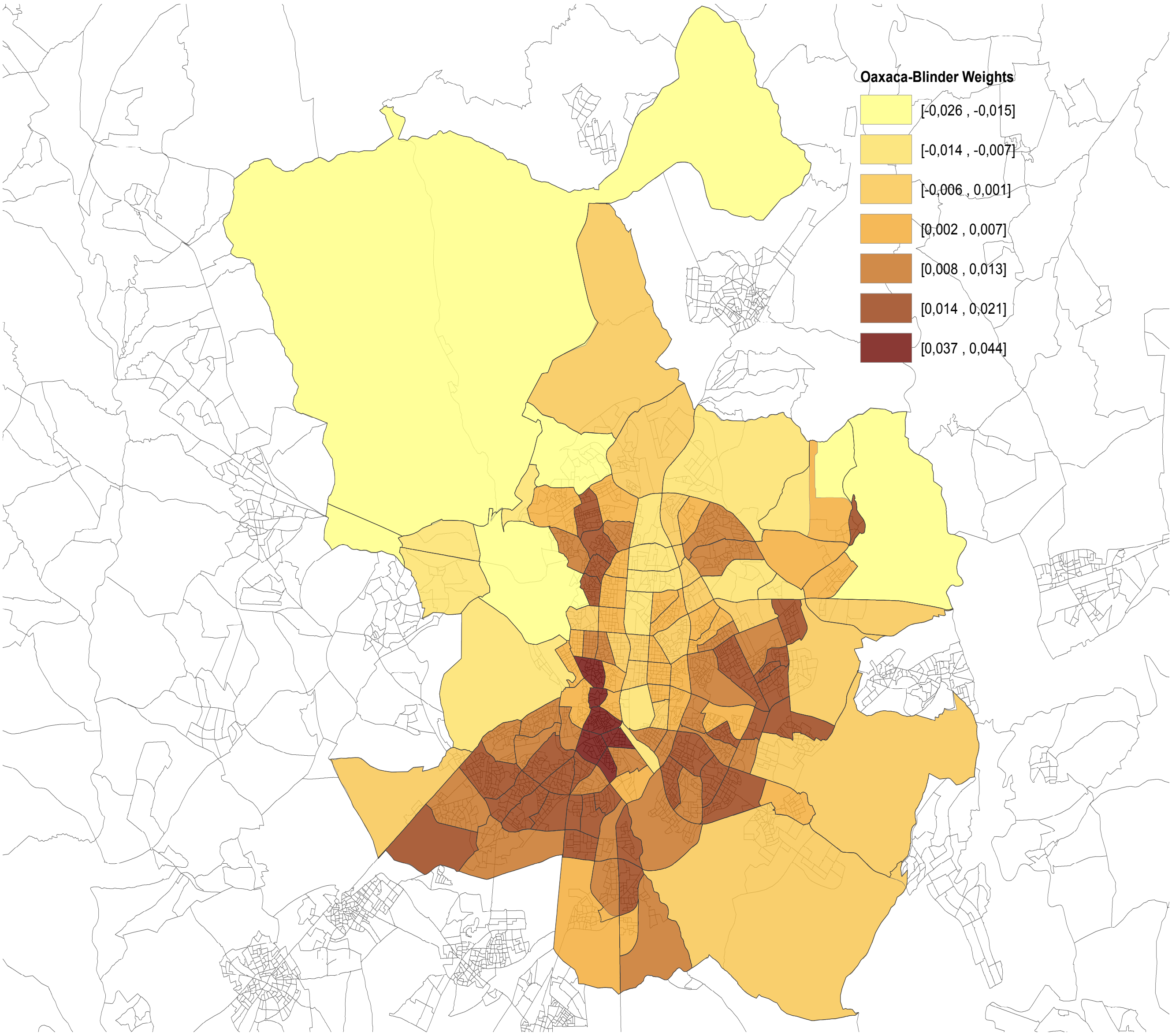
Figure B.1: Santa Caterina i Sant Pere, Barcelona



Dashed lines indicate census tracts boundaries while the solid line delineates the intervention area. The colored areas indicate the exact location of all investments.

Appendix C Placebo analysis for Madrid

Figure C.1: Probability of treatment (Oaxaca-Blinder weights)



Neighborhoods (barrios) as defined by the Madrid's city council. Oaxaca-Blinder weights as defined in Kline (2011) reflect the probability of treatment. The specification used includes the variables considered in column 2 of Table 4, as well as an indicator for historic districts. The highest 3 values are *Embajadores*, *La Chopera* and *Palos de Moguer*.

2013

2013/1, Sánchez-Vidal, M.; González-Val, R.; Viladecans-Marsal, E.: "Sequential city growth in the US: does age matter?"
2013/2, Hortas Rico, M.: "Sprawl, blight and the role of urban containment policies. Evidence from US cities"
2013/3, Lampón, J.F.; Cabanelas-Lorenzo, P-; Lago-Peñas, S.: "Why firms relocate their production overseas? The answer lies inside: corporate, logistic and technological determinants"
2013/4, Montolio, D.; Planells, S.: "Does tourism boost criminal activity? Evidence from a top touristic country"
2013/5, Garcia-López, M.A.; Holl, A.; Viladecans-Marsal, E.: "Suburbanization and highways: when the Romans, the Bourbons and the first cars still shape Spanish cities"
2013/6, Bosch, N.; Espasa, M.; Montolio, D.: "Should large Spanish municipalities be financially compensated? Costs and benefits of being a capital/central municipality"
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2013/9, Asensio, J.; Gómez-Lobo, A.; Matas, A.: "How effective are policies to reduce gasoline consumption? Evaluating a quasi-natural experiment in Spain"
2013/10, Jofre-Monseny, J.: "The effects of unemployment benefits on migration in lagging regions"
2013/11, Segarra, A.; García-Quevedo, J.; Teruel, M.: "Financial constraints and the failure of innovation projects"
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2013/13, González-Val, R.; Tirado-Fabregat, D.A.; Viladecans-Marsal, E.: "Market potential and city growth: Spain 1860-1960"
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2013/17, Guío, J.M.; Choi, A.: "Evolution of the school failure risk during the 2000 decade in Spain: analysis of Pisa results with a two-level logistic mode"
2013/18, Dahlby, B.; Rodden, J.: "A political economy model of the vertical fiscal gap and vertical fiscal imbalances in a federation"
2013/19, Acacia, F.; Cubel, M.: "Strategic voting and happiness"
2013/20, Hellerstein, J.K.; Kutzbach, M.J.; Neumark, D.: "Do labor market networks have an important spatial dimension?"
2013/21, Pellegrino, G.; Savona, M.: "Is money all? Financing versus knowledge and demand constraints to innovation"
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2013/25, Dargaud, E.; Mantovani, A.; Reggiani, C.: "The fight against cartels: a transatlantic perspective"
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2013/31, Dargaud, E.; Mantovani, A.; Reggiani, C.: "The fight against cartels: a transatlantic perspective"
2013/32, Saarimaa, T.; Tukiainen, J.: "Local representation and strategic voting: evidence from electoral boundary reforms"
2013/33, Agasisti, T.; Murtinu, S.: "Are we wasting public money? No! The effects of grants on Italian university students' performances"
2013/34, Flacher, D.; Harari-Kermadec, H.; Moulin, L.: "Financing higher education: a contributory scheme"
2013/35, Carozzi, F.; Repetto, L.: "Sending the pork home: birth town bias in transfers to Italian municipalities"
2013/36, Coad, A.; Frankish, J.S.; Roberts, R.G.; Storey, D.J.: "New venture survival and growth: Does the fog lift?"
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2014/1, Montolio, D.; Planells-Struse, S.: "When police patrols matter. The effect of police proximity on citizens' crime risk perception"
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2014/3, Piolatto, A.; Rablen, M.D.: "Prospect theory and tax evasion: a reconsideration of the Yitzhaki puzzle"
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2015

2015/1, Foremny, D.; Freier, R.; Moessinger, M-D.; Yeter, M.: "Overlapping political budget cycles in the legislative and the executive"
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2015/41, Daniele, G.; Geys, B.: "Exposing politicians' ties to criminal organizations: the effects of local government dissolutions on electoral outcomes in Southern Italian municipalities"
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2016

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