The externalities from social housing Evidence from housing prices

Antoine Goujard*

(Job Market Paper)

January 2011

Abstract

I investigate the impact of social housing on the sales price of neighboring flats in Paris. I construct a unique dataset including flat sales and social housing projects at the building level. To account for endogenous placement of social housing projects, I use a difference-in-differences strategy that includes fine geographical controls and trending unobservables. In my preferred specifications which control for building fixed effects, a particular spatial pattern emerges: a 10 percentage points increase in the social housing share implies a 1.2% increase in housing value within a radius of 50 meters. However, private properties located farther away from the social projects within a 350 to 500 meter belt experience price decrease by 5.5%. The positive effects appear more important for small dwellings and for properties located in poor neighborhoods while negative impacts dominate in high income neighborhoods and for family dwellings. Further estimates exploit the unexpected win of a left-wing mayor in Paris, which was followed by a sharp increase in social housing units driven by the direct conversion of private rental flats into social units without any accompanying rehabilitation. This natural experiment allows to identify the impact of the inflow into the neighborhood of low income tenants, separately from the effects of social housing on the quality of the existing housing stock. I do not find evidence of a positive impact of the conversion projects on housing prices.

Keywords: Social housing, neighborhood effects, housing prices.
JEL Classification: J0, H42, R38

*I thank my supervisors Barbara Petrongolo and Steve Pischke for guidance and support. I am grateful to Julien Grenet, Radha Iyengar, Alan Manning, Guy Michaels and Henry Overman for helpful comments and suggestions. The Commission of Parisian Notaries, the Centre Maurice-Halbwachs, the DREIF, the City of Paris, the APUR and the IAURIF provided the data. I thank Alain David who prepared the housing transactions data. All views and remaining errors are mine.
Ph.D. candidate in Economics, London School of Economics and Political Science.
Tel: +44 (0)20 7955 6907. E-mail: a.j.goujard@lse.ac.uk.

1 Introduction

Neighborhood effects and externalities are key issues in the social sciences and in the design of social policy. A large existing literature investigates the causes and impacts of neighborhood and peer effects in a range of scenarios such as education, labor markets, health and crime[1]. Social housing is an important and growing component of social policy. Various countries have seen an increasing Government involvement in this area at least partly motivated by the intention to create or maintain mixed neighborhoods (see Currie, 2006, for the USA, Cheshire et al., 2008, for the UK and Laferrère and le Blanc, 2006, for France). However, there is little evidence on the impacts of low-income housing developments on the neighborhoods in which they are built.

While economists' knowledge of the effects of social housing in local neighborhoods is still relatively thin (recent exceptions include Baum-Snow and Marion, 2009, and Schwartz et al., 2006), assessing such effects is crucial to compare the benefits of social housing for low-income tenants to the costs (if any) of creating and maintaining mixed neighborhoods. The overall effect of social housing on nearby private housing is potentially ambiguous. On the one hand, by bringing in an inflow of relatively low-income residents, social housing affects the socio-economic mix of a neighborhood and may lower the value of the neighborhood to existing residents. On the other hand, project-based assistance that complements social housing projects may provide an offset to the above effects, and more generally to urban decay. Rosen (1985) argues that social housing units may be justified to replace distressed properties in low-income neighborhoods where social units may be better maintained than private rental units. Thus the effect of social housing concentration on local housing prices is ultimately an empirical question.

This paper estimates the impact of social housing on the private housing market, using information on new housing developments and property sales at the building level for the city of Paris between 1995 and 2005. I ask how proximity to social housing units affect the housing prices of nearby private flats and what are the underlying mechanisms. Paris provides a compelling setting to study the externalities of social housing for three main reasons. First, recent social housing policies in 2001 lead to a rapid expansion of the social dwelling stock with 18 thousands social units, provided between 2000 and 2005. Social units accounted for 23.8% of the occupied rental housing stock at the end 1995 and nearly 27.3% at the end of 2005. Second, Paris is by far the most densely populated city in Europe, and as a result new social housing units potentially affect a large number of private sales. I will be able to exploit the underlying variation using information on private sales at the building level. Finally, by comparing sales affected by new constructions, rehabilitation of existing housing developments, or conversion of private housing, I can obtain a precise picture of the mechanisms driving the externalities stemming from social housing developments.

To analyze the effects of new social housing projects on neighboring private flats, I exploit two complementary research designs. The first identification strategy builds on a difference-in-differences specification. An important contribution here is the introduction of a rich set of

[1] See among recent examples: Oreopoulos, 2003, Kling et al., 2007, Currie et al., 2010, Linden and Rockoff, 2008, the review of Oreopoulos, 2008, and references therein.

local controls. Both developers and housing authorities have some control on the location of new social units and it is therefore important to control for unobserved determinants of project location. In my difference-in-differences estimates, I can control for local unobservables down to the building level. Using the share of social housing within different neighborhoods as an explanatory variable, I examine whether private flats located near social housing projects experience different price changes once the social housing projects are created.

My difference-in-differences estimation strategy delivers two main results. First, without fine local controls the estimated impacts of social housing on housing prices is mainly negative. This mostly stems from the endogenous location of social housing in declining or deprived parts of small neighborhoods. When building fixed effects and local linear trends are included, the private housing stock located within 50 meters of the social housing projects experience positive price growth. Specifically, a new social housing project of typical size (35 units) raises local housing prices by around 2.6% and a 10 percentage points increase of the social housing share raises housing prices by about 1.2%. The timing of these effects is consistent with a causal impact and the estimates are robust to the inclusion of local linear trends. This result challenges the belief that the potential inflows of low-income tenants could offset the benefits of the rehabilitations and new constructions associated with social housing projects. Second, the impacts of social housing projects appear either close to zero or negative for private flats located farther away from the projects. For neighborhoods located 350 to 500 meters away from the social projects, a 10 percentage points increase in the social housing share (corresponding to about one standard-deviation change) would imply a 5.5% decrease in housing values. These average effects are the result of important heterogeneity with respect to neighborhood's characteristics and dwelling size. The positive impacts measured within 50 meter of the projects are driven by small flats in low-income neighborhoods, while the negative externalities measured within the outer belt from 350 to 500 meters are mainly driven by family dwellings and high income neighborhoods.

To investigate the mechanisms driving these externalities, I exploit the election of the current mayor, Bertrand Delanoë, in March 2001. The Delanoë administration marked a sharp increase in the number of social units and a change in their usual channel of provision from new constructions and rehabilitations of distressed private properties towards the conversion of private rental properties into social units. As these direct conversions (*acquisition sans travaux*) do not involve new buildings or rehabilitations, they allow me to identify the effect of the inflow into the neighborhood of low income tenants, separately from the effect of social housing on the quality of the existing housing stock. This policy experiment points towards zero effects of low-income tenants inflows.

This paper builds on the research assessing externalities of housing policies in the private housing market. A first stream of this literature is based on difference-in-differences estimation strategies controlling for census tract or block unobservables. Schwartz et al. (2006) investigate the effects of subsidized housing projects in New York between 1987 and 2000. Using a difference-in-differences hedonic regression at the census tract level, they define the houses located within 600 meters of a project as treated. They find that both rental and owner occupied subsidized housing projects tend to have large positive externalities, mainly due to the construction of new buildings and the removals of disamenities in distressed neighborhoods. Santiago et al. (2001) find similar results for the dispersed housing subsidy program in Denver which led to an increase in small scale rental projects over the period 1987 to 1997. Autor et al. (2009) analyze the effects of the elimination of rent control in Cambridge (USA) during 1995-1997 and document negative externalities of rent controlled properties on neighboring houses, having controlled for detailed property characteristics. Hartley (2008) finds that the timing of closures and demolitions of high rise public housing buildings in Chicago is associated with an increase in housing prices in the vicinity of the past projects, consistent with the removal of disamenities.

Baum-Snow and Marion (2009) tackle more directly the issue of the endogenous location of the new social housing projects. They exploit a discontinuity in the formula for the eligibility for Low Income Housing Tax Credit (LIHTC) subsidies, which creates quasi random variations in the number of new buildings between census tracts. Their regression discontinuity design shows that additional new projects and LIHTC tenants stimulate home-ownership turn-over, housing prices in declining areas and lower median income in poor gentrifying areas.

My identification strategy differs from both the usual difference-in-differences strategies and Baum-Snow and Marion (2009) in three important dimensions that are likely to explain the difference in my findings. First, most papers have used aggregate census data at the tract level[2], while my data gives me the exact location of each sale and each new social housing unit. This spatial richness allows me to get a more detailed picture of spatial spillovers and to control for building unobservables. This is important when the effects considered are extremely localized and if the location of new projects is endogenous within census tracts. Second, the regression discontinuity design adopted by Baum-Snow and Marion (2009) focuses their analysis on the impacts of social housing in poor neighborhoods, while Paris is one the wealthiest city in Europe, the median pre-tax household income ranging from $13,985$ euros in the poorest census tract to $61,783$ euros in the highest in 2001. This allows me to uncover heterogeneous effects of social housing on housing prices. Third, most of the point estimates provided by the existing literature reflect the combined impact of the revitalization effects of new housing projects and the inflows of low-income tenants into a neighborhood. The Parisian set-up allows me to distinguish between the impact of new social housing created via new constructions and rehabilitations of existing dwellings and that of straight conversions of private rental units into social housing and therefore more closely isolate the impact of additional poor households on neighborhoods.

The paper is organized as follows. The next section discusses the features of Parisian social housing that are relevant for my analysis, describes data construction and some summary statistics. Section 3 describes my identification strategies. Section 4 describes my main empirical findings on the externalities of social housing on private housing prices. Section 5 investigates further the mechanisms driving these externalities. Section 6 concludes.

[2]For example, Baum-Snow and Marion (2009) use US census data at the tract level and define neighborhood as a 1-km circle around the census tract's center. Chay and Greenstone (2005) and Greenstone and Gallagher (2008) use comparable data.

2 Institutional background and summary statistics

2.1 Institutional background

The Parisian social housing system is based on rental units subsidized by low interests loans and tax deductions. Housing units are owned by private local companies, *HLM*[3]. Despite their private status, these companies are closely monitored by the central government and the municipality, that sometimes contribute to rehabilitation, maintenance or demolition of buildings. Moreover, in Paris, the municipality is the main joint owner of the largest *HLM* companies.

Project-based assistance is used by *HLM* companies to create new social units either through subsidized construction, rehabilitation or conversion of private buildings[4]. Once a social housing unit is created, it remains in the social sector forever[5]. Figure 1 breaks down the number of new units created in Paris from 1970 by year of completion and type of creation. The timing and types of the new units match closely the city mayoral elections that took place every six years from 1977 to 2001 and in 2008. The overall production of social dwellings is lower after the change of mayor in 1995 and increases significantly after the first election of a left-wing mayor in 2001. Until 2001, the main method to create new social housing units was new buildings. During the 1980s the rehabilitations of existing distressed properties increased significantly. At the same time, figure 1 reveals a sharp decline in the number of social units created through new buildings during the 1990s, from an average of approximately $2,700$ annual new dwellings at the end of the 1980s, to an average of 900 new dwellings between 2000 and 2010. The purchase of 20 year old buildings without any rehabilitation was only authorized by a change in law in 2001[6]. From 2001, rehabilitation of existing properties and conversions of private rental flats were the main methods used to increase the stock of social dwellings.

The French Government has designed several incentives for each municipality to develop a comparable stock of social dwellings. A law adopted in 2000 imposes a minimum share of 20% of social housing units among the occupied housing stock in each municipality and therefore Paris, with a social housing share of 13.1% in 2001, is directly concerned[7]. However, the spatial distribution of social housing inside Paris is a joint decision of the *HLM* developers and the municipality. The municipality intervenes through the selling of public land and buildings to developers, the authorization of new buildings and the design of the subsidies that add non-trivial monetary and non-monetary incentives to the location of new social units. The main objective since 2001 has been to reach a better spatial distribution of the social housing stock. The municipality decided to apply the 20% limit to all the *arrondissements* in Paris and created an inclusionary zoning which stipulates that any large private project located in central Paris should incorporate at least 25% of social dwellings. Figure 2 plots the location of the new units

[3] *Habitations à loyer modéré.*

[4] *HLM* companies were allowed to buy a minority of dwellings of private new projects before their completions (*VEFA*) by the *décret* 2001-104 (08/02/2000).

[5] The French government created incentives for *HLM* companies to sell social units to their low-income tenants. The main *HLM* companies in Paris do not apply this policy.

[6] *Décret* 2001-336 (18/04/2001) for the financing of *PLUS* dwellings and Préfecture de Paris (2004). The purchase of existing buildings for *PLA-I* was authorized earlier by the *Décret* 1990-151 (16/02/1990).

[7] Recently, Glaeser and Gottlieb (2008) advocate the use of subsidized housing in the USA to increase the supply of affordable housing in highly productive areas.

over time. Small dots represent social housing projects created before 2001 and larger dots the projects created after 2001. The conversion projects created after 2001 are represented by large squares. The underlying map presents the median housing price (per square meter) in 1995. Overall a negative correlation appears between the number of projects and housing prices. Interestingly, recent projects are spread throughout the city while older social housing units are located in fewer neighborhoods. The unequal distribution of the variation in the social housing share across the city would pose problems in the presence of localized shocks (e.g. renewal programs, industrial clean-ups etc.). The widespread distribution of the new social housing units mitigate the influence of these local shocks.

The expected impacts of social units on surrounding properties depend crucially on the characteristics of the social dwellings. Each dwelling is subject to some level of rent control according to the subsidies used to finance the project. *HLM* companies have a restricted choice over the eligible tenants who are determined mainly through income, number of children and previous housing (Laferrère and le Blanc, 2006). As a priority is given to households in financial difficulties, the income of the successful applicants appears far below the maximum income levels. Allocation of the two main types of social housing published by the municipality in 2005 shows that the income of the new tenants was below 60% of the usual income threshold in 90% of the cases (APUR, 2006). Hence, new social tenants are typically below the 20th percentile of income by consumption unit[8].

Table 1 summarizes the characteristics of the *HLM* dwellings and tenants with respect to the private accommodation sector according to the French Housing Survey in 2002. The first column shows the characteristics of the stock of social housing dwellings, the second shows the characteristics of the social dwellings with new tenants[9] while the last two columns show the characteristics of private rental dwellings and owner occupied dwellings. Panel A provides information about the structural characteristics of the units. Social dwellings are located in larger and more recent buildings: 19% were built after 1982 against 7% in the private rental sector or 4% for owner occupied units. They are also larger than private rental units by around 25% or 0.6 rooms and located in larger buildings. The average rent by square meters in the social sector is less than half the rent in the private sector. As a result of this rent difference and the scarcity of the social offer, the duration of tenancy in the social sector is greater than in the private sector by 5 years.

Panel B of table 1 displays the main characteristics of the social tenants. The income by consumption unit of the social tenants is one third, approximately one standard-deviation, below the corresponding average in the private rental sector. This lower level of income is related to larger shares of non qualified, unemployed and inactive individuals. Social tenants are also older and less likely to be born in France than households in private accommodation. The shares of families and single parents are also significantly higher.

Finally, panel C of table 1 reports the opinion of the households on the neighborhood and maintenance of social dwellings. Flooding appears less of a concern in the social sector as the buildings are more recent. However, 38% social tenants report that the building has been

[8]Eurostat consumption unit. There are large variation of eligibility level by household size.

[9]I define as new tenants the households who moved in during the last four years.

degraded last year while this number is only of 18% in the private sector. The number of households that declares being victims of robberies (or attempts) is also substantially higher than in the private sector. While the average social tenant thinks that his neighborhood is less safe than the average private tenant, new social housing tenants have a more positive view of the neighborhoods of their social units.

Due to the difference in households' income and the characteristics of the social buildings, investments in low-income housing could have different externalities according to both construction types, level of income of the tenants and initial neighborhoods. Depending on the projects, the main spillover effects could be through the low-income tenants living in social housing, the upgrade of existing buildings or through complementary investments. For example, social housing units are often created through urban renewal operations and associated with new public facilities such as new roads, additional playgrounds or schools' investments.

2.2 Data and summary statistics

The definition of social housing adopted in this article is restrictive, it closely follows the French law of 2000 (*SRU*). Social units belong to an *HLM* landlord and receive an agreement from the state which give rights to construction and rent subsidies in exchange for some level of control on the rents and the choices of the tenants[10]. The only exception are the dwellings which belong to the *HLM* companies since 1977 or before. As formal rental agreement (*conventionement*) did not exist before 1977, all these *HLM* rental dwellings are considered as social housing. Furthermore I restrict the sample of projects to the family dwellings excluding the few students' residences, collective accommodation for the elderly and temporary accommodation for the homeless[11]. These restrictions are motivated by the fact that these social housing units represent a very small fraction of the inflows and are not considered as social housing in the available surveys or in the existing literature.

The public housing stock and its evolution is constructed from seven yearly exhaustive surveys completed by the regional planning agency (*DREIF*). These surveys are mandatory and were carried out in 1998, 2002, 2003, 2004, 2005, 2006 and 2007. Each year the planning agency asks the *HLM* landlords to update a description of their social housing dwellings. The results are used to compute tax transfers to municipalities and as planning instruments for the public housing policy at national and local levels. I have complemented these surveys by administrative records from the City of Paris which contain the same information on a more recent period. This dataset tracks the new and planed social housing units from 2001 to 2012 as of June 2007. In the two data-sets, projects are defined by an address, a subsidy type and a year of comple-

[10]There is no unique definition of the social housing stock. The French census, housing surveys and administrative records use different definitions (see data appendix, CNIS, 2001 and Briant et al., 2010).

[11]In the French 2000 law, these types of housing are considered as social housing. Each bed or room has a weight that is a fraction of a family dwelling.

tion[12]. Information on each project include: the completion year[13], the year of agreement, the address and the number of dwellings by level of subsidy. The completion and agreement of the projects are only known up to the year level. The completion year corresponds to the year of the first occupancy of the building by a social tenant. The agreement year is the signing year of the formal subsidy agreement between the State and the *HLM* company (*conventionnement*). The amount of time between these two dates depends crucially on the mode of provision of social housing units, from less than a year for the conversion of existing private rental properties into social units up to an average of three years for new buildings or rehabilitations. The created dataset is then matched to the geographical location using the addresses of the buildings to leave me with an address-year panel of the social housing stock.

Data on property sales are from the Commission of Parisian Notaries, BIEN dataset[14]. The data has been used to produce official statistics, evaluate the impact of school quality (Fack and Grenet, 2010) and the efficiency of urban renewal projects (Barthélémy et al., 2007). In France, each property sale has to be registered by a Notary who is in charge of setting up the contract and collecting taxes for the State. The sample is restricted to arm's-length sales of Parisian flats without occupant owner. The transactions data set is almost comprehensive from 1995 to 2005 and contains $333,590$ flats transactions inside Paris. The INSEE evaluated the coverage rate of all housing transactions in Paris at 90% in 2004 (Gouriéroux and Laferrère, 2006)[15]. As my outcome variable is the log price, the quality of the information on prices is a main issue. The reported prices may be biased by tax evasion and money laundering. The French National Assembly notes that the permissive regulation of French property-owning companies is the main source of fraudulent transactions in the real estate market (Assemblée Nationale, 2002). This issue is less tangible for the sales between private households. In 95% of these sales, a false price record would require collusion between four parties: the buyer, the seller, the real estate agent and the notary (OECD, 2008). As a result, I restrict my sample to the sales between private households. The sales between private households represent $231,803$ transactions (69.5% of the initial sample). This restricted sample avoids the problem of sales to and from *HLM* companies and other administrative bodies. However these restrictions discard the sales from developers to private households occurring in new buildings that may be located close to social housing projects in urban renewal programs. In the empirical section, I present evidence that these restrictions do not imply sample selection issues. The sales located close to social housing projects are not more likely to have private buyers before or after the projects' completion. Furthermore, the number of sales at the building level does not depend on the local evolution of the social housing share.

[12]The same address or building may contain units financed by different subsidies. This represents several projects in my data.

[13]I corrected two obvious mistakes. First, there were two main mergers between *HLM* companies and some of the buildings were recorded at the merger year in the following surveys. Second, early *HLM*, *HBM* buildings, were described as completed at the time of a public renovation. I recoded them at the time of construction. Some of the projects started in 2007 were not completed. I used the estimated completion year provided by the City of Paris in 2007.

[14]*Base d'Informations Economiques Notariales.*

[15]This number is for the whole universe of housing transactions and does not distinguish private households from firms or public bodies.

The control variables include the characteristics of the flats and the sales, namely: size, number of bedrooms and bathrooms, date of construction of the building, day of the sale and the address. Each address was located in Lambert grid coordinates (Lambert 1 North) by matching on its exact name[16]. Table 2 provides broad descriptive features of the flats sold in Paris in 1995 and 2005: for the whole sample, for the flats sold between private households and repeated sales within the same building. Panel A shows the characteristics of the flats. There was first no independent check on the accuracy of the dwellings attributes[17]. This is particularly striking for the dwellings' size, as nearly half the information was missing in 1995. As data quality control increases, there was less than 10% missing values for the same attribute in 2005. During the sample period the average price per square meter in 2005 euros increases by 100% between 1995 and 2005, while the number of sales also increases twofold from 1995 to 2000 and remains stable afterwards. The main characteristics of the sales remain homogeneous over the sample period. The average flat is around 51 square meters, 60% of the sold properties have one or two rooms and 90% of them were built before 1992. Interestingly, 90.1% of the sales between private households $(208,918)$ occur within buildings[18] having at least two sales (between private households). Consequently, it is reassuring that my results based on controls at the building level will not be driven by a small subsample.

Panel B of table 2 presents the main explanatory variable of my analysis. It was constructed by combining the precise geographic coordinates of sales and the mapping of new social housing projects. To describe the relative intensity of social housing in the vicinity of a sale i at time t, I define different neighborhoods by distance d. $S_{it}(d)$ represents the share of social housing in the neighborhood of sale i with respect to the number of flats in the same circle according to the last comprehensive census in 1999:

$$S_{it}(d) = \frac{H_{it}(d)}{N_i(d)} \ , \tag{1}$$

where $H_{it}(d)$ is the number of social housing units completed at or before time t within a circle of radius d around the flat and $N_i(d)$ is the estimated number of occupied flats in the circle of radius d according to the census in 1999. The break-down of the number of flats at the tract level is the smallest publicly available data from the 1999 census. Thus it is not possible to get a direct estimate of $N_i(d)$. Figure 3 illustrates the process used to compute the social housing share. It shows a map of the 13$^{\text{th}}$ *arrondissement* in Paris. Plain lines represent census blocks and dots the social housing buildings in 2010. Three circles of 50, 250 and 500 meter radii are centered around a particular sale. For each circle, $N_i(d)$ is the sum of the occupied dwellings

[16] Incorrect spellings were manually corrected. The main remaining mistakes were corrected using local tax lots (*parcelles cadastrales*) and additional location information (*compléments d'adresses*). The spatial location has a precision of the order of five meters. The addresses were matched to the census blocks (*Ilots*) and tracts (*IRIS*) that are clusters of blocks using the French statistical office coding file. In Paris, census tracts represent small areas of around $2,500$ inhabitants and census blocks have an average of less than 500 inhabitants.

[17] The French statistical office now produces quarterly housing prices using these data.

[18] I define a building as the intersection of an address and a period of construction. According to this definition, 69.6% of the addresses have a unique building (89.5% for the repeated sales sub-sample). Using building rather than address as the unit of analysis has the advantage of not considering demolition and new construction on the same address as an upgrade of an existing entity. In practice, the results are not sensitive to using building or address fixed effects once I control for the period of construction of the buildings.

over all intersected census tracts, each tract being weighted by the fraction of its area located within the circle[19].

In Panel B of table 2, the average transacted flat in 1995 has 10% of social housing units within 500 meters. This number decreases slightly once smaller circles of 350, 250, 150 and 50 meter radii are considered. Within the smallest geography of 50 meters, the social housing share in 1995 is 7%. This pattern is very similar in the cross-sections in 1995 and 2005. It corresponds to the spatial bunching of social housing units in a few neighborhoods observed in figure 2. The circles are centered around private properties and the smallest radius of 50 meters takes only into account immediate neighbors which are less likely to be social housing units. Furthermore, the standard-deviations of the radial measures of the social housing share are increasing when I consider smaller radii. In 1995, the standard-deviation of the 500 meter measure (0.10) is nearly five times lower than the standard-deviation for the 50 meter measure (0.46). However, all the radial measures display a similar evolution from 1995 to 2005. Over the sample period 1995 to 2005, the share of social housing in the housing stock increases by $27,773$ units or 2.5% of the occupied housing stock in 1999.

The last row of table 2 gives the evolution of an alternative measure of the social housing share. This measure uses a parametric definition of neighborhood: the census tract of the 1999 census. I consider the total number of social units located in each tract. The denominator of the census tract measure, N_i, is known without uncertainty. The descriptive statistics for this measure are close to those obtained for a circle of radius 150 meters. The median size of a census tract is indeed equivalent to a circle of radius 146 meters. However, from figure 3, the radial measures of the social housing share have two main advantages. First, they can be computed at different geographical levels. Second, the census tract boundaries follow the middle of the streets. Thus the crossing of a street implies a partly artificial discontinuity in the measured social housing share.

3 Empirical strategy

3.1 Main specifications

Exposure to social housing varies across time and location. This paper seeks to identify a traditional hedonic equation where the log-price of a flat sale is related to the flat's various characteristics:

$$ln(p_{ibgt}) = x_{ibgt}\beta + \gamma S_{bt}(d) + \alpha_{gt} + \varepsilon_{ibgt} \;, \tag{2}$$

where i is an index for flats, b for buildings, g for various geography levels and t for time. x_{ibgt} is a row vector of observable dwelling characteristics that may affect housing prices. Specifically, x_{ibgt} includes number of rooms; size in square meters; floor; age of the building; and dummy variables if the flat has a bathroom, a parking lot, a cellar or a lift. $S_{bt}(d)$ is the share of social housing dwellings in the neighborhood of the building within a given radius d and α_{gt}

[19]The implicit assumption that the density is constant within census tract is likely to approximately hold in Paris. The regulation of building height, *épannelage*, is strictly applied.

represents geographical unobservable characteristics. My main specifications correspond to a difference-in-differences set-up where $\alpha_{gt} = \delta_g + \alpha_t$.

OLS estimates of the impact of public housing on housing prices are unlikely to identify γ, the parameter of interest, because $S_{bt}(d)$ may be correlated to unobserved neighborhood characteristics or unobserved characteristics of the dwelling through α_{gt} or ε_{ibgt}. This identification problem is difficult to circumvent for three main reasons.

First, the location of social housing projects is a joint decision between the *HLM* developers and the municipality. As the rent of social units is fixed at the city level, landlords have incentives to target distressed properties and neighborhoods with low or declining housing values[20]. Similarly, the municipality may value the removal of slums and their replacement by public housing. Thus, the specific unobservables of the private properties surrounding social housing projects may differ from the characteristics of properties not affected by the projects.

Second, the timing of the effects of new social housing dwellings is ambiguous. Changes in neighborhood composition could be anticipated by buyers and sellers. Social housing buildings take an average of three to four years to be completed after the initial agreement and, in the case of new buildings, public hearings are mandatory. Furthermore, there is a time lag between the flat buying decisions and the recorded time of the sales.

Third, the local public housing stock may evolve jointly with other factors having direct impacts on dwellings' values. For example, new public housing projects may be accompanied by better transportation links, infrastructure investments and new commercial or public services. These complementary investments could be planed by the municipality or the result of a political process. Anecdotal evidence suggests that the affected populations may organize themselves to lobby local governments and *HLM* companies in order to obtain various forms of compensation or amendments to the initial projects (Paris, 2006). Developers may also target new social buildings according to adverse neighborhood shocks such as fire or lack of maintenance of nearby buildings. Mean reversion could also bias upwards the measure of the impacts of social housing on nearby private properties. Even in the same census tract, the characteristics of the sales before and after the creation of social housing units may differ in a systematic manner which would bias difference-in-differences estimates. Finally, the observed changes in price may be driven by changes in the own characteristics of the dwellings such as buildings' upgrades, or by changes in the valuation of observable dwelling's characteristics.

To circumvent the endogeneity of location problem, I take advantage of the high population density in Paris to control for local unobservables. Most previous papers have considered the geographical unit of interest g as a census aggregate (tracts, blocks or counties)[21]. I extend these geographical controls by defining my smallest geographical unit at the building level. Precisely, I define a building as the interaction between an address and a period of construction. This allows me to control for numerous time invariant characteristics of the dwellings. For example, Parisian school catchment boundaries do not follow census tract definition (Fack and

[20]Anecdotal evidence suggests that most *HLM* companies do not take into account the potential residual market value of social properties when they compute the expected returns of social housing projects (Inspection Générale des Finances and Conseil Général des Ponts et Chaussées, 2002).

[21]In most set-ups, repeated sale specifications imply some issues of sample selection.

Grenet, 2010) and most of the major investments that could impact sales prices take place at the building level (e.g. water provision, sanitation, lift maintenance etc.). Moreover, building fixed effects mitigate a main source of time varying unobservables that may be correlated with the social housing share. The replacement of distressed private buildings by new private buildings is not confounded as a neighborhood upgrade.

A first test of the causality of the estimates is to generalize regression (2) by allowing the externalities of social housing to decay with the distance to the projects. In this case, the effects of the social housing projects are measured by a vector (γ_r) corresponding to the impact of the social housing share in different rings (r) around a sale:

$$ln(p_{ibgt}) = x_{ibgt}\beta + \sum_r \gamma_r S_{bt}(r) + \alpha_{gt} + \varepsilon_{ibgt} \quad (3)$$

where the ring variables $S_{bt}(r)$ are mutually exclusive and define concentric belts with different treatment intensities. I would expect to see larger effects for private properties located closer to the social projects because they have a more direct exposure to the potential buildings' upgrades and inflows of low income tenants.

I address the problem of the timing of the impacts by allowing the effects of interest to depend on the completion date of the projects. As the same transaction can be affected by several housing projects occurring at different points in time, I need to consider the inflows of social housing units over time and not pre and post treatment dummy variables. Specifically, I introduce lead and lag flows of social housing divided by the number of flats in the neighborhood in 1999. $F_{b,t+2c}(d)$ represents the additional share of social housing due to projects completed between $2(c-1)$ and $2c$ after the time of the sale, t, within a circle of radius d. I use two year changes to ensure sufficient variation even within small neighborhoods. These new variables can be expressed in terms of the share of social housing within a circle of d meter radius at time t, $S_{b,t}(d)$:

$$F_{b,t+2c}(d) = S_{b,t+2c}(d) - S_{b,t+2(c-1)}(d) \ . \quad (4)$$

For example, $F_{b,t-2}(d)$ takes into account all projects completed two and three years prior to the sale at time t and $F_{b,t}(d)$ measures the inflows of social housing units during years t and $t-1$. The final regression corresponds to:

$$ln(p_{ibgt}) = x_{ibgt}\beta + \gamma_i S_{b,t-14}(d) + \sum_{c=-6}^{3} \gamma_c F_{b,t+2c}(d) + \alpha_{gt} + \varepsilon_{ibgt} \ . \quad (5)$$

This specification assumes that projects built more than 14 years before the time of the sales have a constant impact on housing prices (γ_i) and that projects that will be built more than 6 years after the sale can not be anticipated by the housing market. Under the assumption that flats and neighborhoods unobservable characteristics do not evolve systematically with social housing inflows, the γ_c's measure the differential impact of the closeness to social housing dwellings with respect to the year of completion of the projects. Specification (5) can be extended as specification (3) to incorporate heterogenous impacts on housing values by distance belts.

I test the robustness to potential time varying unobservables correlated with the social housing share by including local linear trends at different geographical levels. In my most flexible specification, this heterogenous growth model includes controls for building unobservables and census tract linear trends.

To get an idea of the precision of my local controls, it is useful to compare the geography of Paris to the one used by Schwartz et al. (2006) to evaluate the externalities of subsidized housing in New-York. The smallest level of the French census is the block for which no public data are available. French census tracts are small clusters of blocks that are designed for the release of statistical information. The French census tracts match the main political units. Each of the twenty *arrondissements* of Paris are divided into four administrative *quartiers* which are subdivided into census tracts. A direct comparison of the 2000 US census and the 1999 French census show that the typical Parisian tract is much smaller than the average New-York tract: the population is on average one third below and the area five times smaller. In terms of area, the average Parisian census tract is also between the Chicago census block groups and census blocks considered by Autor et al. (2009).

3.2 Isolating the effects of low-income tenants

The previous specifications have two remaining shortcomings. First, they estimate an aggregate impact: the creation of new social units through rehabilitation and new buildings and the inflow of low income tenants. Second, even after controlling for local trends, disentangling social housing effects from local complementary investments is not straightforward. In order to obtain a more precise idea of the effects of low income tenants on housing prices, I exploit variation in the stock of social housing units following the election of the current mayor in 2001. The current mayor of Paris, Bertrand Delanoë, was virtually unknown before his electoral win in 2001. This electoral poll was close and uncertain: at the second round of the election, the left-wing alliance received 49.6% of the votes against 50.4% for the divided right wing.

Following this electoral win, a sharp increase in the provision of social housing units was achieved through the conversion of existing buildings into social housing units (Figures 1 and 2) or *acquisition sans travaux*[22]. There were no conversion projects before 2001. These projects were not accompanied by new construction or rehabilitation and thus one can infer that their effects on housing prices were limited to the inflow of low income tenants into the neighborhoods and the consequent changes in their socio-economic compositions. Bacquet et al. (2010) describe the new process for two projects in Paris based on interviews with the tenants. The *HLM* company or the municipality buys an existing rental building from private landlords using social housing subsidies. The vacant flats are allocated to *HLM* applicants and the remaining private tenants are slowly replaced by *HLM* households when they leave the building or their tenancy expires. This process was particularly controversial as it was judged costly in respect to the other ways to provide social housing. Moreover, it was mainly used in wealthy neigh-

[22] This process is also known as *acquisition conventionnement*.

borhoods to create dwellings for very low income households. The APUR (2010)[23] provides descriptive statistics from a survey of the *HLM* landlords of converted buildings in April 2009. During the first two years after the mayoral election, 3,933 social dwellings, more than 60% of the total number of agreed dwellings, were created using this financing scheme. At the time of the survey, 80% of these dwellings were occupied by social tenants. From 2001 to 2005, 6,913 private dwellings were converted into social housing units.

I use this policy shock to isolate the impact of the share of social tenants in the neighborhood of the sales. This policy has two main advantages. It was arguably unpredictable by home-buyers of nearby sales and it is not systematically associated with other public investments in the neighborhood of the sales. From the data provided by the City of Paris, I construct the evolution of the share of the converted social housing in the occupied housing stock in 1999 from 2001 to 2005 as in equation (1).

4 Empirical results

4.1 Cross-sectional estimates and parametric neighborhood definition

Table 3 shows how the log price of sales (in 2005 euros) changes with existing and future social housing projects from 1995 to 2005. The sample is restricted to the sales occurring within building with repeated sales to ease the comparison with the estimates controlling for building unobservables. I use my two alternative measures of the social housing shares: by radii from 500 meters to 50 meters in columns (1) to (4) and within census tract in column (5)[24].

The regressions in panel A control only for the time of the sales. These cross-sectional estimates reveal that housing values are negatively correlated with the share of social housing in the vicinity of the sales. This conclusion is robust to the neighborhoods I consider. The magnitude of the cross-sectional estimate at 500 meters indicates that an increase in the share of social housing by 10 percentage points (approximately one standard-deviation) is correlated with a decrease of 14% in housing prices. The negative impact of social housing on housing prices is decreasing with the closeness to the sales even if the standard-errors remain low. When the social housing share is measured only within 50 meters to the sales, the cross-sectional point estimate is divided by 21. However a one standard-deviation increase of the share of social housing within 50 meters would still imply a significant decrease in housing price by 2.6%. A simple computation can help to get a better sense of the size of the measured effect. As the average property has 161 surrounding flats within 50 meters, an average project of 35 flats would decrease the property value by 1.4%. The census tract measure of the social housing share does not provide a different picture from the radial measures. As expected from the descriptive statistics, the point estimates and standard-errors match closely the results obtained for the 150 meter radius.

[23] *Atelier Parisien d'URbanisme.*

[24] As the pattern of the point estimates is smooth over radii, table 3 does not report the estimates for the 350 meter measure to save some space. Table A1 presents descriptive statistics for the social housing share measures by circles and belts around the sales.

The second and third rows of panel A investigate further the causality of these point estimates. In row 2, the negative point estimates are stronger when the social housing includes only the projects created within the past 10 years. The point estimate for the 500 meter radius is multiplied by 7 and the one for the 50 meter radius by nearly 2. New social housing projects appear to have more negative externalities than existing low income housing. This could be consistent with more negative externalities. New social tenants are poorer than established tenants and new social housing dwellings have more stringent income eligibility requirements than *HLM* created before 1977 (table 1). However, no causal interpretation can be given to this phenomenon. New social housing projects may also be located close to private housing having worse observable and unobservable characteristics than older projects. In row 3, housing prices are also correlated with future social housing units which will be built in the next five years. Interestingly, the magnitude of the point estimates in columns (2) and (3) are close. Within the 50 meter radius, the effect of the future social units is more than twice as high as that of the current units. Flats located in neighborhoods where the share of social units will increase by 10 percentage points in the next five years have 2.6% lower values. On the one hand, the time pattern of the point estimates could be consistent with the fact that social dwellings are located in large deprived neighborhoods and tend to replace distressed properties at the local level. On the other hand, the same pattern could also be consistent with rational expectations of the home buyers if they are able to predict future social housing developments.

In panel B, I introduce an extensive set of controls for flats characteristics[25]. The estimated coefficients decrease slightly in absolute value but are also more precisely estimated. The smallest estimate at 50 meters still implies that a new social housing project would decrease housing values by 1.1% and it remains significant at the 1% significance level. In summary, the linear covariate adjustment leads to similar results as the specification without these controls. Although the set of controls is large, it may not be adequate to solve the endogeneity of the new projects' location. To isolate the causal impact of social housing on housing prices more precise local controls may be needed.

4.2 Geography fixed effects

Table 4 presents the results of the difference-in-differences specifications (2) to (4) at various geographical levels: 80 *quartiers*, 902 census tracts and 36,274 buildings[26]. The idea is to control for the particular local characteristics around social housing projects. All regressions include an extensive set of controls for the flat characteristics and the time of the sales. I use my main measure of the social housing share: by radii from 500 meters to 50 meters. Columns (1) to (3) introduce the share of social housing within 500 meters of the sales, columns (4) to (6) within 250 meters, columns (7) to (9) within 150 meters and columns (10) to (12) within 50 meters.

Panel A of table 4 does not control for different house price trends around the social housing

[25] Table A2 presents the specification and the summary statistics for all the control variables included.

[26] For all specifications, the sample is restricted to the sales between private households occurring within buildings with repeated sales. Controlling for building fixed effects or address fixed effects does not affect significantly the point estimates.

projects. While using *quartier* or census tract controls, the estimates appear consistently negative, their sign changes once the fixed unobserved characteristics of the buildings are controlled for. Column (1), the point estimate using *quartier* fixed effects indicates that an increase of 10 percentage points of the share of social housing within 500 meters would decrease housing value by 6.0%. This estimate is divided by two, a 2.8% decrease, when I control for census tract fixed effects in column (2). However, once I control for building unobservables, column (3), I observe a different story in Paris. The same change would imply a 3% increase in housing value. The price increase estimate is statistically significant at the 10% level. At the same time, the R-squared rise from 0.871 to 0.911 when building rather than census tract controls are included. This means that building and precise location characteristics play a key role to determine both housing prices and social projects' location. The change in the values of the point estimates and R-squared across fixed effects from *quartier* to building is consistent over the different radii.

Focusing on the specification controlling for building unobservables and variation within the 50 meter circle, column (12), the positive impact of the share of social housing within 50 meters of the sale is statistically significant at the 1% level. A new social project of 35 flats would imply an increase in housing value by 1.4%. As projects are associated with new buildings and rehabilitations, positive estimates could correspond to disamenity removals and buildings' upgrades at a small spatial scale. Based on census tract controls, the estimates for the impact of the share of social housing on housing price seem to be biased by omitted variables and have a negative sign. The social housing share is proxying for buildings having worse unobservable characteristics. However, the positive estimates are consistent with another story related to time varying unobservables. The creation of social housing units could be associated with complementary investments in small neighborhoods, such that additional playgrounds or new public services. Even controlling for building fixed effects, the estimates of the impact of the social housing share could be confounded by mean reversion and the selection of locations with particular underlying price trends.

Panel B of table 4 presents the results of the same specifications as panel A but including 80 *quartier* linear trends[27]. In all the fixed effect specifications the overall impact of social housing appears similar to the estimates reported in panel A. At the same time, the R-squared for all the regressions are not affected by the inclusion of these trends. The *quartier* trends explain neither the location of social housing nor the evolution of the log housing price.

Table 5 presents the results of the difference-in-differences specification (3) that investigates further the causality of the relationships of table 4 by introducing the share of social housing within different belts around the flats. As the share of social housing in the different belts are mutually exclusive, each coefficient represents the effect of the social housing share in a given belt. Estimates in columns (1) to (3) condition on flat controls, time of the sales and geographic fixed-effects, while the specifications in columns (4) to (6) also include 80 *quartier* linear trends. In columns (1) and (2), with geographical controls at the *quartier* or tract levels, the spatial pattern of the point estimates is not consistent with a negative externality centered around the projects. The estimate for the 350 to 500 meter social housing share in column (1) is nearly 20 times higher than the point estimate for the 50 meter circle. The pattern of the standard-errors

[27]The linear trends are measured as the number of days between the sale and the 31st December 1994.

is also informative. Given that the 350 to 500 meter ring is much larger than the 50 meter circle, one possible concern is that the observed spatial difference in point estimates may be driven by measurement error. However, the near zero point estimate for the share of social housing within 50 meters in column (1) is very precisely estimated and still significant at the 1% level. Thus it is unlikely that the results are generated by some kind of attenuation bias. Once building fixed effects are included in columns (3) and (6) the estimates are consistent with positive externalities decreasing with distance from social projects. In my preferred specification including both building fixed effects and linear trends by *quartiers* in column (6), the point estimate for the 50 meter circle remains similar to the one obtained in table 4 panel B specification (12). The estimates for the impact of the social housing share within the 50 to 150 meters, 150 to 250 meters and 250 to 350 meter belts appear consistent with some positive externalities and decline with distance. In this specification, properties located within 50 meters of a new social housing project experience a 1.2% increase in housing prices once the project is completed.

Finally, figure 4 plots the difference-in-differences estimates of the social housing projects impacts over time as in specification (5) for the circles from 500 meters (panel a) to 50 meters (panel d). These specifications introduce leads and lags flows of social housing and control for building fixed effects and linear trends by *quartiers*[28]. On the solid lines, each point corresponds to the estimate of γ_c, the time-varying impact of the social housing share on the log of housing prices[29]. The last point, 15 years after the projects completion, is the estimate for γ_i, the long-run impact of social housing on the log of housing prices. The vertical bars represent the 95 confidence interval and the dashed lines represent the 90% confidence interval.

In figure 4 panel a, the long run estimates of the effects of the share of social housing within 500 meters on housing prices appear negative. The timing of the impacts matches closely the completion of the social housing buildings. Estimates are slightly increasing over time before the projects completion but insignificant and close to zero three years and one year before the project completion. They become slightly positive just after the completion of the projects and start to decline five years later. They display constant magnitude after nine years. Based on these estimates, an increase of 10 percentage point of the social housing share would imply on the long-run a 6.2% decrease of private property values located in the vicinity of the projects.

In figure 4, panels b to d replicate the estimates of panel a using circles of 250 meters, 150 meters and 50 meters around the private properties. No clear time pattern emerge from these figures. Panel b, the estimates using the 250 meter share of social housing decrease after the completion of the projects as in figure 4 panel a but they are insignificant at the 10% level. Figure 4 panel c reports the estimates for the impact of social housing within 150 meters. Housing values appear to rise slightly after the completion of the projects. However, the estimates can not be statistically distinguished from zero at the 10% significance level. Finally, figure 4 panel d plots the estimates for the impact of the share of social housing on housing values within 50 meters. The estimates have a clear time pattern. They can not be statistically distinguished from zero before the completion of the social projects and start rising just after. They remain positive and stable three year after the projects' completion. Private properties located within

[28]The corresponding estimates for the radii of 500 meters and 50 meters are reported in appendix table A3.

[29]The $\widehat{\gamma}_c$s are displayed at the middle of the two year intervals $(-2c+1)$.

50 meters of a new social project of 35 units experience in the long run a 2.6% price increase.

Figure 5 shows the results of the extension of specification (5) that allows the impact of social housing to vary with both time and distance for the outer belt from 350 to 500 meters, panel a, and the circle of 50 meters, panel b. The specification includes sales' controls, building fixed effects and linear *quartier* trends. Panel a display only the point estimates over time for the house price impacts of the social housing share within the 350 to 500 meter belt. In the outer belt, housing prices decrease after the completion of the social projects. The estimated impacts become significant at the 5% level seven years after the projects' completion and remain stable afterwards. A 10 percentage points higher social housing intensity leads to a 5.5% decrease housing prices 15 years after the projects' completion.

On the contrary, panel b, in the 50 meter circles around the projects, if the social housing share increases by 10 percentage points, housing prices would increase by 1.2%. This last point estimate is very close to the one obtained in figure 4 panel d where I only introduced the social housing share within 50 meters. The estimates for the other distance belts have more mixed patterns insignificant at the 10% significance level.

4.3 Sample selection issues

As previously mentioned, a possible concern for measuring the externalities of social housing on housing values is that I restricted my sample to the sales between private households and that my sample is restricted to the properties that transact. If the flats that transact after or before the projects' completion become harder or easier to sell to private buyers or if they have different unobservable characteristics, this would likely bias my point estimates. I estimate a linear probability model where my dependent variable is a dummy variable if the flat is sold to a private buyer as in specifications (2) and (5). In this specification, my sample includes the whole universe of transactions from private sellers, administrative bodies and firms[30].

I also investigate if there is any relationship between the number of sales and the timing of the social housing projects at the building level. To do this, I modify my specification to capture the fact that the sales of flats within a building are irregular events but that the number of sales each year is a continuously updated outcome. I construct a panel of building-year observations. I treat a building constructed before 1995 as if it contributed for 11 building-year observations[31]. The new dependent variable is coded as the total number of sales if there are some observed sales in the current year and 0 in all other periods. My specification includes building fixed effects, dummy variables by years and linear trends for the 80 *quartiers*. I then estimate a linear count data model similar to specifications (2) and (5) for the whole sample of buildings and for the balanced panel of buildings constructed before 1992.

Table 6 panel A reports the marginal effects of the social housing share at 500 and 50

[30] A limitation of this analysis is that I only observe the realized sales. All my estimates are conditional on the properties being sold.

[31] As the observation of the year of construction is censored by intervals, I consider that the buildings constructed before 2000 contribute to the sample after 2001 for 5 years and discard the buildings constructed after 2001. I do not observe buildings leaving the sample because they are closed or demolished. My dependent variable is coded as 0 in these cases.

meters on the probability to sell a property to a private buyer for the whole universe of sales. The estimated marginal effects are small both for the whole sample, columns (1) and (2), and the sales of private properties within buildings constructed before 1992, columns (3) and (4). In columns (1) and (3), a 10 percentage points increase in the social housing share within 500 meters would decrease the probability that a flat is sold to a private buyer by 0.7 to 1 percentage point[32]. These estimates are not statistically significant at the 10% significance level. In columns (2) and (4) the marginal effect of a 10 percentage points increase of the share of social housing within 50 meters on the likelihood to sell to a private buyer is between 0.06 and 0.02%. The standard-errors are precise but the point estimates remain not statistically significant at the 10% level. The pattern of the point estimates of specification (5) over time do not reveal any irregularities with respect to the timing of the projects (not reported).

Panel B of table 6 shows the estimates of the linear count data model for the yearly number of sales at the building level. In columns (2) and (4), the point estimates for the impact of the social housing share within 500 meters are imprecisely estimated but small. A 10 percentage points increase of the social housing share within 500 meters would imply a decrease of almost 0.03 sales by year[33]. This figure is consistent with a weak association between social housing projects and urban renewal programs. However, this relationship does not hold for the share of social housing within 50 meters. A 10 percentage points increase of the social housing share would have no distinguishable effects on the number of transactions at the building level.

Overall the estimates in table 6 suggest that my main estimates are unlikely to be biased by the selection of the flats that are transacted and sold to private households. A 10 percentage points increase in the social housing share at 50 meters was generating an increase of 1.2% on housing prices. For the average sale in my sample, this represents $2,125$ euros. The lower bound of the 95% confidence interval in Panel B column (4) implies that an increase of 10 percentage points of the social housing share could reduce the number of transactions by $0.01 \times (0.015 + 1.96 \times 0.019) = 0.005$ sales. The prices of the non-transacted flats after the projects completion would have to be as low as 1.3% of the average price of the transacted flats in order to generate the observed positive effects on housing prices.

4.4 Discussion

Compared to the existing literature, the estimate for the outer belt from 350 meters to 500 meters have of the same sign and magnitude as the estimates of Autor et al. (2009) for rent control housing, where a one standard-deviation increase in rent control intensity implies a 3% to 7% decrease in non-controlled property values within 0.25 miles (400 meters). They interpret their point estimates as the result of investment complementarities in the housing market. Rent controlled properties are less well maintained than non-controlled properties and imply lower level of housing investments in their vicinity. This story does not fit well the Parisian context where most of the new social projects are associated with rehabilitations and new buildings.

[32] The mean of the dependent variable is 0.855 in columns (1) and (2) and 0.861 in columns (3) and (4).

[33] For the whole sample of buildings, the average number of sales by year is 0.435 with standard-deviation 1.083. For the buildings created before 1992, the mean and standard-deviation of the yearly sales are both slightly higher: 0.473 and 1.129.

Other mechanisms include inflows of low-income private tenants, local increase in crime rates and deterioration of public and private schools quality within the school zones of the projects. These mechanisms can not be tested directly due to the lack of available data for Paris. Baum-Snow and Marion (2009) find that LIHTC programs in Chicago were associated with inflows of low income tenants in the private housing market. Hartley (2008) reports that the demolition of high rise social housing buildings is associated with a decrease in crime rate but that small projects do not have significant impacts on local crimes.

Another stream of the literature has found positive impacts of social housing developments on housing values in line with the estimate of the impact of the evolution of the social housing share within the 50 meter circle. Baum-Snow and Marion (2009) estimate positive impacts of new LITHC developments on housing values. However, their estimates are difficult to compare with the ones obtained here as the geographies of Paris and the US metropolitan areas are quite different. They use neighborhoods of one kilometer radius and their explanatory variable is the total number of projects, not the share of social housing units in the occupied housing stock. In New-York city, Schwartz et al. (2006) find a positive impact of subsidized housing on surrounding properties values. They define 150 meter neighborhoods and, in the case of fully rental multifamily projects, a new project leads to an average increase in housing prices by 3.5%, while in the Parisian case within 50 meters of a new project I observe a 2.6% increase in housing value. But their average project is much larger, 250 units, than the typical Parisian development of 35 units.

The overall pattern of the point estimates is difficult to reconcile with a theory based on complementary investments. This would need a public infrastructure making better off the close neighbors and worse off the private owners located farther away from the social housing projects. A first explanation is that if new social projects replace distressed properties the benefits may be extremely localized while other negative externalities (e.g. crime, school performance, etc.) may operate at larger spatial scales. Another story consistent with this evidence would be based on initial taste sorting within small neighborhoods. As social housing projects are located in the distressed parts of neighborhoods, the close neighbors may have lower aversion against low-income tenants than neighbors located farther away in initially better located properties.

Compared to the other determinants of housing prices, the magnitude of my estimates is sizeable and plausible. Fack and Grenet (2010) found that a one standard-deviation increase in middle school quality tends to increase property value by 1.4% to 2.4% in Paris. This estimate is slightly smaller than the first estimate of Black (1999) and in the middle range of the empirical literature on housing prices and school quality reviewed by Gibbons and Machin (2008). The literature on the impact of local crime on property values displays estimates of similar magnitude. Linden and Rockoff (2008) estimate that the average price of a home declines by around 4% once a sex-offender arrives in a neighborhood. Gibbons (2004) reports that a one standard-deviation decrease in the local density of domestic property crime adds 10% to the price of an average London property. Concerning the clean-up of hazardous waste sites, Greenstone and Gallagher (2008) report a maximum positive impact on housing prices of 2.3% once the clean-up is completed through the US Superfund program. Finally, Chay and Greenstone (2005) and Bajari et al. (2010) use quasi-experimental and structural estimation methods and find that a 10% increase in air quality tends to increase property values by 2% to 8%[34].

5 Disentangling different mechanisms

5.1 Heterogeneity by neighborhoods and sales' observables

In the absence of available data to directly test the mechanisms leading to positive social housing externalities in small neighborhoods and negative externalities further away from the projects[35], I investigate the heterogeneity of the treatment effects. So far the results use the full sample of sales in Paris between private households, but the heterogeneity of the effects by neighborhoods and sales' characteristics is potentially important.

Table 7 reports the estimates by neighborhood characteristics. I focus on the impact of the social housing share within 50 meters on housing prices for my preferred specification with building fixed effects and *quartier* linear trends. Panel A shows the estimates of four sub-samples by quartile of housing price in 1995. The quartiles correspond to the median housing price per square meter computed from the 1995 sample of sales with information on flats size. The median prices are computed for each of the 80 *quartiers* of Paris[36]. A clear pattern emerges by neighborhoods' initial housing prices. Most of the positive impact of social housing is driven by neighborhoods with low housing prices (lowest quartile) while the second and third quartile of initial housing prices display smaller point estimates. Interestingly, the estimates are virtually identical if I estimate a constrained specification where the quartiles of housing prices are only interacted with the social housing share and for the sake of brevity I do not report them[37]. Thus my estimation is robust to the implicit assumption that the return to private flats characteristics are homogeneous over space. Overall, the positive estimates decreasing with neighborhood initial wealth are consistent with the view that the renewal effects and the improvement of the quality of the housing stock should dominate any externalities of low-income tenants when the income differential between the current neighborhood population and the social tenants is small.

Panel B of table 7 shows the estimates of an identical specification but using the quartiles of the social housing shares in 1995 by *quartiers*[38]. For comparison with panel A, the quartiles are displayed in reverse order. The externalities of new social housing appears clearly positive in neighborhoods with high initial social housing shares, while they are close to zero otherwise.

Finally, figure 8, panels a and b plot the impact of the 50 meter social housing share on housing prices over time for the lowest and highest quartiles of housing price in 1995. The estimates correspond to specification (5). Panel a, before the completion of the projects, the

[34]These estimates are long-run effects. Currie and Walker (2009) find no immediate effects of the sharp reduction in emissions from motor vehicles induced by electronic toll collection technology on housing prices

[35]French police forces record crime at a geographically localized level. However, it is not possible to obtain this data at the present time for research purposes. Fougère et al. (2009) use the most geographically detailed French data. Paris is one of their data points.

[36]At this level, the spatial distribution of prices is stable over time. Figure A1 plots the quartile of housing prices in 1995.

[37]Estimates using this alternative specification are available upon request.

[38]Figure A2 plots the corresponding quartiles. They are almost perfectly negatively correlated with the quartiles of figure A1.

estimates can not be distinguished from zero at the 10% significance level and raise after the completion of the projects to become stable five years later. The long-run point estimate is higher than for the average Parisian flat: 0.179 against 0.120 log points. An addition of 35 social units would imply an increase of private housing prices by 3.9%. On the contrary, in high income neighborhoods, the social housing share has no statistically significant impact and the point estimates are close to zero or negative (-0.065 log points) in the long-run[39].

Table 8 and figure 7 replicate the results of table 7 and figure 6 using the 500 meter measure of the social housing share. Most of the estimates are not significant at the 10% significance level. In panel A of table 8 and figure 7, the basic finding that any positive impact of social housing decreases with the level of initial housing price holds true. The negative estimates for the effects of the social housing share within 500 meters are driven by high income neighborhoods. The estimates of table 8 panel B, which divides the sample by social housing share in 1995, are less clear-cut.

I now study the heterogeneity of the effects with respect to flat size. Table 9 presents the estimates for the effects of the social housing share within 500 and 50 meters by different number of rooms. As my preferred specification includes building fixed effects, in columns (1) and (3), I introduce the heterogeneity with respect to flat size by interacting the share of social housing with dummy variables for flats of one or two rooms, three or four rooms and more than four rooms. Columns (2) and (4) report the estimates of a more parsimonious specification where the local share of social housing is linearly interacted with the number of rooms of the private flats. In both specifications, all the positive impact of the social housing share on housing prices are measured for small flats of one or two rooms which are mainly made up of single households and couples without children. On the contrary, estimates for the effects of the 500 meter share of social housing becomes negative for flats of more than four rooms and estimates for the effects of the 50 meter share of social housing can not be distinguished from zero for family dwellings. Figures 8 and 9 plot the point estimates over time for the flats of less than two rooms and more than four rooms for the 50 and 500 meter measures of the social housing share. The time pattern of the point estimates is consistent with a causal effect on housing prices for one or two room flats and the 50 meter share and for family dwellings and the 500 meter share of social housing.

5.2 Conversion projects after 2001

In this subsection, I report the estimates based on *acquisition sans travaux* projects (conversion projects). Table 10 presents the estimates of the effects of the share of social housing units created by conversion of existing private buildings between 2001 and 2005 on housing prices within neighborhoods of 500 to 50 meters around the sales. I restrict my sample to the flats transacted after 2001. All the specifications include building fixed effects and *quartier* linear trends.

[39]The pattern observed for the 2nd and 3rd quartiles of housing prices in 1995 is the same. The time pattern obtained when pooling the 2nd to 4th quartiles of housing prices is the same but more precisely estimated.

Panel A reports the estimates using the full sample of flats sold after 2001. The point estimates for the share of social housing units created by conversion of private buildings within 500 meters is negative. In column (1), a 10% increase in share of the flats rented to social tenants would imply a housing price decrease by 3.1%. However, this estimate is not significant at the 10% significance level. The concentration of social tenants within smaller circles of 250 meters, column (2), to 50 meters, column (4) are also imprecise. They become economically close to zero. The last two point estimates for the share of social housing within 150 and 50 meters are positive but more than twice below the corresponding point estimates reported for the share of all social housing units and the same specification in table 4 panel B columns (11) and (12).

These positive point estimates raise concerns that conversion projects may be associated with larger social housing developments and proxy for rehabilitations of distressed buildings and new constructions. This will be the case if *HLM* developers buy buildings located close to each other and decide to convert part them into social housing or to rehabilitate them according to the occupation and maintenance status of the properties. Panel B examines this assumption by controlling for the evolution of the share of other social housing projects within the same neighborhoods. The estimate in column (4) for the share of the conversion projects within 50 meters is divided by two and remains insignificant at the 10% significance level. For wider radii, the estimates for the impact of the share of converted private properties on housing prices become more negative than the corresponding estimates in panel A but they are all insignificant at the 10% level. Overall the conversion projects provide evidence that social housing not associated with new buildings and other public investments does not have a positive impact on private properties located in the vicinity of the new social housing tenants. The estimates for the effects of the share of new social tenants within 500 meters on housing prices are sizeable and negative, but there is not enough variation to provide a definite answer.

6 Conclusion

This paper investigates the indirect effects of social housing on private property values in Paris. I find that social housing projects tend to have a positive average impact on housing prices in small neighborhoods of 50 meters around the social projects while the estimated impact become negative farther away from the projects.

The analysis is based on a unique dataset which combines the whole universe of social housing projects and flat transactions during eleven years at the building level. I exploit the high population density of Paris to identify the impacts of social projects on housing values. I rely on a difference-in-differences identification strategy within small neighborhoods controlling for building unobservables and local linear trends. The timing of the effects provides additional support for a causal interpretation of my results.

I show that a sharp increase of the social housing stock of 10 percentage points, as planned by the French 2000 law, would account for an average increase of around 1.2% of neighboring houses' prices within 50 meters of the projects. However, the measured impacts on housing prices become negative if the share of social housing units is measured at wider radii where private properties are less exposed to the renewal effects of the projects. Within an outer belt from 350 to 500 meters around the projects, the average housing value would decrease by 5.5%.

The empirical results are consistent with the idea that social housing projects associated with new buildings or rehabilitations of distressed properties have two distinct impacts. They improve the quality of the existing housing stock but they lead to an inflow of social tenants into the neighborhood. First, the positive effects of new social housing units are entirely concentrated in small neighborhoods around the projects. Private properties located between 350 and 500 meters experience price decrease. Second, the increase in property value is concentrated in low-income neighborhoods, while high income neighborhoods would not experience housing price increase. The price increase is also entirely driven by small flats of one or two rooms while family dwellings of more than four rooms would not benefit from social housing developments. Third, when I isolate the inflows of low income tenants using the direct conversion of private rental units into social housing without any rehabilitation, the point estimates show that social housing projects that are not associated with an improvement of the quality of the existing housing stock do not have positive effects.

My results suggest that policies intended to create or maintain mixed communities through social housing have significant impacts on the neighborhoods in which they are located and that these externalities depend on neighborhoods and flats' characteristics. The goal of future work would be to evaluate the whole welfare effect of social housing policies. This raises several challenges. First, the subsidized supply of housing is costly and the potential long-run benefits for the social tenants are unclear. Second, the misallocation of the rent controlled dwellings due to the allocation through a queuing mechanism rather than to the households who value them the most is an important concern (Glaeser and Luttmer, 2003).

References

APUR (2006): "L'accès au Logement social à Paris en 2005," Report, APUR.

——— (2010): "Les immeubles acquis conventionnés à Paris entre 2001 et 2008: l'état de leur occupation en 2009," *Note de 4 Pages.*

Assemblée Nationale (2002): "La lutte contre le blanchiment des capitaux en France : un combat à poursuivre," Report, Assemblée Nationale.

Autor, D., C. Palmer, and P. Pathak (2009): "Externalities from Rent Control? Evidence from Cambridge MA," Working paper, MIT.

Bacquet, M.-H., Y. Fijalkow, F. Amé, and S. Vermeersch (2010): "Comment nous sommes devenus hlm. Les opérations de mixité sociale à Paris dans les années 2000," *Espaces et sociétés*, 1, 93–109.

Bajari, P., J. Cooley, K. il Kim, and C. Timmins (2010): "A Theory-Based Approach to Hedonic Price Regressions with Time-Varying Unobserved Product Attributes: The Price of Pollution," Working Paper 15724, National Bureau of Economic Research.

Barthélémy, F., A. Michelangeli, and A. Trannoy (2007): "La rénovation de la Goutte d'Or est-elle un succès ?" *Economie et Prévision*, 107–126.

Baum-Snow, N. and J. Marion (2009): "The effects of low income housing tax credit developments on neighborhoods," *Journal of Public Economics*, 93, 654–666.

Black, S. E. (1999): "Do Better Schools Matter? Parental Valuation of Elementary Education," *Quarterly Journal of Economics*, 114, 577–599.

Briant, P., N. Donzeau, M. Marpsat, C. Pirus, and C. Rougerie (2010): "Le dispositif statistique de l'Insee dans le domaine du logement - Etat des lieux et évaluation comparée des sources," Working Paper F2010/02, INSEE.

Chay, K. Y. and M. Greenstone (2005): "Does Air Quality Matter? Evidence from the Housing Market," *Journal of Political Economy*, 113, 376–424.

Cheshire, P., S. Gibbons, and I. Gordon (2008): "Policies for "Mixed Communities": A Critical Evaluation," Policy Paper 2, Spatial Economics Research Centre.

CNIS (2001): "Questionnaires du Recensement rénové de la Population," Report, CNIS.

Currie, J. (2006): *The Invisible Safety Net*, Princeton University Press.

Currie, J., S. DellaVigna, E. Moretti, and V. Pathania (2010): "The Effect of Fast Food Restaurants on Obesity and Weight Gain," *American Economic Journal: Economic Policy*, 2, 32–63.

Currie, J. and R. Walker (2009): "Traffic Congestion and Infant Health: Evidence from E-ZPass," Working Paper 15413, National Bureau of Economic Research.

Fack, G. and J. Grenet (2010): "When do better schools raise housing prices? Evidence from Paris public and private schools," *Journal of Public Economics*, 94, 59 – 77.

Fougère, D., F. Kramarz, and J. Pouget (2009): "Youth Unemployment and Crime in France," *Journal of the European Economic Association*, 7, 909–938.

Gibbons, S. (2004): "The Costs of Urban Property Crime," *Economic Journal*, 114, F441–F463.

Gibbons, S. and S. Machin (2008): "Valuing school quality, better transport, and lower crime: evidence from house prices," *Oxford Review of Economic Policy*, 24, 99–119.

Glaeser, E. L. and J. D. Gottlieb (2008): "The Economics of Place-Making Policies," Working Paper 14373, National Bureau of Economic Research.

Glaeser, E. L. and E. F. P. Luttmer (2003): "The Misallocation of Housing Under Rent Control," *American Economic Review*, 93, 1027–1046.

Gouriéroux, C. and A. Laferrère (2006): "Managing hedonic housing price indexes: the French experience," Report, OECD-IMF Workshop.

Greenstone, M. and J. Gallagher (2008): "Does Hazardous Waste Matter? Evidence from the Housing Market and the Superfund Program," *The Quarterly Journal of Economics*, 123, 951–1003.

Hartley, D. A. (2008): "The Effects of High Concentration Public Housing on Crime, Construction, and Home Prices: Evidence from demolitions in Chicago," Working paper, Berkeley.

Inspection Générale des Finances and Conseil Général des Ponts et Chaussées (2002): "Rapport sur le Financement du Logement Social," Report, IGF-CGPC.

Kling, J. R., J. B. Liebman, and L. F. Katz (2007): "Experimental Analysis of Neighborhood Effects," *Econometrica*, 75, 83–119.

Laferrère, A. and D. le Blanc (2006): *Housing Policy: Low Income Households in France*, Arnott, Richard and McMillen, Daniel, 159–178, The Blackwell Companion to Urban Economics.

Linden, L. and J. E. Rockoff (2008): "Estimates of the Impact of Crime Risk on Property Values from Megan's Laws," *American Economic Review*, 98, 1103–27.

OECD (2008): "Report on tax fraud and money laundering vulnerabilities involving the real estate sector," Working paper, OECD.

Oreopoulos, P. (2003): "The Long-Run Consequences of Living in a Poor Neighborhood," *Quarterly Journal of Economics*, 118, 1533–1575.

——— (2008): "Neighbourhood Effects in Canada: A Critique," *Canadian Public Policy*, 34, 237–258.

Paris, R. (2006): "Petites misères de la production du logement social," *Etudes foncières*, 119, 12–16.

Préfecture de Paris (2004): "La production de logements sociaux à Paris de 1988 à 2003," Report, Préfecture de Paris.

Rosen, H. S. (1985): "Housing subsidies: Effects on housing decisions, efficiency, and equity," in *Handbook of Public Economics*, ed. by A. J. Auerbach and M. Feldstein, Elsevier, vol. 1 of *Handbook of Public Economics*, chap. 7, 375–420.

Santiago, A. M., G. C. Galster, and P. Tatian (2001): "Assessing the property value impacts of the dispersed subsidy housing program in Denver," *Journal of Policy Analysis and Management*, 20, 65–88.

Schwartz, A. E., I. G. Ellen, I. Voicu, and M. H. Schill (2006): "The external effects of place-based subsidized housing," *Regional Science and Urban Economics*, 36, 679–707.

7 Data appendix

7.1 Social housing stock from EPLS surveys

The EPLS data-set distinguishes between several types of social housing subsidies which were available during different time periods. Differences over time are due to two main reforms in 1977 and in 1997. From 1977, new social housing projects are subject to a formal agreement between the State and the *HLM* companies called *conventionnement*. This agreement is a condition to the subsidies. The existing stock created before 1977 has been subject to various agreements in 1979, 1985 and 1995. In exchange for these subsidies, the *HLM* companies agree to have regulated rents and a limited choice of tenants. The agreement holds in most cases over the whole period of the subsidized loans and is tacitly re-approved. The agreement of the dwellings is the main condition for future tenants to be eligible to means tested benefits, *APL*. I have regrouped this different categories into four main groups according to their level of rents:

- Very low income tenants: *PLA-I* and *PLA d'intégration* (10), *PLA social* (12).
- Low income tenants: *PLUS* (13) created in October 1999 to replace the *PLA-LM/PLA-TS/PLAI* (11).
- Middle/low income tenants: *PLS* and *PLS/PPLS/PLA-CFF* (14), *ILM* (53), *ILN* (54).
- Stock before 1977: Other financing sources before 1977 (99), *HBM* (50), "Ordinary" *HLM* or *HLM-O* (52).
- *ANAH* subsidies (18).

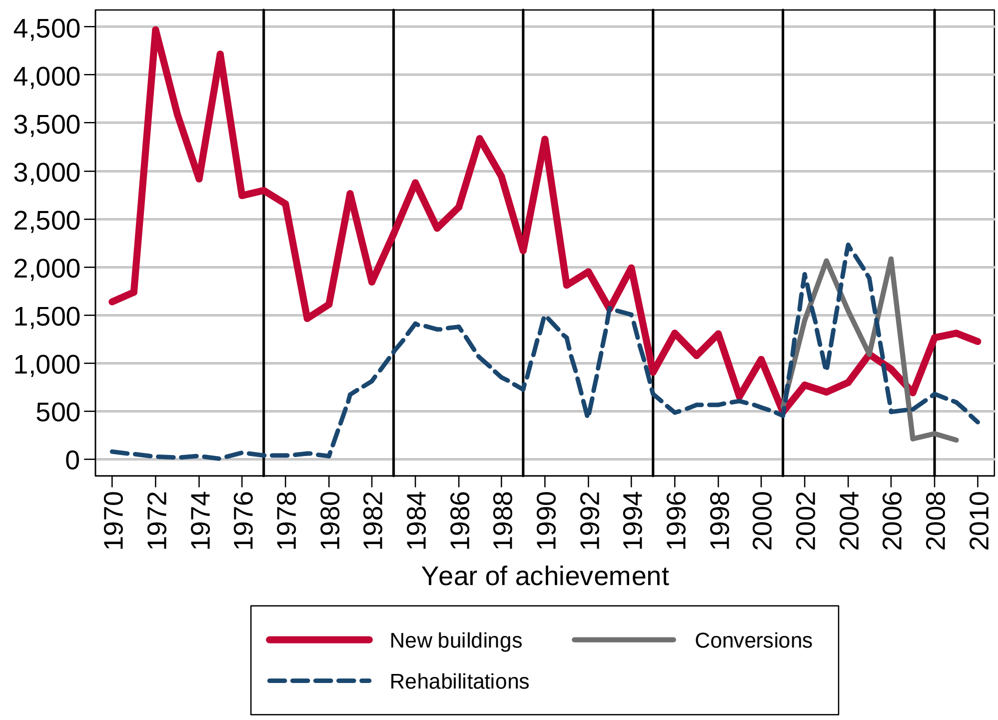
The *EPLS* surveys take also into account various form of subsidies to middle income tenants that are not considered as social housing by the 2000 law. I discard all the projects financed through a *PLI* (16), *PAP-locatif* (15), *PCL* (17) or other financing sources after 1976 (49). None of these subsidies is subject to a *conventionnement*.

In Paris, *HBM* buildings have been renovated from 1984. As substantial improvements were done to the buildings new agreements between the State and the *HLM* companies took place. In this paper, all the *HBM* units are considered entering in the social housing stock when they are built.

7.2 Estimation of the share of social housing at the local level

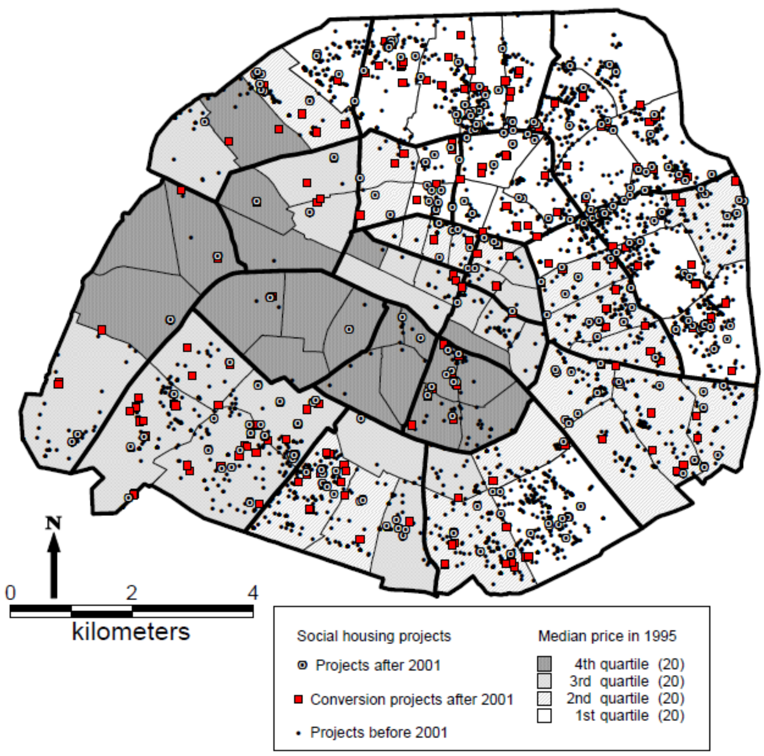
To estimate the number of dwellings in a circle of radius d around sale i, N_d, I use the French 1999 census. For each tract, I know the number N_j of dwellings. Denoting the census tract polygons by (T_j) and the circle around the sale by C_d, I use the area operator, $a()$, to define: $N_d = \sum_j \frac{a(T_j \bigcap C_d)}{a(T_j)} \times N_j$

Figure 1: Yearly social housing inflows by provision methods in Paris 1970-2010



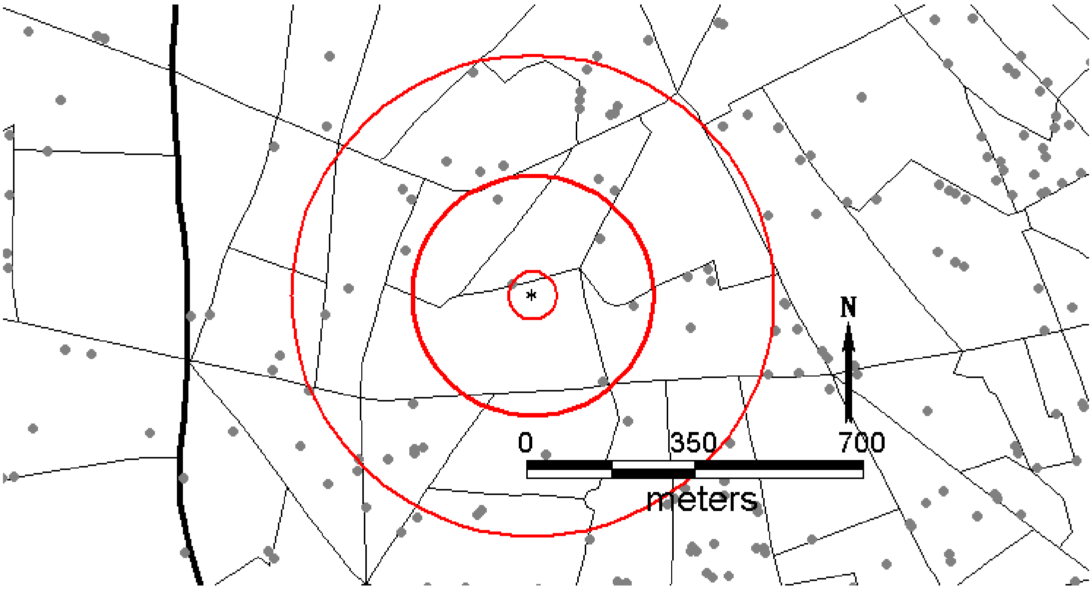
Note: Family dwellings subject to rent regulation: PLA-I, PLUS and PLS. Projects completed or to be completed before 2010.
Source: EPLS surveys 1998 to 2007 and City of Paris/APUR 2007.

Figure 2: Location of the social housing inflows in Paris up to 2010



Note: Family dwellings subject to rent regulation: PLA-I, PLUS and PLS. Thick lines are boundaries between *arrondissements*, small lines are boundaries between *quartiers*. Projects completed or to be completed before 2010.
Source: EPLS surveys 1998 to 2007 and City of Paris/APUR 2007

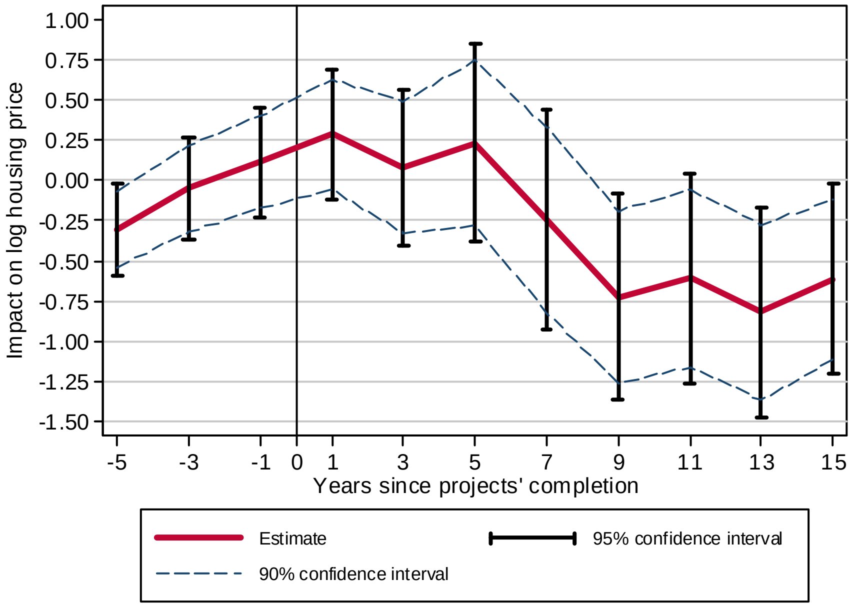
Figure 3: Estimation of the share of social housing in the neighbourhood of a sale



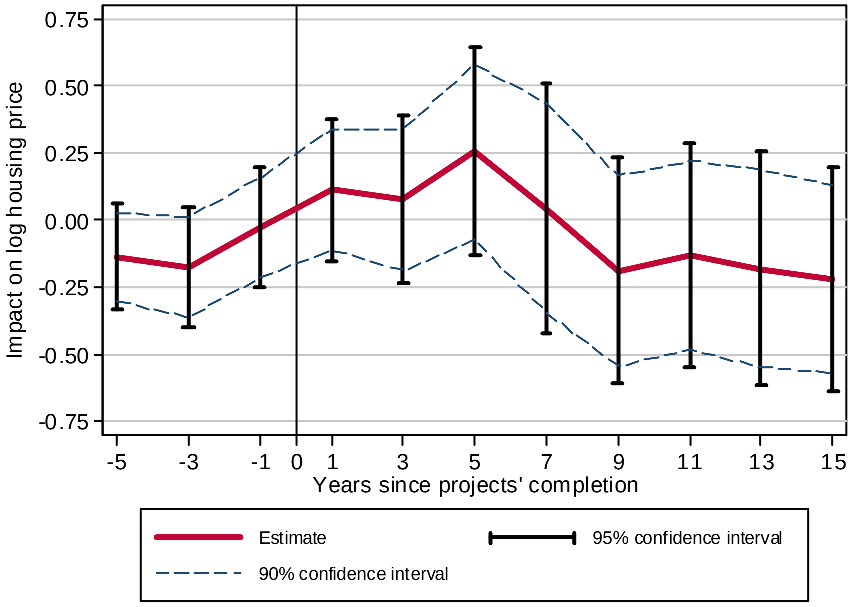
Note: 3 circles (50, 250 and 500 meters), grey dots represent social housing buildings created before 2010. Small lines are IRIS boundaries and the thick line is the boundary between the 13th and 14th *arrondissements*.

Source: EPLS surveys 1998 to 2007 and City of Paris/APUR 2007. Family dwellings subject to rent regulation: PLA-I, PLUS and PLS.

Figure 4: Impact of the social housing share on housing prices over time controlling for building unobservables
4.a. Social housing share at 500 meters

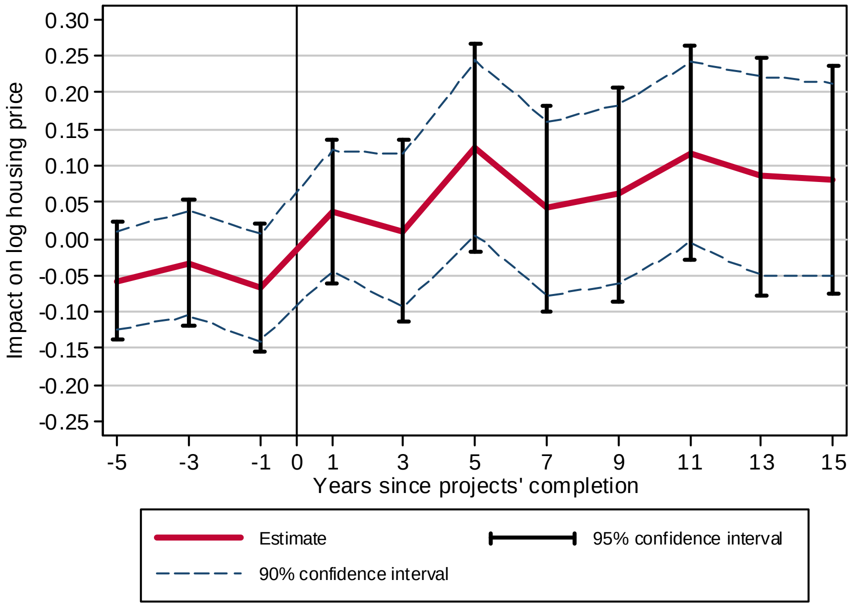


4.b. Social housing share at 250 meters

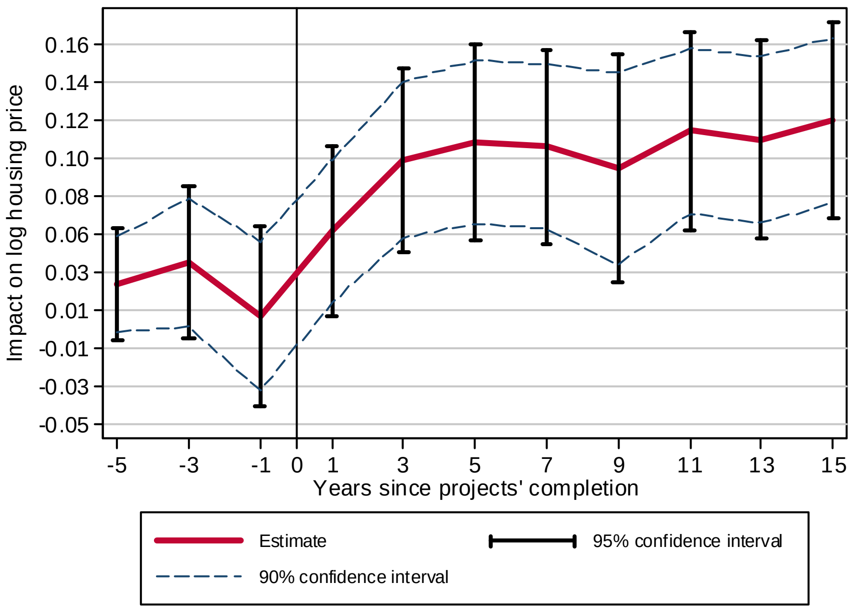


Note: The figure represents the impact of the social housing share on housing prices over time including confidence intervals at the 95% level. The zero value on the horizontal axis defines the year in which the first social tenants moved in.
The sample includes only the sales between private households occurring within building with repeated sales. Sales' controls include: a cubic in size, dummy for unknown size, dummies by numbers of rooms interacted with unknown size, dummies for having a bathroom, a parking, a cellar, a lift interacted with the floor of the flat, dummies by periods of construction and a series of quarterly dummies for each quarter from 1995q1 to 2005q4 and *quartier* linear trends (see appendix table A2).
Source: BIEN dataset, DREIF EPLS surveys 1998-2007, City of Paris records. 1999 census at the IRIS (tract) level.

Figure 4: Impact of the social housing share on housing prices over time controlling for building unobservables
4.c. Social housing share at 150 meters



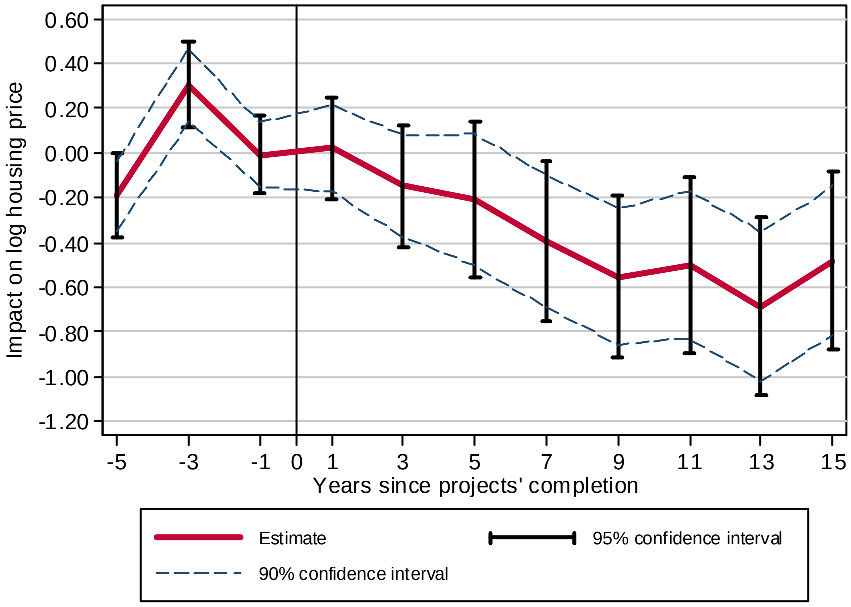
4.d. Social housing share at 50 meters



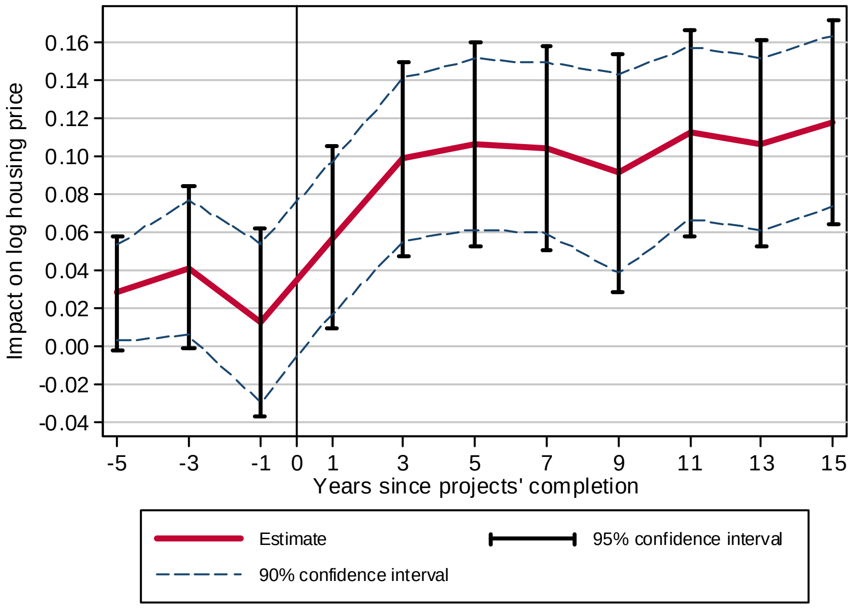
Note: The figure represents the impact of the social housing share on housing prices over time including confidence intervals at the 95% level. The zero value on the horizontal axis defines the year in which the first social tenants moved in.
The sample includes only the sales between private households occurring within building with repeated sales. Sales' controls include: a cubic in size, dummy for unknown size, dummies by numbers of rooms interacted with unknown size, dummies for having a bathroom, a parking, a cellar, a lift interacted with the floor of the flat, dummies by periods of construction and a series of quarterly dummies for each quarter from 1995q1 to 2005q4 and *quartier* linear trends (see appendix table A2).
Source: BIEN dataset, DREIF EPLS surveys 1998-2007, City of Paris records. 1999 census at the IRIS (tract) level.

Figure 5: Impact of the social housing share on housing prices over time and by distance belts

5.a. Controlling for building unobservables (350-500 meter belt)



5.b. Controlling for building unobservables (50 meter circle)



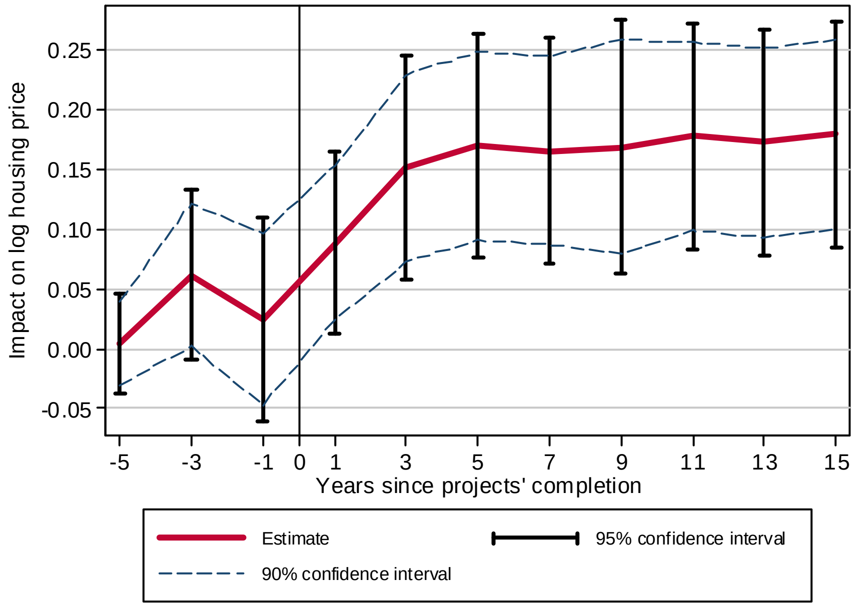
Note: The figure represents the impact of the social housing share on housing prices over time including confidence intervals at the 95% level. The zero value on the horizontal axis defines the year in which the first social tenants moved in.

The sample includes only the sales between private households occurring within building with repeated sales. Sales' controls include: a cubic in size, dummy for unknown size, dummies by numbers of rooms interacted with unknown size, dummies for having a bathroom, a parking, a cellar, a lift interacted with the floor of the flat, dummies by periods of construction and a series of quarterly dummies for each quarter from 1995q1 to 2005q4 and *quartier* linear trends (see appendix table A2).

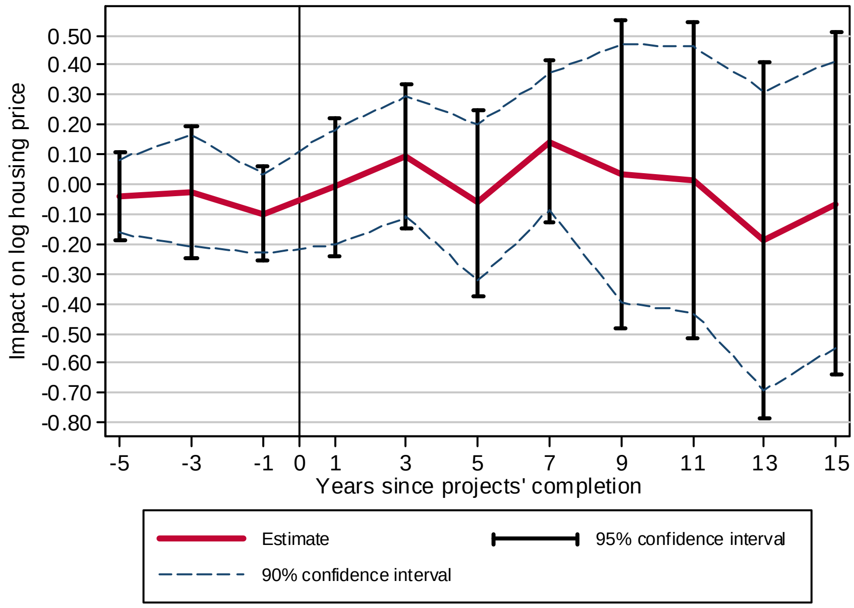
Source: BIEN dataset, DREIF EPLS surveys 1998-2007, City of Paris records. 1999 census at the IRIS (tract) level.

Figure 6: Impact of the social housing share on housing prices over time by neighborhood initial housing prices (50 meters)

6.a. In low-income neighborhoods (1st quartile of housing price in 1995)



6.b. In high-income neighborhoods (4th quartile of housing price in 1995)



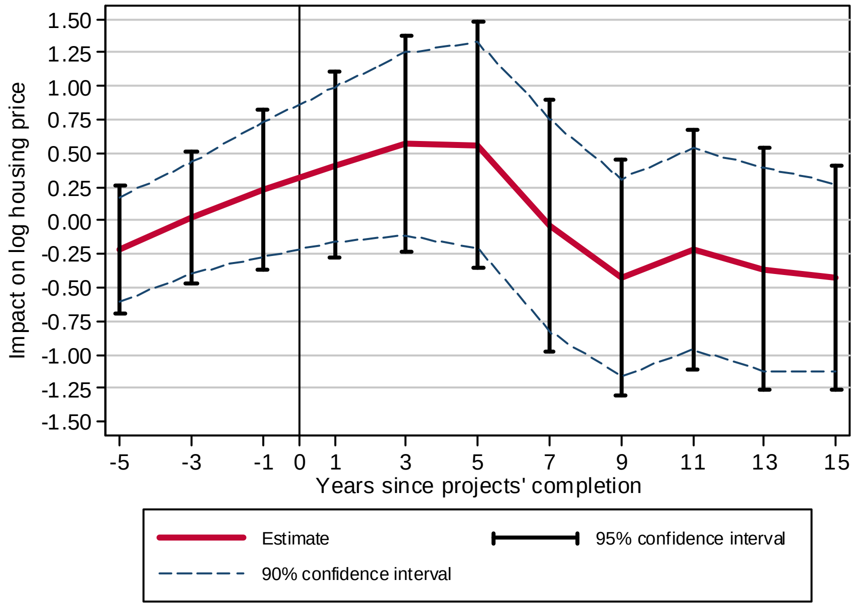
Note: The figure represents the impact of the social housing share on housing prices over time including confidence intervals at the 95% level. The zero value on the horizontal axis defines the year in which the first social tenants moved in.

The sample includes only the sales between private households occurring within building with repeated sales. Sales' controls include: a cubic in size, dummy for unknown size, dummies by numbers of rooms interacted with unknown size, dummies for having a bathroom, a parking, a cellar, a lift interacted with the floor of the flat, dummies by periods of construction and a series of quarterly dummies for each quarter from 1995q1 to 2005q4 and *quartier* linear trends (see appendix table A2).

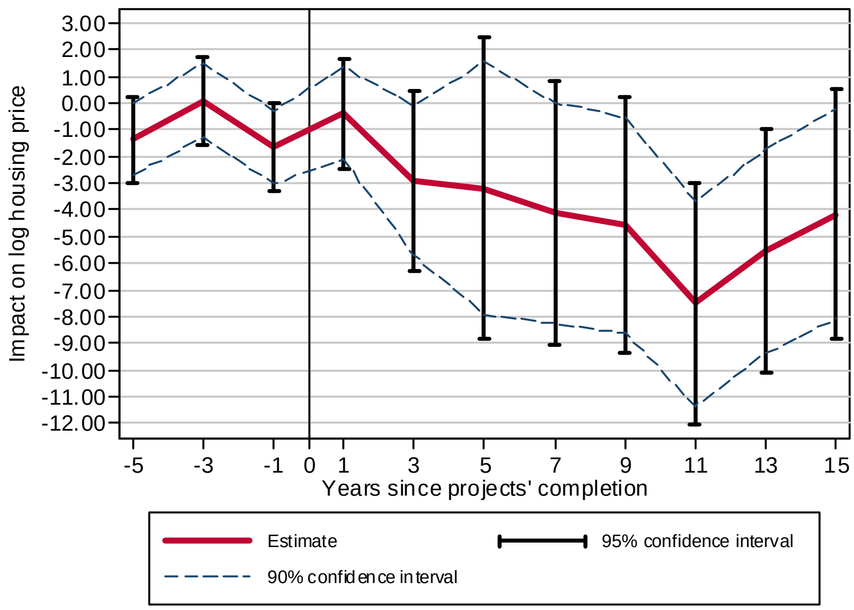
Source: BIEN dataset, DREIF EPLS surveys 1998-2007, City of Paris records. 1999 census at the IRIS (tract) level.

Figure 7: Impact of the social housing share on housing prices over time by neighborhood initial housing prices (500 meters)

7.a. In low-income neighborhoods (1st quartile of housing price in 1995)



7.b. In high-income neighborhoods (4th quartile of housing price in 1995)



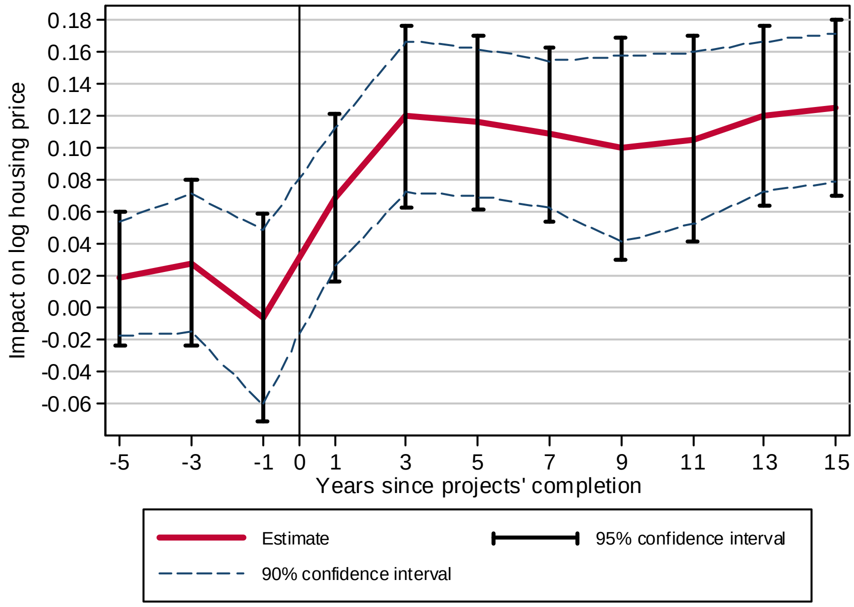
Note: The figure represents the impact of the social housing share on housing prices over time including confidence intervals at the 95% level. The zero value on the horizontal axis defines the year in which the first social tenants moved in.

The sample includes only the sales between private households occurring within building with repeated sales. Sales' controls include: a cubic in size, dummy for unknown size, dummies by numbers of rooms interacted with unknown size, dummies for having a bathroom, a parking, a cellar, a lift interacted with the floor of the flat, dummies by periods of construction and a series of quarterly dummies for each quarter from 1995q1 to 2005q4 and *quartier* linear trends (see appendix table A2).

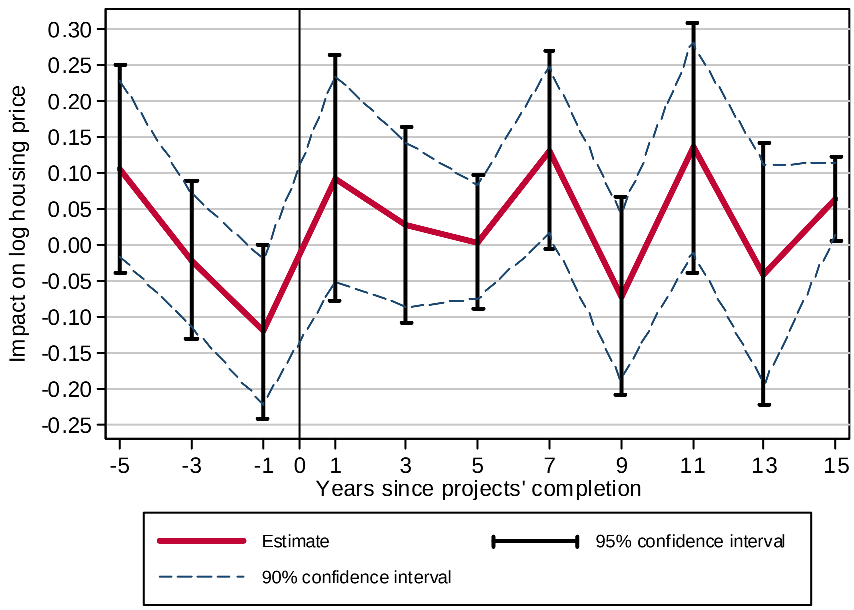
Source: BIEN dataset, DREIF EPLS surveys 1998-2007, City of Paris records. 1999 census at the IRIS (tract) level.

Figure 8: Impact of the social housing share on housing prices over time by neighborhood initial housing prices (50 meters)

8.a. For small flats (one or two rooms)



8.b. For large flats (five rooms or more)

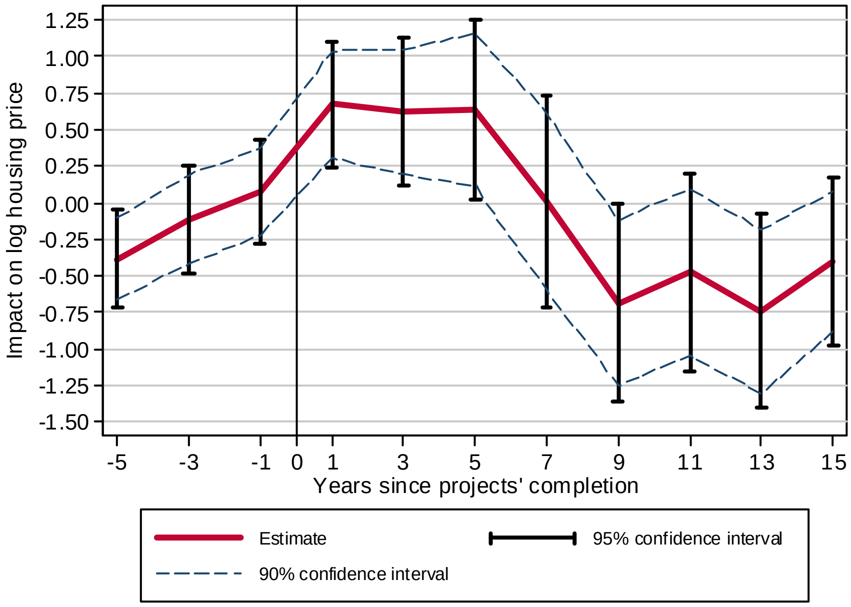


Note: The figure represents the impact of the social housing share on housing prices over time including confidence intervals at the 95% level. The zero value on the horizontal axis defines the year in which the first social tenants moved in.

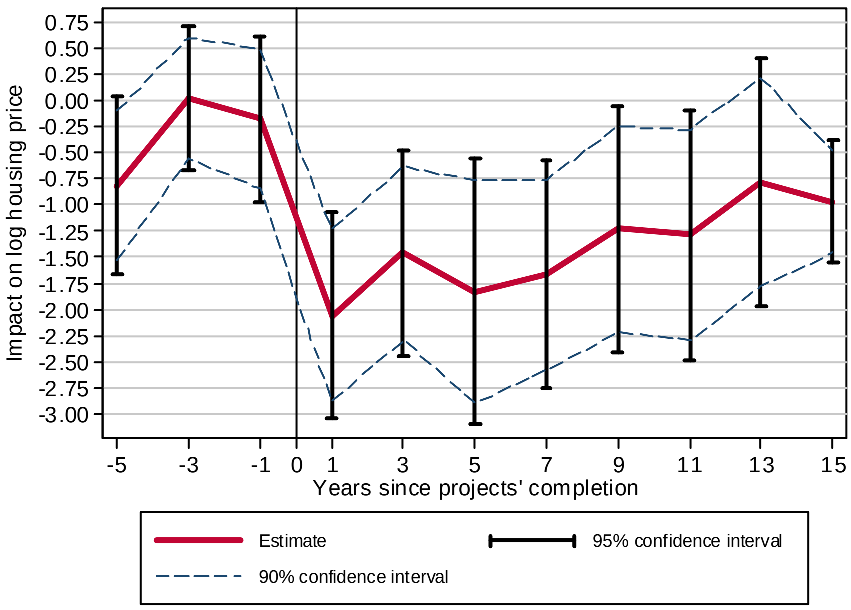
The sample includes only the sales between private households occurring within building with repeated sales. Sales' controls include: a cubic in size, dummy for unknown size, dummies by numbers of rooms interacted with unknown size, dummies for having a bathroom, a parking, a cellar, a lift interacted with the floor of the flat, dummies by periods of construction and a series of quarterly dummies for each quarter from 1995q1 to 2005q4 and *quartier* linear trends (see appendix table A2).

Source: BIEN dataset, DREIF EPLS surveys 1998-2007, City of Paris records. 1999 census at the IRIS (tract) level.

Figure 9: Impact of the social housing share on housing prices over time by neighborhood initial housing prices (500 meters)
9.a. For small flats (one or two rooms)



9.b. For large flats (five rooms or more)



Note: The figure represents the impact of the social housing share on housing prices over time including confidence intervals at the 95% level. The zero value on the horizontal axis defines the year in which the first social tenants moved in.
The sample includes only the sales between private households occurring within building with repeated sales. Sales' controls include: a cubic in size, dummy for unknown size, dummies by numbers of rooms interacted with unknown size, dummies for having a bathroom, a parking, a cellar, a lift interacted with the floor of the flat, dummies by periods of construction and a series of quarterly dummies for each quarter from 1995q1 to 2005q4 and *quartier* linear trends (see appendix table A2).
Source: BIEN dataset, DREIF EPLS surveys 1998-2007, City of Paris records. 1999 census at the IRIS (tract) level.

Table 1: Public and Private dwellings and tenants in Paris in 2002

	Social tenants		New Social tenants (1)		Private tenants		Home owners	
Panel A. Dwelling's characteristics	**Mean**	**S.d.**	**Mean**	**S.d.**	**Mean**	**S.d.**	**Mean**	**S.d.**
Flat size (in m2)	61.80	23.79	58.48	23.41	49.04	32.35	71.19	37.86
Number of rooms	2.90	1.22	2.73	1.20	2.27	1.30	3.22	1.60
Number of dwellings in the building	66.51	81.73	52.25	50.04	32.05	61.35	53.99	113.79
Built before 1914	0.02	0.13	0.02	0.13	0.56	0.50	0.53	0.50
Between 1914 and 49	0.46	0.50	0.51	0.50	0.23	0.42	0.19	0.40
Between 1949 and 81	0.33	0.47	0.15	0.36	0.14	0.35	0.23	0.42
Between 1982 and 90	0.10	0.30	0.12	0.32	0.02	0.15	0.01	0.12
After 1991	0.09	0.29	0.20	0.40	0.05	0.21	0.03	0.18
Monthly rent (euros per m2)	6.17	2.37	6.84	2.48	13.88	6.26		
Years of tenancy/ownership	14.28	12.18	2.24	1.13	9.00	12.65	16.82	15.21
Panel B. Household's characteristics (2)								
Age	51.81	17.28	39.59	12.52	40.94	16.40	57.05	16.75
Foreign born	0.28	0.45	0.36	0.48	0.27	0.45	0.18	0.38
Couple without children	0.18	0.38	0.12	0.33	0.18	0.38	0.28	0.45
Couple with children	0.21	0.41	0.35	0.48	0.14	0.35	0.16	0.37
Single parents	0.15	0.35	0.19	0.39	0.06	0.23	0.03	0.18
Number of children	0.71	1.21	0.91	1.18	0.35	0.81	0.34	0.79
Without High School dipl.	0.53	0.50	0.48	0.50	0.27	0.44	0.25	0.43
Unemployed (if 18/55 yo)	0.04	0.19	0.07	0.25	0.02	0.15	0.02	0.14
Inactive (if 18/55 yo)	0.09	0.28	0.10	0.30	0.07	0.25	0.08	0.27
Income (euros by Eurostat UC)	16731	8768	15767	8591	24240	20173	32666	23161
Panel C. Building's maintenance and safety								
Flood damage last year (flat)	0.19	0.40	0.15	0.35	0.24	0.43	0.22	0.42
Degradation of common space (building)	0.38	0.49	0.26	0.44	0.18	0.38	0.21	0.41
Flat's robbery (or attempt of)	0.22	0.41	0.09	0.28	0.12	0.32	0.13	0.34
Think that neighborhood is not safe	0.23	0.42	0.14	0.34	0.12	0.33	0.15	0.36

Note: (1) New tenants moved in during the last 4 years. (2) For the head of the household. All statistics are weighted using the households' survey weights.
Source: French Housing Survey (ENL) in 2002, Paris.

Table 2: Summary statistics. Features of sales and social housing shares in 1995 and 2005 by selected samples

Sample:	All buyers and sellers		Buyers and sellers are private households		Buyers and sellers are private households	
	All sales		All sales		Repeated sales Within building	
	(1)		(2)		(3)	
Sold in year:	1995	2005	1995	2005	1995	2005
	Mean (s.d.)	Mean (s.d.)	Mean (s.d.)	Mean (s.d.)	Mean (s.d.)	Mean (s.d.)
Panel A. Individual Flat characteristics						
Price (euros 2005)	153702	303099	142917	279375	140389	270321
	(168283)	(301588)	(142331)	(241548)	(133931)	(228837)
Log price	11.6	12.33	11.56	12.29	11.56	12.27
	(0.8)	(0.74)	(0.75)	(0.69)	(0.74)	(0.68)
Price per m2 (euros 2005)	2573.9	5241.3	2520.2	5207.5	2516.4	5165.0
	(1043)	(1504.5)	(859.4)	(1340.9)	(844)	(1308.8)
Flat size (in m2)	52.92	54.18	50.95	51.34	50.67	50.22
	(34.52)	(39.09)	(32.06)	(34.27)	(31.20)	(32.77)
Missing size	0.48	0.09	0.45	0.08	0.46	0.09
Previous ownership (years)	9.62	9.74	10.61	10.43	10.62	10.44
	(9.10)	(9.70)	(8.80)	(9.45)	(8.79)	(9.45)
Number of rooms						
One	0.23	0.24	0.24	0.24	0.24	0.24
Two	0.35	0.34	0.36	0.36	0.37	0.36
Three	0.21	0.21	0.21	0.21	0.21	0.22
Four or more	0.17	0.19	0.16	0.18	0.16	0.17
Unknown	0.03	0.03	0.02	0.02	0.02	0.02
Building age						
Before 1914	0.50	0.42	0.53	0.43	0.54	0.46
Between 1914 and 92	0.40	0.46	0.42	0.48	0.42	0.47
After 1992	0.04	0.04	0.00	0.02	0.00	0.01
Unknown	0.05	0.09	0.05	0.07	0.04	0.05
Having at least 1 bathroom	0.77	0.88	0.77	0.88	0.77	0.88
# bathrooms unknown	0.01	0.10	0.01	0.09	0.01	0.09
Having at least 1 parking lot	0.14	0.15	0.11	0.13	0.11	0.14
# parking lots unknown	0.10	0.01	0.10	0.01	0.10	0.01
Panel B. Share of social housing at the time of the sale (by vicinity, circles)						
Within 500 meters	0.10	0.12	0.10	0.13	0.10	0.13
	(0.10)	(0.11)	(0.10)	(0.11)	(0.10)	(0.12)
Within 350 meters	0.09	0.12	0.09	0.12	0.09	0.12
	(0.11)	(0.13)	(0.11)	(0.13)	(0.11)	(0.13)
Within 250 meters	0.09	0.11	0.09	0.12	0.09	0.12
	(0.13)	(0.14)	(0.13)	(0.14)	(0.13)	(0.14)
Within 150 meters	0.08	0.10	0.08	0.11	0.08	0.11
	(0.18)	(0.17)	(0.19)	(0.17)	(0.19)	(0.18)
Within 50 meters	0.07	0.09	0.07	0.09	0.07	0.09
	(0.46)	(0.37)	(0.51)	(0.38)	(0.53)	(0.35)
Share of social housing	0.08	0.10	0.08	0.10	0.08	0.11
within the same census tract	(0.13)	(0.16)	(0.13)	(0.16)	(0.13)	(0.16)
# observations	18,437	33,546	12,435	23,686	11,408	20,426

Note: The sample is restricted to the sales between private households for the sets of columns (1) and (2). Source: BIEN dataset, DREIF EPLS surveys 1998-2007, City of Paris records. 1999 census at the IRIS (tract) level.

Table 3: Cross sectional estimates of the effects of social housing on housing prices

	Dependent variable: ln(price in 2005 euros)				
	(1)	(2)	(3)	(4)	(5)
Vicinity of the sales, within:	**500 meters**	**250 meters**	**150 meters**	**50 meters**	**Census tract**
Panel A. Years 1995 to 2005 without flat's controls					
Share of social housing	-1.404***	-0.883***	-0.474***	-0.066***	-0.667***
	(0.101)	(0.081)	(0.078)	(0.024)	(0.069)
Variation in the last 10 years	-7.440***	-2.883***	-1.075***	-0.113**	-1.574***
	(0.505)	(0.359)	(0.297)	(0.045)	(0.240)
Variation in the next 5 years	-7.092***	-2.282***	-1.105***	-0.263***	-0.922**
	(0.742)	(0.435)	(0.309)	(0.070)	(0.375)
Year times quarter dummies	Yes	Yes	Yes	Yes	Yes
Flat's controls	No	No	No	No	No
Panel B. Years 1995 to 2005 with flat's controls					
Share of social housing	-1.152***	-0.735***	-0.376***	-0.051***	-0.557***
	(0.058)	(0.047)	(0.053)	(0.019)	(0.038)
Variation in the last 10 years	-5.576***	-2.190***	-0.806***	-0.076**	-1.165***
	(0.276)	(0.224)	(0.198)	(0.031)	(0.129)
Variation in the next 5 years	-5.168***	-1.959***	-0.894***	-0.143***	-0.887***
	(0.431)	(0.255)	(0.166)	(0.034)	(0.213)
Year times quarter dummies	Yes	Yes	Yes	Yes	Yes
Flat's controls	Yes	Yes	Yes	Yes	Yes
# observations	208,918	208,918	208,918	208,918	208,918
# clusters	902	902	902	902	902

Note: Each cell is from a different OLS regression. * significant at the 10% level, ** at 5%, *** at 1%. Standard errors are clustered by census tract (IRIS). In panel B, a basic set of flat's and sales' controls is included in all the regressions. Sales' controls include: a cubic in size, dummy for unknown size, dummies by numbers of rooms interacted with unknown size, dummies for having a bathroom, a parking, a cellar, a lift interacted with the floor of the flat, dummies by periods of construction (see appendix table A2). The variation in the last ten years of this measure corresponds to the change between 1985 and 1995 for year 1995. The variation in the next five years of this measure corresponds to the change between 1995 and 2000 for year 1995.
Source: BIEN dataset, DREIF EPLS surveys 1998-2007, City of Paris records. 1999 census at the IRIS (tract) level. The sample includes only the sales between private households occurring within building with repeated sales.

Table 4. Estimates of the effects of social housing on housing prices with alternative geographical controls

	Dependent variable: ln (price in euros 2005)											
Vicinity of the sales, within:	**500 meters**			**250 meters**			**150 meters**			**50 meters**		
Panel A. Estimates without control for different price trends around the sales												
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**
Share of social housing	-0.603***	-0.276***	0.301*	-0.307***	-0.113***	0.107	-0.132***	-0.046***	0.088	-0.016***	-0.003	0.064***
	(0.044)	(0.046)	(0.177)	(0.027)	(0.018)	(0.099)	(0.019)	(0.010)	(0.057)	(0.005)	(0.002)	(0.018)
R-squared	0.863	0.871	0.911	0.862	0.871	0.911	0.861	0.871	0.911	0.860	0.871	0.911
Fixed effects	Quartier	Tract	Building	Quartier	Tract	Building	Quartier	Tract	Building	Quartier	Tract	Building
Quartiers trends	No	No	No	No	No	No	No	No	No	No	No	No
Sales controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Panel B. Estimates controlling for different price trends around the sales												
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**
Share of social housing	-0.608***	-0.304***	0.157	-0.308***	-0.116***	0.097	-0.132***	-0.047***	0.081**	-0.016***	-0.003	0.058***
	(0.044)	(0.045)	(0.139)	(0.027)	(0.018)	(0.071)	(0.019)	(0.010)	(0.041)	(0.005)	(0.002)	(0.016)
R-squared	0.864	0.872	0.912	0.863	0.872	0.912	0.862	0.872	0.912	0.862	0.872	0.912
Fixed effects	Quartier	Tract	Building	Quartier	Tract	Building	Quartier	Tract	Building	Quartier	Tract	Building
Quartiers trends	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sales controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# observations	208,918	208,918	208,918	208,918	208,918	208,918	208,918	208,918	208,918	208,918	208,918	208,918
# clusters	902	902	902	902	902	902	902	902	902	902	902	902

Note: * significant at the 10% level, ** at 5%, *** at 1%. Standard errors are clustered at the census tract level. The sample includes only the sales between private households within buildings with repeated sales. Sales' controls include: a cubic in size, dummy for unknown size, dummies by numbers of rooms interacted with unknown size, dummies for having a bathroom, a parking, a cellar, a lift interacted with the floor of the flat, dummies by periods of construction and a series of quarterly dummies for each quarter from 1995q1 to 2005q4 (see appendix table A2).
Source: BIEN dataset, DREIF EPLS surveys 1998-2007, City of Paris records. 1999 census at the IRIS (tract) level.

Table 5. Estimates of the effects of social housing on housing prices by distance to the sales

	Dependent variable: ln (price in euros 2005)					
	Without control for different price trends around the sales			Controlling for different price trends around the sales		
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Share of social housing within:						
Ring 350 to 500m	-0.199***	-0.081***	0.144	-0.202***	-0.094***	0.005
	(0.024)	(0.024)	(0.122)	(0.024)	(0.023)	(0.100)
Ring 250 to 350m	-0.137***	-0.080***	0.098	-0.138***	-0.087***	0.069
	(0.017)	(0.016)	(0.064)	(0.017)	(0.016)	(0.055)
Ring 150 to 250m	-0.156***	-0.086***	0.015	-0.157***	-0.091***	0.025
	(0.017)	(0.013)	(0.061)	(0.017)	(0.013)	(0.049)
Ring 50 to 150m	-0.080***	-0.055***	0.037	-0.080***	-0.057***	0.040
	(0.012)	(0.009)	(0.045)	(0.012)	(0.009)	(0.034)
Circle of 50m	-0.010***	-0.008***	0.062***	-0.010***	-0.008***	0.056***
	(0.003)	(0.002)	(0.017)	(0.003)	(0.002)	(0.016)
R-squared	0.863	0.871	0.911	0.864	0.872	0.912
Fixed effects	Quartier	Tract	Building	Quartier	Tract	Building
Quartiers trends	No	No	No	Yes	Yes	Yes
Sales controls	Yes	Yes	Yes	Yes	Yes	Yes
# observations	208,918	208,918	208,918	208,918	208,918	208,918
# clusters	902	902	902	902	902	902

Note: * significant at the 10% level, ** at 5%, *** at 1%. Standard errors are clustered at the census tract level. The sample includes only the sales between private households within buildings with repeated sales. Sales' controls include: a cubic in size, dummy for unknown size, dummies by numbers of rooms interacted with unknown size, dummies for having a bathroom, a parking, a cellar, a lift interacted with the floor of the flat, dummies by periods of construction and a series of quarterly dummies for each quarter from 1995q1 to 2005q4 (see appendix table A2).
Source: BIEN dataset, DREIF EPLS surveys 1998-2007, City of Paris records. 1999 census at the IRIS (tract) level.

Table 6. Estimate of the effects of social housing on the probability to sell a flat to a private buyer and the number of transactions

Panel A. Estimation	**Linear Probability Model**			
Dependent variable	**1 if sold to a private household / 0 otherwise**			
Sample	**All buildings**		**Buildings built before 1992**	
	(1)	(2)	(3)	(4)
Vicinity	500m	50m	500m	50m
Share of social housing	-0.066	0.006	-0.104	0.002
	(0.110)	(0.008)	(0.114)	(0.012)
R-squared	0.272	0.272	0.253	0.253
# observations	310,184	310,182	273,757	273,757
# Buildings	66,023	66,023	54,949	54,949
# clusters	924	924	903	903
Fixed effects	building	building	building	building
Quartier trends	Yes	Yes	Yes	Yes
Sales controls	Yes	Yes	Yes	Yes
Panel B. Estimation	**Linear Count data Model**			
Dependent variable	**Number of sales in the building / 0 if no sale**			
Sample	**All buildings**		**Buildings built before 1992**	
	(1)	(2)	(3)	(4)
Vicinity	500m	50m	500m	50m
Share of social housing	-0.290	-0.016	-0.258	-0.015
	(0.259)	(0.017)	(0.280)	(0.019)
R-squared	0.396	0.396	0.405	0.405
# observations	732,499	732,499	618,541	618,541
# Buildings	67,325	67,325	56,231	56,231
# clusters	926	926	904	904
Fixed effects	building	building	building	building
Quartier trends	Yes	Yes	Yes	Yes

Note: * significant at the 10% level, ** at 5%, *** at 1%. Standard errors are clustered by census tract (IRIS). The sample includes all the sales in Paris. Sales' controls include: a cubic in size, dummy for unknown size, dummies by numbers of rooms interacted with unknown size, dummies for having a bathroom, a parking, a cellar, a lift interacted with the floor of the flat, dummies by periods of construction (see appendix table A2). Columns (3) and (4) exclude observation from sales occurring in buildings built after 1992 (1,757) and in buildings of unknown age (9,748).
Source: BIEN dataset, DREIF EPLS surveys 1998-2007, City of Paris records. 1999 census at the IRIS (tract) level.

Table 7. Heterogeneity of the effects of social housing on housing prices by neighborhood characteristics (circle of 50 meters)

	Dependent variable: ln (price in euros 2005)			
Panel A. Initial price level in the neighborhood (quartier) in 1995				
	Lowest quartile	**2nd quartile**	**3rd quartile**	**Highest quartile**
Share of social housing	0.091***	0.037	0.034	0.041
within 50 meters	(0.027)	(0.031)	(0.022)	(0.096)
R-squared	0.889	0.898	0.909	0.916
# Observations	77,201	56,714	46,850	27,038
# Clusters	297	239	211	152
Panel B. Initial social housing share in the neighborhood (quartier) in 1995				
	Highest quartile	**3rd quartile**	**2nd quartile**	**Lowest quartile**
Share of social housing	0.073***	0.047**	0.052	0.035
within 50 meters	(0.026)	(0.022)	(0.041)	(0.075)
R-squared	0.900	0.911	0.903	0.916
# Observations	72,781	78,181	32,931	23,910
# Clusters	326	290	135	148
Fixed effects	Building	Building	Building	Building
Quartiers trends	Yes	Yes	Yes	Yes
Sales controls	Yes	Yes	Yes	Yes

Note: * significant at the 10% level, ** at 5%, *** at 1%. Standard errors are clustered at the census tract level. The sample includes only the sales between private households within buildings with repeated sales. Sales' controls include: a cubic in size, dummy for unknown size, dummies by numbers of rooms interacted with unknown size, dummies for having a bathroom, a parking, a cellar, a lift interacted with the floor of the flat, dummies by periods of construction and a series of quarterly dummies for each quarter from 1995q1 to 2005q4 (see appendix table A2).
Source: BIEN dataset, DREIF EPLS surveys 1998-2007, City of Paris records. 1999 census at the IRIS (tract) level.

Table 8. Heterogeneity of the effects of social housing on housing prices by neighborhood characteristics (circle of 500 meters)

	Dependent variable: ln (price in euros 2005)			
Panel A. Initial price level in the neighborhood (quartier) in 1995				
	Lowest quartile	**2nd quartile**	**3rd quartile**	**Highest quartile**
Share of social housing	0.202	0.089	0.000	-0.120
within 500 meters	(0.263)	(0.233)	(0.194)	(0.871)
R-squared	0.889	0.898	0.909	0.916
# Observations	77,201	56,714	46,850	27,038
# Clusters	297	239	211	152
Panel B. Initial social housing share in the neighborhood (quartier) in 1995				
	Highest quartile	**3rd quartile**	**2nd quartile**	**Lowest quartile**
Share of social housing	0.026	-0.030	1.417***	-1.331
within 500 meters	(0.192)	(0.193)	(0.535)	(0.993)
R-squared	0.900	0.911	0.903	0.916
# Observations	72,781	78,181	32,931	23,910
# Clusters	326	290	135	148
Fixed effects	Building	Building	Building	Building
Quartiers trends	Yes	Yes	Yes	Yes
Sales controls	Yes	Yes	Yes	Yes

Note: * significant at the 10% level, ** at 5%, *** at 1%. Standard errors are clustered at the census tract level. The sample includes only the sales between private households within buildings with repeated sales. Sales' controls include: a cubic in size, dummy for unknown size, dummies by numbers of rooms interacted with unknown size, dummies for having a bathroom, a parking, a cellar, a lift interacted with the floor of the flat, dummies by periods of construction and a series of quarterly dummies for each quarter from 1995q1 to 2005q4 (see appendix table A2).
Source: BIEN dataset, DREIF EPLS surveys 1998-2007, City of Paris records. 1999 census at the IRIS (tract) level.

Table 9. Heterogeneity of the effects of social housing on housing prices by flats' characteristics (circles of 500 and 50 meters)

	Dependent variable: ln (price in euros 2005)			
Share of social housing	**within 500 meters**		**within 50 meters**	
Interacted with:	**(1)**	**(2)**	**(3)**	**(4)**
No variable		0.600***		0.082***
		(0.136)		(0.019)
Number of rooms is 1 or 2	0.299**		0.065***	
	(0.136)		(0.016)	
Number of rooms is 3 or 4	-0.022		0.051***	
	(0.140)		(0.016)	
Number of rooms is greater than 4	-0.417***		0.008	
	(0.142)		(0.018)	
Number of rooms		-0.190***		-0.010**
		(0.012)		(0.005)
Number of rooms is unknown	0.362*	-0.245**	0.060	-0.022
	(0.190)	(0.123)	(0.053)	(0.053)
R-squared	0.912	0.912	0.912	0.912
Fixed effects	Building	Building	Building	Building
Quartiers trends	Yes	Yes	Yes	Yes
Sales controls	Yes	Yes	Yes	Yes
# Observations	208,918	208,918	208,918	208,918
# Clusters	902	902	902	902

Note: * significant at the 10% level, ** at 5%, *** at 1%. Standard errors are clustered at the census tract level. The sample includes only the sales between private households within buildings with repeated sales. Sales' controls include: a cubic in size, dummy for unknown size, dummies by numbers of rooms interacted with unknown size, dummies for having a bathroom, a parking, a cellar, a lift interacted with the floor of the flat, dummies by periods of construction and a series of quarterly dummies for each quarter from 1995q1 to 2005q4 (see appendix table A2).
Source: BIEN dataset, DREIF EPLS surveys 1998-2007, City of Paris records. 1999 census at the IRIS (tract) level.

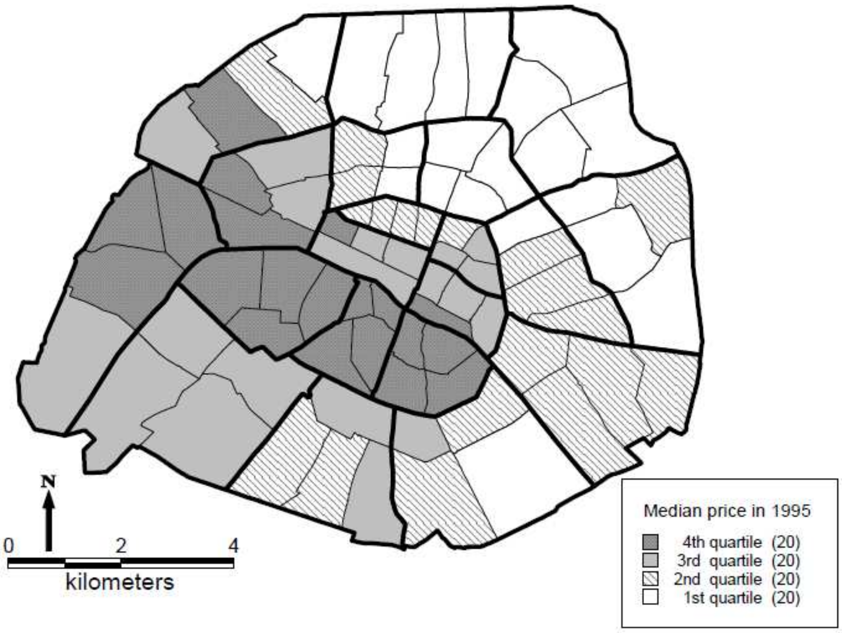
Table 10: Estimates of the effects of the conversion projects on housing prices

	Dependent variable: ln(price in 2005 euros)			
	(1)	**(2)**	**(3)**	**(4)**
Vicinity of the sales, within:	**500 meters**	**250 meters**	**150 meters**	**50 meters**
Panel A. Effect of the conversion projects				
Share of conversion projects	-0.314	-0.055	0.023	0.032
	(0.340)	(0.135)	(0.066)	(0.033)
R-squared	0.924	0.924	0.924	0.924
# observations	116,105	116,105	116,105	116,105
# clusters	892	892	892	892
Panel B. Controlling for the share of other social housing projects				
Share of conversion projects	-0.510	-0.122	-0.062	0.017
	(0.354)	(0.142)	(0.074)	(0.034)
Share of other projects	0.500**	0.186	0.201**	0.055*
	(0.232)	(0.115)	(0.080)	(0.030)
R-squared	0.924	0.924	0.924	0.924
# observations	116,105	116,105	116,105	116,105
# clusters	892	892	892	892
Fixed effects	Building	Building	Building	Building
Quartiers trends	Yes	Yes	Yes	Yes
Sales controls	Yes	Yes	Yes	Yes

Note: * significant at the 10% level, ** at 5%, *** at 1%. Standard errors are clustered by census tract (IRIS). The sample includes only the sales between private households occurring within building with repeated sales. Sales' controls include: a cubic in size, dummy for unknown size, dummies by numbers of rooms interacted with unknown size, dummies for having a bathroom, a parking, a cellar, a lift interacted with the floor of the flat, dummies by periods of construction (see appendix table A2).
Source: BIEN dataset, DREIF EPLS surveys 1998-2007, City of Paris records. 1999 census at the IRIS (tract) level.

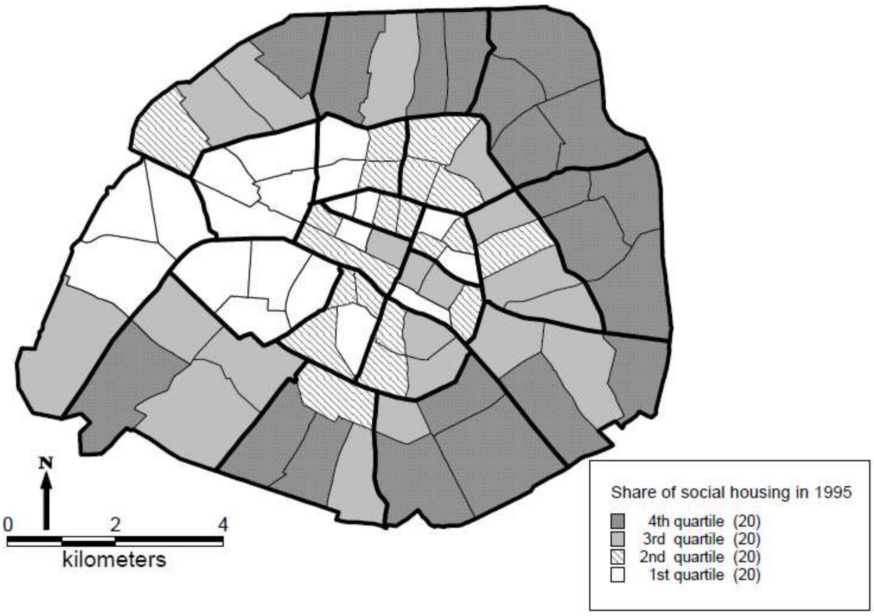
Appendices

Figure A1: Housing prices per square meters in Paris in 1995 by *quartiers*



Note: The sample includes only the sales between private households in 1995 with information about price and surface. Thick lines represent the boundaries of the 20 *arrondissements*.
Source: BIEN dataset.

Figure A2: Social housing share in Paris in 1995 by *quartiers*



Note: Thick lines represent the boundaries of the 20 *arrondissements*.
Source: DREIF EPLS surveys 1998-2007 and 1999 census.

Table A1: Summary statistics. Social housing share for the sample of sales 1995-2005 by circles and belts

Year	1995	2005	1995-2005		1995	2005	1995-2005
	Mean (s.d.)	Mean (s.d.)	Mean (s.d.)		Mean (s.d.)	Mean (s.d.)	Mean (s.d.)
Vicinity		**Within circles**		**Vicinity**		**Within belts**	
500 m	0.10	0.13	0.11	350-500 m	0.10	0.13	0.12
	(0.10)	(0.12)	(0.11)		(0.11)	(0.13)	(0.12)
350 m	0.09	0.12	0.11	250-350 m	0.10	0.13	0.12
	(0.11)	(0.13)	(0.12)		(0.13)	(0.15)	(0.14)
250 m	0.09	0.12	0.10	150-250 m	0.09	0.12	0.11
	(0.13)	(0.14)	(0.13)		(0.14)	(0.16)	(0.15)
150 m	0.08	0.11	0.09	50-150 m	0.08	0.11	0.10
	(0.19)	(0.18)	(0.18)		(0.20)	(0.19)	(0.18)
50 m	0.07	0.09	0.08	50 m	0.07	0.09	0.08
	(0.53)	(0.35)	(0.49)		(0.53)	(0.35)	(0.49)
Within census	0.08	0.11	0.09	Within census	0.08	0.11	0.09
tract	(0.13)	(0.16)	(0.14)	tract	(0.13)	(0.16)	(0.14)
# observations	11,408	20,426	208,918		11,408	20,426	208,918

Note: The sample is restricted to the sales between private households within buildings with repeated sales.
Source: BIEN dataset, DREIF EPLS surveys 1998-2007, City of Paris records. 1999 census at the IRIS (tract) level.

Table A2: Summary statistics. Characteristics of the repeated sales within buildings

Variable	Mean (Std. Dev.)
Price (euros 2005)	173,650.9
	(173,133.1)
Log (price)	11.743
	(0.784)
1 room	0.236
2 rooms	0.367
3 rooms	0.219
4 rooms	0.101
5 rooms or more	0.060
Number of rooms unknown	0.017
1 room and unknown flat size	0.054
2 rooms and unknown flat size	0.084
3 rooms and unknown flat size	0.050
4 rooms and unknown flat size	0.024
5 rooms or more and unknown flat size	0.016
Rooms and flat size unknown	0.007
Flat size (0 if unknown)	38.274
	(35.445)
Flat size squared/100	27.212
	(58.153)
Flat size cubed/10000	27.941
	(147.307)
Flat size unknown	0.235
At least one bathroom	0.825
Number of bathrooms unknown	0.032
At least one parking space	0.126
Number of parking spaces unknown	0.140
Having a lift	0.458
Having a cellar	0.715
Ground floor	0.079
1st floor	0.152
2nd floor	0.161
3rd floor	0.157
4th floor or higher	0.435
Floor unknown	0.016
1st floor and lift	0.059
2nd floor and lift	0.063
3rd floor and lift	0.063
4th floor or higher and lift	0.060
Floor unknown and lift	0.007
Period of construction	
1850 or before	0.053
1850 / 1913	0.454
1914 / 1947	0.157
1948 / 1969	0.136
1970 / 1980	0.123
1981 / 1991	0.018
1992 / 2000	0.008
After 2001	0.001
Unknown	0.050
# observations	208,918

Note: The sample is restricted to the sales between private households within buildings with repeated sales. Source: BIEN dataset.