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The Impact of Housing Subsidies on the Rental Sector: the French example*

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Abstract

Housing subsidies to tenants are a main tool for housing policy in France. They aim to limit the budget share of housing for eligible tenants or to improve their housing conditions for a given budget share. Despite the increasing budget allocated to housing subsidies since the end of the 1970s, the budget share of housing for low-income tenants has kept increasing, in particular in the private rental sector. We assess the impact of housing subsidies on price, quality and quantity in the private rental sector. To do so, we use an instrumental variable method based on a spatial discontinuity in the subsidy scheme. We show that housing subsidies had an inflationist impact. Besides, higher subsidies seem to have almost no effect on housing quality and to have no impact on the number of offered rental dwellings.

Keywords: housing subsidies; tax incidence

JEL classification: H22, R21, R31

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1 Introduction

Housing subsidies are a main tool for housing policy in many developed countries. In France, the budget weight of subsidies to tenants reached 14.5 billions of euros in 2011 (CGDD, 2012), i.e., 0.7% of GDP. These subsidies aim to limit the budget share of housing for tenants and to improve their housing conditions for a given budget share. However, if housing supply is inelastic in the short run, a demand subsidy would lead to a high increase in rents and a small increase in the number and quality of rental dwellings. If so, subsidies would be partly captured by landlords. This inflationist impact of subsidies would be all the more important that homeowners know the terms and conditions of subsidies payment.

Several empirical studies have already highlighted and measured the inflationist impact of housing subsidies targeting housing consumers on rents.[1] In the United States, Susin (2002) finds the inflationist impact of rent vouchers for recipients and also for unsubsidized low-income households. Similarly, Gibbons and Manning (2006) find that a reduction in UK housing benefits decreases rents and that these benefits were massively captured by landlords; in Finland, Kangasharju (2010) also finds an inflationist impact of housing allowances given to low-income households in the private housing sector. In France, Laferrère and Blanc (2004) and Fack (2006) find an inflationist impact of housing subsidies on rents in the 1990s.[2] These two articles use the natural experiment provided by the reform of housing subsidies between 1991 and 1993. This reform aimed at an increasing the number of beneficiaries from housing subsidies. Laferrère and Blanc (2004) find that the significant impact of housing subsidies on rents is only slightly explained by an increase in dwelling quality. Using the Rents and Charges survey (managed by the French National Institute of Statistics and Economics Studies) between 1987 and 1999 as repeated

[1] Subsidies can also target building suppliers. Eriksen and Rosenthal (2010) and Sinai and Waldfogel (2005) show that the impact of subsidized construction of low-income housing on the housing stock in the United States is limited, because this crowds out equivalent housing that otherwise would have been provided by the private sector. See Laferrère and Blanc (2004) for a literature review on the effect of housing allowances on supply in the United States.

[2] See Laferrère and le Blanc (2002) and Fack (2005) for companion papers in French of these two works.

cross-sections, the authors compare the evolution of rents for dwellings occupied by tenants who started to receive (or stopped receiving) subsidies following the reform with the evolution of rents for dwellings occupied by tenants whose status was unmodified. Fack (2006) determines the impact of housing subsidies on rents for French low-income households. The author compares the evolution of rents for households belonging to the first quartile of standard of living and households belonging to the second one. Fack (2006) finds that the reform of housing subsidies between 1991 and 1993 led to an increase of rents that represented 78% of the recently paid subsidies. Her results are established by applying a method of difference-in-differences and using the Housing survey (managed by the French National Institute of Statistics and Economics Studies) between 1973 to 2002.[3]

Our contribution is threefold. First, we extend the results of Laferrère and Blanc (2004) and Fack (2006), as we measure the potential inflationist impact of housing subsidies in France between 1987 and 2012, using the Rents and Charges survey. This quarterly survey is used to compute a rent index, which is included in the calculation of the consumer price index. Around 5,000 households are questioned during five consecutive quarters and answer about their dwelling characteristics, their renting conditions and their amount of rents and charges. These data are supplemented with other variables relative to municipalities.

Second, we offer a different identification strategy based on a fuzzy geographic discontinuity in the calculation of housing subsidies. Subsidies are around 20 or 30 euros per month higher in many agglomerations of more than 100,000 inhabitants. This population threshold has not been strictly used to determine the zones with higher subsidies. Some agglomerations with less than 100,000 inhabitants can receive higher subsidies, but they have specific features: they are more likely low-income areas or have crowded housing markets. Thus, treatment, i.e., the increase of housing subsidies, is endogenous. We use as an instrument a dummy for agglomerations with

[3]See also Fack (2011) for a discussion and a literature review of the impact of housing subsidies on labor supply and housing choices.

more than 100,000 inhabitants and implement an instrumental variable method. We estimate this way a local average treatment effect of housing subsidy on rents in agglomerations close to the discontinuity, that is between 50,000 and 200,000 inhabitants. We break down our estimations across low- and high-income households, which enables us to test the assumption of housing market segmentation, made by Fack (2006).

Third, we quantify the price, quality and quantity effects of housing subsidies. We find that rents are significantly higher in zones with higher housing subsidies, which confirms the results of Laferrère and Blanc (2004) and Fack (2006). The impact of subsidies on rents is heterogenous: it is stronger for the low-income households and for the dwellings with two rooms or less. Besides, higher subsidies seem to have almost no effect on housing quality and to have no impact on the number of offered rental dwellings. The absence of quality or quantity effect indicates that the impact of housing subsidies on rents is inflationist, pointing at a low elasticity of housing supply.

2 Housing subsidies

2.1 The French system

Public spending for housing. In France, public spending for housing aims at easing the burden of housing spending and to improve housing conditions. It targets either housing suppliers or consumers. The share of public spending for housing in the French GDP was stable at 1.6% until the end of the 1990s and has kept increasing since then to reach 2.2% of GDP in 2011, i.e., 45 billions of euros. More than half of this amount (23.0 billions of euros in 2011) was dedicated to building suppliers. Among subsidies to housing consumers (17.6 billions of euros in 2011), housing subsidies to tenants constitute the most important tool, as they represent 14.5 billions of euros in 2011 (CGDD, 2012), of which 6.0 billions of euros for the social rental sector (CGDD, 2012).

The increasing weight of housing subsidies to tenants. Housing subsidies to tenants, which were created in the post-war years, have been massively extended since 1977. After this pivotal year in the French housing policy, public finance was directed in the favor of subsidies to households to the expense of building subsidies, which used to prevail. The budget weight of subsidies to tenants has kept increasing since 1977 to reach 14.5 billions of euros in 2011 (CGDD (2012), see Figure 1).

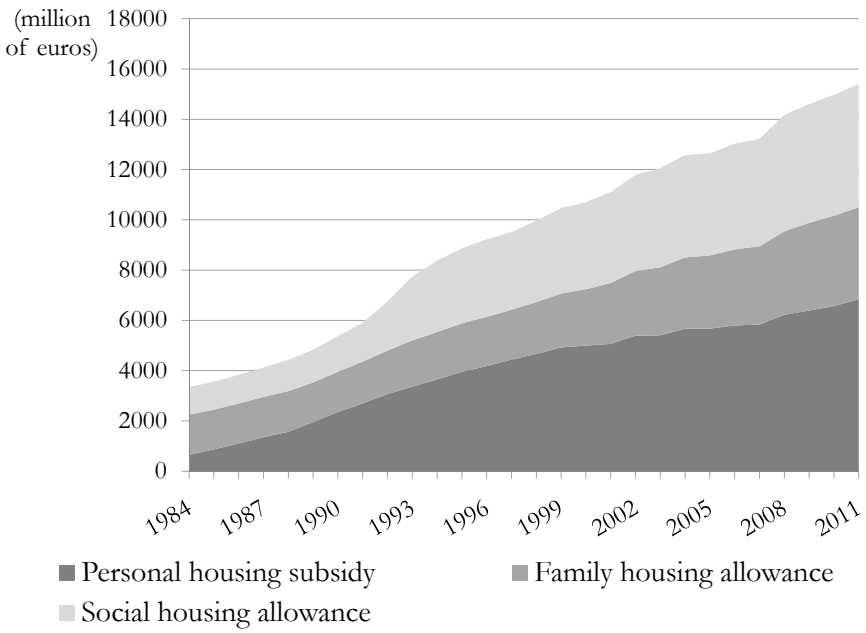

Figure 1: Housing subsidies targeting tenants
Source: CGDD (2012).

The first factor behind this increase is the rise in the average amount (in constant euros) per head since the end of the 1980s (CGDD, 2012). The second and main factor is the growing number of eligible tenants (CGDD (2012), see Figure 2). From the 1990s, the whole set of low-income households, including students, could benefit from these subsidies. This has led to a doubling of the number of beneficiaries compared with the 1980s. Since the 2000s, the number of beneficiaries is almost constant.

Three housing subsidies to tenants. Three main housing subsidies target tenants: *personal housing subsidy* ("*aide personnalisée au logement*", APL), *family*

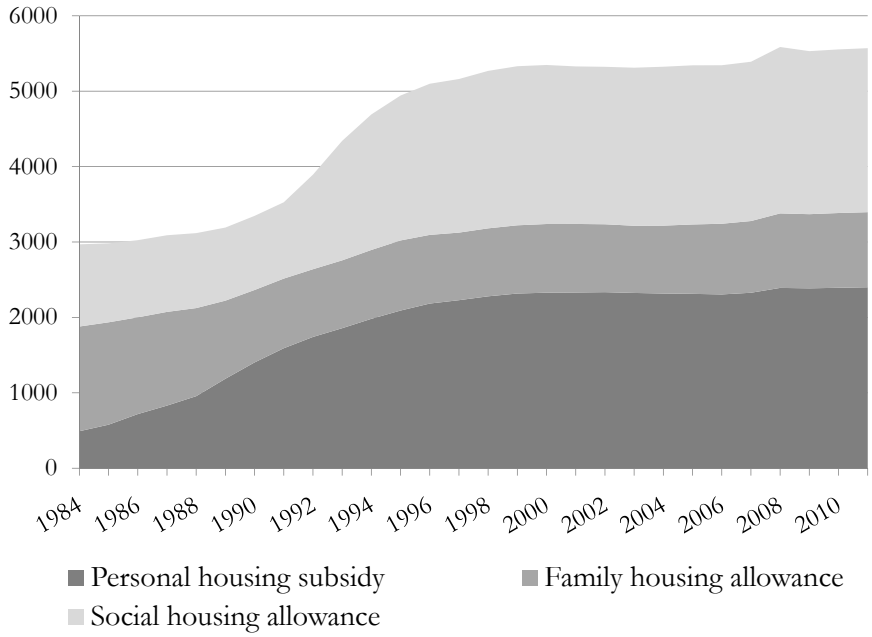

Figure 2: Number of tenants benefiting from housing subsidies
Source: CGDD (2012).

housing allowance ("*allocation de logement familiale*", ALF), and *social housing allowance* ("*allocation de logement sociale*", ALS). These subsidies benefit to the tenants of social or private dwellings, to some homeowners with outstanding loans and also to some hosting hostels' residents. Family housing allowance specifically targets families; social housing allowance is given to students, childless couples, young, old or disabled people. The subsidies can be paid to the tenant or directly to the homeowner.

The calculation of the amount of housing subsidies, which is quite complicated (Ministère de l'Égalité des territoires et du Logement (2012) and Trannoy and Wasmer (2013), Box 12 pp. 51-52), takes into account household characteristics and resources, rent and dwelling's location.

Geographical discontinuity in the amount of subsidies. Even though each subsidy is dedicated to some households or to some dwellings, their method of calculation has been common since 2001. The amount of subsidy depends in particular on the location in one of three zones. Zone I comprises Paris agglomeration and the

new towns in Paris region. Zone II comprises agglomerations of more than 100,000 inhabitants, fringes of Paris region and some agglomerations with a strained real estate situation (in border or coastal areas for example). Zone III corresponds to the rest of the territory (Figure 3). The amount of housing subsidies is higher in zone II than in zone III, all other things being equal. In zone I, the amount is even higher. This zoning was determined in 1977 and has been little modified since then.

However the difference in subsidies between the three zones also depends on the characteristics of the household and of the dwelling. The difference in housing subsidy between zones II and III is around 20 or 30 euros per month (Table 2 in Section 3). For example, in 2012, a single parent with two children, earning the minimum wage and paying a monthly rent of 500 euros, would benefit from a 285 euros subsidy in zone III, a 310 euros subsidy in zone II and a 355 euros subsidy in zone I.

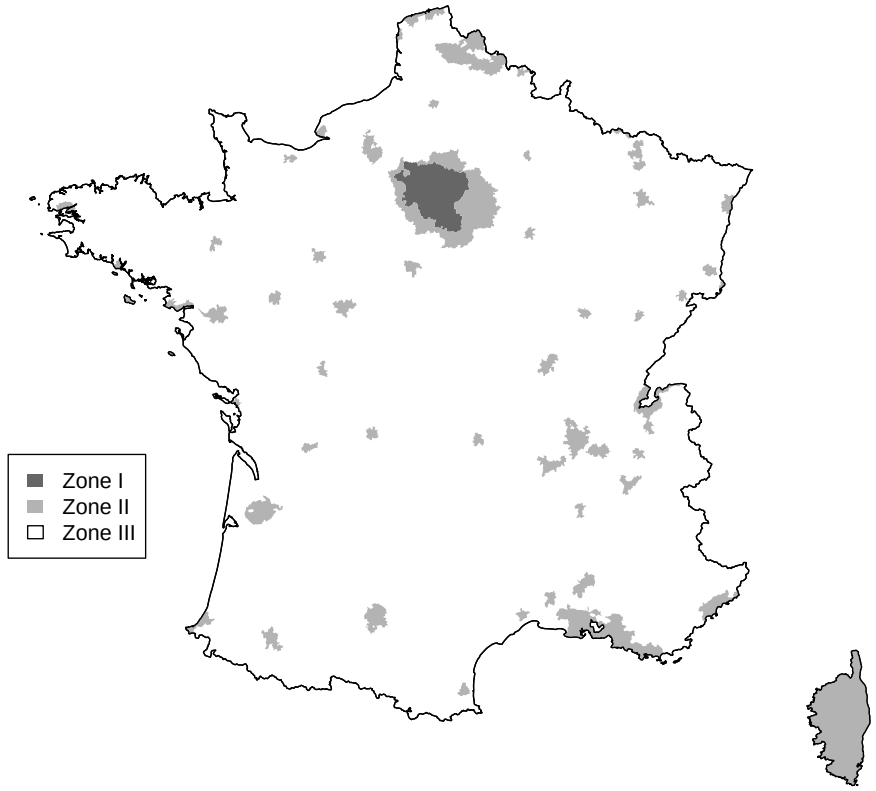

Figure 3: Housing subsidy zones in France

2.2 An inflationist incidence?

Despite the increasing budget allocated to housing subsidies since the mid-1990s, the budget share of housing for low-income tenants has kept increasing, in particular in the private rental sector (Table 1). Fack (2006) already noted a fastest increase of rents paid by low-income households in the 1990s. These concurrent increases of housing subsidies and of the budget share of housing invite to analyze the potential inflationist incidence of housing subsidies.

Indeed, housing market is specific, as supply may be considered as little elastic in the short run.[4] If housing supply is inelastic, a demand subsidy has an inflationist

[4]Vacant housing and new buildings can increase housing supply, respectively in the short and

Table 1: Budget share of housing for households in function of their standard of living and their location

Standard of living	Location	Median budget share (%) in 2010	Budget share evolution (percentage points)	
			1996-2006	2008-2010
All renters	All renters	18.5	0.8	0.1
	Private sector	26.9	3.1	1
	Social sector	20.1	1	-0.3
1st quartile	All renters	23.6	2.8	0.6
	Private sector	33.6	7.6	1.9
	Social sector	20.2	1.8	-1.3
2nd quartile	All renters	21.3	1.6	0.4
	Private sector	29.1	4.6	2.3
	Social sector	23.2	1.5	1.4
3rd quartile	All renters	18.9	0.4	0.1
	Private sector	5.1	1.6	-0.4
	Social sector	n.s.	0.1	n.s.
4th quartile	All renters	11	-1.5	0.1
	Private sector	18.8	-0.2	-1.1
	Social sector	n.s.	-0.2	n.s.

Source: Arnault and Crusson (2012).
Note: some statistics are not provided for the renters of the last two quartiles in the social sector, because they might be too few.

impact: it leads to a high increase in rents and a small increase in the number of rental dwellings and in their quality. As rents increase much more than housing quality, subsidies are partly captured by homeowners. This inflationist impact of subsidies is all the more important that homeowners know the terms and conditions of subsidies payment (and can even sometimes directly receive these subsidies). This inflationist incidence should eventually disappear if housing supply is elastic in the long run. However, housing supply might remain inelastic in the long run, in particular if landowners occupiers restrain new buildings to limit negative externalities due to density in their neighborhood (Glaeser et al., 2005).

long run.

Table 2: Example of housing subsidy amounts depending on location and income

Monthly disposable income	0	500	1000	1500	2000	2500
Monthly subsidy in zone II	425	425	340	196	51	0
Monthly subsidy in zone III	398	398	314	173	31	0
Difference in monthly subsidy	27	27	26	23	20	0

Note: housing subsidy amount for a single-parent family with two children, for a monthly rent of 500 euros, according to the 2012 scheme.
Source: authors' calculations.

3 Evaluation method

3.1 Evaluation strategy

Importance and relevance of the geographic discontinuity. We use a method of instrumental variable that relies on the dependency of the subsidy amount on the dwelling's location: this amount is higher in zone II than in zone III, all other things being equal. To quantify the difference in subsidies between zones II and III, we compute this difference for a household with two adults and two children, given a monthly rent of 500 euros in 2012 (Table 2). This subsidy difference between zones II and III is around 20 or 30 euros per month.

In zone I, housing subsidies are even higher; however, it comprises Paris region which is too particular to be compared with agglomerations of the other zones. On the contrary, we consider that there are very comparable agglomerations in zones II and III that mainly differ by the amount of received subsidies. These comparable agglomerations are the ones of which population is just below or just above the population limit between these two zones, that is 100,000 inhabitants. These agglomerations have a comparable share of housing subsidy recipients, a similar population trend, and comparable shares of private and social housing (Table 3). Besides, the zoning for other housing subsidies, such as landlord subsidies for rental investment, does not match with this housing subsidies zoning (Table 12 in Appendix A.1).

Table 3: Share of housing subsidy recipients, population trend, and shares of private and social housing in zones II and III: average value by municipality

	Zone II	Zone III
Share of housing subsidy recipients$_{2012}$ (*)	62.8%	65.1%
Gross rate of agglomeration pop$_{1982-09}$	8.1%	8.7%
Share of private rental housing$_{1982}$	26.1%	28.5%
Share of private rental housing$_{2009}$	24.2%	26.2%
Share of social rental housing$_{1982}$	18%	21.6%
Share of social rental housing$_{2009}$	18.8%	21.5%

Note: (*) data available only for municipalities with more than 10,000 inhabitants.
Sources: Population census by INSEE in 1982 and 1999, Family Allowance Fund.

Comparing these agglomerations makes it possible to determine the impact of the payment of housing subsidies on the level of rents. A similar method is used by Bono and Trannoy (2012) to estimate the impact of a rental investment subsidy scheme (the *Scellier scheme*) on building land prices. However, Bono and Trannoy (2012) compare the evolution of building land prices for bordering municipalities between which real estate markets are potentially interdependent. When comparing here agglomerations and not municipalities across the border, this dependency effect is likely negligible.

Instrumental variable method. The population limit of 100,000 inhabitants between zones II and III has not been strictly used to determine the outlines of the two zones, as some less populated agglomerations have been included in zone II (Table 4). In this framework, being located on one side or on the other side of the threshold modifies the probability to live in zone II or III (and so to receive or not higher housing subsidies), without fully determining the location in zone II or III. As a consequence, this variable can be used as an instrument for treatment assignment.

The average rent per square meter is always higher in the treatment group (Table 4). In addition, its level does not increase with population in both groups for agglomerations under 200,000 inhabitants, which suggests that there is no population

Table 4: Frequency and average rent in function of the agglomeration population

Agglomeration population in 1975	Number of agglomerations		Rent per square meter	
	untreated (zone III)	treated (zone II)	untreated (zone III)	treated (zone II)
20000-40000	48	3	7.2	8.6
40000-60000	27	7	7.8	8.6
60000-80000	21	3	7.5	8.8
80000-100000	9	1	7.1	9.6
100000-120000	0	9	.	8
120000-140000	0	7	.	8.5
140000-160000	0	4	.	8.9
160000-180000	0	1	.	7.2
180000-200000	0	4	.	9.7
200000-220000	0	6	.	9.7
220000-250000	0	2	.	10.4

Source: Rents and Charges survey by INSEE between 2005 and 2012. Population census 1975.

trend in the rent level.

We use the instrumental variable method in a standard linear hedonic model. Concretely, we regress the logarithm of the rent per square meter R on the treatment T and the characteristics X of the dwelling.[5] X comprises characteristics that are intrinsic to the dwelling (living area, completion year, etc.) and relative to its location (past growth of agglomeration, median fiscal income of the municipality, share of open space in the municipality). We add year fixed effects. As the treatment assignment might depend on the level of rents in the agglomeration and so might be endogenous, we instrument the treatment T with the threshold $\underline{P}$ of 100,000 inhabitants. We use a two stage least squares method to estimate this model.

$$\begin{cases} T &= \eta \underline{P} + \gamma X + \nu \\ R &= \delta T + \beta X + \epsilon \end{cases}$$

[5]Results are robust when regressing the total rent.

The threshold of 100,000 inhabitants is relative to agglomeration size. As in our data observations are dwellings, residuals are clustered by agglomeration to take into account spatial autocorrelation of rents.

The treatment effect estimator δ is computed by using the rents of dwellings located in the agglomerations between 50,000 and 200,000 inhabitants (Figure 4). This window can be considered as wide but reducing it would lead to keep too few agglomerations in the estimations (Table 4).

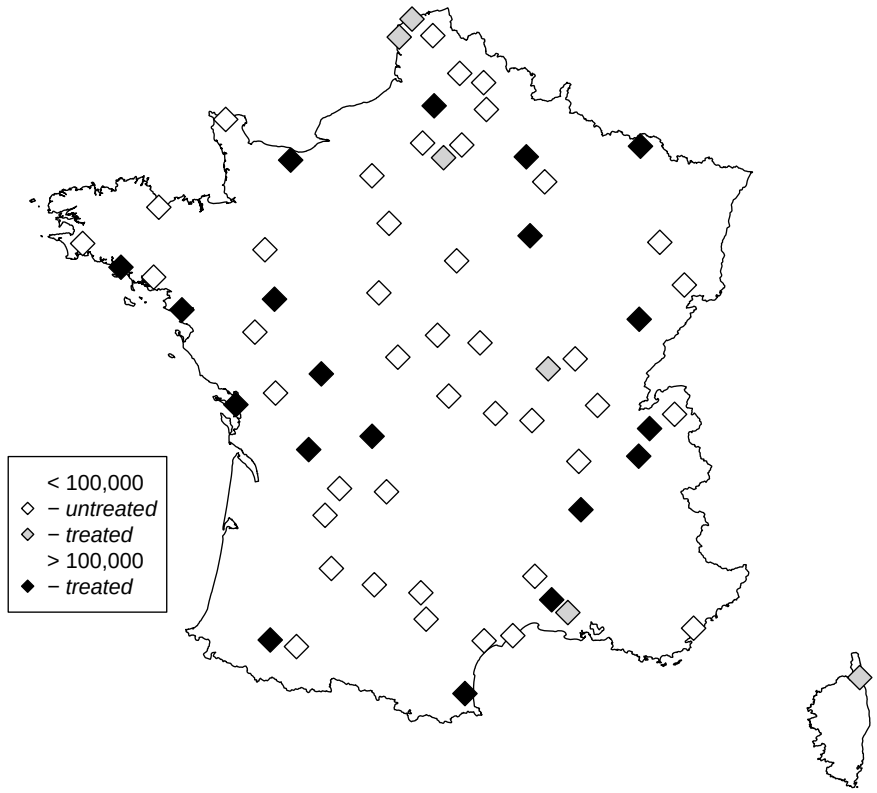

Figure 4: Agglomerations used for estimations

3.2 Sample selection

The simplest way to compute the estimation would be to compare all dwellings located in agglomerations inside our window. This solution is inadequate, because the

treatment is not homogenous within an agglomeration. Indeed, in treated agglomerations, only the central one is classified in zone II and residents benefit from higher housing subsidies; the outskirts are classified in zone III and the subsidies are the same than in untreated agglomerations. Thus, comparing the whole agglomerations would not provide the treatment effect.

To our knowledge, the delineation of targeted areas refers neither to existing administrative nor to statistical zoning. Thus, we observe the exact border of the central part of the agglomeration only for the treatment group. We need to assess what this central zone would have been in the control group to compare similar treated and untreated municipalities and to provide unbiased estimates.

The French National Institute of Statistics and Economics Studies (INSEE) provides a delineation of agglomeration called *urban areas* (*"aires urbaines"*) that are similar to the metropolitan statistical areas in the US. These *urban areas* are divided into a central part and a peripheral part. One can notice that the central part of *urban areas* often coincides with the zone II of housing subsidy, where the treatment is higher. In treated agglomerations, the central part of the *urban areas* correctly predicts the treatment assignment for 96% of dwellings of our sample.[6] Figure 5 provides an example for the Valence agglomeration. This is why we use the central part of the *urban areas* as defined by INSEE in 2010 for the central zone in the control group.[7] All population variables at the agglomeration scale, including the 100,000 inhabitants threshold, are computed according to this zoning. We provide in Section 5 a robustness test that shows that our estimates are robust to a change in the estimation zoning.

[6]In our data, in treated agglomerations, 89% of dwellings are located in both the central treatment zone and the central part of the *urban areas*; 7% of dwellings are located outside the two groups; 3% of dwellings are located in the central part of the *urban areas* but are not treated; 1% are treated but located in the outskirts of the *urban areas*.

[7]In treated agglomerations, we use the central part of the agglomeration as defined by housing policy makers (i.e., the part of the agglomeration where housing subsidies are higher).

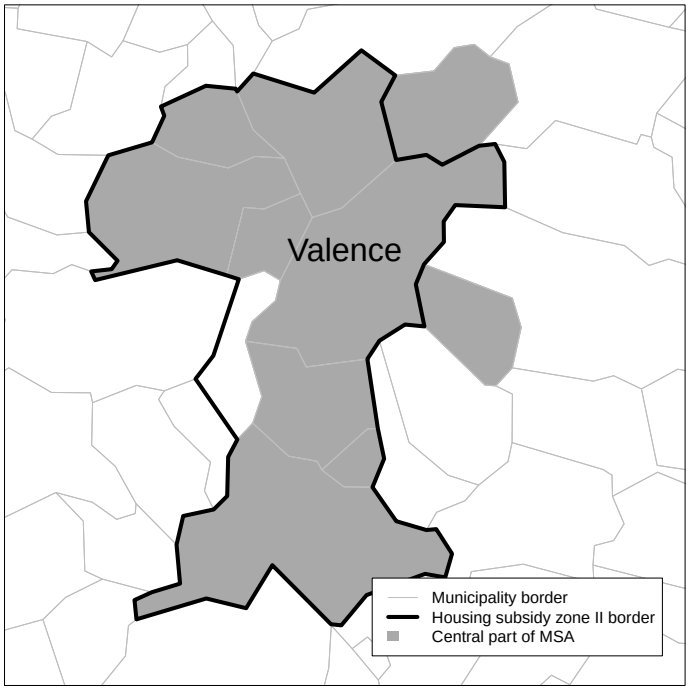

Figure 5: Coincidence of the central part of *urban areas* with the zone II of housing subsidy: the example for Valence agglomeration

Agglomerations in which the housing subsidy zoning was modified between 1977 and 1991 are excluded; they represent 4% of the observations. In our sample, no zoning modification was performed after 1991. Besides, agglomerations in border areas are excluded, because they often belong to a wider international metropolitan area, about which we have no information.[8]

3.3 Housing market segmentation

The rents of dwellings that are not occupied by subsidy recipients can also be affected by the treatment. Indeed, the French private rental sector is quite competitive and the rent could be set without legal constraint at the tenant's arrival, until 2012.[9] Given that housing subsidies increase the willingness to pay of some tenants, this policy might consequently increase the equilibrium rent of all dwellings, including those that are not occupied by subsidy recipients.

[8]For example, Annemasse (Haute-Savoie) is part of the metropolitan area of Geneva.

[9]Before 2012, rent control concerned only the annual update of rent, the years following the occupier's installation.

This impact on untargeted households could concern only some of them. Indeed, housing market might be, at least partially, vertically segmented: low-income households, who are targeted by these subsidies, might live in low-quality dwellings. If housing market is segmented, the impact of housing subsidies on rents or on dwelling quality should be stronger for low-quality dwellings. Our method enables to test the assumption of housing market segmentation, which was required in Fack (2006).

As the Rent and Charges survey provides very limited data on the households and in particular no income variable, we propose a method to estimate the probability of a dwelling to be occupied by a low-income household. In a first stage, we use the 2006 Housing survey and a probit model to compute the probability for a dwelling to be occupied by a low-income household (i.e., belonging to the three first standard of living deciles) given the dwelling characteristics. In a second stage, we use these estimated parameters to compute the probability of a dwelling of the Rent and Charges survey to be inhabited by a low-income household. We break down our estimations across these two types of dwellings. Estimates are reported in Section 5.

4 Data

We use the Rents and Charges survey between 1987 and 2012.[10] Around 5,000 households are questioned during five consecutive quarters and answer about their dwelling characteristics, their renting conditions and their amount of rents and charges.

To measure the dwelling quality, we use the following variables provided by this survey: the living area, the number of rooms, the presence of a bathroom, toilets, a

[10] In France, there is no comprehensive recording of rents (contrary to dwellings sales, which are recorded by solicitors). Except for Paris region, available sources are heterogenous. Harmonization of data collection is ongoing in order to enable some rent control. This comprehensive and homogenous data set will be available only in a few years.

bath, a garden, a balcony, a garage, a safety device (alarms, reinforced doors), and a sound or thermal insulation, and the number of dwellings in the building.[11]

Information about households' characteristics is limited; in particular, the variable indicating whether the household receives or not housing subsidies cannot be reliably used. Thus, it is not possible to precisely identify the beneficiaries of these subsidies.

These data are supplemented with other variables relative to municipalities: the zoning for housing subsidies, the sociodemographic composition of municipalities, the agglomeration population in 1975 and the population trends between 1975 and 2009 (provided by census data), the average fiscal income since 1985, and the location in a border area. Additional control variable like landscape, coastal area, distance to the city center or the features of the housing stock have been tested but happened to be non significant.

5 Results

5.1 Impact of housing subsidy zoning on rents

Housing subsidy zoning has a significant and positive impact on rents in the private sector.[12] Location in zone II, where housing subsidies are higher, significantly increases the level of rents. This holds in a basic ordinary least square (OLS) specification and with an instrumental variable method (IV) (Table 5). As expected, this impact is less important with the IV method, as this design corrects the selection bias that contributes to the impact that is estimated by the OLS. Adding variables that control for the dwelling quality also reduces this impact, suggesting a positive correlation between the location in zone II and the housing quality. However, location in zone II has no significant impact on any specific proxy for the dwelling

[11] The presence of a bathroom and of a bath is a good proxy for decent dwelling when built in the 1980s.

[12] Many characteristics of municipalities have been added as control variables; the regressions here presented include the significant ones only.

quality (Section 5.3).

The impact of housing subsidy zoning on rents is of important magnitude: with the IV method and with control variables, location in zone II increases the rents by 5.3%. Given that the average rent is 475 euros, it means the zoning increases the rent by 25 euros. This inflationist impact holds in the long run (between 2005 and 2012), suggesting that housing supply remains inelastic.

The instrumental variable method relies on a first stage equation, which explains the treatment (being located in zone II for housing subsidies) with respect to the location in an agglomeration of more than 100,000 inhabitants. The threshold of 100,000 inhabitants significantly explains the treatment (Table 13 in Appendix A.2); indeed it is the main predictor for location in zone II for housing subsidies. Besides, the F-test of joint nullity of coefficients in this first step equals 125, which guarantees that the threshold of 100,000 inhabitants is not a weak instrument.

5.2 Treatment heterogeneity

The impact of location in zone II on rents has an heterogenous impact depending on the predicted household standard of living and the dwelling size (Table 6). When restricting the sample to the low-income household dwellings, this impact is significant and higher than the average impact (with an impact of 6.0% instead of 5.3%); when considering the rich, it is lower (4.5%). When restricting the sample to the dwellings with two rooms or less, this impact is significant and higher (5.7%); it is smaller (4.4%) when estimated for the dwellings with three rooms or more.

We also cross the treatment with the characteristics of land use and real estate market of the agglomerations, such as the shares of social housing, vacant units, students, landowners, or the population density. However, these characteristics define a too small sample to enable to identify a significant heterogeneity in the

Table 5: Effect of housing subsidy zoning on the logarithm of the rent per square meter

Zone II for housing subsidies	0.0776**	0.0666***	0.0756**	0.0525***
	(0.0304)	(0.0193)	(0.0319)	(0.0187)
Population density$_{1999}$	0.0000571***	0.0000251***	0.0000575***	0.0000273***
	(0.0000141)	(0.00000919)	(0.0000139)	(0.00000825)
Share of open space$_{2000}$	0.241***	0.208***	0.241***	0.211***
	(0.0672)	(0.0553)	(0.0655)	(0.0553)
Share of rental housing$_{1999}$	0.0823	−0.174*	0.0813	−0.182**
	(0.163)	(0.0916)	(0.164)	(0.0883)
Δ agglomeration pop$_{1975-99}$	0.895***	0.505***	0.896***	0.514***
	(0.124)	(0.0737)	(0.121)	(0.0741)
log(size)		−0.633***		−0.633***
		(0.0274)		(0.0268)
Number of rooms		0.0533***		0.0533***
		(0.0104)		(0.0103)
Length of the tenancy		−0.0131***		−0.0131***
		(0.00119)		(0.00118)
Completion year < 1914		−0.0706***		−0.0693***
		(0.0257)		(0.0258)
Completion year 1915-1948		−0.0901***		−0.0902***
		(0.0241)		(0.0237)
Completion year 1949-1967		−0.106***		−0.104***
		(0.0183)		(0.0188)
Completion year 1968-1990		−0.0475**		−0.0477***
		(0.0182)		(0.0179)
Completion year > 1990		ref.		ref.
Bathroom		0.684***		0.684***
		(0.245)		(0.240)
Bath		0.0372**		0.0371**
		(0.0173)		(0.0171)
Garden		0.0624***		0.0626***
		(0.0173)		(0.0168)
Balcony		0.0385***		0.0387***
		(0.0142)		(0.0140)
Home security device		0.0374***		0.0385***
		(0.0136)		(0.0137)
House		0.0450*		0.0453**
		(0.0227)		(0.0226)
Number of dwellings		−0.000301		−0.000290
		(0.000203)		(0.000200)
Observations	1638	1638	1638	1638
Estimator	OLS	OLS	IV	IV
Year fixed effects	✓	✓	✓	✓
Period	2005-2012	2005-2012	2005-2012	2005-2012
Sample	private sec.	private sec.	private sec.	private sec.
Agglomeration population	50,000-200,000	50,000-200,000	50,000-200,000	50,000-200,000

Notes: standard errors are in parentheses; significance levels: *** 1%, ** 5%, * 10%.
Sources: Rents and Charges survey, Tax Income survey, Population census by INSEE.

treatment effect.

5.3 Almost no significant impact on housing quality or quantity

A demand subsidy should lead not only to an increase in rents but also to an increase in the quality of dwellings or in the number of rental dwellings, unless housing supply is fully inelastic (Subsection 2.2). Results show that location in zone II where housing subsidies are higher has no impact on housing quality, as measured by some intrinsic characteristics of the dwelling (number of housings in the building, number of rooms, presence of a bathroom, and the living area) (Table 7). However, these characteristics cannot be easily improved by the landlord (contrary to other proxies for quality, such as the painting or the presence of a fully fitted kitchen).

Similarly, when using data at the municipality scale, results show that housing subsidy zoning has no impact on the proportion of rental housing in the total housing stock (Table 8)[13]. These two results suggest that housing supply remains inelastic in the long run. They also confirm that the dwellings below and above the threshold are indeed comparable, which validates our approach.

5.4 Robustness checks

Window and study period. Results are provided for a sample with dwellings located in agglomerations between 50,000 and 200,000 inhabitants and rented between 2005 and 2012 (Tables 5 to 8): this sample comprises 1,638 dwellings located in 63 agglomerations. Results are robust when using different windows or different study periods (Table 9).

A wider window of 30,000-300,000 inhabitants (2,973 dwellings located in 101 ag-

[13]These results hold when considering the variation of the number of rentals between two census years as the dependant variable.

Table 6: Effect of housing subsidy zoning on the logarithm of the rent per square meter. Treatment heterogeneity

Zone II for housing subsidies	0.0598**	0.0445**	0.0566***	0.0435**
	(0.0263)	(0.0188)	(0.0199)	(0.0218)
Population density$_{1999}$	0.0000287**	0.0000303***	0.0000278***	0.0000307***
	(0.0000131)	(0.00000786)	(0.0000102)	(0.00000771)
Share of open space$_{2000}$	0.268***	0.192***	0.286***	0.180***
	(0.103)	(0.0503)	(0.0741)	(0.0565)
Share of rental housing$_{1999}$	−0.200	−0.210**	−0.322***	−0.130
	(0.138)	(0.0955)	(0.123)	(0.114)
Δ agglomeration pop$_{1975-99}$	0.365***	0.560***	0.560***	0.513***
	(0.109)	(0.0737)	(0.0928)	(0.0796)
log(size)	−0.619***	−0.627***	−0.620***	−0.629***
	(0.0427)	(0.0380)	(0.0362)	(0.0497)
Number of rooms	0.0349	0.0566***	0.0317	0.0435***
	(0.0220)	(0.0123)	(0.0197)	(0.0157)
Length of the tenancy	−0.0135***	−0.0123***	−0.0150***	−0.0120***
	(0.00261)	(0.00118)	(0.00171)	(0.00127)
Completion year < 1914	−0.0799**	−0.0550*	−0.0862***	−0.0429
	(0.0348)	(0.0311)	(0.0317)	(0.0364)
Completion year 1915-1948	−0.0553*	−0.0945***	−0.0643**	−0.112***
	(0.0294)	(0.0300)	(0.0276)	(0.0324)
Completion year 1949-1967	−0.0607	−0.109***	−0.0789***	−0.108***
	(0.0397)	(0.0195)	(0.0300)	(0.0248)
Completion year 1968-1990	−0.0110	−0.0534**	−0.0491**	−0.0455**
	(0.0323)	(0.0210)	(0.0198)	(0.0229)
Completion year > 1990	ref.	ref.	ref.	ref.
Bathroom	1.456***	0.431***		0.678***
	(0.120)	(0.140)		(0.215)
Bath	0.00676	0.0586***	0.0146	0.0602***
	(0.0207)	(0.0197)	(0.0184)	(0.0233)
Garden	−0.0572	0.0872***	−0.00332	0.0956***
	(0.0423)	(0.0173)	(0.0312)	(0.0212)
Balcony	−0.00495	0.0557***	0.0107	0.0633***
	(0.0276)	(0.0151)	(0.0201)	(0.0185)
Home security device	0.0436**	0.0285	0.0251	0.0424*
	(0.0220)	(0.0174)	(0.0167)	(0.0226)
House	0.0151	0.0365	−0.0298	0.0527*
	(0.0595)	(0.0243)	(0.0337)	(0.0274)
Number of dwellings	−0.000300	−0.000198	−0.00000862	−0.000538
	(0.000375)	(0.000278)	(0.000265)	(0.000437)
Observations	450	1188	771	867
Estimator	IV	IV	IV	IV
Year fixed effects	✓	✓	✓	✓
Period	2005-2012	2005-2012	2005-2012	2005-2012
Sample	private sec. low-income household	private sec. other household	private sec. less than 2 rooms	private sec. more than 3 rooms
Agglomeration population	50,000-200,000	50,000-200,000	50,000-200,000	50,000-200,000

Notes: standard errors are in parentheses; significance levels: *** 1%, ** 5%, * 10%.
Sources: Rents and Charges survey, Tax Income survey, Population census by INSEE.

Table 7: Effect of housing subsidy zoning on housing quality

	Number of housings in the building	Number of rooms	Presence of a bathroom	Living area
Zone II for housing subsidies	1.441	−0.0356	0.00207	−0.0234
	(1.210)	(0.0928)	(0.00170)	(0.0446)
Δ agglomeration $pop_{1975-99}$	15.41***	−0.770**	0.00224	−0.448**
	(4.556)	(0.332)	(0.0130)	(0.177)
Population $density_{1999}$	0.00178***	−0.000111***	−0.000000908	−0.0000717***
	(0.000520)	(0.0000398)	(0.000000896)	(0.0000188)
Share of open $space_{2000}$	2.471	−0.164	−0.00190	−0.0584
	(3.201)	(0.208)	(0.00541)	(0.110)
Share of rental $housing_{1999}$	25.79***	−1.901***	0.0229	−0.553***
	(7.704)	(0.471)	(0.0204)	(0.193)
Observations	1638	1638	1638	1638
Estimator	IV	IV	IV	IV
Year fixed effects	✓	✓	✓	✓
Period	2005-2012	2005-2012	2005-2012	2005-2012
Sample	private sec.	private sec.	private sec.	private sec.
Agglomeration population	50,000-200,000	50,000-200,000	50,000-200,000	50,000-200,000

Notes: standard errors are in parentheses; significance levels: *** 1%, ** 5%, * 10%.
Sources: Rents and Charges survey, Tax Income survey, Population census by INSEE.

glomerations) provides a similar positive and significant impact of location in zone II on rents. Reducing the window to 70,000-150,000 gives a non significant impact, as this new sample contains 684 dwellings located in 26 agglomerations only. These 26 agglomerations are not different enough to enable the identification of the treatment effect.

Performing the estimation on previous periods (1987-1995 or 1996-2004, instead of 2005-2012) confirms the impact of location in zone II on rents: during these periods, the amount of housing subsidies was already important (CGDD (2012), see Figure 1) and had an inflationist impact, as found by Fack (2006). The impact of location in zone II is significant in the 1987-2004 period and the treatment coefficient are higher than during the subsequent period. However, these results do not imply that the housing subsidy effect fades over time: first, the descriptive statistics do not support this idea; second the interaction term of treatment and time trend is not significant in the OLS model[14].

[14]It is not possible to apply our IV method to a model including an interaction term as we do

Table 8: Effect of housing subsidy zoning on the proportion of rental housing at the agglomeration scale

Zone II for building subsidies	−0.00328	0.0161	−0.0104	0.00260
	(0.0165)	(0.0214)	(0.0128)	(0.0161)
Zone A for landlord subsidies	0.183***	0.187***	0.0163	0.0197
	(0.0359)	(0.0376)	(0.0158)	(0.0176)
Zone B1 for landlord subsidies	0.0326	0.0242	0.00232	−0.00283
	(0.0324)	(0.0348)	(0.0184)	(0.0203)
Zone B2 for landlord subsidies	0.00264	−0.0000935	0.00711	0.00452
	(0.0244)	(0.0266)	(0.0128)	(0.0145)
City median income$_{1982}$	−0.0000182***	−0.0000185***		
	(0.00000451)	(0.00000444)		
Δ metropolitan pop$_{1968-1982}$	−0.0808	−0.0825		
	(0.0988)	(0.0910)		
Population density$_{1982}$	0.0000287***	0.0000272***		
	(0.00000710)	(0.00000729)		
Share of open space$_{1990}$	−0.0653*	−0.0625*		
	(0.0361)	(0.0357)		
City median income$_{2009}$			−0.0000041	−0.0000041
			(0.0000005	(0.0000004
Δ metropolitan pop$_{1990-2009}$			0.0829***	0.0752***
			(0.0260)	(0.0255)
Population density$_{2009}$			0.0000230*	0.0000214*
			(0.0000073	(0.0000075
Share of open space$_{2006}$			−0.0435	−0.0429
			(0.0291)	(0.0288)
Observations	763	763	776	776
Estimator	OLS	IV	OLS	IV
Year fixed effects	✓	✓	✓	✓
Year	1982	1982	2009	2009
Agglomeration population	50,000-200,000	50,000-200,000	50,000-200,000	50,000-200,000

Notes: standard errors are in parentheses; significance levels: *** 1%, ** 5%, * 10%.
Sources: Tax Income survey, Population census by INSEE in 1982 and 1999.

Social housing, zoning size, and other housing policies. When considering social housing only, the interpretation of the impact is difficult, because the housing subsidy zoning matches with the rent threshold zoning (Table 10). Thus, the impacts of the two different zonings cannot be disentangled: the impact of the location in zone II on rents may correspond to the ability for the lessor to fix a higher rent.

Results are robust to changes in the estimation zone and considering the city center instead of the central part of the agglomeration (Table 10). Significance still holds but is of less magnitude (4.2% instead of 5.3%), probably because the size of the sample is reduced. Results are robust when adding the zoning for landowners, meaning that this other housing policy does not explain the increase of rents (Table 10).

Placebo tests. Placebo tests do not reveal any unexpected impact (Table 11). Other discontinuities at 50,000 or 200,000 inhabitants are non significant. When restricting the sample to the untreated agglomerations of less than 100,000 inhabitants, the threshold of 50,000 has a non significant impact on rents. Similarly, when restricting the sample to the treated agglomerations of more than 100,000 inhabitants, the threshold of 200,000 is non significant.

Besides adding dummies for intervals in agglomeration size confirms that the main discontinuity is indeed the threshold of 100,000 inhabitants. Concretely, living in a agglomeration with less than 100,000 inhabitants decreases the level of rents. This impact is significant for dwellings in agglomerations of less than 50,000 inhabitants and also for dwellings in agglomerations between 50,000 and 100,000 inhabitants, but to a lower extent. This is consistent: agglomerations between 50,000 and 100,000 inhabitants are more numerous to be located in zone II (i.e., they have a higher probability of receiving higher housing subsidies), which increases rents.

not have any instrument for this type of variable.

Table 9: Effect of housing subsidy zoning on the logarithm of the rent per square meter. Robustness checks: window and study period

Zone II for housing subsidies	0.0406	0.0597***	0.112***	0.132***
	(0.0275)	(0.0159)	(0.0282)	(0.0204)
Population density$_{1999}$	0.0000299***	0.0000285***	0.00000892	0.0000136
	(0.00000815)	(0.00000564)	(0.0000116)	(0.00000876)
Share of open space$_{2000}$	0.155**	0.197***	0.0378	0.128*
	(0.0655)	(0.0441)	(0.0847)	(0.0723)
Share of rental housing$_{1999}$	−0.0356	−0.107	0.0205	−0.0864
	(0.136)	(0.0861)	(0.180)	(0.134)
Δ agglomeration pop$_{1975-99}$	0.803***	0.527***	0.735***	0.442***
	(0.123)	(0.0584)	(0.169)	(0.0974)
log(size)	−0.688***	−0.626***	−0.723***	−0.710***
	(0.0452)	(0.0224)	(0.0375)	(0.0322)
Number of rooms	0.0632***	0.0459***	0.0756***	0.0577***
	(0.0179)	(0.00941)	(0.0134)	(0.0120)
Length of the tenancy	−0.0123***	−0.0119***	−0.0155***	−0.00468***
	(0.00159)	(0.00102)	(0.00223)	(0.00102)
Completion year < 1914	−0.0957**	−0.0898***	−0.259***	−0.218***
	(0.0483)	(0.0181)	(0.0474)	(0.0264)
Completion year 1915-1948	−0.0996**	−0.0901***	−0.272***	−0.171***
	(0.0411)	(0.0169)	(0.0488)	(0.0261)
Completion year 1949-1967	−0.162***	−0.0987***	−0.304***	−0.224***
	(0.0259)	(0.0148)	(0.0472)	(0.0251)
Completion year 1968-1990	−0.105***	−0.0569***	−0.183***	−0.129***
	(0.0293)	(0.0137)	(0.0372)	(0.0179)
Completion year > 1990	ref.	ref.	ref.	ref.
Bathroom	0.232***	0.284**	0.593***	0.804***
	(0.0836)	(0.125)	(0.0743)	(0.116)
Bath	0.0771***	0.0401***	0.0322	0.0424**
	(0.0237)	(0.0120)	(0.0300)	(0.0202)
Garden	0.106***	0.0634***	0.0342	0.0642***
	(0.0282)	(0.0133)	(0.0280)	(0.0241)
Balcony	0.0138	0.0371***	−0.00632	0.0343**
	(0.0208)	(0.0113)	(0.0219)	(0.0159)
Home security device	0.0435***	0.0230**	0.102***	0.0463***
	(0.0166)	(0.0115)	(0.0322)	(0.0131)
House	0.0505	0.0437**	0.0860**	0.0346
	(0.0351)	(0.0176)	(0.0398)	(0.0336)
Number of dwellings	−0.0000695	−0.000644**	−0.00135***	−0.000775**
	(0.000418)	(0.000279)	(0.000467)	(0.000384)
Observations	684	2973	1106	1718
Estimator	IV	IV	IV	IV
Year fixed effects	✓	✓	✓	✓
Period	2005-2012	2005-2012	1987-1995	1996-2004
Sample	private sec.	private sec.	private sec.	private sec.
Agglomeration population	70,000-150,000	30,000-300,000	50,000-200,000	50,000-200,000

Notes: standard errors are in parentheses; significance levels: *** 1%, ** 5%, * 10%.
Sources: Rents and Charges survey, Tax Income survey, Population census by INSEE.

Table 10: Effect of housing subsidy zoning on the logarithm of the rent per square meter. Robustness checks: social housing, zoning size, and other housing policies

Zone II for housing subsidies	0.0606^{***}	0.0418^{**}	0.0561^{***}
	(0.0199)	(0.0181)	(0.0179)
Population density$_{1999}$	0.0000106	0.0000331^{***}	0.0000248^{***}
	(0.0000100)	(0.00000898)	(0.00000799)
Share of open space$_{2000}$	0.0942	0.279^{***}	0.187^{***}
	(0.0679)	(0.0613)	(0.0539)
Share of rental housing$_{1999}$	0.00493	-0.405^{**}	-0.165^{*}
	(0.0859)	(0.168)	(0.0889)
Δ agglomeration pop$_{1975-99}$	0.00227	0.546^{***}	0.432^{***}
	(0.104)	(0.0737)	(0.0728)
log(size)	-0.711^{***}	-0.625^{***}	-0.634^{***}
	(0.0369)	(0.0310)	(0.0264)
Number of rooms	0.0803^{***}	0.0464^{***}	0.0528^{***}
	(0.0108)	(0.0117)	(0.00993)
Length of the tenancy	-0.00264^{***}	-0.0119^{***}	-0.0133^{***}
	(0.000528)	(0.00133)	(0.00116)
Completion year $<$ 1914	-0.238^{***}	-0.0606^{**}	-0.0762^{***}
	(0.0560)	(0.0287)	(0.0251)
Completion year 1915-1948	-0.287^{***}	-0.0979^{***}	-0.0950^{***}
	(0.0465)	(0.0248)	(0.0233)
Completion year 1949-1967	-0.317^{***}	-0.109^{***}	-0.109^{***}
	(0.0151)	(0.0196)	(0.0184)
Completion year 1968-1990	-0.226^{***}	-0.0570^{***}	-0.0516^{***}
	(0.0160)	(0.0177)	(0.0176)
Completion year $>$ 1990	ref.	ref.	ref.
Bathroom	-0.0124	0.804^{*}	0.695^{***}
	(0.0671)	(0.461)	(0.238)
Bath	0.0430^{**}	0.0340^{**}	0.0360^{**}
	(0.0202)	(0.0160)	(0.0170)
Garden	0.0361	0.0625^{***}	0.0640^{***}
	(0.0304)	(0.0185)	(0.0165)
Balcony	0.0228^{*}	0.0540^{***}	0.0345^{**}
	(0.0128)	(0.0150)	(0.0134)
Home security device	0.0249	0.0280^{**}	0.0402^{***}
	(0.0158)	(0.0133)	(0.0135)
House	0.0995^{***}	0.0557^{**}	0.0471^{**}
	(0.0327)	(0.0264)	(0.0222)
Number of dwellings	-0.000426^{***}	-0.000205	-0.000265
	(0.000151)	(0.000217)	(0.000207)
Zone A for landlord subsidies			0.119^{***}
			(0.0287)
Zone B1 for landlord subsidies			0.0807^{*}
			(0.0434)
Zone B2 for landlord subsidies			-0.00712
			(0.0181)
Observations	1733	1457	1638
Estimator	IV	IV	IV
Year fixed effects	✓	✓	✓
Period	2005-2012	2005-2012	2005-2012
Sample	social housing	private sec. city center	private sec.
Agglomeration population	50,000-200,000	50,000-200,000	50,000-200,000

Notes: standard errors are in parentheses; significance levels: *** 1%, ** 5%, * 10%.
Source: Rents and Charges survey, Tax Income survey, Population census by INSEE.

Finally, a temporal trend (here the log of the agglomeration size) is non significant, which confirms that the threshold of 100,000 inhabitants does not capture a non modeled trend effect.

Table 11: Effect of housing subsidy zoning on the logarithm of the rent per square meter. Placebo tests

Population density$_{1999}$	0.0000387***	0.0000284***	0.0000295***	0.0000285***	0.0000295***
	(0.0000115)	(0.00000895)	(0.00000758)	(0.00000629)	(0.00000838)
Share of open space$_{2000}$	0.118**	0.208***	0.238***	0.171***	0.205***
	(0.0449)	(0.0582)	(0.0670)	(0.0386)	(0.0517)
Share of rental housing$_{1999}$	−0.247*	−0.215**	−0.0928	−0.125	−0.156
	(0.125)	(0.0909)	(0.125)	(0.0851)	(0.0995)
Δ agglomeration pop$_{1975-99}$	0.438***	0.508***	0.615***	0.484***	0.487***
	(0.0505)	(0.0780)	(0.0866)	(0.0507)	(0.0710)
log(size)	−0.660***	−0.631***	−0.619***	−0.634***	−0.634***
	(0.0297)	(0.0273)	(0.0317)	(0.0215)	(0.0274)
Number of rooms	0.0587***	0.0527***	0.0419***	0.0475***	0.0536***
	(0.00985)	(0.0106)	(0.0136)	(0.00880)	(0.0102)
Length of the tenancy	−0.0122***	−0.0132***	−0.0109***	−0.0118***	−0.0130***
	(0.00130)	(0.00123)	(0.00134)	(0.00101)	(0.00117)
Completion year < 1914	−0.144***	−0.0683**	−0.0705***	−0.106***	−0.0711***
	(0.0277)	(0.0264)	(0.0234)	(0.0184)	(0.0254)
Completion year 1915-1948	−0.120***	−0.0897***	−0.0718***	−0.0915***	−0.0928***
	(0.0269)	(0.0244)	(0.0171)	(0.0155)	(0.0235)
Completion year 1949-1967	−0.123***	−0.1000***	−0.0920***	−0.0984***	−0.110***
	(0.0237)	(0.0198)	(0.0184)	(0.0148)	(0.0180)
Completion year 1968-1990	−0.0539**	−0.0474**	−0.0830***	−0.0603***	−0.0480***
	(0.0234)	(0.0184)	(0.0153)	(0.0143)	(0.0181)
Completion year > 1990	ref.	ref.	ref.	ref.	ref.
Bathroom	0.469**	0.675***	0.350*	0.382**	0.679***
	(0.229)	(0.245)	(0.195)	(0.153)	(0.242)
Bath	0.0446***	0.0369**	0.0357**	0.0384***	0.0377**
	(0.0165)	(0.0177)	(0.0167)	(0.0116)	(0.0169)
Garden	0.0724***	0.0610***	0.0747***	0.0703***	0.0642***
	(0.0205)	(0.0172)	(0.0136)	(0.0129)	(0.0167)
Balcony	0.0159	0.0383***	0.0495***	0.0377***	0.0381***
	(0.0176)	(0.0143)	(0.0124)	(0.0108)	(0.0135)
Home security device	0.0187	0.0394***	0.0306*	0.0288***	0.0374***
	(0.0156)	(0.0143)	(0.0163)	(0.0108)	(0.0131)
House	0.0234	0.0478*	0.0434*	0.0397**	0.0420**
	(0.0222)	(0.0240)	(0.0218)	(0.0166)	(0.0209)
Number of dwellings	−0.00119**	−0.000280	−0.000519	−0.000688**	−0.000269
	(0.000506)	(0.000205)	(0.000363)	(0.000274)	(0.000192)
$\mathbb{1}$ (Agglo. pop < 50000)	0.00531				
	(0.0184)				
$\mathbb{1}$ (Agglo. pop < 100000)		0.0469***			
		(0.0172)			
$\mathbb{1}$ (Agglo. pop < 200000)			0.00399		
			(0.0175)		
Agglo. pop 20000-50000				−0.0616**	
				(0.0237)	
Agglo. pop 50000-100000				−0.0390**	
				(0.0175)	
Agglo. pop 100000-150000				0.0254	
				(0.0251)	
Agglo. pop 150000-200000				−0.00616	
				(0.0200)	
Agglo. pop 200000-250000				0.0233	
				(0.0237)	
Agglo. pop 250000-300000				ref.	
Zone II for housing subsidies					0.108**
					(0.0468)
log(agglomeration pop$_{1975}$)					−0.0640
					(0.0487)
Observations	1382	1638	1731	3256	1638
Estimator	OLS	OLS	OLS	OLS	IV
Year fixed effects	✓	✓	✓	✓	✓
Period	2005-2012	2005-2012	2005-2012	2005-2012	2005-2012
Sample	private sec. untreated	private sec.	private sec. treated	private sec.	private sec.
Agglomeration population	20,000-100,000	50,000-200,000	100,000-300,000	20,000-300,000	50,000-200,000

6 Conclusion

Housing subsidies to tenants are a main tool for housing policy in France. They aim to limit the budget share of housing for tenants and to improve their housing conditions for a given budget share. Despite the increasing budget allocated to housing subsidies since the end of the 1970s, the budget share of housing for low-income tenants has kept increasing, in particular in the private rental sector. We measure the impact of housing subsidies on the private rental sector. To do so, we use an instrumental variable method based on a spatial discontinuity in the subsidy scheme. We show that housing subsidies had an inflationist impact on rents. This impact is stronger for the low-income households and the dwellings with two rooms or less. Besides, higher subsidies seem to have almost no effect on housing quality and to have no impact on the number of offered rental dwellings.

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A Appendix

A.1 Comparison of housing subsidies zones crossed with the landlord subsidies zones

Table 12: Number of dwellings in the housing subsidies zones (zones II and III) crossed with the landlord subsidies zones

	Zone II	Zone III
Landlord sub. zone A	0	43,252
Landlord sub. zone B1	177,584	55,784
Landlord sub. zone B2	1,208,007	1,201,865
Landlord sub. zone C	29,297	90,245

Source: Population census by INSEE.

A.2 First stage of the instrumental variable method

Table 13: First stage of the instrumental variable method

$\mathbb{1}$ (Agglo. pop $<$ 100000)	0.893^{***}
	(0.0501)
Δ agglomeration $\text{pop}_{1975-99}$	-0.126
	(0.136)
log(size)	0.0374
	(0.0282)
Number of rooms	-0.0119
	(0.00914)
Length of the tenancy	-0.00205
	(0.00137)
Completion year $<$ 1914	0.0189
	(0.0366)
Completion year 1915-1948	0.00884
	(0.0310)
Completion year 1949-1967	0.0777^{*}
	(0.0429)
Completion year 1968-1990	0.00644
	(0.0278)
Completion year $>$ 1990	ref.
Bathroom	-0.166
	(0.155)
Bath	-0.00407
	(0.0263)
Garden	-0.0293
	(0.0249)
Balcony	-0.00814
	(0.0138)
Home security device	0.0179
	(0.0291)
House	0.0485
	(0.0442)
Number of dwellings	0.000192
	(0.000219)
Observations	1638
Year fixed effects	✓
Period	2005-2012
Sample	private sec.
Agglomeration population	50,000-200,000

Notes: standard errors are in parentheses; significance levels: *** 1%, ** 5%, * 10%.
Sources: Rents and Charges survey, Tax Income survey, Population census by INSEE.