How do housing allowances affect rents?
An empirical analysis of the French case

Anne Laferrère* and David Le Blanc

Centre de Recherche en Economie et Statistique,
Institut National de la Statistique et des Etudes Economiques, 15 Bd G. Péri, 92245 Malakoff, France

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Abstract

Between 1992 and 1994, the benefit of rental housing allowances was extended to all low-income households in France. Aggregate data on the short-term impact of the reform indicates a rise in the rents of dwellings occupied by subsidized renters, compared to those of non-subsidized renters. This is mainly due to compositional changes in the populations of assisted and unassisted tenants. However, looking directly at rent changes at the dwelling level, rent changes are higher when new renters receive housing allowances. This finding is consistent with the hypothesis that in the short run individual private landlords capture part of the subsidy.

Keywords: Subsidized housing; Rental allowances; Matching estimators

1. Introduction

In most developed countries housing policies have shifted away from subsidizing construction to giving housing allowances directly to low-income households, who
are then free to choose where to live. This move from supply to demand policy was triggered by the negative side effects of public housing construction. It appeared costly and had led to the creation of neighborhoods of high-rise buildings concentrating poverty. In France, the housing problem was gradually seen less as one of shortage or slums, as was the case after World War II, but as one of affordability for low-income households. From 1977 on, direct housing allowances were thus added to the other types of transfers to low-income families (child allowances, minimum income program, etc.). Housing allowances were supposed to be less costly than construction-oriented programs, and more targeted to the poor than social housing. However, the question of their possible inflationary effect on rents was not raised at that time.

Overall, the amount spent on housing subsidies to private sector tenants was 5.3 (billion euros in 2000). This is by no account a small figure. Thus, it seems crucial to examine the effect of distributing generous housing allowances on the level of rents. Without a structural model explaining the setting of rents and their changes, this is a difficult task. What is used here is a natural experiment, in the form of a reform of housing allowances that took place between 1992 and 1994. The reform extended rental assistance to households who did not benefit from it previously, without changing the subsidy computation, so that assisted tenants received exactly the same amounts before and after the reform. The extension took place gradually between 1992 and 1994, beginning in the Paris region and ending up with the rest of France. In the private sector the proportion of tenants being granted an allowance increased from one-third to one-half between 1990 and 1996.

The analysis is centered on the short-term effect of the reform. Aggregate time-series data indicate that the reform coincides with a faster rent growth of dwellings occupied by subsidized renters, compared to those of non-subsidized renters. No such difference is seen during the period before the reform. This phenomenon reflects two primary compositional effects. First, an overall increase in housing demand (quality or quantity) of subsidized renters. Second, a compositional effect arising from the fact that newly subsidized renters would represent a greater part of the new leases, which are more expensive because rent control induces a tenure discount. These two compositional effects are consistent with a simple competitive search model of the rental market. A third effect, the importance of which we try to estimate, would correspond to a landlord’s strategy of pricing the dwellings differently according to the assistance status of the renter, i.e., charging assisted tenants higher rents.

Our data consist of a rotating panel sample of rental dwellings followed on a quarterly basis. Using them as repeated cross-sections, and controlling for dwelling characteristics and tenure length (to account for the tenure discount), we continue to find higher growth in the rents of dwellings with assisted tenants. Next, looking directly at rent changes at the dwelling level, we find that they are significantly higher when the new tenant gets housing allowances than in any other cases. Moreover, this

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1 See Le Blanc and Laferrère (2001). In France, the rent paid by a public housing tenant is not a function of the tenant’s income.
is true over the whole period, both before and after the reform. This strongly suggests that landlords capture part of the subsidy.

The paper is constructed as follows. Section 2 presents the French housing market and the 1992–1994 reform of housing allowances. Section 3 offers the theoretical background and reviews the empirical literature on the effect of housing allowances on rent levels. The data are presented briefly in Section 4. Section 5 presents the evidence from aggregated time-series data and hedonic-type analysis. In Section 6, rent changes are analyzed by two different statistical methods and economic implications of the results are drawn. Section 7 summarizes and considers extensions.

2. Rental assistance in France and the 1992–1994 reform

In 1996, 38% of French households were renters, 54% owned their homes, the remaining 8% being classified as living in a rent-free dwelling, a furnished home or subletting. The rental sector can be divided into two main categories: the private market sector, with 4.4 million tenants (19.1% of households) and the public housing sector, with 4.1 million households (17.6% of households). The public social housing sector is left aside here because the public sector rents are set well below the market level by legal provisions (for a description, see Le Blanc and Laferrère, 2001). Moreover, up to 2002 the rental assistance system applying to public sector tenants, the APL (aide personnalisée au logement, personal housing assistance), was distinct from the one applying to the private sector, the AL (allocation logement, housing allowance).

2.1. Rental allowances in the private sector

A direct rental allowances program was created after World War II to allow families to enjoy decent housing conditions without having to spend too large a proportion of their income on housing. This creation took place in a context of an acute housing shortage and of the partial lifting of stringent rent control. The program was also aimed at stimulating housing supply through new construction, maintenance or rehabilitation.

Rental assistance is a means-tested benefit. In 1948, it was only granted to families with children. At that time, most of governmental help to the housing sector was in the form of project-oriented subsidies. As in other countries, this type of policy was gradually found to be inefficient, and at the same time the housing problem shifted from a situation of shortage and low quality to one of affordability. Thus, personal housing allowances programs tended to rise whereas project-based assistance declined. In 1971, rental assistance was extended to other types of households: persons aged over 65, young workers under 25, disabled adults. It was further extended to include the long-term unemployed. In 1977, housing allowances were increased,

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2 There are also some pre-World War II, severely rent-controlled apartments (1.4% of all dwellings), the number of which diminishes steadily.
mostly to renters of public social housing. In January 1992, the final process of extending the housing assistance on which this paper concentrates began. It extended rental assistance to all low-income households, including students who had been excluded until then. The subsidy thus became a universal means-tested allowance whereas it had previously been linked to other characteristics than income (such as family structure) and to characteristics of the dwellings (such as their belonging to the construction-subsidized sector). The reform, known in French as the bouclage des aides or ‘housing assistance completion,’ did not involve any change in the amount of allowances at the household level, but only an extension of the target population. The extension was progressive: first in the Paris region in 1992, then in 1993 to the major large cities, and finally to 1994 in the rest of France. The largest increase in the number of recipients occurred in 1992 and 1993; the movement was considered completed by 1995. There were 1.9 million assisted private sector tenants in 1990, which represented a third of all private sector tenants; there were 3.1 million in 1997, representing half of private sector tenants (Table 1). The increase in the number of assisted tenants was 19.6% in 1992 and 14.7% in 1993. In 1996, the total amount of subsidies in the private rental sector was 4.4 billion euros. According to the 1996 French Housing Survey, these subsidies covered on average 43% of the rent of assisted households. The proportion of assisted tenants is large, compared to most countries. In the US, housing allowances have been available for low-income private sector tenants since 1974. Some 13% of American renters are assisted and about half of them get an allowance close to the French type (the so-called Section 8 certificates and vouchers). The main difference is that while all French eligible households receive an allowance, there exist quotas of vouchers in the US, and it

Table 1
Number of private sector tenants, assisted tenants, and rental allowance amounts

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<tbody>
<tr>
<td>Private sector tenants (thousands)</td>
<td>4664</td>
<td>4730</td>
<td>4820</td>
<td>4888</td>
<td>4946</td>
<td>5003</td>
<td>5053</td>
<td>5099</td>
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<tr>
<td>Assisted tenants (thousands)</td>
<td>1507</td>
<td>1559</td>
<td>1910</td>
<td>2218</td>
<td>2382</td>
<td>2497</td>
<td>554</td>
<td>2630</td>
</tr>
<tr>
<td>% assisted tenants</td>
<td>32.3</td>
<td>33.0</td>
<td>39.6</td>
<td>45.4</td>
<td>48.2</td>
<td>49.9</td>
<td>50.5</td>
<td>51.6</td>
</tr>
<tr>
<td>Annual increase in assisted tenants %</td>
<td>3.5</td>
<td>22.5</td>
<td>16.1</td>
<td>7.4</td>
<td>4.8</td>
<td>2.3</td>
<td>3.0</td>
<td></td>
</tr>
<tr>
<td>Allowance (million Euros)</td>
<td>2396.5</td>
<td>2728.8</td>
<td>3211.8</td>
<td>3933.2</td>
<td>4238.5</td>
<td>4476.8</td>
<td>4638.3</td>
<td>4742.5</td>
</tr>
<tr>
<td>Annual increase (%)</td>
<td>13.9</td>
<td>17.7</td>
<td>22.5</td>
<td>7.8</td>
<td>5.6</td>
<td>3.6</td>
<td>2.2</td>
<td></td>
</tr>
<tr>
<td>Monthly allowance per tenant (Euros)</td>
<td>132.5</td>
<td>145.9</td>
<td>140.1</td>
<td>147.8</td>
<td>148.3</td>
<td>149.4</td>
<td>151.3</td>
<td>150.3</td>
</tr>
<tr>
<td>In 1990 Euros</td>
<td>132.5</td>
<td>141.4</td>
<td>132.7</td>
<td>137.0</td>
<td>135.2</td>
<td>134.0</td>
<td>133.0</td>
<td>130.6</td>
</tr>
</tbody>
</table>

Source: Authors’ computation from Comptes du Logement, 1999.

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is estimated that only a third of eligible households receive them (Olsen, 2001). In
other words, in the French system, housing subsidies are an entitlement.\footnote{As the rise in unemployment increased the number of eligible households above what was forecasted in the early 1990s, this has been recognized as a problem. However there is no talk of changing the entitlement feature of the French system; only the parameters of Eq. (1) are yearly modified to adjust to a government budget constraint.}

The housing subsidy is usually given to the household in the form of a cash transfer from the Welfare bureau.\footnote{In the case of public social housing, rental assistance is usually given directly to the landlord.} The amount of the allowance $A$ depends both on the rent $R$ and on household’s characteristics. More specifically, it is computed as follows:

$$A = k(I, S) \left[ \min(R - \bar{R}(G, S)) - R_0(I, S) \right],$$

(1)

where $\bar{R}$ is a ceiling rent above which the allowance does not vary and $R_0$ is a ‘minimum participation rent’ increasing with the household’s income $I$. Both $\bar{R}$ and $R_0$ vary with family composition $S$. $G$ is the geographic area of the dwelling (France is divided into four areas), $k$ is a coefficient decreasing in income and increasing with the number of people in the dwelling, up to 0.9. It is important to note some features of Eq. (1). First, up to the ceiling rent, any increase in rent is partly compensated by an increase in the subsidy, which lowers the relative price of housing.\footnote{For a family with two children $\bar{R} = 360$ euros per month in 2000.} Thus the incentive to consume more housing is strong. Second, the tenant’s choice of rent is free: the allowance is granted whatever the rent and the household may rent a house for a higher price than the ceiling rent. Third, the decline in the allowance when income increases is not linear. Finally, the conditions on housing quality are not very stringent: most dwellings are fit for their renter to be subsidized. These features differ from the American situation. In the case of Section 8 Rental Certificate program, participants cannot rent units with rents above a fair market rent. This rent level is sometimes set so low that it makes it impossible for recipients to find a home.\footnote{HUD (2001), quoted by DiPasquale et al. (2003). Meeting housing quality standard may also be hard. All in all 31% of voucher holders did not succeed in finding a qualifying unit in 2000 (HUD, 2001).}

Roughly speaking, in the US the rent of a subsidized household is a fixed percentage of income (adjusted for family composition), usually 30%, with the allowance paying for the remaining rent. By contrast, in France the allowance is a percentage of the rent, up to a ceiling rent. As a consequence, in a large range of rent levels below the ceiling rent, the landlord and the renter may be induced to agree, tacitly or explicitly, on increasing the rent and sharing part of the allowance, since both can benefit from the public transfer.

### 2.2. Legal provisions concerning rent changes

In France, rent increases are subject to legal provisions even in the private market rental sector. The freeze on rents at the end of World War I became a severe control after World War II, and has turned since 1989 into a type of ‘second generation’ rent

\footnote{In the case of public social housing, rental assistance is usually given directly to the landlord.}
control. More precisely, rents are freely set whenever a new tenant enters a dwelling, whereas during tenancy, annual rent changes are bound not to exceed a reference index (the Construction Cost Index) published by the ministry of Housing, which is the same for all dwellings. Thus, the only case where the rent is freely set is when a new renter moves in. This feature has important implications. First, the level of the rent depends on tenancy length. Empirically, the longer the tenancy, the lower the rent, because the variations of the rent have been capped since the beginning of the lease. Second, observed rent changes to market levels will be rare in the data, both because of a direct effect of the regulation, and because of its indirect effect reducing tenants’ mobility. Third, the distribution of observed rent changes will be quite specific (we turn to this issue in Section 6). Rent control generates some rent stickiness: the diffusion of an exogenous shock such as a change in the housing allowance scheme on the observed rents is not immediate. Its full effect can only be seen after a sizeable proportion of dwellings have known at least one change of tenant. While we do not dwell here on the effect on such a type of rent control on landlords’ and tenants’ behavior, it shapes our empirical strategy of Section 6 when we focus on rent changes occurring when a new tenant moves in.

3. Theoretical issues and literature review

The theoretical justification of a rental subsidy is that in a second-best world individuals are not fully aware of the benefit they, their children or the community get from their consuming housing of good quality; thus they should be encouraged to spend more on housing. Housing subsidies would do better in this case than income subsidies, because they directly affect the housing prices perceived by the households. In addition, for a government with a vertical equity preoccupation, housing subsidies may serve as a redistributive device. However, they may not be optimal because, at least under certain conditions, an income tax should suffice to achieve redistribution (Atkinson and Stiglitz, 1976). Rosen (1985a) asks whether housing benefits are not just an indirect means for the federal government of subsidizing the construction industry.

Going back to Eq. (1), the French housing allowance schedule can be perceived as a price reduction of housing compared to other goods. The effects of such a price reduction in a partial equilibrium context can be traditionally decomposed into a substitution and an income effect. Inasmuch as housing is a normal good, its consumption increases with income. The magnitude of the extra consumption will
depend on the income elasticity of housing as compared to other goods, i.e., how households choose to allocate the extra income between housing and other goods. But globally both income and substitution effects produce more housing consumption.

However, the textbook case is not totally appropriate for housing. Since housing consumption can be significantly modified only by moving, the reaction of demand to lower rental prices may take time. Due to significant search, transaction and moving costs, not all households react instantaneously to shifts in prices. This sluggishness in the adjustment process has been modeled by Hanushek and Quigley (1980) in order to estimate elasticities of housing demand. In the French rental market, the sluggishness is likely to be reinforced by tenancy rent control, as mentioned above. Old tenants are less likely to adjust their housing consumption because of the gap between their rents and market rents for a new lease. A key issue will be how many households move to adjust their housing consumption, and how many simply accept the subsidies while not moving instantly. We are not dealing with it here.

In the US case where housing allowances are not an entitlement, the reform would cause a raft of newly assisted tenants entering the market and outbidding current unassisted tenants for units. By contrast, in the French case housing subsidies are an entitlement. The reform caused redistribution: the newly assisted tenants saw their housing purchasing power increase, while the other households stayed where they were in the first place. After the reform, all households with identical family size and income are granted the same subsidies. The likely result is a competition for units between newly assisted and formerly assisted households. The market will tighten due to increased competition for units. This pushes rents up. Under the French tenancy rent control law, sitting tenants will have further incentives not to move. Thus, newly assisted (unassisted) tenants will be more (less) represented in the population of new tenants than formerly. These compositional changes will modify the average rents.

A potential additional effect of the reform is to change the relative price of the private rental sector, vis-à-vis the other sectors (public rental housing and home ownership). However, the reform also concerned renters of the public sector and low-income homeowners. Thus it may be safe to assume that it did not distort the choice between owning and renting, nor between public housing and the private rental sector. Thus, we do not expect to see a huge rise in rental demand due to shifts from other sectors.11

The extension of housing subsidies may also induce the formation of new households: for instance, children may choose to live independently from their parents because they now get housing allowances.12 Börsch-Supan (1986) emphasizes the

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11 The existence of a public social sector may affect rents (Fallis and Smith, 1984, 1985), and construction (Murray, 1999) in the private sector. However, it is unlikely to have any impact on the short-run effects of an extension of rental assistance in the private sector.

12 The ultimate beneficiary of the allowance may not be the direct recipient (e.g., the student), but a member of his/her family (e.g., the parents), who pays the rent. This is the classic response to a public transfer in the altruistic intergenerational model (Barro, 1989).
fact that leaving home decisions can be driven by changes in rents, and can have a big impact on overall housing demand. In France between 1992 and 1996, after the reform of the benefit system, the number of ‘new’ households (households formed during the 4 years) was 2,193,000, whereas in the preceding 4 years, it was 2,134,000, a 3% rise. Among the post-reform new households, 19% were student households, and 46% were one-person households. The figures for the 1988–1992 period were, respectively, 15 and 43%. Thus at first glance, the effect of the reform on the number of households appears to exist but is modest.13

3.1. Supply response

Due to the short-run rigidity of housing supply, a positive shock to the demand curve will, at least temporarily, raise the rents for all tenants.14 In a competitive framework, longer-term outcomes depend on the rigidity of housing supply. In practice, the degree of competitiveness in the housing market, as well as the extent of market segmentation, will also play a role. For example, with perfectly segmented markets rents may rise only in the segments aimed at low-income households.

Not much is known about rental housing supply elasticity in France. Many theoretical models assume a constant returns to scale production function for housing, which implies perfectly elastic long-term supply (see Rosen, 1985b, for a review). Concerning market competitiveness, many theoretical papers have argued that the housing market is ‘thin’ (Arnott, 1989, Igarashi and Arnott, 2000). This is due to the heterogeneity of housing units and the idiosyncratic tastes of households. Moreover, a final feature of the French rental market is that the tenant’s information is poorer and more scattered than in the US. Few households use a broker to find a dwelling,15 and even using the services of a broker does not allow households to have a broad view of the state of the rental market. The multiple listing service (MLS), which formalizes co-brokerage in many US cities, does not exist in France. Agents searching for an apartment and contacting a particular broker have only access to the dwellings managed directly by that broker (or the broker’s company), which represent a small share of the market. Those wanting to have a broader view of the state of the market must contact more than one broker, with the risk of incurring several commission fees. These features make plausible the assumption of some form of market power of landlords. Faced with the existence of housing allowances, the landlord is induced to guess the probability of attracting a subsidized renter. This probability depends on the characteristics of the dwelling (e.g., number of rooms, size, and location), because different dwellings attract different types of households that

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13 However, concentrating on students, Laferrère and Le Blanc (2003) find an important impact of housing subsidies on their living independently from their parents.

14 This price effect of housing allowances is often mentioned by the French media about student accommodation, or the rental of ‘slum’ accommodation.

15 According to the last French Housing Survey, only 41% of new renters had found their home through a broker, while 26% had dealt directly with the landlord, and 23% had found it through friends or relatives (authors’ computation).
have different probabilities of receiving a rental allowance. If the landlord has sufficient information about the applicant, he knows the level of allowance that the tenant can obtain. He may then select applicants on this basis and discriminate among them. A form of bargaining may occur, resulting in sharing the subsidy between the tenant and the landlord, in the form of a higher rent. If this happens, the same apartment may fetch a higher rent if its tenant gets housing allowance than if he does not. This effect is distinct from the increase in overall housing demand of subsidized renters. It is also distinct from the compositional effect arising from the fact that newly subsidized renters represent a greater part of new leases, fetching higher rent because of the tenure discounts associated with rent control. These two latter effects induce a higher general rent level. The discrimination effect induces an extra increase in rent of dwellings occupied by subsidized tenants, compared to dwellings rented by non-subsidized tenants. This is what this article detects, which distinguishes it from previous work.

There is no study that we are aware of on the effect of housing allowances on rent levels in Europe. In the US the empirical effect of housing allowances on supply has been looked at through the Experimental Housing Allowance Program, an 11-year study of assisted housing initiated in 1971 in two Midwest cities. But while some are adamant that allowances increase supply (Crews and Olsen, 2002), others are more dubious (Weicher, 1990). Two types of studies have given very different results on the effect of housing allowances on rent levels. First, the Experimental Housing Allowance Program concluded that ‘housing allowances have virtually no effect on the price of housing, and that they do little to stimulate new construction or major rehabilitation.’ More precisely, Rydell (1982) reports that the potential increase in rent from the modest 4 to 6% increase in demand in the two experiment communities of Wisconsin and Indiana may have been dampened by one-third to one-half because of the supply side response of the market. Actually, the way the experiment was conducted in two small Midwest cities where all eligible households who agreed were given a subsidy, and where the market was not tight, makes it difficult to find an adequate control group, as mentioned in Rosen (1985a). Crews and Olsen (2002) emphasize Rydell’s (1980) result on the importance of the supply response and the non-existence of changes in rents following the experiment. An opposite result is found by Susin (2002) with a different method using metropolitan level data. Susin argues that the supply response to vouchers is not documented, and he finds that low-income households in metropolitan areas with more vouchers have experienced faster rent increases than those were vouchers were less abundant. In the 90 largest metropolitan areas he estimates that vouchers have raised rents by 16% on average, a large effect consistent with a low supply elasticity in the low-quality rental housing market.17


17 As vouchers are not granted to all eligible low-income households, those figures amount to a net loss to the low-income non-recipients. As a result Susin advocates supply-side policies for the low-income population.
Given the lack of information on supply, this paper concentrates on the short-run response of private sector rents. It does not estimate long-run responses. Moreover, the features of the French housing allowance and the nature of the data (a rotating panel of dwellings over the whole country, with quarterly observations on rents) leads to a different strategy than the above studies: we aim at comparing the behavior of rents of identical dwellings in the cases where the tenant gets an allowance and where he does not. 18

4. The data

The Quarterly Rent Survey (Enquête trimestrielle sur les Loyers et charges) is conducted each quarter by the French Institute of Statistics (INSEE, Institut national de la Statistique et des Etudes Economiques) to compute the official rent index for the French Consumer Price Index. It is a representative sample of all dwellings located in urban areas (rural areas are excluded). The quarterly sample of about 8000 dwellings is a rotating panel: each dwelling is surveyed during 8 quarters; thus the sample is renewed by 1/8th at each quarter. In other words, the dwellings are not followed over the whole period, but each is observed for 2 years. Some dwellings are owner-occupied; others are vacant, rented furnished or free, or sublet, which make them outside of the scope of the survey. By also not including the public rental sector, we are left with a quarterly sample of 3000–3500 private sector dwellings for which the monthly rent is known. 19 The questionnaire includes information on rent level and housing allowances, primary dwelling characteristics and household characteristics. Some landlord characteristics are also known.

The questionnaire was improved in 1993 when a new and larger sample was drawn after the 1990 census. This break in sampling frame compels us to use the two subsamples 1989–1992 and 1993–1999 separately. Fortunately, the break approximately coincides with the rental housing assistance reform, which started in 1992. The entire sample consists of 40,989 observations between 1984 and 1992, and 66,353 observations between 1993 and 1999. 20

Fig. A.1 in Appendix A shows the proportion of rent-assisted dwellings in the sample for the Paris area and for the rest of France (the province). The proportion is lower in the Paris region, reflecting higher income in this area. In both areas it is stable before 1993, then increases sharply.

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18 Susin’s (2002) identification strategy is to look at exogenous geographical differences in the distribution of vouchers. There are no such spatial variations in France.

19 During the period under study, there were budget cuts at INSEE during 3 quarters, reducing the sample to 1989 observations in 1995 q3, 2429 in 1995 q4, and 2868 in 1996 q1.

20 We sometimes use the 1993–1997 period, with 62,877 observations.
5. The evidence from time-series data

5.1. Aggregate time series

We first present the result that motivated our study: the pattern of rents from aggregated time-series data obtained from the quarterly rent survey (QRS). In this survey, dwellings are separated into two categories: those occupied by assisted tenants (i.e., receiving housing allowances at the time of the survey) and dwellings occupied by non-assisted tenants. Before 1993, prior to the reform, no clear difference in the time pattern of rents is observed between the two types of dwellings. Rents per square meter for assisted households are on average lower than those for dwellings occupied by non-assisted tenants, reflecting differences in quality and location, but the pattern of rent change is quite similar in both cases (Fig. 1). This is true of small dwellings (1 or 2 rooms) as well as larger dwellings, and both for dwellings in the Paris region and in the rest of France.

In contrast, after 1993 different patterns are observed for dwellings occupied by non-assisted and assisted tenants (Fig. 2). Rents of non-assisted households increase regularly, whereas those of subsidized households are fairly stable at the beginning and at the end of the period, but increase sharply between the third quarter of 1994 and the third quarter of 1995. Breaking the sample down by age and size of dwelling, the extra rent increase of assisted dwellings is clear in the sub-sample of more recent dwellings (those built after 1948), as well as for one- or two-room dwellings, while nothing is seen for older or larger dwellings. The differential increase starts earlier in the Paris region (beginning of 1994, Fig. 2C) than in the rest of France (1995, Fig. 2D), which tallies with the assistance completion schedule.

These patterns are consistent with a simple search theoretic model in a competitive rental market.21 When the reform takes place, the competition for units is increased due to newly assisted households. Landlords observe unusually short ‘time on the market’ of vacant units, low-vacancy rates, a high number of applicants, and respond by increasing the profit-maximizing reservation price. In the short run, rents paid by assisted tenants will appear to grow faster than for unassisted, but in the long run, rents paid by unassisted tenants should grow faster in order to reach a new equilibrium.

5.2. A rental-price-index type of analysis

Average figures of rent change should be regarded with caution for two reasons:

1. Average rent changes for subsidized households could reflect both a structural (quantity or quality) effect along with any potential price effect. The significant increase in coverage of the tenant population could result in a faster observed rent growth for subsidized tenants, because apartments now observed with assisted tenants are of higher quality and rent than the previously assisted stock.

2. Since immediately after the reform the newly assisted households are those with the greatest incentive to adjust housing consumption, most new renters will be

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21 We thank a referee for this remark.
Fig. 1. Evolution of rents of assisted and non-assisted tenants 1985–1992.
newly assisted tenants. These new renters will pay higher rents because of the loss of the tenure discount resulting from the existence of rent control.\textsuperscript{22}

To assess the importance of these effects, both the compositional and the tenancy discount effects have to be controlled for. We first use the Quarterly Rent Surveys as repeated cross-sections. A hedonic model of rent level is estimated, where the logarithm of rent is modeled as a function of the dwelling and landlord characteristics, which account for the housing quality effect, and the length of tenure of the tenant, to account for the tenancy discount effect.\textsuperscript{23}

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\textsuperscript{22} Between 1993 and 1999 the tenure discount is estimated to be 1.3\% per year of tenancy (Table 2).

\textsuperscript{23} As landlords only rarely undertake rehabilitation or maintenance during a lease, a negative correlation between the rent and the length of tenancy could also reflect a lower maintenance state. Length of tenancy may also be linked to unobserved high quality factors, and thus to higher rents, because tenants tend to remain longer in better quality dwellings. This seems to be true of unrestricted rents in New York, for example (Gyourko and Linneman, 1989).
Fig. 2. Rents per square meter of assisted and non-assisted tenants, 1993–1999.
The estimated model is:

\[ l_i = \sum_k \alpha_k X_{kit} + \sum_t v_t T_t + \sum_t w_t A_i T_t + \epsilon_{it}, \]  

(2)

where \( l_i \) is the logarithm of the rent of dwelling \( i \) at time \( t \), \( X_{kit} \) denotes the value of the \( k \)th characteristic of dwelling \( i \) at time \( t \), \( A_i \) is a dummy for the receipt of housing allowance by household in dwelling \( i \) at time \( t \), \( T_t \) are quarterly time dummies and \( \epsilon_{it} \) is a residual.

\( v_t \), the parameters of the time dummies, are temporal effects describing the overall pattern of rent change. They can be interpreted as a rental price index.

\( w_t \), the parameters of the time dummies interacted with the receipt of an allowance, is an extra temporal effect associated to allowance receipt. The \( w_t \) parameters are then interpreted as the extra change of the rent of ‘assisted’ dwellings (that is, dwellings having a subsidized renter) as compared with ‘non-assisted’ ones.

We also estimate a more general model:

\[ l_i = \sum_k \alpha_k X_{kit} + \sum_k \beta_k X_{kit} A_i + \sum_t v_t T_t + \sum_t w_t A_i T_t + \epsilon_{it}, \]  

(3)

in which all characteristics variables and time dummies are interacted with a dummy for the receipt of rental subsidy, \( A_i \). This model allows for a different price of observed housing characteristics for assisted and non-assisted dwellings. The two models, estimated by OLS for the period 1993–1999, give virtually the same results as regards the estimation of the \( w_t \) coefficients, which is our main focus. We thus only present results for model (3) in Table 2.

Taking the last quarter of 1993 as the base case, the parameters of the time dummies interacted with allowance receipt are significant and positive from the third quarter of 1995 until the third quarter of 1996, and for the three last quarters of 1999. In other words the \( w_t \) plotted against time forms a “bump”: the subsidized rents rise more steeply in 1995 and 1996, then rise more slowly (Fig. 3A). During those 2 years the rents paid by assisted tenants seemed to increase significantly faster than the rents of non-assisted tenants. For example, between the fourth quarter of 1993 and the third quarter of 1995, the rents of non-subsidized dwellings rose by 2.6%, whereas the rents of subsidized dwellings rose by 8.6%, some 6.0% points more (Table 2). The model was also estimated on various sub-samples of dwellings: those built before or after 1948, those of the Paris region (Ile-de-France, Fig. 3B) and of the province (Fig. 3C), and small versus large dwellings. The same pattern is found for dwellings built after 1948, but the parameters are not significant for older dwellings, which is consistent with the increase in demand being stronger for newer dwellings (not shown). The differential increase is also very distinct for one or two-room dwellings, +8% in the third quarter of 1995 (not shown). At the end of the period, the price effect does not seem to have disappeared for newer one or two-room apartments. These are favored by students, which were the primary (in number) beneficiaries of the reform. The pressure on the demand for small
Table 2

<p>|                          | Coefficient | Pr &gt; |t| | Coefficient | Pr &gt; |t| | Coefficient | Pr &gt; |t| |
|---------------------------|-------------|------|---|---|-------------|------|---|-------------|------|---|---|
| Intercept                 | 6.5262      | &lt;.0001 |   |   | Built after 1990 | 0.1252 | 0.0019 | T3 | 0.0837 | &lt;.0001 |
| Allowance reception       | 0.2213      | 0.0013 |   |   | Unknown date | 0.0602 | 0.3416 | T4 | 0.0853 | &lt;.0001 |
| Dwelling Incidence        | 0.1252      | 0.0019 |   |   | Before 1914 * A | 0.0969 | 0.1264 | 1998 T1 | 0.1033 | &lt;.0001 |
| Square meters             | 0.1341      | 0.0343 |   |   | 1915–1948 * A | 0.1241 | 0.0508 | T3 | 0.1098 | &lt;.0001 |
| Square meters squared     | 0.1006      | 0.1145 |   |   | 1948–1967 * A | 0.0452 | 0.48 | 1999 T1 | 0.1253 | &lt;.0001 |
| Lift                      | 0.0272      | 0.6689 |   |   | 1982–1990 * A | 0.1455 | 0.0001 | T2 | 0.1098 | &lt;.0001 |
| Lift * A                  | 0.0894      | &lt;.0001 |   |   | Built after 1990 * A | Ref | T3 | 0.1218 | &lt;.0001 |
| Balcony                   | 0.0622      | &lt;.0001 |   |   |   | 0.0894 | &lt;.0001 | T4 | 0.1246 | &lt;.0001 |
| Balcony * A               | 0.0075      | 0.2054 |   |   | Tenure (in years) | -0.0135 | &lt;.0001 | T2 | 0.0065 | 0.7091 |
| Garden                    | 0.0283      | &lt;.0001 |   |   | Tenure * A | 0.0026 | &lt;.0001 | 1993 T1 | 0.0214 | 0.2281 |
| Garden * A                | -0.0004     | 0.9599 |   |   | Landlord’s charact. | T2 | 0.0001 | T3 | -0.0084 | 0.6296 |
| Cellar                    | -0.0241     | &lt;.0001 |   |   | Family member | -0.2279 | &lt;.0001 | T4 | 0.0001 | 0.6296 |
| Cellar * A                | -0.0063     | 0.2439 |   |   | Family member * A | 0.0893 | &lt;.0001 | T4 | 0.0001 | 0.6296 |
| WC. bathroom central heating | 0.5138     | &lt;.0001 |   |   | Company | -0.2368 | &lt;.0001 | 1994 T1 | -0.0030 | 0.8625 |
| WC. bath. No central heating | 0.4618    | &lt;.0001 |   |   | Company * A | 0.0726 | &lt;.0001 | T2 | 0.0065 | 0.7121 |
| WC. bathroom central heating * A | -0.0056 | 0.6506 |   |   | Individual | 0.0000 | &lt;.0001 | T3 | 0.0000 | 0.6296 |
| WC. bathroom No central heating * A | -0.0141 | 0.2723 |   |   | Formal lease | 0.2246 | &lt;.0001 | T4 | 0.0109 | 0.5415 |
| No WC or no bath          | Ref         |   |   |   | Time dummy | -0.0961 | &lt;.0001 | 1995 T1 | 0.0155 | 0.3786 |
| Separate kitchen          | -0.0336     | &lt;.0001 |   |   | Time dummy | 0.0272 | 0.0272 | T2 | 0.0722 | 0.1186 |
| Kitchen                   | 0.0226      | 0.0027 |   |   | 1993 T1 | -0.0210 | 0.0299 | T3 | 0.0604 | 0.0024 |
| House                     | -0.0371     | &lt;.0001 |   |   | T2 | -0.0085 | 0.3793 | T4 | 0.0335 | 0.0747 |
| House * A                 | -0.0074     | 0.4059 |   |   | T3 | 0.0021 | 0.8308 | 1996 T1 | 0.0452 | 0.0114 |
| Ile-de-France             | 0.5152      | &lt;.0001 |   |   | T4 | Ref | T2 | 0.0392 | 0.0231 |
| Ile-de-France * A         | -0.0789     | &lt;.0001 |   |   | 1994 T1 | 0.0162 | 0.0988 | T3 | 0.0302 | 0.0832 |
| 1 room                    | -0.1991     | &lt;.0001 |   |   | 1995 T1 | 0.0180 | 0.2754 | T4 | 0.0164 | 0.3489 |
| 1 room * A                | -0.0049     | 0.7321 |   |   | T3 | 0.0166 | 0.103 | 1997 T1 | 0.0144 | 0.4127 |
| 2 rooms                   | -0.1017     | &lt;.0001 |   |   | T4 | 0.0259 | 0.0093 | T2 | 0.0206 | 0.2395 |
| 2 rooms * A               | -0.0082     | 0.4341 |   |   | 1995 T1 | 0.0417 | &lt;.0001 | T3 | 0.0162 | 0.3584 |
| 3 rooms                   | -0.0729     | &lt;.0001 |   |   | T2 | 0.0374 | 0.0002 | T4 | 0.0145 | 0.4149 |</p>
<table>
<thead>
<tr>
<th>Predicators</th>
<th>Coeff1</th>
<th>Coeff2</th>
<th>Coeff3</th>
<th>Coeff4</th>
<th>Coeff5</th>
<th>Coeff6</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 rooms + A</td>
<td>0.0301</td>
<td>0.0001</td>
<td>T3</td>
<td>0.0256</td>
<td>0.0296</td>
<td>1998 T1</td>
</tr>
<tr>
<td>4 rooms or more</td>
<td>Ref</td>
<td>T4</td>
<td></td>
<td>0.0452</td>
<td>&lt;.0001</td>
<td>T2</td>
</tr>
<tr>
<td>Built before 1914</td>
<td>-0.0758</td>
<td>0.0588</td>
<td>1996 T1</td>
<td>0.0570</td>
<td>&lt;.0001</td>
<td>T3</td>
</tr>
<tr>
<td>1915–1948</td>
<td>-0.1157</td>
<td>0.004</td>
<td>T2</td>
<td>0.0626</td>
<td>&lt;.0001</td>
<td>T4</td>
</tr>
<tr>
<td>1949–1967</td>
<td>-0.1413</td>
<td>0.0004</td>
<td>T3</td>
<td>0.0677</td>
<td>&lt;.0001</td>
<td>T4</td>
</tr>
<tr>
<td>1968–1974</td>
<td>-0.1320</td>
<td>0.001</td>
<td>T4</td>
<td>0.0753</td>
<td>&lt;.0001</td>
<td>T2</td>
</tr>
<tr>
<td>1975–1981</td>
<td>-0.0693</td>
<td>0.0854</td>
<td>1997 T1</td>
<td>0.0892</td>
<td>&lt;.0001</td>
<td>T3</td>
</tr>
<tr>
<td>1982–1990</td>
<td>0.0747</td>
<td>0.0647</td>
<td>T2</td>
<td>0.0834</td>
<td>&lt;.0001</td>
<td>T4</td>
</tr>
</tbody>
</table>

*Note. $R^2 = 0.577$. Number of observations: 77,026. Authors’ calculations based on Quarterly National Rent Surveys, INSEE. Each explanatory variable is interacted with a dummy A for allowance reception.*
dwellings could explain this price effect. Unfortunately, students cannot be isolated in the Quarterly Rent Surveys. There is also an extra rent increase, but to a lesser extent, for the larger dwellings. The distinction between Paris and the other regions shows that the impact occurs in 1994 in the Paris region (however it is not significant). The impact occurs one year later in the rest of France, in conformity with the temporal implementation of the reform.

The same analysis applied to the 1985–1992 series reveals no significant difference in rent variation between assisted and non-assisted dwellings (results not shown). Thus time-series analysis provides evidence of a differential increase in assisted dwellings at the time of the policy reform.

Model (3), however, allows estimation of a causal effect of subsidies on rents only if the error terms in the equation are uncorrelated with all the explanatory variables of the model. This is a very strong assumption. Indeed, it is quite possible that unobserved characteristics of the dwellings affect both the receipt of a rental allowance and the rent level. In that case, the assumption

Fig. 3. Evolution of constant quality assisted and non-assisted rents, 1993–1999. The figures show the parameters of extra time dummies for assisted dwellings in the hedonic regression of log of rents on dwellings characteristics, and their significance at 10%.
E(ε_{it}|X_{kit}, A_{it}, T_t) = 0 is not valid. By using the rotating panel structure of the data, it is possible to break down the error terms into a fixed effect f_t and a residual η_{it}, imposing only the weaker assumption E(η_{it}|X_{kit}, A_{it}, T_t) = 0. In the case studied here, all the characteristic variables are time-invariant. Thus, estimating (3) in first differences, for example, does not permit recovery of the z_k coefficients. However, the coefficients of the time dummies can still be estimated. Within estimate of model (3) makes all the effects observed hitherto disappear: one no longer observes a significant effect of assistance on time dummies coefficients. However, the coefficients of the time dummies can still be estimated. Within estimate of model (3) makes all the effects observed hitherto disappear: one no longer observes a significant effect of assistance on time dummies coefficients (see Fig. 4). But this comes hardly as a surprise, since the model no longer contains explanatory variables. To assess more precisely the robustness of the observation of an additional increase in rent for subsidized tenants, it is thus necessary to directly model rent changes from one period to another. This is the object of Section 6.

6. Direct analysis of rent changes

We are now interested in rent changes between two consecutive quarters, for the same dwelling. In all that follows, we consider as an endogenous variable the quantity

\[ r_{i,t} \equiv \frac{L_{i,t+1} - L_{i,t}}{L_{i,t}} , \]

where \( L_{i,t} \) is the rent of dwelling \( i \) at quarter \( t \). We thus restrict our sample to dwellings observed for two consecutive quarters.

Due to rent regulations in France, the distribution of \( r_{i,t} \) across dwellings is specific. First, as indicated in Section 2, rents during a lease may change only once a year, and the rent change is capped by the construction cost index (ICC) at that time.
Second, over a 1-year interval, a large portion of rents do not change (45% over the period 1993–1997). Thus, the distribution of the \( r_t \) is not continuous, but rather results from a combination of a continuous distribution (for dwellings with a change of renter), a mass at 0, and a continuous distribution with support \([0, ICC]\). Thus, only the distribution of rent changes for dwellings experiencing a change of tenant may be considered as continuous and unrestricted a priori. This feature of the distribution of the rent changes calls for considerable caution to be exercised regarding the robustness of the results. For this reason, two different statistical techniques are used successively: traditional OLS estimators, and matching estimators. Moreover, we perform separate analyses on dwellings experiencing a change of tenant, and on the whole set of dwellings.

Compared to the preceding section, we can also distinguish more finely the trajectories of the dwellings with respect to assistance. At each period, every dwelling falls into one of the two following categories: the tenant receives housing allowance (A) or not (NA). Thus, the possible trajectories of dwellings with respect to assistance between dates \( t \) and \( t + 1 \) are four: one of them is being unassisted in period 1 and getting the allowance in period 2, which we denote NA \( \rightarrow \) A. Similarly, the other trajectories are denoted NA \( \rightarrow \) NA (non-assisted in both period), A \( \rightarrow \) NA, and A \( \rightarrow \) A.

### 6.1. OLS analysis in case of change of tenant

Between 1993 and 1999, 1346 dwellings changed from assisted to non-assisted status, and 1412 changed from non-assisted to assisted. Thus the number of assisted households increased (Table 3). Since rent changes are regulated when the tenant does not move, we focus on the cases where there is a change of tenant. We perform OLS on quarterly changes of rents, introducing as regressors dummies for the type of change of allowance receipt (NA \( \rightarrow \) A, NA \( \rightarrow \) NA, A \( \rightarrow \) NA, and A \( \rightarrow \) A, which is our reference case) together with time dummies, tenure length and other dwelling characteristics. The rent change is found to be significantly higher when the new tenant is subsidized while the previous tenant was not (NA \( \rightarrow \) A), than in any other configurations (Table 4). On average between 1993 and 1999 (Table 4, panel 2), considering a dwelling where there is a change of tenant, the quarterly change is about 6% when there is no change in the situation as regards allowances; it is 3.9% points higher when the new tenant is assisted and the previous tenant was non-assisted. Moreover, the extra change is also observed in the 1984–1992 period (Table 4, panel 1). It is higher because of the higher inflation during this period.

As above the sample is separated into different sub-samples. During the first period

---

24 Over eight quarters, 18% of the dwellings have constant rents.

25 Table 4 only extracts the parameters on the allowance status. An example of the total specification is provided in Appendix B.

26 The rents were not converted to constant Francs because it would have introduced spurious changes in rents. Time dummies are introduced to control for overall inflation in each quarter.
the extra rent increase is not significant in the Paris region, but it is after 1993. During the first period, both dwellings owned by individual private landlords and rental companies behave the same; during the second period, the extra rent increase is seen only for dwellings owned by private individuals.

6.2. Using matching estimators to state the size of the impact

We now use the treatment/control (or evaluation) framework to check the robustness of the results. Our purpose remains to assess whether different trajectories of a dwelling vis-à-vis its housing assistance status have any impact on the variation of the rent. Consider a given period of observation between dates $t$ and $t + 1$ and the dwellings occupied in the two periods. The treatment variable is defined as belonging to $\text{NA} \rightarrow \text{A}$ category. All other dwellings ($\text{A} \rightarrow \text{A}$, $\text{NA} \rightarrow \text{NA}$, $\text{A} \rightarrow \text{NA}$) are considered as not treated. According to this definition, we define a treatment variable $T$ for each dwelling that takes the value 1 for dwellings belonging to $\text{NA} \rightarrow \text{A}$ category, and 0 otherwise. An important point to confirm in this framework is that the treatment is defined relative to the trajectories of the dwellings and not relative to the positions at the initial or terminal date, vis-à-vis the housing assistance.

---

Table 3  
Rented dwellings: quarterly changes of benefit status

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sample size</td>
<td>Percent</td>
</tr>
<tr>
<td><strong>No change of tenant</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-assisted/assisted</td>
<td>400</td>
<td>0.98</td>
</tr>
<tr>
<td>Assisted/non-assisted</td>
<td>347</td>
<td>0.85</td>
</tr>
<tr>
<td>Non-assisted/non-assisted</td>
<td>29,269</td>
<td>71.41</td>
</tr>
<tr>
<td>Assisted/assisted</td>
<td>9005</td>
<td>21.97</td>
</tr>
<tr>
<td><strong>Change of tenant</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-assisted/assisted</td>
<td>140</td>
<td>0.34</td>
</tr>
<tr>
<td>Assisted/non-assisted</td>
<td>231</td>
<td>0.56</td>
</tr>
<tr>
<td>Assisted/assisted</td>
<td>252</td>
<td>0.61</td>
</tr>
<tr>
<td>Non-assisted/non-assisted</td>
<td>1345</td>
<td>3.28</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>40,989</td>
<td>100</td>
</tr>
</tbody>
</table>

*Note.* Authors’ computations based on National Quarterly Rent Survey, INSEE. Sample includes institutional landlords who are excluded in Tables 2 and 4 and Appendix B.
Table 4
OLS on quarterly rent evolution in case of a change of tenant

<table>
<thead>
<tr>
<th></th>
<th>All</th>
<th>Paris region</th>
<th>Rest of France</th>
<th>Individual</th>
<th>Company</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coefficient</td>
<td>Pr &gt;</td>
<td>t</td>
<td>Coefficient</td>
<td>Pr &gt;</td>
</tr>
<tr>
<td>Panel 1. 1984–1992</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>19.24</td>
<td>0.0002</td>
<td>19.84</td>
<td>0.0487</td>
<td>19.11</td>
</tr>
<tr>
<td>Non-assisted → assisted</td>
<td>16.06</td>
<td>&lt;.0001</td>
<td>9.875</td>
<td>0.2590</td>
<td>17.04</td>
</tr>
<tr>
<td>Assisted → non-assisted</td>
<td>3.47</td>
<td>0.1840</td>
<td>5.21</td>
<td>0.5768</td>
<td>3.02</td>
</tr>
<tr>
<td>Non-assisted → non-assisted</td>
<td>3.42</td>
<td>0.0824</td>
<td>4.94</td>
<td>0.3253</td>
<td>3.19</td>
</tr>
<tr>
<td>Assisted → assisted</td>
<td>Reference</td>
<td>Reference</td>
<td>Reference</td>
<td>Reference</td>
<td>Reference</td>
</tr>
<tr>
<td>Nb obs.</td>
<td>1896</td>
<td>440</td>
<td>1455</td>
<td>1635</td>
<td>247</td>
</tr>
<tr>
<td>R²</td>
<td>0.0397</td>
<td>0.1145</td>
<td>0.0734</td>
<td>0.0618</td>
<td>0.1873</td>
</tr>
<tr>
<td>Panel 2. 1993–1999</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>6.32</td>
<td>0.0330</td>
<td>5.31</td>
<td>0.6140</td>
<td>6.08</td>
</tr>
<tr>
<td>Non-assisted → assisted</td>
<td>4.04</td>
<td>0.0015</td>
<td>9.56</td>
<td>0.0637</td>
<td>3.48</td>
</tr>
<tr>
<td>Assisted → non-assisted</td>
<td>−0.05</td>
<td>0.9667</td>
<td>−1.11</td>
<td>0.8156</td>
<td>0.05</td>
</tr>
<tr>
<td>Non-assisted → non-assisted</td>
<td>0.86</td>
<td>0.4095</td>
<td>−0.82</td>
<td>0.8441</td>
<td>1.31</td>
</tr>
<tr>
<td>Assisted → assisted</td>
<td>Reference</td>
<td>Reference</td>
<td>Reference</td>
<td>Reference</td>
<td>Reference</td>
</tr>
<tr>
<td>Nb obs.</td>
<td>2846</td>
<td>516</td>
<td>2329</td>
<td>2489</td>
<td>342</td>
</tr>
<tr>
<td>R²</td>
<td>0.0275</td>
<td>0.0674</td>
<td>0.0173</td>
<td>0.0279</td>
<td>0.1153</td>
</tr>
</tbody>
</table>

Note. Authors’ computation from Quarterly National Rent Surveys, INSEE. OLS on quarterly rent change in case of a change of tenant. Regressors include control dummies (see Appendix B for an example of a complete model).
to households and not directly to dwellings. Thus, a dwelling with certain characteristics may or may not be treated, depending on the renter.

Next, the potential outcomes are defined as the percentage rent change between \( t \) and \( t + 1 \); \( r_1 \) and \( r_0 \cdot r_1 \) is observed if the dwelling is treated, \( r_0 \) otherwise, so that the rent change is given by the switching regression model

\[
r = Tr_1 + (1 - T)r_0.
\]

The causal effect of the treatment is defined as \( \Delta = r_1 - r_0 \). As in Rosenbaum and Rubin (1983), the propensity score is

\[
S(X) = \Pr(T = 1/X).
\]

We use one classical hypothesis of conditional independence of outcomes and treatment in the form

\[
(CI) \quad r_0 \perp T/S(X).
\]

That is, conditional on the probability of being treated, the potential change of the rent without treatment does not depend on the treatment. As in many empirical studies lacking a structural model, the validity of the (CI) hypothesis is a matter of assumption. It is thus valuable to use two different methods to study the same data: if they give comparable results, there is less reason to suppose that the (CI) hypothesis is untenable. Conditional on this hypothesis, the source of identification of the treatment effect is the presence in the sample of dwellings that undergo different trajectories regarding assistance.\(^{30}\) Under the conditional independence hypothesis, we have \( E(r_0/T = 1, S(X)) = E(r_0/T = 0, S(X)) \), which allows us to identify \( E(r_1 - r_0/T = 1, S(X)) \), which is not observed, with \( E(r_1/T = 1, S(X)) - E(r_0/T = 0, S(X)) \), which is observed.

We are interested on the mean effect of the treatment on the treated,

\[
M = E(r_1 - r_0/T = 1).
\]

More specifically, the matching estimators estimate an averaged version of this parameter, as in Heckman et al. (1997):

\[
M(S) = \frac{\int_S E(\Delta/S(X), T = 1) dF(S(X)/T = 1)}{\int_S dF(S(X)/T = 1)}, \tag{4}
\]

where \( S \) denotes the support of \( S(X) \) given \( T = 1 \).

Only a mean response is estimated. We do not attempt more sophisticated analyses such as estimating a response function depending on the characteristics of the dwelling, because of the relative infrequency of rent changes.\(^{31}\) We do, however,

\(^{30}\) Another potential source of identification would arise from the temporal schedule of the reform, since it took place in the Paris region one year before it was implemented in other regions. Thus, providing that rents evolve similarly in the Paris region and in other regions, the reform effect might be identified by comparing the evolutions of rents in Paris and in other cities in the initial year of the reform. However, Paris and the Province are widely recognized as different housing markets, so we did do this.

\(^{31}\) Trying to identify a response function could only be achieved by looking at the dwellings for which the dwellers change. These dwellings are too rare in the sample to allow for the identification of more than a few basic parameters.
estimate the effects on sub-populations, such as small dwellings, Paris region dwellings, etc. In the same vein, the overall rent changes are compared to the rent changes of dwellings that have known at least one change of dweller over the period: as mentioned before, these situations are the only ones where rents are freely set. Normal and biweight kernel matching estimators are presented (see for example Heckman et al., 1997). For a detailed description of the estimators, see Appendix C.

Tables 5–7 summarize the results. Table 5 presents the estimates for the treatment effect based on quarterly rent changes. The increase in the rent of treated dwellings is not significant in Paris. In other regions, however, it is significant at a 5% level, indicating a significant supplementary increase of the rent of the treated dwellings. Due to the low number of changes of dwellers, the estimates based on the dwellings that have undergone at least one change of dweller are only significant at a 15% level, but the estimated coefficient is quite large. The estimated effect is stronger for recent dwellings (built after 1968), but not different for small dwellings (one or two rooms). The same qualitative conclusions can be drawn from Table 6, which presents the estimates based on a five-quarter observation of the dwellings. Due to the rotating nature of the panel, the sample size is much reduced. Thus although the size of the estimated effects stays roughly the same, they are only significant at a 10% level. The Province dwellings as a whole, however, remain significant at a 5% level. As before, no significant effect can be found in the Paris region.

Table 7 presents the one-quarter period estimated effects for the 1989–1992 period. No significant effect can be found in the Paris region (not shown in the table). The other groups exhibit stronger effects than in the reform period. For example, the mean rent change of a dwelling with a new tenant was 14.1% when the new tenant was subsidized and the previous one was not, and only 5.4% in other cases. Note, however, that no significant effect is found for recent-built dwellings in that period, contrary to the post-reform period.

To sum up, the results are consistent with the hypothesis that some landlords use their market power to exert a certain form of discrimination. If the landlords could not set different rents for assisted and non-assisted renters, then, conditional on the probability of getting a subsidized renter, the ex post type of the renter (assisted or not) should not matter: the rent would be the same in all dwellings of the same type, whether the tenant gets allowances or not. As a rent differential is observed with respect to the assisted/non-assisted position of the renter, after controlling for dwelling characteristics that might be linked to rental assistance, then one can conclude that (at least some) landlords use information on the renters to set the rent.

32 One might expect finding larger effects on a five-quarter basis than on a one-quarter basis. Recall however that the two samples are not the same due to the QRS rotating panel sampling frame, and that as a rule rent changes occur quite infrequently.

33 It cannot be said whether the less significant effect reflects a change in the behavior of individual landlords or is due to sample size.
Table 5
Analysis of quarterly rent changes, period 1993.1–1997.4

<table>
<thead>
<tr>
<th></th>
<th>Paris region</th>
<th>Other regions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>All dwellings</td>
</tr>
<tr>
<td>Number of observations in control group</td>
<td>12,158</td>
<td>37,714</td>
</tr>
<tr>
<td>Number of observations in treatment group</td>
<td>NA → A</td>
<td>149</td>
</tr>
<tr>
<td>Mean increase in control group (1)</td>
<td>.40</td>
<td>.53</td>
</tr>
<tr>
<td>Mean increase in treatment group (2)</td>
<td>.92</td>
<td>1.34</td>
</tr>
<tr>
<td>Difference (2) − (1)</td>
<td>.52 (.41)</td>
<td>.81 (.25)</td>
</tr>
<tr>
<td>Normal kernel estimator</td>
<td>.32 (.45)</td>
<td>.67**** (.26)</td>
</tr>
<tr>
<td>Biweight kernel estimator</td>
<td>.30 (.47)</td>
<td>.66*** (.26)</td>
</tr>
</tbody>
</table>

*Note.* Standard error in parenthesis.
** Significant at 15% level.
**** Significant at 5% level.
This behavior is not due to the policy reform, because both periods show the same pattern: the rent of dwellings with newly assisted tenants rises more than the rent of other dwellings. In a steady state, the aggregate time variations of the rents of assisted and non-assisted tenants would not exhibit differences, because the flows of dwellings into and out of assistance are of the same magnitude. This is what is observed for the 1989–1992 period (our Section 5). The reform introduced a temporary disequilibrium: for 3 or 4 years, the flows of entry into assistance were greater than the opposite flows, causing the aggregate variation of the rent of dwellings with assisted tenants to rise above that of non-assisted. When a new steady state is reached, the proportions of the two types of dwellings are modified. The flows into and out of receipt of allowances have again the same order of magnitude, and tend to 'contaminate' each other, so little or no difference appears in the aggregate changes of the rents of the two types of dwellings. Thus, the reform period acts as a means of revealing the underlying economic mechanism.

Is there an alternative economic explanation to our discrimination one of the observed differential? The rent differential might be thought to reflect a risk premium associated with subsidized households. If the landlords are not risk-neutral, they could charge more for a subsidized tenant. In fact, 80% of the landlords in the private sector are non-corporate individuals, the overwhelming majority of them owning one or two dwellings. If getting an housing subsidy signals a greater probability of default, the risk adverse landlords could impose a premium on subsidized people. Distinguishing dwellings by type of landlords (see Table 8), no significant discrimination effect appears for company-owned dwellings (real estates societies, insurance companies, banks) for the
The effect for individual landlords is significant at a 5% level for the post-reform period, and at a 15% level for the pre-reform period. However, even this explanation is not fully satisfactory. Indeed, the housing subsidies themselves can be conceived as insurance against the non-payment of the rents. Thus, a renter who receives housing subsidies should be considered as less risky to default than a non-subsidized one. But since the allowances are usually paid to the households, not directly to the landlords (this latter case concerns only 15% of the cases), they are probably not considered as a full insurance by landlords. To further investigate this question, one would like to concentrate on the households who were most impacted by the reform, and check if the risk premium associated with them has grown or diminished after the reform. Unfortunately, the Quarterly Rent Surveys do not contain very many variables describing the households (income, or whether they are students, is not known), nor their rent payment behavior.

### Table 7

<table>
<thead>
<tr>
<th>All dwellings</th>
<th>Changes of dweller only</th>
<th>Dwellings built after 1968</th>
<th>One or two-room dwellings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of observations in control group</td>
<td>15,592</td>
<td>822</td>
<td>7272</td>
</tr>
<tr>
<td>Number of observations in treatment group NA → A</td>
<td>309</td>
<td>45</td>
<td>132</td>
</tr>
<tr>
<td>Mean increase in control group (1)</td>
<td>1.02</td>
<td>5.43</td>
<td>1.01</td>
</tr>
<tr>
<td>Mean increase in treatment group (2)</td>
<td>2.99</td>
<td>14.11</td>
<td>2.85</td>
</tr>
<tr>
<td>Difference (2) – (1)</td>
<td>1.97 (.77)</td>
<td>8.68 (4.34)</td>
<td>1.84 (1.13)</td>
</tr>
<tr>
<td>Normal kernel estimator</td>
<td>1.41*** (.80)</td>
<td>9.34*** (.70)</td>
<td>0.16 (.89)</td>
</tr>
<tr>
<td>Biweight kernel estimator</td>
<td>1.44 *** (.79)</td>
<td>9.05*** (4.78)</td>
<td>0.10 (.88)</td>
</tr>
</tbody>
</table>

**Note.** Standard error in parenthesis.

*** Significant at 10% level.

**** Significant at 5% level.

### Table 8

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual</td>
<td>Company</td>
</tr>
<tr>
<td>Number of observations in control group</td>
<td>31352</td>
</tr>
<tr>
<td>Number of observations in treatment group NA → A</td>
<td>939</td>
</tr>
<tr>
<td>Mean increase in control group (1)</td>
<td>.52</td>
</tr>
<tr>
<td>Mean increase in treatment group (2)</td>
<td>1.43</td>
</tr>
<tr>
<td>Difference (2) – (1)</td>
<td>.51 (.30)</td>
</tr>
<tr>
<td>Normal kernel estimator</td>
<td>.78*** (.30)</td>
</tr>
<tr>
<td>Biweight kernel estimator</td>
<td>.76*** (.29)</td>
</tr>
</tbody>
</table>

**Note.** Standard error in parenthesis.

** Significant at 15% level.

**** Significant at 5% level.

1993–1997 and the 1989–1992 periods. The effect for individual landlords is significant at a 5% level for the post-reform period, and at a 15% level for the pre-reform period. However, even this explanation is not fully satisfactory. Indeed, the housing subsidies themselves can be conceived as insurance against the non-payment of the rents. Thus, a renter who receives housing subsidies should be considered as less risky to default than a non-subsidized one. But since the allowances are usually paid to the households, not directly to the landlords (this latter case concerns only 15% of the cases), they are probably not considered as a full insurance by landlords. To further investigate this question, one would like to concentrate on the households who were most impacted by the reform, and check if the risk premium associated with them has grown or diminished after the reform. Unfortunately, the Quarterly Rent Surveys do not contain very many variables describing the households (income, or whether they are students, is not known), nor their rent payment behavior.
7. Summary and extensions

This paper uses the impact of the 1992–1994 French reform of housing subsidies to assess how housing allowances affect private sector rents in the short run. Aggregate empirical evidence shows a differential in the time trend of rents of dwellings with assisted and non-assisted renters, beginning a few quarters after the reform. Taking the base index as 100 for the last quarter of 1993, it stands at 102.6 in the third quarter of 1995 for dwellings with non-assisted renters, and 108.6 for those with assisted renters, about 6 points higher. The effect is larger for recently built or small dwellings. This differential remains after controlling for dwelling characteristics and tenure discounts in a hedonic model of rents. An alternative strategy to control for dwelling characteristics, namely to analyze rent changes of the same dwelling, provides the same result of a rent differential. Both traditional OLS and matching estimators show that the rent growth is higher (around 3% points more, outside the Paris region) when the new renter is assisted and the previous renter was not, than in any other case (no change of allowance status, or the new renter is no longer subsidized). This was also the case before the reform. The reform, modifying the relative proportions of assisted and non-assisted renters in the population, introduces a temporary disequilibrium, which by a composition effect allows the observation of the differential effect on aggregate time-series data.

Previous papers on the subject addressed the issue of the effect of a housing allowance on the overall level of rents. Some assumed an adequate supply response meeting the new demand and thus argued for a small or negligible effect on rents (Crews and Olsen, 2002; Rydell, 1980). Others (Susin, 2002) pointed to the tightness of the low-income housing sub-market, insufficient supply, and rents being pushed up because of subsidies and the competition between beneficiaries and non-beneficiaries for the same type of houses. This study is one of the first to examine rent adjustments in response to a change in a housing assistance system at the microeconomic level, and it provides evidence for another mechanism. In some cases landlords and tenants might agree, tacitly or not, to share the subsidy by increasing the rent. Whether this is due to idiosyncratic features of the French rental market or is more general is left for future research.

It should be emphasized that this non-structural approach does not answer the question ‘How much did housing subsidies increase rents?’ Indeed, the evidence presented in Section 5 shows that three or four years after the implementation of the reform, the rents of dwellings with non-subsidized renters seem to catch up those of dwellings with subsidized renters (although there is still some difference at the end of the period in 1999). The effect of the reform on all rents, and the long-term effect of housing subsidies on rents cannot be identified without modeling both demand and supply in the rental market. Given the unique attributes of the French private rental sector, this is by no means an easy task. Extensions to this work could include identifying other datasets from countries where rent control is less severe. This could allow for the estimation of individual landlord response functions, rather than the aggregated response. With larger samples, one could also sharpen the matching criteria, by matching a dwelling with dwellings located in the same local housing market. This could be done using rent data from cities, rather than nationwide data. Unfortunately, such data are not currently available in France.
Appendix A

Fig. A.1. Sample evolution of assisted and non-assisted tenants in the Paris region and in the rest of France.

Appendix B. Complete OLS model of rent evolution

An example of OLS analysis of quarterly rent evolution in case of change of tenant: 1993–1999

| Parameter estimate | Pr > |t| | Parameter estimate | Pr > |t| |
|--------------------|------|---|-------------------|------|---|
| Intercept          | 6.3253 | 0.0330 | T4                | 1.7635 | 0.4706 |
| NA → A             | 4.0408 | 0.0015 | 1995 T1           | -0.8921 | 0.7358 |
| A → NA             | -0.0477 | 0.9667 | T2                | 6.4960 | 0.0187 |
| NA → NA            | 0.8642 | 0.4095 | T3                | -1.0777 | 0.7557 |
| A → A              | Ref   |     | T4                | -1.7449 | 0.5083 |
| Family member      | -8.8656 | 0.0980 | 1996 T1           | -0.0008 | 0.9998 |
### Appendix B (continued)

| Parameter estimate | Pr > |t| | Parameter estimate | Pr > |t| |
|---------------------|-------|---|---------------------|-------|---|
| Individual          | 2.4336 | 0.0326 | T2                  | −0.7008 | 0.8081 |
| Company             | Ref | T3 | 0.4922 | 0.8675 |
| Built after 1948    | −2.2142 | 0.0035 | T4 | 0.5307 | 0.8252 |
| Ile-de-France       | −0.9199 | 0.3676 | 1997 | T1 | −0.4688 | 0.8595 |
| Formal lease        | −1.9351 | 0.2941 | T2 | 0.3149 | 0.9076 |
| 1 room              | −3.1681 | 0.0008 | T3 | −0.1237 | 0.9658 |
| 2 rooms             | −2.7394 | 0.0018 | T4 | 0.4626 | 0.8484 |
| 3 rooms or more     | Ref | 1998 | T1 | −1.4550 | 0.5827 |
| Tenure (in years)   | −0.0442 | 0.6883 | T2 | 6.9517 | 0.0127 |
| 1993 T2             | 1.1124 | 0.6918 | T3 | 1.6696 | 0.5560 |
| T3                  | −2.2939 | 0.3917 | T4 | −0.3339 | 0.8902 |
| T4                  | 1.7017 | 0.4860 | 1999 | T1 | 2.2815 | 0.4094 |
| 1994 T1             | Ref | T2 | 0.4368 | 0.8723 |
| T2                  | 1.0977 | 0.7147 | T3 | −0.8751 | 0.7570 |
| T3                  | −0.4244 | 0.8853 | T4 | −1.2712 | 0.6012 |

| $R^2$ | 0.0275 | Number obs. | 2846 |

*Note.* Dependent variable: quarterly rent change in case of change of tenant. OLS performed on sub-sample excluding institutional landlords such as municipalities.

### Appendix C. Matching models

The $(CI)$ hypothesis allows to write $M = E(E(r_{1T} / T = 1, S(X)) - E(r_{0T} / T = 0, S(X)))$.

The first caveat when using matching estimators is to guarantee that the support of the characteristics is the same for the treatment group and the comparison group (see for example Heckman et al., 1997). Our estimators meet this requirement, since the first step consists in finding the common support of the propensity score for both groups. The second caveat, the comparability of information on the two groups, is obviously satisfied here as the two groups come from the same survey sample and have been administered the same questionnaire. Third, Heckman et al. (1997) insist on controlling for the heterogeneity which arise from different spatial conditions: “matching methods are far more effective in recovering the parameter of interest when the comparison group and the treatment group both reside in the same local labor market.”

In our case, the heterogeneity may arise from matching dwellings from different housing markets. The size of our sample does not allow for a separation in, e.g., the 22 French administrative regions, but we break the sample in two: the Paris area (Ile-de-France) and the other regions (Province), as they are widely recognized as different housing markets.
Two types of kernel matching estimators, are used with normal and biweight kernels, respectively. Specifically, the procedure is as follows. The sample of dwellings is parted in two groups, the treatment group \( C_1 \), where \( T = 1 \), and the control group \( C_0 \), where \( T = 0 \). The first step consists in estimating the propensity score \( S(X) \). This is done with a logit model. Denote \( N_0 \) the number of observations in the control group, and \( V_0 \) the empirical variance of the score in the control group. The bandwidth parameter is defined as:

\[
h_0 = \sqrt{\frac{V_0}{N_0^2}}.\]

Each treated dwelling \( i \) which meets the common support requirement is matched with all the non-treated dwellings \( j \) which also meet that requirement, with a weight equal to \( f( (S_i - S_j)/h_0 ) \), with

\[
f = \exp(-x^2/2) \text{ for the normal kernel,}\]

\[
f = (1 - x^2)^2 \cdot 1_{|x|<1} \text{ for the biweight kernel.}\]

The corresponding estimator has the form

\[
\hat{M} = \frac{1}{N_1} \sum_{i=1}^{N_1} \left[ r_{1i} - \frac{\sum_{j \in C_0} p_{0j} \cdot f \left( \frac{S_i - S_j}{h_0} \right)}{\sum_{j \in C_0} f \left( \frac{S_i - S_j}{h_0} \right)} \right],
\]

where \( N_1 \) is the number of dwellings of the treated group that meet the common support restriction.

The variance of the estimators is obtained by bootstrap. Bootstrapped samples have the same size than the original one, and the number of tries is 100. Sensibility analysis show that after 50 tries, the estimated parameters do not vary.

References


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\(34\) In fact, different bandwidths were tried to assess the robustness of the estimators.
Rydell, C.P., 1982. Price elasticities of housing supply, The Rand Corporation, Santa Monica, CA, Number R-2846-HUD.