Are Housing Benefits an Efficient Way to Redistribute Income ? Evidence From a Natural experiment in France

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Abstract

In this paper, we show that in-kind benefits such as voucher programs may have a significant impact on the price of the subsidized good. It is thus very important to take this effect into account to assess properly the efficiency of such welfare programs. We use a French housing benefit reform to evaluate the effects of the benefits on rents. We find that one additional euro of housing benefit leads to an increase of 78 cents in rents, leaving only 22 cents for low income households to reduce their net rent and increase their consumption. This large impact of housing benefits on rents seems to be caused by a very low housing supply elasticity. We show that the housing benefits reform has induced additional demand not only from low income households but also from students who have used the benefits to become independent. Unfortunately, housing supply has responded very little in the short and middle term to the increase in demand. The only possible effect of the reform is a small increase in housing quality. These results question the use of such in-kind transfers when the supply of subsidized good is almost inelastic.

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1 Introduction

Housing benefits have become a major component of redistributive programs in many developed countries. In France for example, housing subsidies have constantly increased over the past thirty years and cost 12.8 billion euros in 2002 (more than 0.8 % of French GDP). For comparison in-work benefits (the French equivalent of EITC) and the so called "revenu minimum d'insertion" (minimum benefit payment for the poorest households) amounted respectively to 2.5 and 4.7 billions euros. Surprisingly, the efficiency of housing benefits in redistributing income has not often been questioned. The debate about housing benefits usually focuses on the advantages and drawbacks of housing benefits compared with public housing. The later has been widely criticized since the end of the seventies and housing benefits has been presented as a more reliable and efficient way to help poor people. But even if housing benefits give more choice to consumers than public housing, these two types of programs are in-kind transfers and it is still not very clear that they are more efficient than cash transfers to improve poor households' welfare.

In the absence of market imperfections, it is known that the welfare value of an in-kind transfer cannot be more than the value of an equal cash transfer and may be less. In case of a lump-sum subsidy, if the transfer is inferior to the household consumption of the good before the subsidy, it is equivalent to a cash transfer, but if it is greater, it will distort consumption, leading to overconsumption of the subsidized good. In case of a proportional transfer (which is generally the case for housing benefits), the subsidy always distorts consumption choices.

The classic justification (usually referred to as the paternalistic justification) of using in-kind transfers instead of cash transfers is that poor households do not consume enough of the subsidized good. It can be because they do not take into account externalities (on the surrounding neighborhood for example) or that the person who chooses consumption in the household does not take into account other members' utility (typically one does not take enough care of her children's needs). In a paper that assesses the effects of housing programs for low income households, Olsen [2000] considers that one of the main goals of these programs is *"to induce the worst housed families at each level to occupy better housing than they would choose if they were given equally costly cash grants with no strings attached"*.

In-kind transfers can also be justified in a world of imperfect information when the government is not able to distinguish between the needy and the others. Blackorby and Donaldson [1988] show that in-kind transfers can be used to self select the persons who

really need them, when they are specific and non tradable. Everybody would be tempted to claim cash transfers whereas in-kind transfers will be claimed only by those who really need them (because the other have no interest in getting these transfers). In that case, in-kind transfers are better than cash transfers. This explanation is appealing but it applies only to specific types of transfers (for example specific medical care) and is not very relevant for housing benefits because everybody would be better off with housing benefits. Besides, there is not such an information problem in our case.

Empirical studies have usually focused on the evaluation of the "costs" of in-kind transfers, because it is difficult to estimate the potential "benefits" of in-kind transfers that could result from a greater consumption of the subsidized good. Several Papers (Moffit [1989] or Slesnick [1996]) have estimated the deadweight loss of receiving in-kind instead of cash transfers, but they usually assume that in-kind transfers do not have any impact on market prices.

There are several recent empirical papers that study the impact of housing benefits on rents, finding significant price effects. A first paper by Susin [2002] on the American "Section 8" voucher program estimates the impact of the proportion of benefit recipients on the price of low income housing in the area. The study exploits the fact that only 10% of eligible low income households actually receive benefits in the United States and that the proportion of recipients varies greatly over the different metropolitan areas. Susin comes with the results that Section 8 programs have raised the rents for all low income households by more than the amount of voucher distributed, hurting especially eligible households who do not receive benefit and resulting in a transfer from low income households to landlords. However, the precise estimate of the effect can be questioned, because of a problem of endogenous allocation, that may not be entirely solved in the paper. A French paper by Laferrère and Le Blanc [2002] also finds an effect of housing benefits on rents. The authors use a survey called Enquête Loyer et Charges that is conducted every trimester in order to update the Price Index and follows each flat for 8 semesters. The paper exploits the panel structure of the survey to compare the change in rents for flats whose tenants have started (or stopped) receiving benefits to those whose tenants have not experienced any change in benefit reception. They find a significant effect of housing benefit on rents, but their method does not give them a precise estimate of the effect. A study by Gibbons and Manning in the United Kingdom also finds substantial rent reductions after a reform that has cut housing benefits for new recipients. But their results varies greatly depending on the survey used in the regression.

All these studies draw a similar overall picture of the housing market for low income households. Housing supply seems to be quite inelastic and landlords seem to extract a part of housing benefits. These results suggest that low income households are really trapped into low quality units, unable to move out. But these studies do not give a precise and satisfactory estimate of the part of the housing benefit that is taken by landlords. The task of this paper is to produce a precise estimate of the cost induced by the price effect in order to evaluate the efficiency of such a transfer.

We exploit a French housing benefits reform passed in the beginning of the nineties as a natural experiment. The reform has extended the housing benefits program to single and small low income households who did not received benefits before, without affecting other households. We show that one euro of housing subsidies has led to an increase of 78 cents in rents for these poor subsidized households, leaving them only 22 cents. Consequently, they do not seem to have increased a lot their housing consumption. The only possible effect would be a small increase in the quality of housing. The large impact of housing benefits on rents seems to have been caused by a very low housing supply elasticity. These results show that the price effect can entails severe efficiency costs for in-kind transfers programs and they question the use of such programs when the supply of the subsidized good is almost inelastic.

The rest of this paper is organized as follows. First, we are going to describe the French housing benefit system. We will then present a simple model to understand the effects of housing subsidies on rents (section 2). Then we will explain the empirical methods (section 3), describe the data used for the estimation (section 4), and show the results (section 5). The last sections address the questions of the side effects due to students (section 6) and the housing quality effects (section 7).

2 The French Housing Benefits System

A short history of French Housing Policy since the Second World War. Housing Policy has been developing in France since the beginning of the twentieth century but the shortage of dwellings after the Second World War (caused by the damages of the war but also the lack of new investments during the 1920s and 1930s) led to an increase of State subsidized housing. Until the end of the seventies, subsidized housing consisted mainly of government funded construction (housing projects called "Habitations à Loyers Modérés" (HLM)). Housing benefits existed, but they were targeted to particular groups of people.

The first type of housing benefit created in France in 1948, "L'Allocation de Logement Familiale" (ALF) aimed at helping low income families with children. In 1971, a second type, "l'Allocation de Logement Sociale" (ALS) was created to help other categories of low income households who could not receive ALF (old people aged 65 or more, young workers under 25...).

However housing projects started to be criticized, mainly because of their bad quality but also because they were not enough targeted to poor people. It appeared that many households who were once entitled to rent a flat in a subsidized unit managed to stay there even if their growing income did not entitled them anymore to live in it : to avoid concentration of poverty, managers would prefer to let them stay than to replace them by poorer households. The government also wanted to start to withdraw and to give more strength to the private housing market. In 1977, the government passed a reform that led to a dramatic shift of subsidized housing : the priority was given to housing benefits, with the objective to spend two third on it (with only one third remaining to fund housing projects). A new type of housing benefit was created "l'Aide Personnalisée au Logement" (APL). It was targeted to low income income households but only to those living in dwelling having a special agreement with the state (mainly public housing).

Only in the beginning of the 1990's a reform extended housing benefits to every low income household either in public or private sector. The extension was made in three years, first for Ile de France (Paris and the surrounding region) in 1991, then for the other big cities in 1992 and finally in 1993 it was extended to the rest of the country. We are going to exploit this reform to estimate the effects of housing benefits on rents.

The French housing benefits system. In France, housing benefits subsidy rents in public or private units, but also payments from a house mortgage. Subsidized units must meet minimum inhabitability standards. From the three subsidy schemes, ALS and ALF differ only by the characteristics of people entitled to claim it (ALF remains targeted to families, ALS to other households) but the calculation is the same. APL differs from the other subdsidy schemes because to be entitled to claim it, one has to live in a dwelling specially agreed by the state (this agreement is called "conventionnement"). APL has the same formula but the income and rent scales taken into account are different : they are usually more generous. The housing benefit is a function of the rent (up to a certain limit), the household income and the family size. Until 1997, the formula was the following :

$$A = K(R + C - R_0)$$

With A the Housing Allowance, R the rent, up to a maximum rent function of family size and geographical location, C a fixed amount (depending of the family size) to cover the service charge et R_0 the minimum housing expenses that should be paid by the household. K was a coefficient between 0 et 0.9, decreasing in income and increasing with the family size N .

In 1997, the formula for APL has been modified and this new formula has been extended to the other subsidy schemes in 2001. The new calculation is the following :

$$A = R + C - P_p$$

where P_p is the part of the rent that has to be paid by the household.

To summarize, housing benefit increases with the rent paid by the household, up to a limit. They also increase with the family size and decrease with income.

Compared with other subsidy schemes, the French housing benefits system has some specificities. First, the system is universal, meaning that every eligible household will receive the allowance if he claims it. This situation is very different from the American case described by Susin [2002] where vouchers are rationed and only a small part of the poor eligible households receive benefits. The French Housing benefits system is more like the English one, but there is one difference between them. Until the end of the 1990's, the English system did not have a fixed rent cap and the housing subsidy would pay up to 100% of the rent for poorer families. Thus households were not incited to search for cheaper accommodations. In France, there is no restriction on the price of the unit rented, but the subsidy will only cover the rent up to the maximum, defined by family size and geographical location, and the excess will be at the family expense. And in any case, the formula defines a minimum amount to be paid by the household (function of income and family size), so the subsidy never covers 100% of the rent. The French system incites people to find units with the maximum rent but not more expensive ones.

3 A simple model to understand the effects of housing benefits on rents

The hypothesis of segmented housing markets. We can construct a simple model to understand the effects of housing benefits on rents. We follow Susin [2002] assuming the existence of different housing submarkets offering a range of housing quality, with the poor household occupying the lower quality housing, middle income having middle quality housing and so on... Houses of different qualities can be more or less substitutable. In the short run we can assume that each submarket works without connection with the others. However it is not the case in the long run, because landlords can adjust new constructions and they also have the possibility to do some "filtering". For example, if houses first built for middle income families are not maintained, they will deteriorate and eventually "filter down" to the poor [1].

Equilibrium without subsidy. To keep things simple, let us assume that the rental housing market is split into two submarkets of different qualities : the first segment is for households of income y_1 and the second for those of income y_2, with $y_1 \leqslant y_2$. In period 1, there is no subsidy and each household chooses her consumption of housing services s (in square meters) and of a numeraire composite good c, maximizing her utility function under the budget constraint:

$$\max U(c_{i1}, s_{i1})$$
$$\text{under the budget constraint : } c_{i1} + s_{i1} r_{i1} \leqslant y_i$$

Where r_{i1} is the rent per square meter of household type y_i in period 1, s_{i1} her consumption of housing services and c_{i1} the consumption of composite good in period 1.

The demand curve $S_i^D(r_{i1})$ for housing services is given by the aggregation of individual demands on each submarket. The equilibrium rent in period 1 r_{i1}^* is determined by the intersection of the demand curve with the supply curve $S_i^S(r_{i1})$.

Equilibrium with a subsidy. We suppose that a housing subsidy reform is passed so that in period 2, low income households y_1 start receiving an housing allowance, defined as follows : $A = a_i.s_i$ where a_i is the subsidy per square meter. Only low income households y_1 can claim it : $a_{12} > 0$ and $a_{22} = 0$ (and $a_{11} = a_{21} = 0$, because there is no housing

[1] Such models thus are called filtering models.

allowance in period 1).

Thus the budget constraint for households y_1 benefiting from the subsidy becomes in period 2 :

$$c_{12} + (r_{i1} - a_{12})s_{i1} \leq y_1$$

Housing benefits reduces the price of housing services compared to other goods. We can consider housing as a normal good, so there is an increase in the demand for housing by the new recipients : $S_1^D(r_{12} - a_{12}) > S_1^D(r_{11})$. The increase of rents is a function of the elasticity of housing supply.

Formally if we suppose constant elasticity for housing supply e_s and housing demand e_d, we have for households y_1:

$$\frac{\Delta s}{s_{11}} = e_s \frac{(\Delta r_1)}{r_{11}} = -e_d \frac{(\Delta r_1 - \Delta a_1)}{(r_{11} - a_{11})}$$

Following:

$$\Delta r_1 = \theta \Delta a_1 \quad \text{avec} \quad \theta = \frac{e_d}{\left[e_s\left(\frac{(r_{11}-a_{11})}{r_{11}}\right) + e_d\right]}$$

In this simple model, as there is no subsidy in period 1 ($a_{11} = 0$), we get :

$$\theta = \frac{e_d}{e_s + e_d}$$

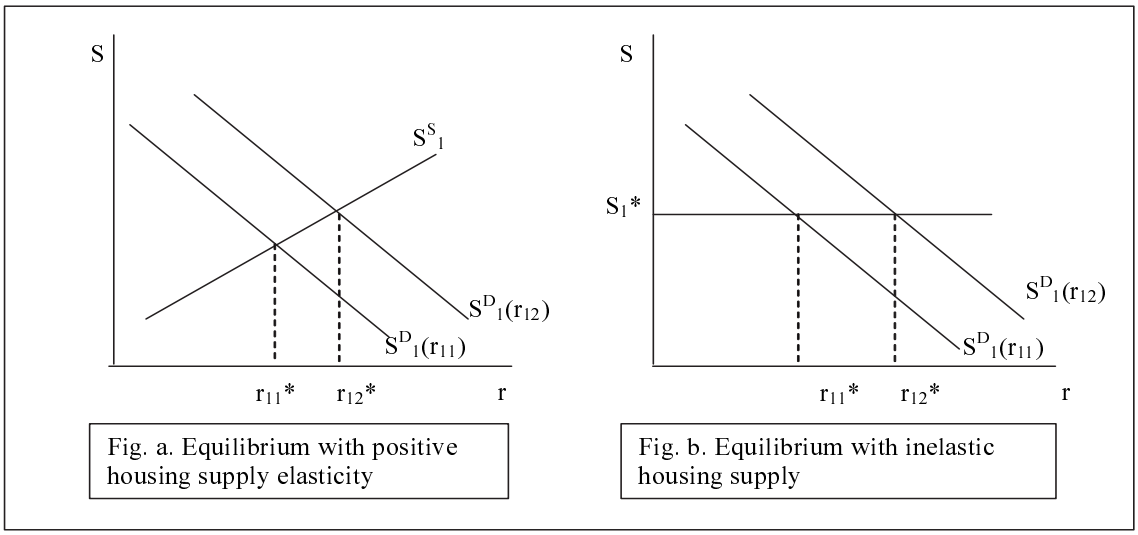

Fig. a. Equilibrium with positive housing supply elasticity

Fig. b. Equilibrium with inelastic housing supply

In this model, the gap between elasticities plays an important role : the lower the housing supply elasticity compared to housing demand elasticity, the higher θ. And a high level of θ implies that an increase of housing benefits will lead to an increase in rents on the

low income submarket. In an extreme situation of inelastic housing supply ($e_s = 0$), with a fixed stock of housing supplied by landlords on the low income submarket, the additional demand for housing induced by the subsidies will not be satisfied. As a result, the subsidy will be entirely crowded out by the increase in rents ($\theta = 1$) as shown on figure b.

The situation would be different if there was an unique housing market with pure and perfect competition. The additional demand for housing induced by the subsidies given to households type y_1 would lead to a shift of the global supply curve. The increase in rents would be smaller and would affect everybody, those receiving benefits has well as those not entitled to it. With a proportion α of households receiving the housing subsidy, every household would suffer from the following increase in rents :

$$\Delta r = \alpha\theta\Delta a$$

In the empirical part, we are going to estimate θ, the proportion of the subsidy that has been crowded out by the increase in rents. But we want to make a few preliminary remarks concerning the meaning of θ.

i) Without additional hypothesis, we can not say if the effects of housing benefits on rents will sustain in the long run. It is possible to view it as a transient phenomenon that will disappear after the adjustments made in the long run. Galster [1997] considers for example that housing supply is inelastic in the short run, because houses of different qualities are not perfectly substitutable but not in the long run.

But we can also make the hypothesis that substitutability between different markets is not very good because of the specificity of housing. A housing unit can be seen as a bunch of different characteristics that can not be bought separately. Two housing units can have the same rent but different characteristics and this heterogeneity implies that housing units are less substitutable than other types of goods. For example in France, flats for students are often small and not of very good quality but located in city centers and would not be very easily replaced by middle class suburb houses.

ii) The increase in rents could also be the result of the choice of better quality housing by subsidized households. In this case, the increase in rents should be transmitted to the other housing market of better quality housing. To test this hypothesis, we have to search for an increase in the housing quality of subsidized households during the period.

4 Empirical Specification

We will first present the identification problems of the ordinary least square method and then develop the differences in differences method favored to estimate θ.

The potential biases in the OLS strategy The OLS estimate of θ is subject to several potential biases that question the validity of the results. Practically, the OLS regression has the following form :

$$r_{it} = \alpha + \sum \beta_k quartile_{ik} + \delta_t + \sum \gamma_j X_{ij} + \theta a_i + \epsilon_i$$

Where r_{it} is the annual rent per square meter of the housing unit rented by household i, $quartile_{ik}$ are dummies indicating the quartile of income, δ_t is a time effect, X_{ij} is the value of the characteristic j of the household i and a_i is the annual housing benefit per square meter received by household i.

Several sources of biases can affect this basic specification. First, as housing benefits are to a certain extent function of the rent, some non observables affecting rents could have an effect on housing benefits. This relationship between rents and housing benefits can be very annoying in the case of a rent rise, because it would lead to an upward bias for the estimate of θ. However this source of potential bias is in fact limited, since the rent taken into account in the formula of housing benefits is limited by a rent cap. For households who already pay a rent above the cap, further increase in rents will not have any effect on their housing benefits. In 1988, prior to the reform, 65% of tenants in the private market have already a rent equal to or above the cap (respectively 61% of subsidized tenants and 67% of non-subsidized ones), thus this source of bias will affect only a limited part of the sample.

An other type of bias can affect the estimate of θ: if some non observables characteristics have an impact on rents but also on the reception of benefits, then the estimate will be biased. For example, if the households who really care about receiving benefits are those who pay the higher rents, then the estimate will be upward biased. On the contrary, there will be a downward bias if the households who actually receive benefits are the poorest ones with bad quality cheap housing (and if the observable income gives imperfect information about this poverty state).

Finally, if some control variables as income and family size entirely determine the housing allowance received by the household, then the effect of housing benefits on rents

can not be estimated with the OLS method. Control variables do not actually entirely determine housing benefits reception in the sample, because of misreporting or non claiming of benefits entitlements : in 1996 only 75% of the first quartile of tenants in our sample report that they receive benefits, whereas theory predicts that everybody in that quartile should receive benefits [2]. However, it is difficult to interpret the effect identified by the OLS regression as the true effect of housing benefits on rents.

The differences in differences method. To avoid these potential biases, we use a differences in differences estimation strategy, exploiting the 1991-1993 extension reform of the housing benefit program. The differences in differences (DD) method consist in comparing the rents before and after the reform for a group affected by the change (the treatment group T) to a group not affected by the policy reform (the control group C).

The differences in differences estimate is an unbiased estimate of the effect of the reform if, absent the reform, the evolution of the rents would have been the same for the two groups (after controlling for the structural sociodemographic changes in the population). In other words, this so called "parallel trend assumption" supposes that there is not any unobservable that affects the composition of the groups at the same time than the policy change and that the fixed time effects are the same for the two groups.

To be convincing, the DD strategy has to be applied very carefully (Bertrand, Duflo and Mullainathan [2004]). First, it is very important to choose the treatment and control groups as close as possible. But it is also fundamental to have a clear break of trend at the time of the reform for the treatment group.

Implementation of the strategy. The differences in differences strategy is equivalent to an IV regression, using the dummy of the treatment group interacted with the dummy of the post reform period as the instrument. This regression suppresses the OLS estimate problem of correlation of the outcome variable with the residuals. Practically, we implement a two stage method, regressing first the housing benefit per square meter on the instruments :

$$a_{it} = \alpha' + \beta' * quartile_1 + \gamma' * post + \sum \delta'_j * X_{ij} + \epsilon' * quartile_1 \times post + \mu'_{it}$$

Where a_{it} is the housing benefit per square meter of household i for the year t, $quartile_1$ is a dummy for the first quartile, *post* is a dummy for the years after the reform, X_{ij} is the

[2] This low number seems to be the result of misreporting (because in some cases the benefit is directly paid to the landlord and the tenant may not realize that he is actually subsidized) rather than of a low take-up rate.

value of the characteristic j for the household i and u_{it} are the residuals.

Then we regress the rent per square meter on the predicted housing benefit (and the controls) :

$$r_{it} = \alpha + \beta * quartile_1 + \gamma * post + \sum \delta_j X_{ij} + \theta * Pa_{it} + \mu_{it}$$

Where r_{it} is the rent per square meter for household i and Pa_{it} is the predicted housing benefit per square meter

Without any controls, the the estimator of θ is equivalent to the Wald estimator :

$$\hat{\Theta} = \frac{\left[(\bar{r}_{T,1} - \bar{r}_{T,2}) - (\bar{r}_{C,1} - \bar{r}_{C,2})\right]}{(\bar{a}_{T,1} - \bar{a}_{T,2}) - (\bar{a}_{C,1} - \bar{a}_{C,2})\right]}$$

Where $\bar{r}_{ij}$ is the mean rent per square meter and $\bar{a}_{ij}$ the mean housing allowance per square meter of group i $(i = T, C)$, for the period j $(j = 1, 2)$.

In our regressions, we add control variables to correct for the observable changes in the composition of the treatment and control groups at the time of the reform.

5 The data

To estimate the effects of housing benefits on rents, we use the French Housing Survey, called "Enquête Logement". This survey is conducted every four or five years by the French Institute of Statistique INSEE (Institut National de la Statistique et des Études Économiques). We have the data for the past thirty years, corresponding to the following years of survey : 1973, 1978, 1984-85, 1988-89, 1996-97 and 2001-2002. Each survey contains between 20000 and 45000 observations (with a little less than the half of tenants) and gives specific information on housing conditions of the households, along with detailed characteristics of the household, including income. The Enquête Logement constitutes a unique source of information to study housing in France on a long period, although it is not a panel. We have also checked our results on an other available survey : Enquête Budget des Familles (the French Family Resources Survey). This survey contains less observations (around 10000) and has less detailed information about housing conditions of the households, but it is sufficient to run the basic regression of our model and check the validity of the results obtained with the Enquête Logement.

Before focusing on the 1991-1993 reform, we can show the striking pattern of rents by decile in France during the past thirty years. In Figure 1, we plot the annual rent per

square meter by decile for each year of survey since 1973, computing the deciles of income for the sample of tenants (without correcting with equivalence scale) [3]. Between 1973 and 2002, rents per square meter have increased in France faster than the Price Index, but the rise is higher for the first and second deciles of tenants than for the others. In 1973 and 1978, their rents are lower than the others but the gap is filled in the 1980's and there is a further sharp increase during the 1990's. In 1996 and 2002, the rent of the first decile is as high as the rent of 10th decile, drawing a U-shaped curve.

$< Fig.1 >$

This impressive increase in rents for low-income households can be partly explained by changes in the socio-demographic composition of the population. In 1973, many low income households were old people living in rural areas whereas in 2002, poverty is more a problem of a young urban population (see descriptive statistics in Appendix). These changes have an impact on rents, implying structurally higher rents per square meter. But they are only a part of the explanation of the increase in rents for poor households : the U-shaped curve is still there after correcting for the structural socio-demographic changes.

It is interesting to plot in the same way housing benefits per square meter by decile of income since 1973 (see Figure 2). The increase in housing benefits for low-income households strikingly mirrors the increase in rents, with a first increase following the creation of APL after 1978 and a second sharp increase in the 1990's at the time of the AL reform. We are going to show more precisely the effects of housing benefits on rents by exploiting the 1991-1993 reform.

$< Fig.2 >$

We choose to restrict our study to the private housing market, because public housing rents are fixed according specific rules[4]. We can thus exploit the very clear effects of the housing benefits reform on the private housing market, due to little changes in the

[3]This choice is practical : we need to identify the small poor households, because they constitute the group concerned by the reform. They can be found in the first quartile of "raw" income but we would have more difficulty to identify them if we used equivalent income. We have to keep in mind that with a traditional measure of poverty using equivalence scale, we would not have exactly the same people in the first quartile. Thus, this paper does not pretend to describe the housing situation of all types of poor households.

[4]Rents in the private housing markets are also subject to a strict legislation because rents increases are limited except for new tenants.

legislation before and after the reform (an additional reform in 1988 for public housing tenants would complicate the identification strategy).

The control and the treatment groups. The 1991-1993 reform has extended housing benefits to low income household who where not already benefiting from the previous housing benefit programs, i.e. to the small poor households (such as single persons or couples without children). We want to have these households in our treatment group and a good way to have them is to choose the first quartile as the treatment group. The analysis of the data shows that the first quartile is the group who has gained the most from the reform (see Figure 3). In 1988 (the last disposable survey before the reform) only 39% of the households of the first quartile receive benefits. They are more than 70% after the reform in the 1996 and 2002 surveys (a jump of more than 30 percentage points). During the same time, the second quartile has gained only about 10 percentage points of new claimants. We thus take the second quartile as the control group, because it is the closest comparable group and has not been much affected by the reform (see statistics in Appendix).

$< Fig.3 >$

We can compare the evolution of the two groups before and after the reform by plotting the differences in rent and housing benefits per square meter between the first and the second quartile (private tenants only, see Figure 4). The lines representing differences in rents and housing benefits are strikingly parallel. The break of trend at the time of the reform is also very clear : before the reform, there is no change in the differences of rents nor benefits between the two quartiles, whereas there is a sharp increase between 1988 and 1996 [5] at the time of the reform, which stops after 1996. This pattern suggests a strong and long lasting effect of housing benefits on rents.

$< Fig.4 >$

To check the robustness of our strategy, we can test wether this pattern is specific to our chosen groups by plotting the same differences but between the second and the third quartiles instead of the first and the second (see Figure 5). This placebo figure shows two

[5] We have chosen not to use the 1992 survey because it has been made during the reform years (the reform has been conducted between 1990 and 1993) and the interpretation of the data would thus be problematic.

groups non affected by the reform and thus we should not see any impact of the reform on rents nor housing benefits differences. We can observe that the changes are much smaller than on figure 4 and that we can not detect any break of trend between 1988 and 1996. This placebo graph confirms that the break of trend observed on figure 4 seems to be caused by the housing benefit reform and not by some other common event.

$< Fig.5 >$

We can make a further check with our alternative data set, Enquête Budget des Familles. This survey is conducted each five or six years and we have the following surveys at our disposal : 1984-85, 1988-89, 1994-95 and 2000-01. The two earliest surveys have been conducted around the same time than the Enquête Logement, but the latest have not the same timing, giving us additional information on the rent increase. When plotting the differences in rent and housing benefits per square meter between the first and the second quartile for private tenants only (see Figure 6), we find exactly the same pattern than with the Enquête Logement : parallel trends in differences and a break at the time of the reform. The regressions results give us a precise estimate of the effects of housing benefits on rents.

$< Fig.6 >$

6 Results

Table 1 shows the computation of the DD estimate of θ without controls, to explain how works the differences in differences method. The upper box shows the rent increase per square meter : between 1988 and 1996, the rent increase has been greater for the first quartile than for the second quartile by 14.9 euros (per square meter). Similarly, the first quartile has received 15.8 euros more of housing benefit per square meter than the second quartile. The ratio of the two numbers is the Wald estimator and it gives a first estimate of 0.94 for θ. According to this crude estimate without controls, an additional euro of housing benefits per square meter leads to an increase in rents of 0.94 euros per square meter. But this estimate does not take into account the structural socio-demographic differences existing between the first and the second quartile and we run regressions with controls to account for theses differences.

$< Tab.1 >$

We add several controls to correct for the structural differences between the first and the second quartiles. We first control for the type and size of the household (11 dummies to allow for the numbers of adults and children to vary). These variables controls for the fact that larger households live in larger flats, which have usually a cheaper rent per square meter. We also control for the geographical location, putting dummy of the type of area (small, medium, large city, Paris or rural area) interacted with the region[6]. Finally, we add dummies for the age group of the head of the household (five groups), accounting for the fact that older households tend to have longer length of tenure, with cheaper rents per square meter. We have decided to put the age group instead of the length of tenure in the regression because we believe that the length of tenure can be affected by the reform. If people start receiving benefits, they can be willing to find a new better housing and move, affecting the length of tenure. Age group is thus a better control than length of tenure[7].

The first DD regressions with controls for the private sector (first line in Table 2 and Table 2bis in Appendix) give estimates around 0.5 for θ. The fall of the θ estimate when we add controls show that the socio-demographic structure of the groups plays a role. We would like to be sure that the differences in the composition of the two groups does not mix up with the effect estimated. For this purpose, we run the regression on the 1984, 1988, 1996 and 2002 surveys, adding a dummy to test for a differential trend between the two groups over the period. The other advantage of these Triple differences estimates (DDD estimate) is that they exploit the additional information of the years prior and after the reform. The DD regressions are run with 1988 and 1996 surveys only and can not use the clear rupture of trend provoked by the reform to estimate θ. The drawback is that standard errors are automatically much higher with DDD than DD, leading to less significant estimates of the coefficients. The results are shown on the second line of table 2.

$< Tab.2 >$

The estimates of θ are higher with the triple differences method and stay significant.

[6]In Appendix (table 4), we show regressions with an additional dummy indicating if the flat is in a city center or a suburb, but it does not change the results.

[7]In Appendix (table4), we show regressions with length of tenure, but it does not change the main results.

In our preferred specification (Table 2, line 2, column 1), an additional euro of housing benefits per square meter causes an increase of 0.78 euros in rents per square meter. In other words, 78% of the benefits have been crowded out by the increase in rents and only 22% of the allowance can actually serve the low income households to reduce their housing expenses. This high number corresponds to a case where the elasticity of housing supply is lower than the elasticity of housing demand. Given this number, we can also calculate what is the part of the rent increase explained by the housing benefit reform. Between 1988 and 2002, housing benefits for the first quartile have increased by 22.2 euros and the rents by 29.9 euros. Assuming a linear model with a θ of 0.78, we deduce that housing benefits can account for up to 58% of the increase in low income tenants' rents over the period. The estimates made with our alternative data set Enquête Budget des Familles, give results of the same order, although they are less significant, given the smaller size of the sample (see results in Appendix, table 5).

But in these first regressions we measure a raw increase in rents, mixing several effects. First, the reform has had an unpredicted impact on students decision to become independent. Students have gained the right to claim housing benefits, which they did not have before the policy change (unless they were in a specific dwelling giving right to APL). The resulting increase in students as independant households may have contributed to the rent increase for low income housing.

Moreover, the rent increase for low income households could be the result of quality improvements in housing made by people receiving benefits. We would like to know what is the proportion of the increase that could be explained by an increase in the quality of housing and what is the proportion that has been directly taken by the landlords. The two following sections will deal with these questions.

7 The effect of the reform on students

The housing benefit reform has had an unpredicted effect on students, fostering their moving from their parents' home to independent housing. It appears that students have benefited a lot from the policy change : in 1994, 58% of the new "reform" claimants were students, thus forming a quarter of the total number of ALS claimants[8]. Among the private sector tenants whose head of household is a student (referred to as the student households

[8]These numbers, given by Steck [1997] are in line with the statistics computed from Enquêtes Logement: in 1996, 13.4% of housing benefits (all types) recipients are students versus 0.6% in 1988.

afterwards), 6% received benefits in 1988 but 79% in 1996. During the same time, the proportion of independent student households has doubled. We have to account for the increase in the number of college students over the period, but a study by Laferrère and Le Blanc [2003] shows that housing benefits have played a role in the decision of students to leave their parents' home. This is an interesting side effect but it questions our estimate of the impact of housing benefits. The increase in rents for low income housing could be partly explained by the demand induced by these new independent households.

To deal with this problem, we have first run the regressions excluding students from our sample. The socio-demographic composition of the groups is thus more stable over the period (see descriptive statistics in Appendix, table 3). Figure 7 shows the differences in rents and housing benefits per square meter between the first and second quartile of tenants, after excluding students from the sample. The overall picture is the same as with the whole sample, even if the break of trend is a little less pronounced.

$< Fig.7 >$

The regressions (Table 2, column 2) give significant estimates of θ, with values not very different from the first estimates: the DD estimate is somewhat lower (0.39 instead of 0.45) but the DDD is higher (1.02 instead of 0.78), suggesting a total crowding out of housing benefits by the rent increase.

These regressions show that the effect of housing benefits on rents is still strong, even if we exclude students. However, we can we can imagine that these new arrivals have exerted an additional pressure on the market for low income housing, leading to rent increases. This scenario is likely to have been played, because of the shortage of student halls of residence in France, that forces students to search for an accommodation on the private market. The effect of student housing benefits can be broke down in two effect : a "straight effect" on the students' rents and a "side effect" on other households' rents. Excluding students from the sample in the regression does not help us to separate the two effects and we have to build a new estimation strategy to address this issue.

To estimate the side effect separately from the straight effect, we split our sample into two zones on the basis of proportion of students, using our urban variables. Zone 1 groups the areas where most of the independents students are living, namely Paris (but not its suburbs), the cities of more than 100000 inhabitants (center and suburbs) and the centers of medium sized cities (between 50000 and 100000 inhabitants). Zone 2 is formed with Paris suburbs, the suburbs of medium sized cities, and the smaller cities (rural areas are

excluded from the sample, to have more homogenous subgroups). Table 3 shows that most of the independent students live in zone 1. The subsamples are carefully designed in order to avoid grouping all the large urban areas together in one subsample and the small ones in the other [9]. The effect identified will thus not be mixed with any urban size effect.

$< Tab.3 >$

We run the regression separately on the two subsamples (students excluded). If the new demand caused by students had caused an increase in rents, we should find a higher θ in zone 1 than in zone 2. As the size of the sample has been divided by two, the estimates are not always significant. The results (Table 4) show that the θ estimated are higher in zone 1 than zone 2, although the difference is not statistically significant.

$< Tab.4 >$

These results confirm that the student newcomers had played a role in the increase in rents of low income households by contributing to the rent increase in the areas where they have moved in. In a situation of inelastic housing supply, this new demand of students induced by housing benefits has reinforced the pressure on rents already put by the increase in demand of the other (low income) benefits recipients. To be sure that things have happened that way, we have to test wether the rent increase reflects an increase in housing quality or not.

8 A weak effect of housing benefits on housing quality

If housing benefits had given to poor households the means to afford better housing, we should observe it, either in the size of the housing units rented or in the quality.

A very small increase in the size of housing units. There has not been much change in the size of the housing units rented between 1988 and 1996. When excluding students from the sample, we observe no change for the first quartile and a small decrease for the second quartile of private tenants (see statistics in Appendix, tables 2 and 3). As the difference is not statistically significant, we conclude that the housing size has not changed over the period for the first quartile, meaning that housing recipients have not moved

[9] We exploit the fact that students tends to live more in city centers.

into larger units. However, housing size is a crude indicator of the housing standards. Households may have improved their housing quality, if not size.

A quality improvement? But it is much more difficult to observe quality changes in a survey than size changes. For example it is impossible to evaluate changes in the environment of the dwelling with Enquête Logement. It is also very difficult to have an objective indicator of quality improvements inside the dwelling, available for all years of survey. The best indicator we have found is a variable indicating wether the basic conveniences such as running water, bathroom, WC or central heating are installed in the unit. This variable is present in all years of surveys and, as shown on table 5, varies greatly for the first quartile over the period. In 1984, more than 30% of households in the first quartile do not have a bathroom, whereas only 3% remain in this state in 2002. Housing quality measured by basic conveniences has really improved over the period, but this trend is observed before and after the reform, and not only for the first quartile, but also for the second quartile. These observations suggest that housing benefits may have helped, but are not the main cause of this improvement.

$< Tab.5 >$

In order to test more precisely wether the estimated θ mixes raw increase in rents and increase due to better housing quality, we simulate the rents of "quality fixed" units, using a hedonic regression. We first evaluate the price of each basic convenience for each year by regressing the rent per square meter on the basic convenience indicator. Then we calculate rents supposing that all the units are equipped with the basic conveniences. We are thus able to measure the "pure" increase in rents, having eliminated the "increase-in-quality" component. We run our basic regressions on this simulated corrected rents (see results in table 6). The results are not very significant, but they show practically no changes in the estimated coefficients.

$< Tab.6 >$

The increase in housing quality, as we have measured it, does not seem to explain the increase in rents for poor households. However, our quality indicators are far from perfect, observing only major changes. We can imagine that landlords have made some minor improvements such as painting or repairing. The quality effect is quite possibly underestimated, but it is clear that it can not explain the sharp increase in rents that have experienced low income households.

9 Conclusion

The results of our preferred specification show that for 1 euro of housing benefits, 78 cents are absorbed by landlords in rent increases and only 22 cents are left to low income households. The poor performance of housing benefits is the result of a quite inelastic housing supply in the short and middle term, that has responded very little to the increase in demand provoked by the new benefits. This estimate may underestimate the improvement in housing quality of the subsidized units because our quality indicators are not perfect, but this does not change the overall results.

More generally, these results show that this type of in-kind transfers may have severe effects on market prices and that it can not be ignored when assessing the efficiency of such programs. When the the supply is quite inelastic, subsidizing the consumption of a privately provided good will never be efficient. If the aim of the public policy was to increase housing consumption, it would be better to work directly on housing supply. Otherwise, cash transfers, by giving more choice to households, would certainly minimise these price effects and generate higher welfare gains for poor households.

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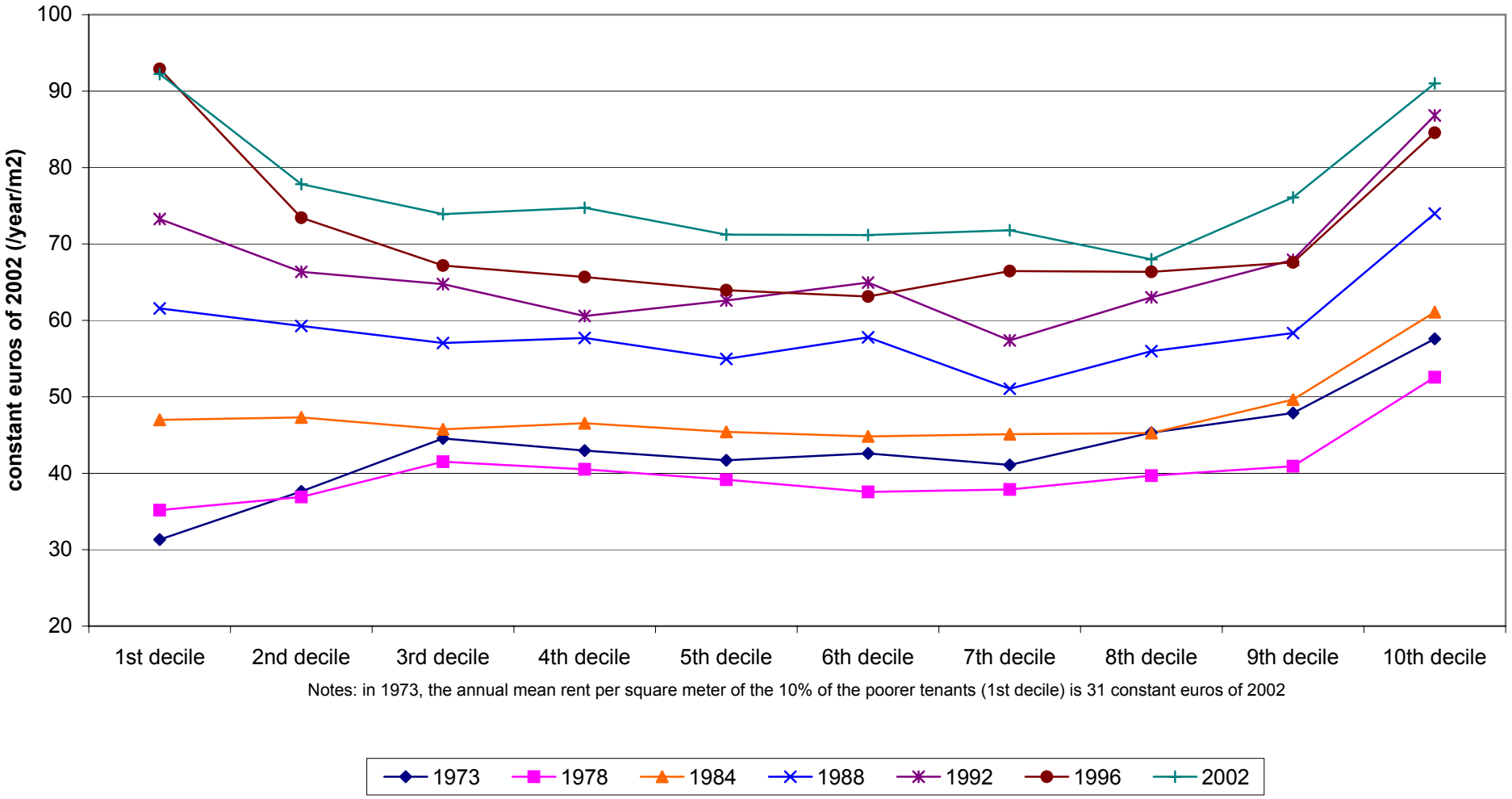
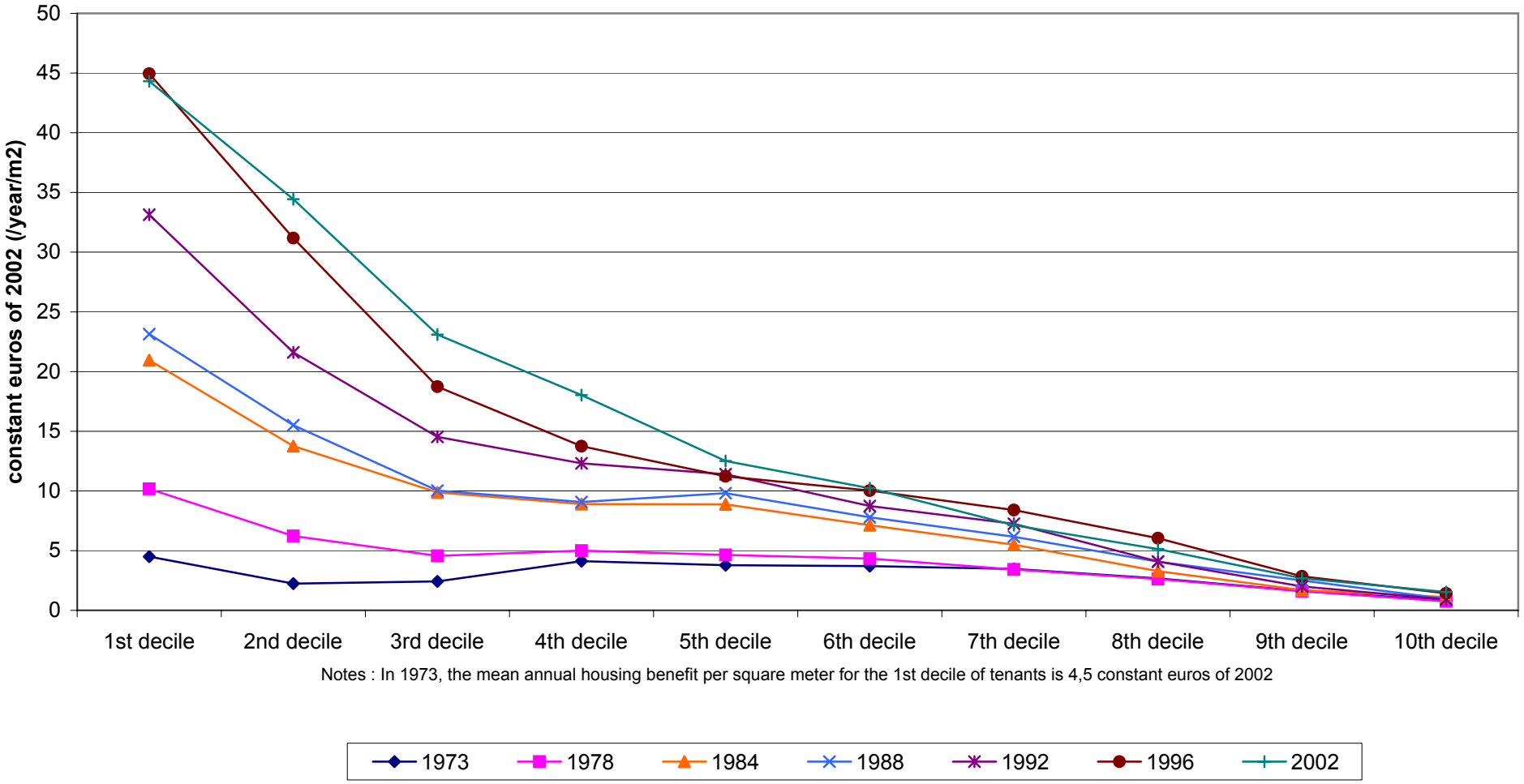
Figure 1
Annual rent per square meter by decile of income, all tenants, 1973-2002
Sources : author's computation from Enquêtes Logement Insee



Notes: in 1973, the annual mean rent per square meter of the 10% of the poorer tenants (1st decile) is 31 constant euros of 2002

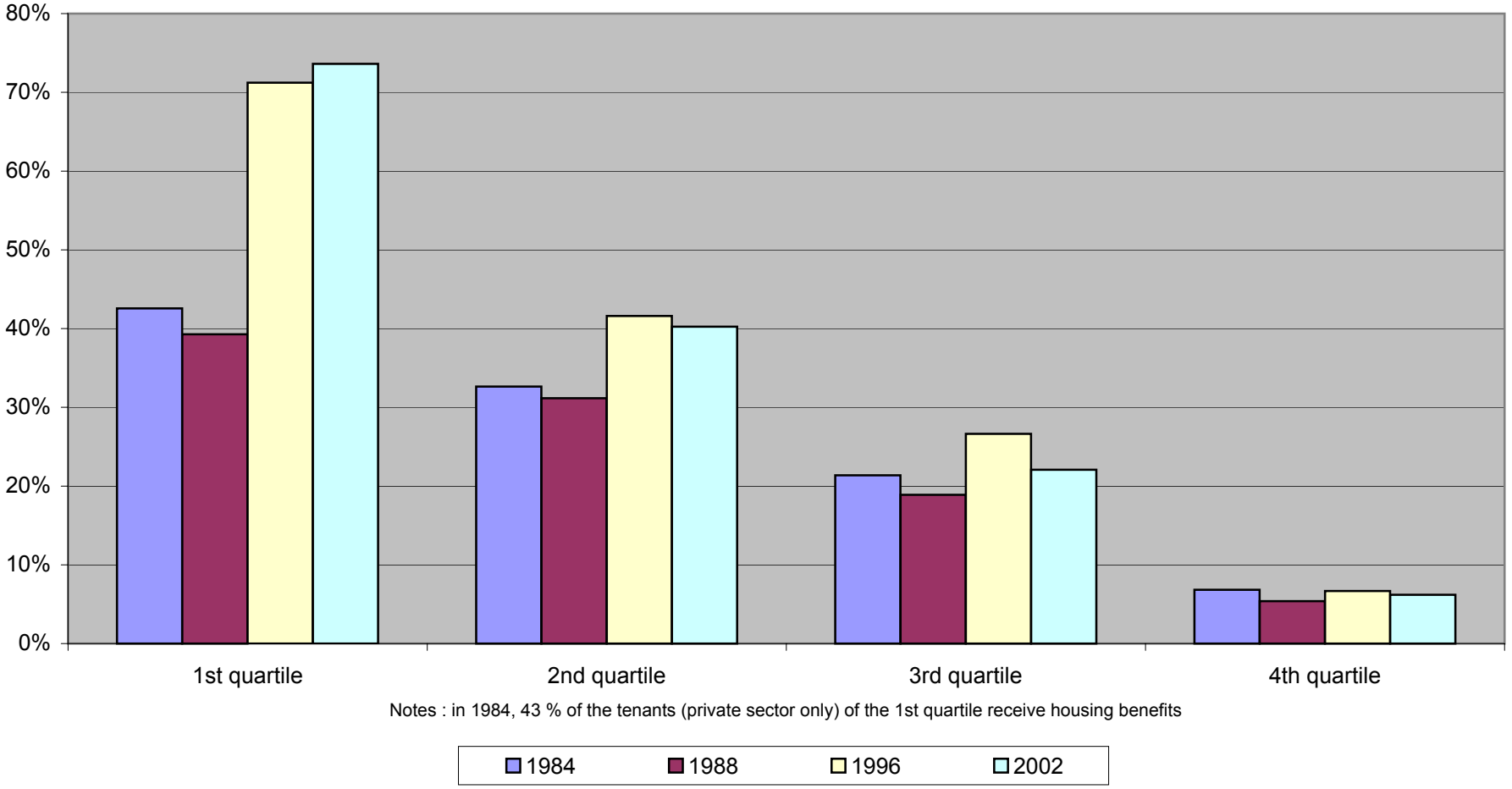
Figure 2
Annual Housing Benefit per square meter by decile of income, all tenants, 1973-2002
Sources : author's computation from Enquêtes Logement Insee



Notes : In 1973, the mean annual housing benefit per square meter for the 1st decile of tenants is 4,5 constant euros of 2002

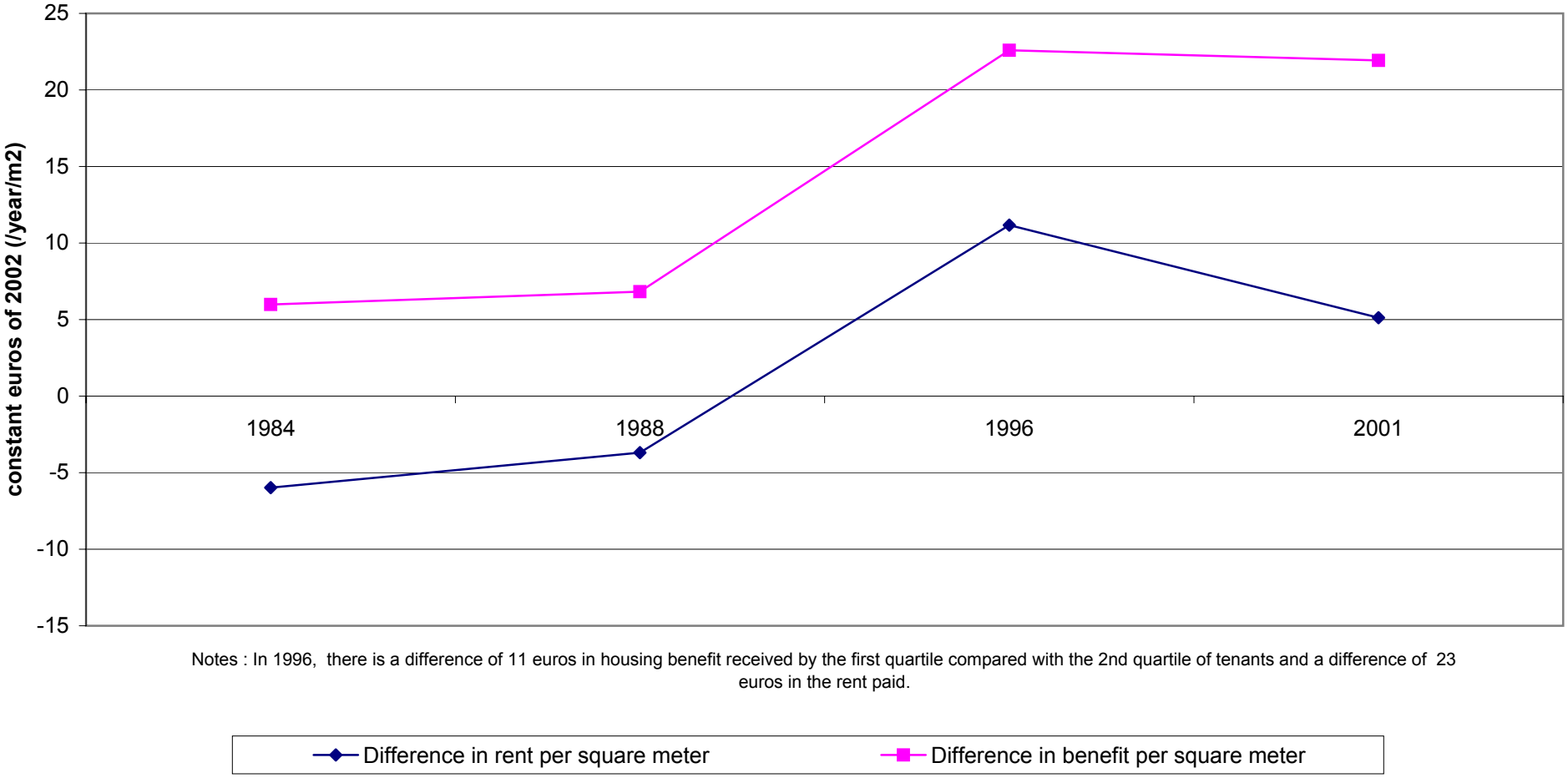
Figure 3
Percentage of tenants receiving housing benefits by quartile, before and after the reform (private sector only)

Sources : author's computation from Enquêtes Logement Insee



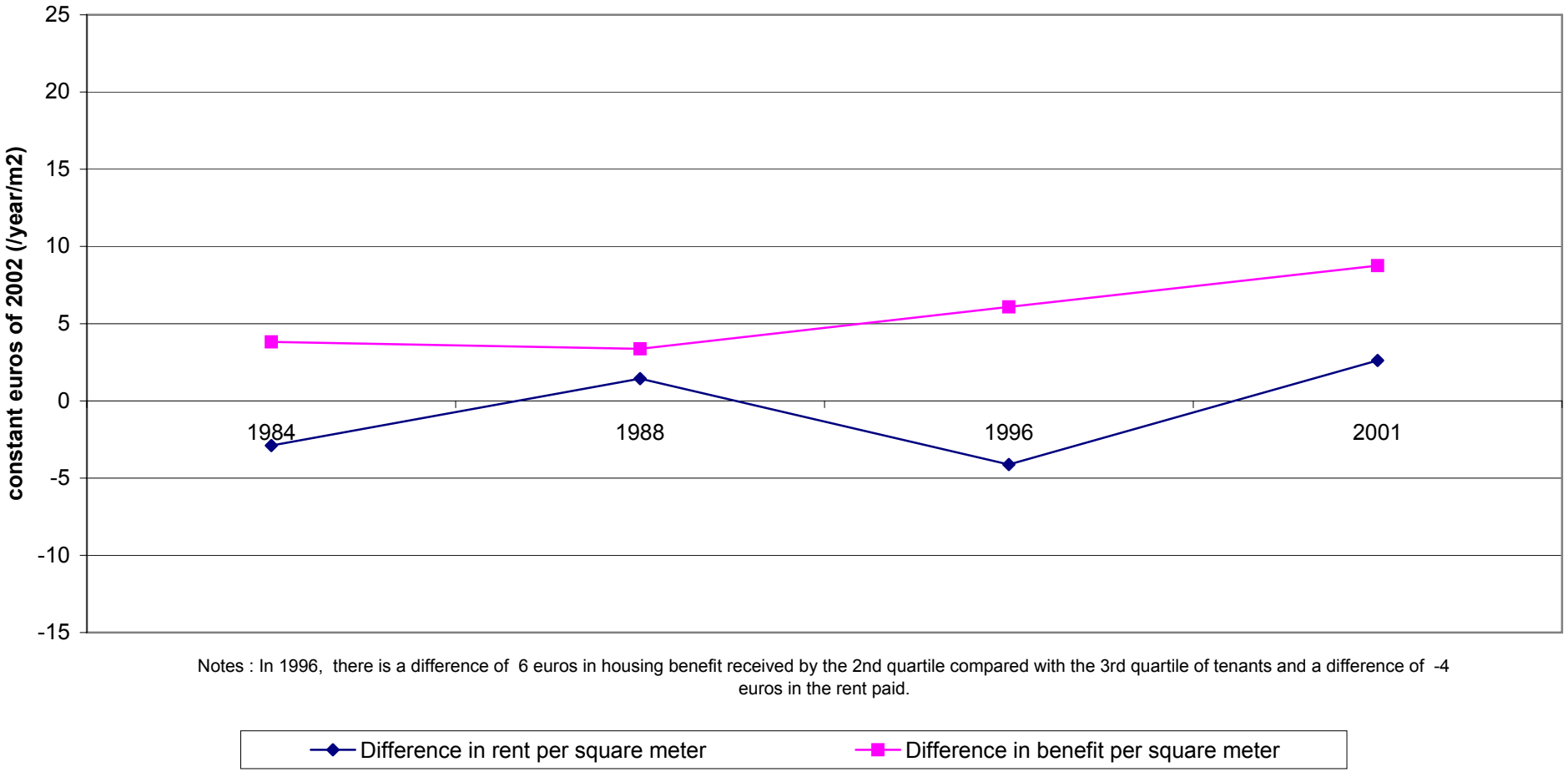
Notes : in 1984, 43 % of the tenants (private sector only) of the 1st quartile receive housing benefits

Figure 4
Differences in mean housing benefits and rents per square meter between the the first and the second quartiles before and after the reform, private sector tenants
Sources : author's computation from Enquêtes Logement Insee



Notes : In 1996, there is a difference of 11 euros in housing benefit received by the first quartile compared with the 2nd quartile of tenants and a difference of 23 euros in the rent paid.

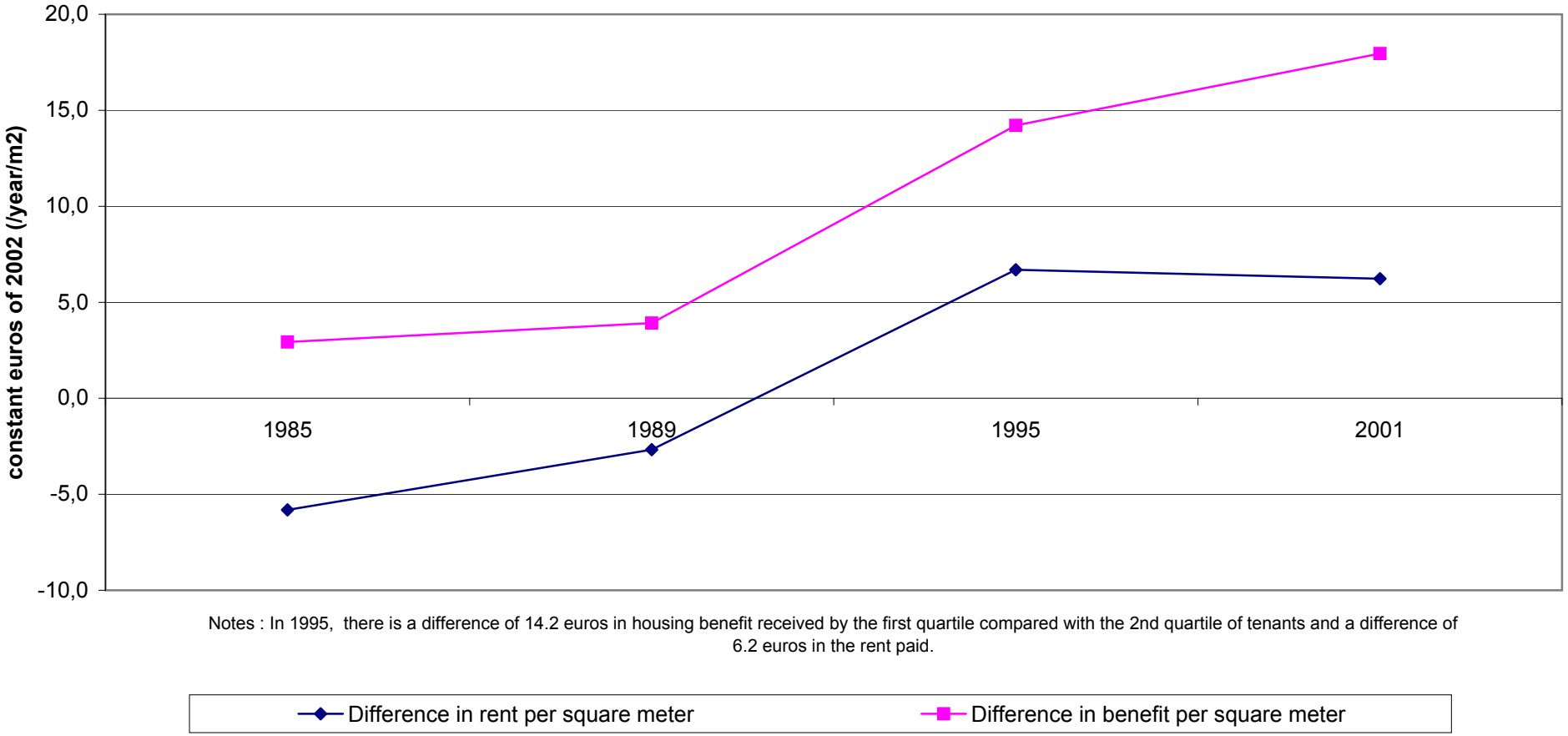
Figure 5
Differences in mean housing benefits and rents per square meter between the second and the third quartiles before and after the reform, private sector tenants
Sources : author's computation from Enquêtes Logement Insee



Notes : In 1996, there is a difference of 6 euros in housing benefit received by the 2nd quartile compared with the 3rd quartile of tenants and a difference of -4 euros in the rent paid.

Figure 6
Differences in mean housing benefits and rents per square meter between the the first and the second quartiles before and after the reform, private sector tenants

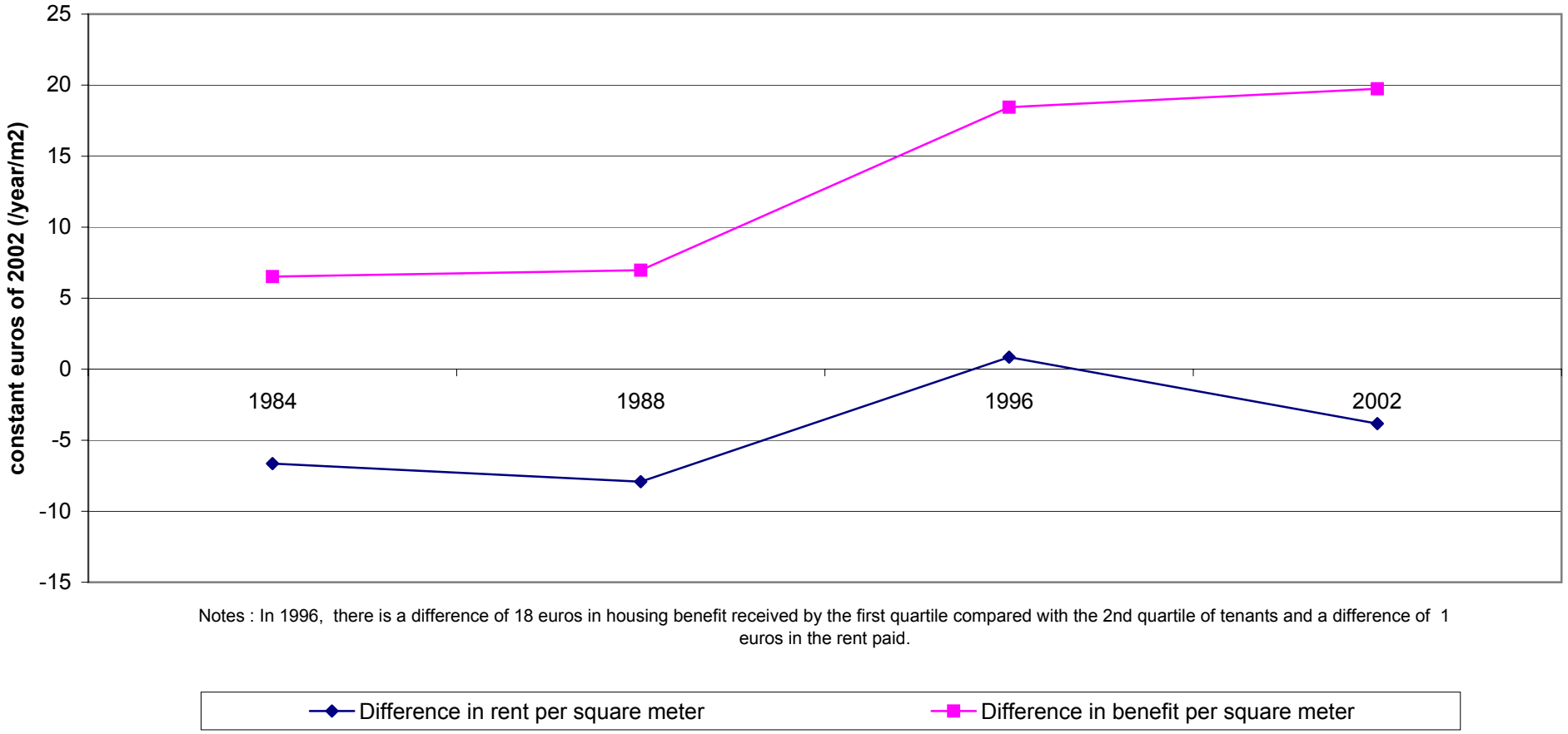
Sources : author's computation from Enquêtes Budget des Familles Insee



Notes : In 1995, there is a difference of 14.2 euros in housing benefit received by the first quartile compared with the 2nd quartile of tenants and a difference of 6.2 euros in the rent paid.

Figure 7
Differences in mean housing benefits and rents per square meter between the the first and the second quartiles before and after the reform, private sector tenants (students excepted)

Sources : author's computation from Enquêtes Logement Insee



Notes : In 1996, there is a difference of 18 euros in housing benefit received by the first quartile compared with the 2nd quartile of tenants and a difference of 1 euros in the rent paid.

Table 1 : A simple differences in differences estimate of the effects of benefits on rents

		1988	1996	1996 - 1988
Annual rent per square meter (euros of 2002)	1st quartile	64,1	90,2	26,1
		(2,2)	(2,5)	(2,3)
	2nd quartile	67,8	79,0	11,2
		(2,2)	(2,2)	(2,2)
	1st – 2nd	-3,7	11,2	14,9
		(2,4)	(2,1)	(3,2)

		1988	1996	1996 - 1988
Annual Housing benefit per square meter (euros of 2002)	1st quartile	14,3	34,9	20,6
		(0,5)	(1,0)	(1,4)
	2nd quartile	7,5	12,3	4,8
		(0,2)	(0,3)	(0,8)
	1st – 2nd	6,8	22,6	15,8
		(1,0)	(1,2)	(1,5)
Wald estimator (14,9/15,8)			0,94	
			(0,20)	

Notes : Standard errors are between parenthesis.
Sample is the 50 % poorest tenants of the private sector
Sources : author's computation from Enquêtes Logement Insee.

Table 2 : DD estimates of the effects of housing benefits on rents (private sector)

Sample of private tenants, 1st and 2nd quartile

Method	Variable	Sample size	All private tenants	Students excepted
DD (1988 and 1996)	Housing benefit instrumented by a dummy 1996 x 1st quartile	4476	0,45***	0,39**
		(4248)	*(0,18)*	*(0,24)*
DDD (84, 88, 96, 02)	Housing benefit instrumented by a dummy year x 1st quartile	9635	0,78***	1,02***
		(9180)	*(0,31)*	*(0,52)*
Controls				
Type of area (rural, small, medium, large cities or Paris) x region				
Type and size of the household (11 types)				
Age of the head of the household (5 age groups)				

Notes : Standard errors are between parenthesis.
*** : significant at 5% level, ** : significant at 10 % level.
The sample sizes between parenthesis are the sample sizes without students
Sources : author's computation from Enquêtes Logement.

Table 3 : Changes in the proportion of students among tenants (private sector) by zone

	1984	1988	1996	2002
Zone 1	2 %	5 %	12 %	12 %
Zone 2	0 %	1 %	2 %	2 %

Notes : Zone 1 represents cities with more than 100 000 inhabitants, city centers of urban areas with between 50 000 and 100 000 inhabitants and Paris without the suburbs. Zone 2 groups the rest of France, except rural areas.
In 1984, there was 2% of students (as head of households) among tenants in the private sector in zone 1 and no students in zone 2.

Table 4 : The « student effect » estimated by zone

Private tenants, students excluded, 1st and 2nd quartile

Method	Variable	Reference sample	Strongest student concentration (zone 1)	Lowest student concentration (zone 2)
DD (1988 and 1996)	Housing benefit instrumented	0,39**	0,58**	0,10
		(0,24)	*(0,32)*	*(0,37)*
DDD (84, 88, 96, 02)	Housing benefit instrumented	1,02***	1,34	0,71
		(0,52)	(0,86)	*(0,47)*
Sample size		4248 (DD) 9180 (DDD)	2043 (DD) 4521 (DDD)	1486 (DD) 3196 (DDD)
Controls				
Type of area (rural, small, medium, large cities or Paris) x region				
Type and size of the household (11 types)				
Age of the head of the household (5 age groups)				

Notes : Standard errors are between parenthesis.
*** : significant at 5% level, ** : significant at 10 % level.
Sources : author's computation from Enquêtes Logement.

Table 5 :Changes in housing quality by quartile

1984	1st quartile	2nd quartile	3rd quartile	4th quartile
No running water	1,1	0,5	0,0	0,0
Running water only	21,9	10,2	4,5	1,5
Running water and WC without bathroom	9,1	3,8	2,8	1,1
Running water and bathroom	3,9	5,0	2,6	2,3
WC, bathroom but no central heating	24,7	24,8	23,3	10,9
WC, bathroom and central heating	39,4	55,8	66,8	84,2

1988	1st quartile	2nd quartile	3rd quartile	4th quartile
No running water	0,4	0,1	0,0	0,0
Running water only	11,9	6,2	1,7	1,2
Running water and WC without bathroom	5,4	2,3	1,4	0,3
Running water and bathroom	3,5	2,2	2,1	0,7
WC, bathroom but no central heating	31,0	24,9	20,3	13,2
WC, bathroom and central heating	47,9	64,3	74,5	84,7

1996	1st quartile	2nd quartile	3rd quartile	4th quartile
No running water	0,2	0,1	0,0	0,0
Running water only	3,3	1,3	0,6	0,1
Running water and WC without bathroom	2,3	1,2	0,3	0,3
Running water and bathroom	2,2	2,0	0,6	0,3
WC, bathroom but no central heating	28,5	23,1	19,8	14,6
WC, bathroom and central heating	63,6	72,4	78,7	84,7

2002	1st quartile	2nd quartile	3rd quartile	4th quartile
No running water	0,1	0,0	0,0	0,0
Running water only	1,3	0,2	0,4	0,0
Running water and WC without bathroom	1,5	0,4	0,3	0,1
Running water and bathroom	1,5	2,1	0,4	0,4
WC, bathroom but no central heating	9,4	7,6	7,5	2,8
WC, bathroom and central heating	86,2	89,7	91,4	96,7

Notes : Sample is tenants of the private sector.
In 1984, 21.9 % of households among the first quartile have only running water.
Sources : author's computation from Enquêtes Logement Insee.

Table 6 : DD estimates of the effects of housing benefits on rents after correcting for quality changes

Sample of private tenants, 1st and 2nd quartile

Method	Variable	Sample size	All private tenants	Students excepted
DDD (84, 88, 96, 02)	Housing benefit instrumented by a dummy year x 1st quartile	9635	0,76**	0,92
		(9180)	*(0,40)*	*(0,64)*
Controls				
Type of area (rural, small, medium, large cities or Paris) x region				
Type and size of the household (11 types)				
Age of the head of the household (5 age groups)				

Notes : Standard errors are between parenthesis.
*** : significant at 5% level, ** : significant at 10 % level.
The sample sizes between parenthesis are the sample sizes without students
Sources : author's computation from Enquêtes Logement.

Appendix table 1 : Descriptive statistics. Sample of tenants (private and public)

Sources : author's computation from Enquête Logement INSEE

		1973	1978	1984	1988	1992	1996	2002
Annual rents per square meter (euros of 2002)	1st quartile	36,3	36,7	46,4	60,1	68,3	79,9	83,0
	2nd quartile	42,9	40,7	46,4	56,1	62,7	65,4	72,9
	3rd quartile	42,5	38,0	45,0	54,4	61,8	65,1	70,6
	4rth quartile	51,3	45,4	53,5	64,5	74,6	74,1	80,7
	All tenants	43,3	40,2	47,8	58,8	66,8	71,1	76,8
Annual rents (euros of 2002)	1st quartile	1399	1504	2008	2477	2883	3237	3447
	2nd quartile	2071	1993	2353	2880	3264	3484	3806
	3rd quartile	2401	2253	2721	3326	3780	4079	4308
	4rth quartile	3585	3419	4061	4853	5611	5757	6092
	All tenants	2364	2292	2781	3383	3872	4139	4412
Housing size (in square meters)	1st quartile	46,4	49,3	53,2	52,8	53,4	52,0	52,3
	2nd quartile	57,7	59,5	61,7	62,4	63,2	63,0	63,0
	3rd quartile	64,8	68,7	70,5	71,8	71,0	72,0	70,3
	4rth quartile	75,4	81,4	82,3	82,5	82,9	84,5	82,5
	All tenants	61,1	64,7	66,9	67,3	67,5	67,9	67,0
Annual Housing benefit per square meter (euros of 2002)	1st quartile	3,1	7,5	15,9	17,4	25,1	34,4	36,3
	2nd quartile	3,7	4,7	9,0	9,6	12,1	13,6	16,4
	3rd quartile	3,5	3,6	5,8	6,4	7,2	8,7	8,0
	4rth quartile	1,4	1,4	1,7	2,2	1,9	2,7	2,7
	All tenants	2,94	4,33	8,11	8,90	11,60	14,86	15,90
Proportion of housing benefits recipients	1st quartile	16%	35%	48%	49%	62%	75%	77%
	2nd quartile	22%	28%	38%	37%	41%	48%	48%
	3rd quartile	22%	25%	28%	28%	29%	35%	30%
	4rth quartile	10%	10%	11%	10%	8%	12%	11%
	All tenants	17%	25%	31%	31%	35%	43%	42%
Households'income (euros of 2002)	1st quartile	7319	8180	8336	8582	8217	7323	7378
	2nd quartile	15352	15831	15316	15408	15152	14319	14226
	3rd quartile	22667	23368	22920	22813	22718	21732	21902
	4rth quartile	40418	41029	41668	40927	44012	39705	42781
	All tenants	21436	22094	21993	21920	22381	20766	21553
Age of the head of household	1st quartile	59	57	54	52	49	45	45
	2nd quartile	42	42	42	42	45	46	45
	3rd quartile	39	39	39	40	41	42	43
	4rth quartile	41	41	41	41	41	42	42
	All tenants	45	45	44	44	44	44	44
Household size (Adults and children)	1st quartile	1,6	1,6	1,7	1,6	1,5	1,5	1,5
	2nd quartile	2,8	2,5	2,3	2,3	2,2	2,1	2,0
	3rd quartile	3,5	3,2	3,0	2,9	2,7	2,8	2,5
	4rth quartile	3,7	3,4	3,2	3,1	3,0	3,1	3,0
	All tenants	2,9	2,7	2,6	2,4	2,4	2,3	2,3
Proportion of households living in a rural area	1st quartile	17%	14%	12%	12%	11%	10%	9%
	2nd quartile	12%	11%	10%	9%	10%	11%	10%
	3rd quartile	10%	10%	10%	11%	11%	11%	11%
	4rth quartile	6%	6%	7%	7%	9%	11%	11%
	All tenants	11%	10%	10%	10%	10%	11%	10%
Proportion of « student » households (the head of the household is a student)	1st quartile	2,9%	4,2%	3,9%	7,6%	12,2%	17,1%	18,3%
	2nd quartile	1,2%	1,2%	0,9%	1,1%	2,0%	2,0%	2,7%
	3rd quartile	0,4%	0,4%	0,3%	0,8%	0,6%	0,6%	0,4%
	4rth quartile	0,2%	0,1%	0,1%	0,2%	0,3%	0,3%	0,5%
	All tenants	1,2%	1,5%	1,3%	2,4%	3,8%	5,0%	5,5%

Appendix table 2 : Descriptive statistics. Sample of private tenants

Sources : author's computation from Enquête Logement INSEE

		1973	1978	1984	1988	1992	1996	2002
Annual rents per square meter (euros of 2002)	1st quartile	32,3	37,1	46,8	64,1	76,0	90,2	94,0
	2nd quartile	45,6	44,8	52,8	67,8	77,7	79,0	88,9
	3rd quartile	46,6	44,5	55,7	66,4	75,2	83,2	86,3
	4rth quartile	59,8	53,9	67,1	78,7	93,9	90,3	95,4
	All	45,9	45,1	55,5	69,2	80,7	85,7	91,1
Annual rents (euros of 2002)	1st quartile	1407	1626	2163	2705	3254	3593	3851
	2nd quartile	2318	2260	2662	3489	3945	4064	4434
	3rd quartile	2709	2629	3276	3967	4632	4943	5151
	4rth quartile	4343	4301	5160	6091	7289	7261	7380
	All	2682	2704	3311	4062	4773	4964	5204
Housing size (in square meters)	1st quartile	49,7	51,8	54,4	52,0	53,3	50,2	49,2
	2nd quartile	59,0	61,2	61,7	62,8	61,5	61,4	60,1
	3rd quartile	65,5	68,5	69,0	71,1	71,7	70,7	70,4
	4rth quartile	78,9	87,2	85,6	86,3	87,0	88,6	85,8
	All	63,2	67,2	67,6	68,0	68,3	67,7	66,4
Annual Housing benefit per square meter (euros of 2002)	1st quartile	2,9	7,3	13,9	14,3	23,2	34,9	36,6
	2nd quartile	3,6	4,9	7,9	7,5	11,5	12,3	14,7
	3rd quartile	3,4	3,1	4,1	4,1	5,4	6,3	5,9
	4rth quartile	1,3	1,1	1,1	1,0	1,1	1,4	1,5
	All	2,8	4,1	6,8	6,8	10,4	13,7	14,7
Proportion of housing benefits recipients	1st quartile	0,14	0,31	0,43	0,39	0,54	0,71	0,74
	2nd quartile	0,18	0,26	0,33	0,31	0,35	0,42	0,40
	3rd quartile	0,19	0,19	0,21	0,19	0,22	0,27	0,22
	4rth quartile	0,08	0,08	0,07	0,05	0,05	0,07	0,06
	All	0,15	0,21	0,26	0,24	0,29	0,37	0,36
Households'income (euros of 2002)	1st quartile	7237	8158	8510	8837	8714	7223	7333
	2nd quartile	15533	16172	15962	16375	16398	14959	14845
	3rd quartile	23180	24197	24278	24705	24634	23237	23597
	4rth quartile	42760	44410	45740	46302	49529	45131	48157
	All	22020	23226	23555	24047	24744	22620	23480
Age of the head of household	1st quartile	59	56	53	49	44	41	41
	2nd quartile	41	41	40	40	41	43	42
	3rd quartile	38	38	37	38	38	39	41
	4rth quartile	40	40	40	40	40	41	41
	All	44	44	42	42	41	41	41
Household size (Adults and children)	1st quartile	1,7	1,7	1,7	1,5	1,5	1,4	1,4
	2nd quartile	2,9	2,5	2,3	2,2	2,1	2,0	1,8
	3rd quartile	3,4	3,0	2,7	2,6	2,5	2,4	2,3
	4rth quartile	3,5	3,3	3,1	2,9	2,9	2,8	2,8
	All	2,9	2,6	2,4	2,3	2,3	2,2	2,1
Proportion of households living in a rural area	1st quartile	31%	24%	19%	17%	16%	15%	12%
	2nd quartile	20%	18%	17%	16%	14%	16%	13%
	3rd quartile	16%	15%	16%	17%	15%	17%	16%
	4rth quartile	10%	8%	9%	9%	10%	13%	12%
	All	19%	16%	15%	14%	14%	15%	13%
Proportion of « student » households (the head of the household is a student)	1st quartile	1,7%	3,9%	3,5%	8,6%	14,8%	22,2%	23,3%
	2nd quartile	1,4%	1,5%	1,2%	1,4%	2,0%	3,2%	3,6%
	3rd quartile	0,6%	0,5%	0,3%	0,5%	0,8%	0,7%	0,4%
	4rth quartile	0,1%	0,1%	0,1%	0,1%	0,3%	0,4%	0,7%
	All	0,9%	1,5%	1,3%	2,7%	4,6%	6,6%	7,0%

Appendix table 3 : Descriptive statistics. Sample of private tenants, students excluded
Sources : author's computation from Enquête Logement INSEE

		1973	1978	1984	1988	1992	1996	2002
Annual rents per square meter	1st quartile	31,5	36,6	45,7	59,8	69,8	78,8	84,2
(euros of 2002)	2nd quartile	44,5	42,8	52,3	67,7	77,0	78,0	88,0
	3rd quartile	46,1	44,6	55,9	65,4	74,9	83,0	86,4
	4rth quartile	59,7	54,1	67,1	79,1	94,2	90,9	95,5
	All	45,4	44,4	55,2	68,0	79,0	82,6	88,5
Annual rents	1st quartile	1383	1636	2145	2703	3219	3542	3875
(euros of 2002)	2nd quartile	2294	2233	2646	3511	3998	4143	4527
	3rd quartile	2698	2631	3300	3957	4666	5043	5201
	4rth quartile	4343	4324	5182	6150	7372	7395	7516
	All	2673	2699	3317	4077	4812	5016	5279
Housing size	1st quartile	49,8	52,3	55,0	54,3	56,5	55,3	54,7
(in square meters)	2nd quartile	59,3	62,4	62,0	63,2	62,4	63,3	61,7
	3rd quartile	65,6	68,5	69,1	71,8	72,5	71,8	71,0
	4rth quartile	78,9	87,5	85,9	86,5	87,7	89,6	87,1
	All	63,3	67,6	68,0	68,9	69,8	69,9	68,6
Annual Housing benefit	1st quartile	2,9	7,1	14,2	14,7	20,4	28,9	31,5
per square meter	2nd quartile	3,7	5,1	7,7	7,7	11,0	10,5	11,7
(euros of 2002)	3rd quartile	3,4	3,0	4,1	3,9	5,0	5,5	5,0
	4rth quartile	1,3	1,1	1,1	1,0	1,0	1,3	1,3
	All	2,8	4,1	6,8	6,8	9,4	11,6	12,4
Proportion of housing benefits	1st quartile	14%	30%	44%	42%	53%	67%	69%
recipients	2nd quartile	19%	27%	32%	31%	34%	38%	34%
	3rd quartile	19%	18%	21%	18%	21%	24%	20%
	4rth quartile	8%	7%	7%	5%	5%	6%	6%
	All	15%	21%	26%	24%	28%	34%	32%
Households'income	1st quartile	7263	8523	8575	9384	9393	8320	8482
(euros of 2002)	2nd quartile	15550	16504	16064	16812	17007	16170	16040
	3rd quartile	23183	24383	24441	25066	25285	24370	24634
	4rth quartile	42775	44628	45936	46726	50423	46415	49486
	All	22105	23418	23731	24467	25510	23678	24652
Age of the head of household	1st quartile	59,9	56,5	53,5	50,3	47,9	46,7	46,6
	2nd quartile	40,7	41,5	39,8	39,8	41,4	42,6	42,4
	3rd quartile	37,9	38,2	37,4	38,4	38,3	39,3	40,3
	4rth quartile	39,8	40,4	39,8	40,6	39,7	41,1	41,2
	All	44,6	44,3	42,7	42,3	41,8	42,4	42,6
Household size	1st quartile	1,7	1,7	1,7	1,6	1,6	1,5	1,5
(Adults and children)	2nd quartile	2,9	2,6	2,3	2,2	2,1	2,0	1,9
	3rd quartile	3,4	3,0	2,7	2,6	2,6	2,5	2,3
	4rth quartile	3,5	3,3	3,1	2,9	2,9	2,9	2,8
	All	2,9	2,7	2,4	2,3	2,3	2,2	2,1
Proportion of households	1st quartile	31%	24%	19%	18%	19%	18%	15%
living in a rural area	2nd quartile	20%	19%	17%	16%	14%	16%	14%
	3rd quartile	16%	16%	15%	16%	15%	18%	17%
	4rth quartile	10%	8%	9%	9%	10%	13%	12%
	All	19%	17%	15%	15%	14%	16%	14%

Appendix table 4 : DD estimates of the effects of housing benefits on rents with various controls

Sample of private tenants, 1st and 2nd quartile

Method	Variable	Sample size	(1)	(2)	(3)	(4)
DD (1988 & 1996)	Housing benefit instrumented	4476	0,45***	0,51***	0,45***	0,43***
			(0,18)	*(0,17)*	*(0,17)*	*(0,19)*
DDD (84, 88, 96, 02)	Housing benefit instrumented	9635	0,78***	0,78***	0,74***	0,81***
			(0,31)	*(0,30)*	*(0,30)*	*(0,31)*

Sample of private tenants, 1st and 2nd quartile, students excepted

Method	Variable	Sample size	(1)	(2)	(3)	(4)
DD (1988 & 1996)	Housing benefit instrumented	4248	0,39**	0,38**	0,38**	0,36**
			(0,24)	*(0,23)*	*(0,23)*	*(0,24)*
DDD (84, 88, 96, 02)	Housing benefit instrumented	9180	1,02***	0,92**	0,94**	1,0**
			(0,52)	*(0,53)*	*(0,51)*	*(0,53)*

Controls				
Type of area x region	YES	YES	YES	YES
Type and size of the household (11 types)	YES	YES	YES	YES
Age of the head of the household (5 age groups)	YES	NO	YES	YES
Length of tenure (and squared)	NO	YES	YES I	NO
Dummy city centre / suburb	NO	NO	NO	YES

Notes : Standard errors are between parenthesis.
*** : significant at 5% level, ** : significant at 10 % level.
In our preferred specification (DDD of column (1)), 1 additional euro of housing benefits leads to an increase of rents by 0.78 euros for private tenants.
Sources : author's computation from Enquêtes Logement.

Appendix table 5: DD estimates with an alternative data set (Enquête Budget des Familles)

Sample of private tenants, 1st and 2nd quartile

Method	Variable	Sample size	All private tenants	Students excepted
DD (1988 and 1996)	Housing benefit instrumented by a dummy 1996 x 1st quartile	1617 (1607)	0,75** *(0,45)*	0,44** *(0,27)*
DDD (84, 88, 96, 02)	Housing benefit instrumented by a dummy year x 1st quartile	3636 (3619)	1,24 *(1,04)*	0,63 *(0,53)*
Controls				
Type of area (rural, small, medium, large cities or Paris)				
Type and size of the household (11 types)				
Age of the head of the household (5 age groups)				

Notes : Standard errors are between parenthesis.
*** : significant at 5% level, ** : significant at 10 % level.
The sample sizes between parenthesis are the sample sizes without students
Sources : author's computation from Enquêtes Budget des Familles.