Document de travail du LEM / Discussion paper LEM 2017- 14

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September 2017

Abstract

Housing allowances aim at providing adequate and affordable housing. This paper seeks to evaluate whether renting is indeed affordable with a new approach based on actual housing financial hardship. A theoretical discussion and literature review show why it is challenging for housing allowances to actually shield households from financial hardship. An empirical application, using National French Housing Survey data studies financial outcomes. This is one of the scarce applications of a probit model for financial hardships with a double sample selection (being a tenant, and being eligible for means-tested allowances). Estimation results show that housing allowances help to cope with some life events but that otherwise their recipients remain more exposed to housing financial hardship than their counterparts. The gap between recipients and non-recipients is larger for the households with children than for those without despite the goal of horizontal equity.

Keywords: Housing allowances, housing affordability, selection effect, financial difficulties, unpaid rent.

JEL classification: H24, I38, R21

1. Introduction

In most developed economies, housing allowances play a major role. They are viewed as an instrument of housing policy that enables households to improve their living conditions beyond an acceptable standard of housing consumption at an affordable cost. These ear-marked benefits are justified on the grounds that they provide benefits that extend beyond the provision of decent housing at an affordable cost. Grisby and Bourassa (2003) remind us that, in the mid-19th, slums were considered "breeding-grounds for fires, disease and various social pathologies that could endanger the general population". Subsidizing housing has arisen, they continue, from the belief that a minimum standard of housing is necessary and that it generates positive externalities. Psychological distress (Bratt (2002)) and poor children performance at school (Goux and Maurin (2005, 2007)) have for instance been reported to be associated with poor housing conditions or financial hardship. This paper seeks to investigate whether housing allowances fulfil their role of externalities internalisation by improving the recipient's financial situation.

The literature mainly focuses on studying the impact of housing allowances on housing consumption and conditions, on rent level and on disincentives such as the unemployment trap. But it is quite silent on measuring the impact on affordability *and* its relationship with residual financial difficulties. After all, housing allowances should reduce (if not eliminate) housing financial hardship of assisted households, *if* households and landlords do not change their behaviour *and if* circumstances do not change. Indeed, affordability is measured at one point in time for some representative households based on rent-to-income ratio. When this ratio is below thirty percent, it is generally considered that affordability is achieved.

This research does not take these elements as granted. It contributes to the literature by firstly analysing the mechanisms which complicates the task for governments to reduce housing financial hardship. Secondly, a case study on French National Housing Survey of 2001 and 2013 analyses the socio-demographic factors and key life events that increase the risk and the occurrence of financial hardship. It unveils some risk factors, by no means unique to France, which should be considered when designing housing policies. A methodological contribution of the empirical analysis is to compare financial hardship for housing allowance recipients and non-recipients, taking into account the inherent bias selection. It is one of the only applications of probit model with a double sample selection. As a matter of fact, most of the applications deal with the estimation of a quantitative variable (such as the wage rate) with a simple sample selection. The methodology and its implementation are therefore described in details in appendix. The remaining of the paper is as follows. Section 2 summarizes earlier research and studies the expected effects of housing allowances. Section 3 presents the data used and the econometric specifications. Section 4 analyses the estimation results before Section 5 concludes the paper.

2. Impacts of Housing Allowances

Housing allowances have been a frequently debated issue in the last twenty years both in political and academic circles. Some controversial issues are discussed first in a general framework and then in the French context.

2.1 Literature Review

Housing allowances have become a main instrument of housing policy in most developed countries and their merits and limits have been debated. Governments have to trade-offs between different objectives: controlling the cost of housing allowances but at the same time maintaining affordability, assisting people but avoiding disincentives (unemployment and poverty trap). Turner and Elsinga (2005) discuss the difficult role for governments in times of austerity to find a balance between social justice and market incentives. "The problem is to make the system well balanced: not so generous that it shelters households more than necessary and not so economical that it does not properly address the affordability problem."

Market Incentives:

Three controversies are whether housing assistance (1) undermines employment (2) has positive or negative effects on human capital accumulation and (3) if it has household composition effect. Shroder (2002) concludes that housing assistance does not undermine employment. Evidence on human capital is not conclusive. And housing assistance might discourage cohabitation with another adult (the income effect reduces the urge for cohabitation). Carlson et al. (2012) confirm housing vouchers have no negative effects on unemployment in the USA but reduce earnings. Salvi del Pero et al. (2016) with an OECD tax-benefit model estimate the withdrawal effect of housing benefit for a couple-family with one earner and two dependent children whose earnings increase from 65 to 70% of the average worker earnings. The reduction in housing benefit taxes away more than half of the wage-increase in Luxemburg and more than one fourth in Germany or in France. The figures remain stable between 2001 and 2015 for France (see the online calculator for different simulations[i]).

Another controversy is whether housing allowances create dependence on welfare. Newman and Harkness (2002) conclude there is no welfare trap in the United States for children of assisted parents. Every year of public housing residence between ages 10 and 16 increased a youth's probability of working between ages 25 and 27 by 7%. Nordvik and Ahrén (2005) fail to identify a dependency culture and a welfare trap associated with housing allowances in Norway: the turnover of housing allowance claim is quite important. In line with the previous findings, Chen (2006) finds no evidence of negative duration dependence arising from the duration of housing allowance claims in Sweden.

Finally, a major concern of housing assistance is the possible inflationary effect of housing allowances on the rent level. If housing assistance raises the price of occupied dwellings relative to those in the absence of assistance, then the allowance does not reduce the housing expenditure of assisted households in full or at all. Evidences suggest that housing allowances are partly captured by landlords (Susin (2002), Laferrère and Le Blanc (2004), Fack (2006), Gibbons and Manning (2006), Kangasharju (2010), Grislain-Letrémy and Trevien (2014)). Exploiting a French housing benefit reform in the nineties, Fack (2006) showed that one euro of housing subsidies has fuel a 78 cent rent increase for poor subsidized households, leaving them only 22 cents. Grislain-Letrémy and Trevien (2014) estimate that housing allowances raise rent for recipients more than it does for those who do not receive the allowances, but they find a much lower incidence on average than Fack (2006) does. The rent increase, they argue, is the highest in metropolitan areas where housing market is tight. Exploiting a 2002 reform in Finland, Kangasharju (2010) concludes that one additional euro of allowance increases the rent of recipients by 60 to 70 cents.

Consumption effects:

Housing assistance aims to provide adequate housing at an affordable cost for low-income households. Salvi del Pero et al. (2016) report that 9% of tenants in subsidized-rent dwellings are overburdened by rents in OECD countries (with a higher incidence in the private rental sector where 16% of households spend more than 40% of disposable income to pay rent). When total housing costs are considered (insurance, mandatory services and charges, maintenance and repairs, taxes and the utilities) 20% of tenants with a subsidized rent (31% for private market tenants) are overburden. Salvi del Pero et al. (2016) also mention that evictions in OECD countries are high among tenants due to financial hardship. In addition, 15% of households live in overcrowded space (and 14% do not have indoor private toilet). There is no substantial difference in overcrowding rates between the subsidized renters and those who are not.

In line with these findings, Walker and Niner (2012) find mixed evidence that the UK housing benefits enable recipients to consume more housing than is available to otherwise similar non recipients in the private sector. Nordvik (2015) concludes to a small positive incidence of housing allowances on mobility and crowding out in Norway. By contrast, Grislain-Letrémy and Trevien (2014) show that housing allowances fail to improve the quality of dwellings for French recipients. Flambard (2013) finds evidence that housing allowances in France do not shield from forced moves.

Affordability:

According to Griggs and Kemp (2012), housing allowances have become an income support instrument in addition to their traditional role of provision of adequate housing at an affordable cost. This new role reflects rising needs in the society which include single

parenthood, illness, long term unemployment or working poverty. This goes along with an increased salience of the notion of affordability.

In Australia, instead of focusing only on the issue of the rent burden (the "30% rule"), a "30%:40%" rule is used. In Rowley et al. (2015), housing stress rule is defined as "a household in the bottom 40 per cent of the income distribution spending 30 per cent or more of its gross income (although disposable income is an accepted alternative) on direct housing cost". This dominant approach in terms of ratio of housing expenditure has been criticized and the concept of residual income (income left to pay for other goods and services) has also been used. However, they argue that this concept also fails to identify people as poor when they under consume. Existing affordability concepts are also unable to discriminate between people who are deemed poor because they over consume by choice from people who are forced to overconsume because they are unable to find adequate housing. Rowley et al. (2015) define financial stress, or moderate financial difficulties, as households unable to pay their rent or utility bills on time or who need to seek help from family or friends to make ends meet. They show that people who have been in housing stress for more than a year are more likely to run into financial difficulties.

Some empirical papers suggest that housing support does not warrant affordability at least with respect to financial hardship. Haffner and Boumeester (2014) conclude that tenants are not always able to afford the rent due even when receiving all possible housing subsidization in the Netherlands. The unaffordable renting issue can arise from the fact that firstly *housing expenses are too high* in relation to the socially acceptable norm (a housing problem), secondly because *the income is too low* (an income problem) or thirdly because *too much quality housing is consumed* (overconsumption of housing). They see the first cause (expensive housing cost) as a housing market issue and the second one as a redistribution one. The last one, overconsumption can be caused by the difficulty to find a smaller dwelling or by high moving costs.

In the same line, Stone et al. (2015) report that in Australia even with Rental Assistance, "a variety of households require additional assistance throughout their tenancies in order to remain housed". They point out the importance of life events and housing transitions as aggravating factors. Low to moderate-income private rental tenants are more likely to experience critical life events (CLE) than other households and the impacts of these events are more pronounced for them. They define CLE as life course milestones (such as the birth of a child or losing a partner) or hardships (serious illness or injury and economic loss). Indeed, for low to moderate-income households it is more difficult to cope with CLE with less precautionary savings, less assets and a lower ability to borrow money than more well-off households.

Berger et al. (2008) conclusions on affordability for low-income single mothers in the United States are even more striking. They find that the rent to income ratio is on average 43% and that the incidence of difficulty paying rent or utilities in the last year is 35%. Based on a two-

stage instrumental variables model, they show that tenant-based assistance tends to *increase* modestly difficulty paying rent or utilities. They offer two likely explanations. Assisted households likely choose to spend more on housing than they would have otherwise to obtain higher quality dwellings. Or they are force to do so to meet the minimum quality standard necessary to be eligible to housing assistance.

The literature suggests that housing allowances (and more generally housing assistance) is not too generous and that work disincentives are limited. However, it is not clear that housing allowances address properly the objective of housing people in better quality dwellings at an affordable cost. Indeed rent increase compromises their efficiency. In addition, an inherent difficulty for policy makers is a selection effect. Indeed the households that the government wants to help are by nature more at risk of financial difficulties and less likely to be able to cope with these difficulties. The related literature is still new and scarce on this subject. No prior paper has attempted to unravel comprehensively the mechanisms which compromise financial well-being of low to moderate income households despite rental assistance. And there is no empirical case study for France on this relationship between housing allowances and financial difficulties.

2.2. Limitations of housing allowances (in shielding households from financial hardships)

France vs other OECD countries

OECD countries spend between 0.6 and 1.8% of their GDP on housing allowances (Salvi del Pero, A. et al. (2016)). The United Kingdom spends the largest share at 1.8% and France is in an intermediate position with 0.8% of the GDP. This same OECD study suggests that the French system covers more extensively tenants than in other countries but that the lowest income households (at the 10^{th} percentile of the earning distribution for instance) receive lower amount of benefits. It suggests housing allowances are less targeted on households who need it the most relative to many OECD countries as the following statistics suggest. Housing allowances are usually focused on the lowest-income households. Indeed in most countries, only 2% of the households in the third income quintile receive housing allowances (by contrast, this proportion is higher than 10% in a few countries including France). While in Israel the rent allowance represents nearly a quarter of the gross earnings at the 10th percentile of the earnings distribution, in France it represents just between 5% and 10%. Housing allowances also interact with other benefits and taxes. The OECD tax-benefit model calculates the impact of moving from half-time work at the 10^{th} percentile of the wage distribution to full-time work assuming earning is doubled for a single parent renter with two children. Marginal tax rate is 40% in France (versus 0% in Australia, Israel, Malta and the Netherlands).

Housing allowance scheme in France is close to commonly used ones in Europe. As suggested by the OECD figures however, its generosity and targeting differ. The French

system is described at the time of the study at the end of 2001 (no major reform has been implemented since). The impacts on recipient's well-being are discussed in the French setting. However, most of the effects generalise for similar housing schemes.

From now on, we define financial hardship by a situation where households have difficulty or are unable to pay their rent or utility bills on time. The terms allowance, benefit or subsidy are used interchangeably in what follows.

French Housing Scheme

The French housing system has three main instruments: construction of public housing, housing allowances and subsidy to low-income owner-occupiers. Housing allowances account for at least three quarters of the housing assistance budget to households. There are means-tested by reference to a household's net income and people have to apply to benefit from them. The taxable income of year t (with some deductions for receipt of other welfare benefits) is used for the calculation of the benefit for July of year (t+1) to June of year (t+2). The benefit of a person is adjusted, generally once a year, if the amount to which he is entitled changes. However, this can be problematic in interim (following a substantial drop in income for instance). Subsidised unit must meet minimum standard which is a way to force households to increase housing quality and to live in adequate housing. However, this obligation of minimum standard reduces the affordability provided by the housing allowance since the housing expense increases and takes up part or all of the allowance.

Households receive a lump sum amount to compensate for mandatory service charges directly related to housing expenses (*r*ental expenses for facilities and equipment). Debrand (2002) has compared the actual amount paid with the lump sum benefits based on the French Housing Survey of 2001. For most of the tenants in single family accommodation, the lump sum benefits covers quite well the actual expense. However, for tenants in multi-family accommodation with collective heating, elevator and/or high equipment level the lump sum benefit is much lower than the actual amount paid and may cause housing financial stress.

In addition, households receive an amount to help pay for the rent. Below a given income level I_o (equal to minimum income minus family allowances and minus a lump sum rent), the allowance is maximum and equal to 91.5% of the rent R paid by the household, up to a limit set on rent $\bar{R}(G,S)$ which varies with family size S and geographical area G. The formula is $k(I,S)*[min(R,\bar{R}(G,S)]$ *with* $k(I,S)=0,915$ in this particular case where the income does not exceed I_o. The existence of a rent ceiling prevents moral hazard issue and over consumption. However, affordability of housing assistance is reduced if households end up occupying housing above this ceiling (in France, this is the case of 77% of tenants in the private rental sector and 37% in the social housing sector).

Above the income level I_o, the level of the allowance decreases with the income I as follows:

$$allowance=k(I,S)*[min(R,\bar{R}(G,S))-R_0(I,S)] \quad (1)$$

with $0<k(I,S)<0.915$

Households with higher income I support a larger housing burden (a vertical redistribution toward households that need more help). The minimum participation rent R_o which remains at the household expense increases with the income and decreases with the household size S.

The housing benefit varies with the household size, geographical location (three zones are distinguished base on housing costs) and income. Housing allowances also act in practice as a safety net, along with other welfare transfers, cushioning drop in income (after a job loss or death of a family earner) or increase in needs (with a child birth for example through the parameter S). However, paradoxically this role is weaker for households with income close to I_o than for more well-off households. As a matter of fact, below a certain income level (I_o) the housing allowance does not increase with a reduction in income failing to offer a financial relief to the recipient (because it has already reached its maximum level). In contrast, more well-off households who experience a loss of income will benefit from an increase in allowance which will partly offset the drop in income making the adjustment easier. Similarly, the lowest income households who depend on various social subsidies (for school, transportation…) are more at risk if there is discontinuity in total benefits. If all welfare policies are not well coordinated a moderate change in income can come with a large change in benefits.

Some theoretical effects of housing allowances on housing consumption

Since the housing allowance is proportional to the housing expense, it can be argued that this benefit acts as a housing price subsidy with (1) a direct *price effect* and (2) an *income effect* (resulting from the price reduction). The price effect (1) changes the relative price of housing relative to the other goods (a price subsidy), increases demand (consumption) and leads to a price increase. However, the price elasticity of housing is known to be small (-0.5 in France (Nichèle (1989), limiting the magnitude of the first effect). The income effect (2) also increases housing consumption as housing is considered to be a normal good. The income elasticity of low-income households is below 1 and the magnitude of effect (2) is also limited (the marginal propensity to spend on housing from one dollar of unearned income is 0.17 according to Fallis (1990)). Households may also be reluctant to move to a better or bigger dwelling if the housing assistance is perceived as a temporary assistance. The housing allowance then contributes to increase moderately housing consumption and allows households to consume more of the other goods.

Cornuel and Calcoen (2005), using a Stone Geary demand function on the 2001 French Housing Survey show that the share of the housing allowance devoted to housing is only fifteen per cent (with eighty five per cent spent on other goods). These results are consistent with previous findings for the United States (Fallis (1990)). This share is estimated for the households who are able to reach the minimum standard of housing without housing

allowances. They conclude that the housing allowances increase the consumption of housing mostly for the households who would not be able to afford the minimum housing standard without them. For the others, only a limited fraction of the housing allowances (estimated at 15%) is dedicated to housing, the rest being used on other goods and services. They suggest that the income effect exceeds increasingly the price effect when the income increases. Housing subsidies are likely to change housing behaviour relative to simple income redistribution, and more so for low income households than for others. As a matter of fact, we would expect low income households to increase by more their housing consumption in response to housing allowances than higher income households who are likely to be closer to their optimal housing choice.

In the French system, landlords can request to directly receive the housing allowance in direct payment of the rent. This feature explains that landlords may discriminate between those receiving housing allowances and those who do not and hence capture part of the housing allowance in the form of higher rents. Indeed Fack (2006) shows that with a rent increase of 78 cents per euro of additional housing allowances, their recipients are left with just 22 cents net gains.

It should start to become clear why the link between housing assistance and difficulty paying rent or service charges is not straightforward. Recipients of housing allowances have insufficient income. Lack of income and resources make it difficult for them to cope with substantial drop in income or increased financial needs. Those on low income have difficulty borrowing at an affordable cost increasing the probability of financial difficulties with unexpected events. Housing allowances decrease rent burden and difficulty paying rent or utilities only to the extent that households do not increase housing expenses by the full amount of the allowance (which a minority might be forced to do to reach the minimum standard or because cheaper dwellings are not available in the market) and to the extent that landlords do not increase the rent level too much. In France, this concern is acute because the inflationary effects of the housing allowances are large and because there is a lack of very affordable dwelling. Finally, if households use most of the housing allowance to consume *more* other goods and services, it might still be difficult to pay for housing costs.

3. Evaluating households financial health

A multivariate analysis will seek to determine the causes of financial hardship and the profile of the households more at risk.

3.1 Data

The Housing Survey of 2001 administered by the French National Institute of Statistics and Economic Studies (INSEE) is a representative sample of all dwellings at the end of 2001. It aims to describe housing conditions of households and their housing expenditure. It contains

information on 32,156 households (72,791 individuals) with information on dwelling and household characteristics, occupancy status, housing costs and housing allowances at the date of the survey in December 2001. Information on households and their accommodation is also available for December 1997 (but not for December 1998 to 2000). The socioeconomic characteristics of each individual living in the housing are documented. The chosen statistical unit for this research is the household.

Total gross (before housing allowances) and net (after housing allowances) rent burden have been calculated. Large differences appear by income level, family type, age while smaller differences exist by geographical areas (three zones used in the housing allowance scheme). These results have guided the choice of exogenous variables. In addition, it is also based on findings by Haffner and Boumeester (2014) who bring out that household of the two-lowest income deciles, single-parent families and people younger than 65 are more at risk than the others to suffer from unaffordable housing. Rowley et al. (2015) have shown the importance of adverse events as risk factors. Therefore events are also included as exogenous variables.

The education level and age of the household are those of the most educated person in the couple. The geographical location of the housing (by the three zones used in the housing allowance scheme and by size of urban units) is taken into account to capture housing price differences. Binary variables are constructed to assess change in situation and financial hardship. Respondents are asked whether their situation has changed over the last four years. The occurrence of an event is coded with 1 (0 otherwise). Three types of events are distinguished for this research: (A) loss of income with death in the household, separation or job loss, (B) other family changes and (C) labour market transition. Interviewed persons are also asked whether they encountered financial difficulties and binary variables were constructed using 1 for financial hardship and 0 otherwise. The two forms of financial hardship measured this way are: (1) difficulties encountered to pay for rent or rental service charges over the last 24 months, (2) late payments of rent or rental service charges of at least two months over the last 24 months. In the subsequent surveys of 2006 and 2013 question (2) on unpaid rent or service charges is not available anymore. It is why the survey of 2001 is predominantly used here. Estimations using question (1) are also conducted with the survey of 2013.

In 2001, 1.4 million tenants out of 10 million had had difficulties paying their rent or charges during the two years preceding the survey and 400,000 were not able to pay their rent and charges in full for at least two months.

The proportion of recipients of housing benefits who declared they had difficulties paying their rent or charges during the two preceding years is higher than that of non-recipients (21.8% compared to 8.5%recipient). But among those households who faced difficulties, the share of households who did not pay their rent for the past 2 to 6 months was close for recipients (36.8%) and non-recipients (37.2%). And among those households who faced difficulties during the two preceding years, the share of recipients who still had arrears of

more than 6 months at the time of the survey was even lower than for non-recipients (8.42% versus 11.45%).

The financial health of the households has deteriorated since 2001 but the nature of the results is the same for the aspects that are studied. A proportion of 19.7% of households experienced financial difficulties over the past two years in 2013 (relative to 14.3% in 2001). Recipients of housing allowance are more at risk than non-recipients (28.0% versus 13.2% in 2013 relative to 21.8% versus 8.5% in 2001).

3.2 Specification issues

Housing allowances aim at promoting affordability. This paper considers here that to achieve these goal households should be able to pay their rent and thus occurrence of difficulty paying or rent arrears should be exceptional.

Probit regressions are used to analyse the association between a household characteristics and the occurrence of financial difficulties. With the estimated parameters, the main determinants of difficulties are identified. But selection bias could arise. Recipients are typically low income households and therefore possess different characteristics than an average person. Ignoring the bias could result in coefficients that are biased. As a matter of fact the financial difficulties of the recipients are observed only for those receiving the benefit (they must be eligible and must have made the request). Only low income households who trust they can meet the eligibility criteria are observed biasing upward the probability of financial difficulties. Moreover, the population being studied consists of renters. This population is typically younger and less well-off than owners introducing a second upward bias if no correction is made.

Thus evaluating financial hardship requires accounting for the non-random assignment of households into recipients and non-recipients on one hand and into renters and owners on the other hand. It is the methodology we implement here with a double selection effect.

Besides it is generally considered that the housing occupation status depends on long term assessment of the financial and demographic characteristics of the household. Permanent income is deemed more relevant to housing decision than transitory income. Imputing the income based on the household characteristics (education level, age, family type and size) is used here as a proxy of the permanent income. This makes it possible to estimate stated financial difficulties as a function of exogenous variables (instead of using the endogenous income level). Other specifications have been tested for the selection equations, including equations with just the income per quartile in the selection equations and also with both income and overall financial housing burden (rent or mortgage payments plus utilities). The results are robust to specification changes. From the survey, it is not possible to tell whether people claimed or not housing allowances. Only the observed status: recipient or not is available. A proxy we can give here is the proportion of non-recipients among the lowest-income tenants normally eligible to housing allowances. In 2001, seventeen percent of the

tenants in the lowest two income deciles did not receive housing allowances (against 19% in 2013). The proportion of non-recipients among the first income decile falls to 14% in 2001 and 15% in 2013.

In the appendix, we explain how to implement the analysis of a probit model with a double sample selection. The main features are the following. The variable of interest (experiencing financial difficulties or being late in paying rent) is a binary variable and is estimated with a probit model. Based on descriptive statistics and the existing literature (Haffner and Boumeester (2014) and Rowley et al; (2015)), the chosen determinants to explain this binary outcome are the observed characteristics of the household (age, education level, family type), the location of the housing (to capture possible price level differences between large geographical areas) and some dummy variables that indicate whether or not the household had experienced destabilizing events. We have grouped some events together. We distinguish what we call event A (death or separation in the household or a job loss during the last four years preceding the survey) to capture possible reduction in income. Event B (family change other than separation and death) capture other changes affecting expenses (such as birth in the family). Event C (retire, enter labour market or other professional change) is also likely to affect income and/or expenses.

We correct for a possible selection bias by estimating with a bivariate probit the binary variables being a housing recipient and being a tenant. We use the same variables plus dummy variables indicating whether the household was a housing allowance recipient and/or a tenant four years before the survey. The reader is referred to the appendix for a detailed presentation of the model equations. The inverse Mill's ratios calculated from the biprobit selection model are added as explanatory variables to the probit model of financial hardship. A significant and *positive* Mill ratio for tenancy in the estimated financial difficulty probability implies that there are unobserved characteristics which increase the probability of selection into tenancy *and* increase the probability of a *higher* than average incidence of the explained variable (financial difficulties). It is the case for the estimation run with the survey of 2001 (see Table 3). It suggests that non accounting for selection into tenancy leads to a downward bias (underestimating the probability of financial difficulties). With the estimation run on the survey of 2013, both Mill ratios are significant suggesting a double bias without the selection. Therefore, a model that accounts for selectivity is necessary for this research question.

[INSERT TABLE 1 HERE]

Table 1 presents the list of variables used in the different equations.

4. Analysis of the results

We now evaluate with econometric estimations the main observed determinants and the more vulnerable households. The results are for 2001. If the results differ in 2013, it is mentioned.

4.1 Risk factors of financial hardship

Only event A (losing one's job, death of a household member, or separation) consistently increases the probability of a threat for recipients (measured with financial difficulties and unpaid rents). Event C (encompassing professional changes not included in A) is also an aggravating factor for financial difficulties but not for unpaid rents[ii]. Housing allowances appear to have protected households from event B while all events increase the probability of financial difficulties for non-recipients[iii]. In this sense, it can be said that housing allowances protect recipients against some types of events compared to non-recipients. Event B (including other family changes than those previously considered in A) does not appear to represent a risk factor for recipients. Housing allowances therefore seem to be sufficiently flexible with respect to family size. But there are not tailored to eliminate the risk of financial hardship arising from unforeseen events such as job loss or death of a household member or even sometimes professional changes such as retirement or change in job.

Single parent-families and couples with children receiving housing allowances are more likely to suffer from a higher likelihood of financial hardships (defined by both financial difficulties and unpaid rents) than couples receiving housing allowances[iv]. Housing allowances are more generous for families with children, the aim being horizontal equity across all family types. In spite of this, our results show that families with children are more exposed to financial threat than couples. This multivariate analysis shows that even when controlling for other variables this gap still exists. Therefore housing allowances do not fully achieve the goal of horizontal equity with respect to sustainable housing.

Highly educated households appear to be less at risk than households with the lowest education level (our reference variable). This effect is not significant for all education levels. Care is needed in interpretation here, because in addition to their income filtering role in the selection effects, these dummies capture other household characteristics such as finance management skills.

Older households face a lower likelihood of financial hardship than younger ones (the age coefficient is negative). This may be attributable to the fact that young households did not have time to accumulate much precautionary savings. Lambert and Pignatti (2008) shows that saving increases at the beginning of the life-cycle up to retirement age before declining which is consistent with the life-cycle theory of savings.

The two inverse mills ratio which are introduced to correct for the selection effects of being a tenant and a recipient are significant justifying the choice of the method. For the

recipients, the coefficient for the selection effect for being a tenant is positive which suggests that tenants do not have the same characteristics as the owner-occupiers. The estimated probabilities of financial difficulties and rent arrears would have been lower for owners-occupiers than they are for tenants[v].

To summarize, it appears that payment difficulties and unpaid rent are more pronounced in the case of young, less educated households with children which encounter destabilising events, confirming Stone et al. (2015).

[INSERT TABLES 3, 4 AND 5 HERE]

The estimations were also run on the sub-sample of the households in the two-lowest-income deciles (not presented here, but available upon request). The results are similar with respect to the significance and the direction of the impacts for the role of events, family composition, education level and age.

We can go further and compare the expected differences between recipients and non-recipients for some type of households.

4.2 Difference in expected probability to face financial hardship between and non-recipients

Among recipients, for a couple with a secondary school vocational diploma and children, the estimated probability of experiencing difficulties in paying rent or charges is 0.12 higher than for non-recipients (see second row of Table 6). If this household experiences a job loss or death during the past four years, the estimated disadvantage between a recipient and a non-recipient is even larger and equal to 0.19[vi]. The estimated difference in probability for unpaid rent or charges is much lower. It falls to 0.05 and 0.09 for the typical households just described.

The gap between recipients and non-recipients is larger for financial difficulties than it is for unpaid rents (Table 6 versus Table 7). This may reflect that the former also encompasses financial stress associated with poverty and their underlying trade-offs between housing and other necessities of life. Unpaid rent is probably in this sense a better indicator of effective housing affordability than financial difficulties.

Recipients remain more exposed than non-recipients to financial hardship, this is consistent with the explanations presented in the literature review, the descriptive statistics showing a higher proportion of housing allowance recipients with difficulties than non-recipients and the results obtained from Tables 3, 4 and 5. The gap between recipients and non-recipients of housing allowances depend on household characteristics, as shown in Tables 6 and 7. Households who accumulate risk factors are particularly vulnerable to financial hardship. Based on the studied cases, young households with children who experienced death, separation or job loss are particularly disadvantaged (sixth row of Tables 6 and 7). The study

run on the two lowest-income-decile households' shows that the conclusions are unchanged when housing allowances cover a large share of the eligible rent. The estimated probabilities of financial hardship remain slightly higher for recipients than for non-recipients. But the difference in estimated probabilities is reduced between recipients and non-recipients when comparing the two lowest income decile households' to all households (differences of respectively 0.05 for financial difficulties and 0.01 for unpaid rent and charges for the two-lowest income decile households' relative to 0.10 and 0.04 on the whole sample). This average masks a wide range of situations: some households actually gain to the point where their inherent disadvantage disappears while others remain more vulnerable.

[INSERT TABLES 6 AND 7 HERE]

It can be concluded based on Tables 3 and 5 that having experienced events A or C, having no education; being young or having children represent risk factors of financial difficulties for housing allowance recipients. The risk factors are the same for unpaid rent or service charges except for event C.

The positive values for the expected difference in probabilities of Tables 6 and 7 show that housing allowance recipients remain slightly more at risk than their counterparts who do not receive assistance. The gap between recipients and non-recipients is however quite small on average except for households who accumulate risk factors (who had experienced unexpected adverse events; who are young and less educated and who have children).

There results show that housing allowances fail to shield their recipients from financial hardship, a result in line with Berger (2008) or Haffner and Boumeester (2014). This conclusion may seem paradoxical. However, it is important to remember that recipients are less well off financially than non-eligible households. They have also fewer precautionary saving on average. Poverty is a main and difficult issue to be tackled. Housing conditions cannot be improved in isolation from the other household basic needs. Assisted households face financial trade-offs between subsidized housing and non-subsidized housing goods. When spending more on both housing and other goods, financial hardship can still arise. A number of other potential explanations can be given. Allowances are adjusted with delay which may cause financial hardship for households when their circumstances change. Housing allowances are progressive but below a certain income I_o the allowance is set at its flat rate maximum and above a certain housing expenditure R any rent increase is not compensated. This design of the housing allowance scheme fails to protect the lowest income households (near the maximum allowance) who pay a rent close to the ceiling. These households will not benefit from an increased allowance if faced with income reduction or rent increase whereas households (not yet at the maximum allowance) would benefit from this safety net. Moreover, recipients benefit only partially from their housing subsidies, the other part being captured by landlords through higher rents. Indeed it has been estimated by Fack (2006) that seventy to the totality of the housing allowances are wiped out by rent increase in France (in a context of inelastic supply curve). Lower income households with less

secure job also tend to experience more volatility of income. They tend to live in the most affordable dwellings, precisely those that are likely to be old, with a higher probability to be demolished or renovated. Relocation usually entails rent increase only partially covered by housing allowances. For all these reasons, recipients are still moderately more exposed to housing financial hardship than non-recipients are. It explains why in practice 22% of them declare that they experienced financial difficulties in the last 24 months against 8% for non-recipients.

5. Conclusion

Housing allowances have become an increasingly popular instrument of housing policies in the OECD countries but start to be regarded as controversial with respect to efficiency and affordability. They have been blamed to fuel rent increase and more so for recipients than for non-recipients questioning their efficiency as an instrument.

Rowley et al. (2015) argued that the well-known rent-to-income-ratio as a measure of affordability fails to provide an accurate measure of actual financial hardship. This paper contributes to the literature by analysing affordability through observed financial outcomes: financial difficulties and unpaid rents. Based on previous research and the theoretical analysis of the impacts of housing allowances, it can be said that housing allowances have the potential to reduce only moderately housing financial hardship. A case study, conducted on the National French Housing Survey confirms this. In France, the housing allowances are not able to bring the recipients (poor and modest-income households) to the same risk level of running into financial hardship than the non-recipients (that are better off financially). This group remains more vulnerable. But at least the differences are weaker for actual unpaid rents than for financial difficulties. Unforeseen events worsen the prospect of financial hardship for all households. But, the gap between recipients and non-recipients is wider following a death in the family or a job loss than when not encountering these life hardships.

These results were obtained based on the estimations of the probabilities of financial hardships for those who benefit from housing allowances and for those who don't. The conclusions also hold for the sub-sample of the households in the lowest two income deciles. It is one of the scarce applications using a probit model for the outcome with a double sample selection. This methodology corrects for the selection biases which arise from the fact that unobserved characteristics which increase the probability of selection into tenancy and claim of housing allowances also raise the risk of experiencing problems meeting housing costs. Not accounting for selectivity would have biased the results.

The empirical findings of this case study also show that some differences with respect to financial hardship in paying rent or charges remain across education level and family types

for recipients of housing allowances. Particular compositions of households (namely lone parents and young families with children) have been found to increase the risk of financial hardship. It is interesting to note however that only unemployment and death or separation in the household is a risk factor for housing allowance recipient while all types of life events represent risk factors for the other households. It can be said therefore that housing allowances shield households from some types of risks.

What policy recommendations should we draw from this?

Households do not have the same education level and ability to manage their budget impacting the probability of financial hardship (it is true in comparison with non-recipients and within the group of recipients). These vulnerable households may not be fully aware of the full range of social assistance they are eligible to when facing financial hardship. A challenge is for public services to reach this public to provide financial advice.

The lowest income households are also those more at risks of experiencing some adverse events (renovation of old rented dwellings requiring a costly move, job loss for precarious employment situations for instance). Temporary special measures may be needed to address emergency situations.

Moreover demand-side housing policies are known to fuel rent increase as discussed in the literature review. French president Macron calls, in 2017, homeowners to reduce rent by five euros to fully compensate the coming reduction of housing allowances. He is indirectly suggesting that rent level varies with the assistance level and that collective responsibility is needed. This questions whether housing allowances in France are a good way to redistribute income with an almost inelastic supply and an incidence of subsidy mostly on homeowners. Caldera-Sanchez and Johansson (2011) showed that France has one of the lowest long price elasticity of the OECD countries (less than 0.5 compared to 2 for the USA). The reasons why supply is so unresponsive in France has not been documented yet. This low responsiveness could be related to the financial hardship studied in this paper. It could be that investors are concerned not only about their residential investment return but also about risk. Poor-income households constitute a high risk with respect to late payments or rent arrears as demonstrated in this paper. Protection for landlords against rent arrears therefore should not be neglected by policy-makers. Housing supply elasticity also depends on land-use regulation; planning restriction on construction or taxes on vacant properties. Some research is needed to identify the main issues and to suggest adequate policies to tackle them. Supply-side housing policies do not have this drawback of fuelling price increase but also have their disadvantages (see Galster (1997)). But it is beyond the scope of this paper to analyse the pros and cons of demand-side policy versus supply-side policy (see also the response by Yates and Whitehead (1998) for this debate).

This paper also concludes that housing affordability is not enough to prevent financial unsustainability because conditions change. As household incomes decrease (following job

loss, job change, death, separation) or household expenses increase (with a birth in the family, a relocation, a raise in rent), a dwelling that was affordable yesterday might no longer be. Housing allowances are usually adjusted once a year. In the transition period, households suffer from financial stress. In addition, dwellings downsizing can be costly (moving costs plus rents to pay in two places if timing is not good). Households may also face some constraints in finding cheaper and smaller dwellings available in the market especially with low rent ceilings. Some households also depend on several forms of social assistance.

If the flexibility of the housing allowance transfers are to slow or insufficient when conditions change and most of all if other social policies are not well coordinated then it can increase financial hardship. Indeed our results show that recipients are more at risk than others following a death or a job loss (undesired and unplanned for the most part). Housing affordability and sustainability cannot be addressed in isolation from the other needs. Housing benefits can be effective only in so far as they are well coordinated with other social policies. Our results therefore call to a better coordination when conditions change. Recently scholars raised the attention to the poor coordination of social policies in France. A recent paper calls to reform French housing allowances by merging the different social benefits to address that issue (Bozio et al. (2015)). The objective would be to avoid the effects of some thresholds that may cause financial hardships and work disincentives.

Consequently, our conclusion is that we need housing allowance and more generally social programs that ensure continuing housing affordability and are sufficiently flexible to ensure housing sustainability. Indeed, without housing allowances, some households would not be able to pay for their rent. Housing allowances cover 70% of the rent of people in the lowest income decile. But family and professional changes represent risk factors that can be alleviated only if the housing allowances can respond quickly enough to changes in income, family size or rent level. Regular indexation of housing allowances, rent ceilings and lump sum charges, together with provision of rapid adjustment in case of negative shocks plus advice to households in financial difficulty would lessen these problems and would tend to reduce the inherent disadvantage for these recipients. Policies which promote the increase of supply elasticity are essential for countries that use extensively housing allowances. Ultimately a necessary condition seems to be a good coordination with other social policies to ensure continuing housing affordability and sustainability since the lack of resources of these households seem to be at the heart of the problem. More research on this question is needed.

References

Berger, L. M., Heintze, T., Naidich, W. B. & Meyers, M. K. (2008) Subsidized Housing and Household Hardship among Low-Income Single-Mother Households, *Journal of Marriage and Family,* 70(4), pp. 934-949.

Bozio, A., Fack, G., Grenet, J., Guillot, M., Monnet & M., Romanello, L. (2015) Reforming French Housing Benefits: Why Not Merging Benefits?, IPP Note, 18, pp. 1-4.

Bratt, R. G. (2002) Housing and family well-being, Housing Studies, 17(1), pp. 13-26.

Cornuel, D. & Calcoen, F. (2005) Effets économiques des aides personnelles au logement, *Economie & prévision*, 169-170-171(3), pp. 211-226.

Caldera-Sanchez, A. & Johansson, A (2011) The price responsiveness of housing supply in OECD countries. OECD Economics Department Working Papers, No. 837.

Carlson, D. , Haveman R., Kaplan T.& Wolfe, B. (2012) Long-term earnings and employment effects of housing voucher receipt, *Journal of Urban Economics*, 71, pp. 128–150.

Chen, J. (2006) The dynamics of housing allowance claims in Sweden: A discrete-time time hazard analysis, *European Journal of Housing Policy, 6(1), pp. 1-29.*

Debrand, T. (2002) Les charges dans tous leurs états, in "Habitat et Société", 26, pp. 6-14.

Fack, G. (2006) Are housing benefits an effective way to redistribute income? Evidence from a natural experiment in France, *Labour Economics*, 13(6), pp. 747-771.

Fallis, G. (1990) The optimal design of housing allowances, *Journal of Urban Economics*, 27, pp. 381-397.

Flambard, V. (2013) Housing Allowances and Forced Moves, *International Journal of Housing Policy*, 13(2), pp. 159-182.

Galster, G.(1997) Comparing demand-side and supply-side housing policies: submarket and spatial perspectives, *Housing Studies*, 12, pp. 561-578.

Gibbons, S., Manning, A. (2006) The incidence of UK housing benefit: Evidence from the 1990`s reforms, *Journal of Public Economics*, 90, pp. 799-822.

Goux, D. & Maurin, E. (2007) Close neighbours matter: neighbourhood effects on early performance at school, Economic journal, 117(523), pp. 1193-1215.

Goux, D., Maurin, E. (2005) The Effect of Overcrowded Housing on Children's Performance at School, *Journal of Public Economics*, 89, 797-819.

Griggs, J. & Kemp, P. A. (2012) Housing Allowances as Income Support: Comparing European Welfare Regimes, *International Journal of Housing Policy*, 12(4), pp. 391-412.

Grigsby, W. G. & Bourassa, S. C. (2003) Trying to Understand Low-income Housing Subsidies: Lessons from the United States, Urban Studies, 40(5-5), pp. 973-992.

Grislain-Letremy C., Trevien, C.(2014) The Impact of Housing Subsidies on the Rental Sector: The French Example, INSEE working paper.

Haffner, M. & BoumeesterIs renting unaffordable in the Netherlands?, International Journal of Housing Policy 14(2), pp. 117-140.

Heckman, J. J., 1979. Sample Selection Bias as a Specification Error, Econometrica 47(1), 153-161.

Kangasharju, A., 2010. Housing Allowance and the Rent of Low-Income Households, Scandinavian Journal of Economics, 112(3), 595-617.

Laferrère, A. & Le Blanc, D. (2006) Housing Policy : Low-Income Households in France, in R. J. Arnott & D. P. McMillen (Eds) *A Companion to Urban Economics*, 604 pages (Wiley-Blackwell).

Laferrère, A. & Le Blanc, D. (2004) How do Housing Allowances affect rents? An empirical analysis of the French Case, *Journal of Housing Economics*, 13, pp. 36-67.

Lambert, F. & Pignatti, M. (2008) Saving behaviour over the life cycle does not differ across countries. Portfolio choices do, working paper, downloaded on September 2017 at https://www.ecb.europa.eu/events/pdf/conferences/ecb_cfs_conf/Lambert_Pignatt.pdf?4924f06082afa82a7c8b953f39e1f8a6

Newman, S. J. & Harkness, J. M. (2002) The long-term effects of public housing on self-sufficiency, *Journal of Policy Analysis and Management*, 21(1), pp. 21–43.

Nichèle, V. 1989 Effets redistributifs et gains d'efficacité de l'allocation de logement en France : une analyse micro-économique, Economie et Prévision 91(5), pp. 19-34.

Nordvik, V. (2015) Housing allowances, mobility and crowded living in the Norwegian case, *Journal of Housing and the Built Environment*, 30(4), 667-681.

Nordvik, V. & Ahrén, P. (2005) The duration of housing allowance claims and labour market disincentives: the Norwegian case, *European Journal of Housing Policy*, 5(2), 131-146.

OECD Affordable Housing Database(2006) Social Policy Division- Directorate of Employment, Labour and Social Affairs, Available at https://www.oecd.org/els/family/PH3-3-recipients-payment-rates-housing-allowances.pdf. (Accessed on August, 14th 2017).

Priemus H. and Haffner, M. E. A. (2016) How to design a rent rebates scheme? Experience in the Netherlands, *Housing Studies,* pp. 1-19.

Rowley, S., Ong, R. & Haffner, M. (2015) Bridging the Gap between Housing Stress and Financial Stress: The Case of Australia, *Housing Studies*, 30(3), pp. 473-490.

Salvi del Pero, A., Adema, W., Ferraro, V. & Frey, V. (2016) *Policies to promote access to good-quality affordable housing in OECD countries,* OECD Social, Employment and Migration working papers, 176, February 26 2016, OECD Publishing Paris.

Shroder, M. (2002) Does housing assistance perversely affect self-sufficiency? A review essay, *Journal of Housing Economics*, 11(4), pp. 381-417.

Stone W., Sharam, A., Wiesel, I., Ralston, L., Markkanen S. & James, A. (2015) *Accessing and sustaining private rental tenancies: critical life events, housing shocks and insurances***,** AHURI Final Report No.259. Melbourne: Australian Housing and Urban Research Institute Limited.

Susin, S. (2002) Rent Vouchers and the Price of Low-Income Housing, *Journal of Public Economics*, 83, pp. 109-152.

Turner, B. & Elsinga, M. (2005) Housing Allowances: Finding a Balance Between Social Justice and Market Incentives, *International Journal of Housing Policy*, 5(2), pp. 103-109.

Wynand, P.M.M., Van de Ven, B. & Van Praag, M. S. (1981) The demand for deductibles in private health insurance : A probit model with sample selection, *Journal of Econometrics*, 17(2), pp. 229-252.

Walker, B. & Niner, P. (2012) Welfare or Work? Low-income working households' housing consumption in the private rented sector in England, *Housing Studies*, 27(3), pp. 381-397.

Yates, J. & C. Whitehead, C. (1998) In Defence of Greater Agnosticism: A Response to Galster's 'Comparing Demand-side and Supply-side Housing Policies', *Housing Studies*, 13(3), pp. 415-423.

Appendix

1. Specification of selection and outcome equations

We assume that a household will self-select in the program of housing allowances if the housing program is perceived as beneficial for him and if he thinks he will be eligible. This treatment decision is modelled by an index model $x_3'\beta_3$ and associated with a latent variable that is not observed y^*_3. Only the state of the household (recipient or not) is observed. It is expressed with the binary variable y_3. Because tenants can systematically differ from owners by their characteristics we will also assume that a household will self-select in the renting occupation status if renting is the best (sometimes only) option. This decision rule is modelled by an index model $x_2'\beta_2$ and associated with a latent variable that is not observed y^*_2. Only the state of the household (tenant or not) is observed and the binary variable y_2 takes a value of one or zero respectively.

The latent model for the two equations of selection is defined as follows:

$$y_3 = \text{RECIPIENT}=1 \text{ if } y^*_3 = x_3'\beta_3 + u_3 > 0 \quad (2)$$

$$y_2 = \text{TENANT}=1 \text{ if } y^*_2 = x_2'\beta_2 + u_2 > 0$$

where x_3 is a (24×1) vector of exogenous variables (events, education level, age, family type, location, two dummies-dummy variables indicating whether the household was a housing allowance recipient in 1997 and/or a tenant in 1997- and an intercept). The same variables appear in x_2. (See Table 1 for variable description).

[INSERT TABLE 1 HERE]

Then the outcome (i.e. financial difficulties) is estimated separately for the tenants that benefit from the program and for the others. We use the answer to a survey question (Have you experience financial difficulties?). The outcome variable y_1 takes a value of one or zero (with y_1=1 in case of self-declared financial difficulties and 0 otherwise). We construct a model that links the outcome to a set of independent factors by introducing a latent index $x_1'\beta_1$ (when it exceeds zero the household is supposed to experience financial difficulties). The latent model outcome equation (i.e. financial difficulties) and primary equation of interest is:

$$y_1 = \text{DIFF}=1 \text{ if } y^*_1 = x_1'\beta_1 + u_1 > 0 \quad (3)$$

where x_1 is a subset of x_3. The omitted dummies are the location dummies and dummies indicating perception of housing allowances and tenancy in 1997.[1] We drop the subscript to denote the

[1] It is assumed that these variables of location and the dummies indicating occupation status and perception of housing allowances four years before the year under study are not correlated with intrinsic household characteristics influencing financial difficulties four years later: ability to manage one's budget, giving priority to housing over other expenditures and probability of familial or professional shocks.

household in the sample. To simplify notation, we drop the subscript which indicates whether the equation will be estimated on the subsample of the recipient or on the subsample of the non-recipients.

The stochastic structure of the model is as follows. We assume that (u_1,u_2,u_3) follow a joint multivariate normal distribution with zero means, and variances and covariances defined as follows:

$$V(u_1) =\sigma_1^2,\ cov(u_1,u_2)=\sigma_{12}^2,\ cov(u_1,u_3)=\sigma_{13}^2,$$

$$V(u_2) =V(u_3)=1,\ cov(u_2,u_3)=\rho$$

We will estimate a probit model with double selection. The population regression function for the outcome equation (3) may be written as:

$$E[y_1|x_1] =E[y^*_1|x_1]$$

$$E[y_1|x_1] =x_1'\beta_1 \qquad (4)$$

The population regression function for the outcome equation (3) for the subsample of tenant recipients (a non-randomly chosen sample) is:

$$E[y_1|x_1,y_2,\ y_3 \text{ are observed}] =E[y^*_1|x_1, \text{ sample selection rule for tenant recipients}]$$

$$E[y_1|x_1,y_2,\ y_3 \text{ are observed}] =E[y^*_1|x_1,y_2=1,y_3=1]$$

$$E[y_1|x_1,y_2,\ y_3 \text{ are observed}] =x_1'\beta_1+E[u_1|x_1,y_2=1,y_3=1]$$

$$E[y_1|x_1,y_2,\ y_3 \text{ are observed}] =x_1'\beta_1+\sigma_{12}\lambda_2+\sigma_{13}\lambda_3 \qquad (5)$$

where $\lambda_2=\phi(a)\Phi(A)/\Phi_2(a,b,\rho)$ and $\lambda_3=\phi(b)\Phi(B)/\Phi_2(a,b,\rho)$ are selection rule variables with $a=x_2\beta_2$, $b=x_3\beta_3$, $A=(b-\rho a)/\sqrt{(1-\rho^2)}$ and $B=(a-\rho b)/\sqrt{(1-\rho^2)}$. As usual, ϕ is the standard normal distribution, Φ is the cumulative standard normal distribution and Φ_2 denotes the bivariate standard normal distribution function.

There is potentially a sample selection bias when estimating the outcome equation on the subsample of the tenant recipients (or on the tenant non-recipients, since both are non-randomly selected subsamples). As a consequence, estimation of the coefficients β_1 yields potentially inconsistent estimates (compare equations (4) and (5)). We correct for this potential bias by applying a method which Heckman (1979) introduced for an analogous problem when explaining a non-dichotomous variable with one selection variable. This method has been used in particular by Wynand et al. (1981) for a dichotomous variable with one selection variable. The two-step estimation procedure for the estimation of financial difficulties for tenant recipients is the following. Firstly, estimate the parameters of the probability that a household is selected (i.e. here receives housing allowances and is a tenant), using a bivariate probit analysis (with the system of equation (2)) for the full sample by maximizing log likelihood. From these estimators $\widehat{\beta_2}$ and $\widehat{\beta_3}$, compute $\widehat{\lambda_2}$ and $\widehat{\lambda_3}$. Secondly, estimate a simple probit model (equation (3)) on the subsample of the tenant recipients by maximizing log likelihood (financial difficulties y_1 is the dependent variable and $(x_1,\widehat{\lambda_2},\widehat{\lambda_3})$ are the independent variables).

Repeat this two-step estimation for the subsample of the tenant non-recipients. The sample selection rule for tenant non-recipients involves (y_2=1,y_3=0). The Mill's ratios for the estimation on the tenant non-recipients are denoted (λ_4,λ_5). In the second-step of the estimation on the subsample of tenant non-recipient, the dependent variable of the probit model is financial difficulties y_1 and the independent variables are (x_1,$\widehat{\lambda_4}$, $\widehat{\lambda_5}$).

Finally, the whole estimation procedure is repeated for another dependent variable unpaid rent or charges (i.e. instead of difficulties paying rent or charges). The two-step estimation procedure need to be performed twice: once for tenant recipients and once for tenant non-recipients.

Table 2 summarizes the estimation of the selection equations (used twice: once for estimation of difficulties in paying rent and once for estimation of unpaid rent). The results of the selection equations show that tenant and allowance recipient status are positively correlated outcomes (ρ=0.65). This implies that the selection equations need to be estimated simultaneously in order to take into account the correlation between the selection effects. It is what we did since we used a bivariate probit (instead of two separate probit equations) to estimate the selection equations (with the system of equations (2)).

[INSERT TABLE 2 HERE]

The results of the estimation of the second step of the estimation procedure (outcome equation with selection) are presented in Tables 3 and 4. These show the determinants of payment difficulties and unpaid rent, respectively. In both cases the selection effects play a part. (Correction for selection effect is therefore indeed needed).

Table 1: Variables used for the estimations

Variable name	Description
Age	Age of the more educated person of the couple
Zone 1	Paris agglomeration, in the Ile-de-France region (IDF)
Zone 2	Other in IDF and cities of more than 100 000 inhabitants
Zone 3	Towns not in zone 1 and 2
zone_21	In zone 2 in urban unit of [100 000; 1 999 999[inhabitants
zone_22	In zone 2 in urban unit of [10 000; 99 999[inhabitants
zone_23	In zone 2 in urban unit of less than 10 000 inhabitants
zone_32	In zone 3 in urban unit of [10 000; 99 999[inhabitants
zone_33	In zone 3 in urban unit of less than 10 000 inhabitants
Ed_0	No diploma
Ed_1	Former primary school certificate
Ed_2	Middle school certificate ("BEPC" or "BE")
Ed_3	Vocational high school certificate ("CAP" or "BEP")
Ed_4	Professional Baccalaureate, High school graduate
Ed_5	Technical Baccalaureate, High school graduate
Ed_6	General Baccalaureate, High school graduate
Ed_7	Two years of postsecondary education
Ed_8	More than two years of postsecondary education
Event A	Death, separation, job loss over the last four years
Event B	Family change other than separation and death
Event C	Retire, enter labour market or other professional change
Family type	A dummy is created for each family type: single person, single family, couple with children, other
Recipient -4y	The household received housing allowances 4 years before the date of the survey
Tenant -4y	The household was a tenant 4 years before the date of the survey

Table 2: Selection effects for being a tenant and a recipient.

	Tenant Coef. in 2001 (Robust Std. Err.)	Tenant Coef. in 2013 (Robust Std. Err.)	Recipient Coef. In 2001 (Robust Std. Err.)	Recipient Coef. In 2013 (Robust Std. Err.)
Event A	0.06***	0.17***	0.10***	0.18***
	(0.02)	(0.03)	(0.02)	(0.03)
Event B	0.13***	0.11***	0.19***	0.22***
	(0.02)	(0.03)	(0.03)	(0.03)
Event C	0.10***	0.21***	0.07***	0.15***
	(0.02)	(0.03)	(0.03)	(0.03)
Ed_0: ref				
Ed_1	-0.37***	-0.36***	-0.41***	-0.32***
	(0.03)	(0.05)	(0.04)	(0.06)
Ed_2	-0.61***	-0.67***	-0.71***	-0.75***
	(0.04)	(0.06)	(0.05)	(0.07)
Ed_3	-0.67***	-0.62***	-0.78***	-0.78***
	(0.03)	(0.04)	(0.03)	(0.04)
Ed_4	-0.72***	-0.88***	-1.00***	-1.00***
	(0.06)	(0.05)	(0.07)	(0.06)
Ed_5	-0.91***	-0.95***	-1.10***	-1.15***
	(0.05)	(0.06)	(0.06)	(0.07)
Ed_6	-0.83***	-0.80***	-0.99***	-0.84***
	(0.04)	(0.05)	(0.04)	(0.06)
Ed_7	-0.97***	-1.20***	-1.27***	-1.37***
	(0.04)	(0.05)	(0.05)	(0.05)
Ed_8	-1.05***	-1.18***	-1.54***	-1.47***
	(0.04)	(0.04)	(0.04)	(0.04)
Zone_33	-0.85***	-0.80***	-0.04	-0.05
	(0.03)	(0.04)	(0.03)	(0.04)
Zone_32	-0.24***	-0.62***	0.28***	0.02
	(0.03)	(0.03)	(0.03)	(0.02)
Zone_23	-0.88***	-0.01	-0.29***	0.27
	(0.07)	(0.54)	(0.09)	(0.37)
Zone_22	-0.20***	-0.13	0.23***	0.28***
	(0.05)	(0.10)	(0.06)	(0.11)
Zone_21	-0.11***	-0.13***	0.38***	0.27***
	(0.03)	(0.03)	(0.03)	(0.03)
Zone1: ref	Paris agglomeration, in the Ile-de-France region (IDF)			

(Continue)

	Tenant Coef. in 2001 (Robust Std. Err.)	Tenant Coef. in 2013 (Robust Std. Err.)	Recipient Coef. In 2001 (Robust Std. Err.)	Recipient Coef. In 2013 (Robust Std. Err.)
Single person	0.68***	0.78***	0.77***	0.90***
	(0.02)	(0.03)	(0.03)	(0.04)
Single family	0.52***	0.69***	1.32***	1.48***
	(0.04)	(0.04)	(0.04)	(0.05)
Couple: ref				
Couple with children	-0.24***	-0.25***	0.61***	0.49***
	(0.02)	(0.03)	(0.03)	(0.04)
Other family type	0.42***	0.44***	0.59***	0.71***
	(0.05)	(0.06)	(0.05)	(0.06)
Age	-0.03***	-0.03***	-0.03***	-0.02***
	(0.00)	(0.00)	(0.00)	(0.00)
Recipient 4 years before	0.32***	0.63***	0.88***	1.21***
	(0.04)	(0.06)	(0.04)	(0.06)
Tenant 4 years before	0.51***	0.62***	0.06**	0.02
	(0.02)	(0.03)	(0.03)	(0.04)
Intercept	2.12***	1.83***	0.30***	0.08
	(0.06)	(0.07)	(0.07)	(0.08)
Nb of obs	30,774	25,983	30,774	25,983
Log pseudolikelihood	-19,638,354	-21,054,885	-19,638,354	-21,054,885

The correlation coefficient rho between tenants and housing allowance recipients is significantly different from zero at 1% (Chi2(1)=2300 and rho=0.65 in 2001 and Chi2(1)=1856 and rho=0.76 in 2013). It is necessary to estimate simultaneously the two equations tenant & housing allowance recipients.

Robust Standard Errors are between Parenthesis.

*** p<0.01, ** p<0.05, * p<0.1

Table 3: Determinants of Difficulties paying rent or charges for recipients over the last 24 months.

	In 2001		In 2013	
	Recipients		Recipients	
	Coef	Marg. Effects	Coef	Marg. Effects
	(Robust Std. Err.)	(Robust Std. Err.)	(Robust Std. Err.)	(Robust Std. Err.)
Event A	0.42***	0.13	0.44***	0.14
	(0.05)	(0.15)	(0.05)	(0.02)
Event B	0.06	0.02	0.06	0.02
	(0.05)	(0.01)	(0.06)	(0.02)
Event C	0.10**	0.03	0.19**	0.06
	(0.05)	(0.01)	(0.06)	(0.02)
Ed_0: ref				
Ed_1	-0.14*	-0.04	0.11	0.04
	(0.08)	(0.02)	(0.11)	(0.04)
Ed_2	0.08	0.02	0.13	0.04
	(0.09)	(0.03)	(0.12)	(0.04)
Ed_3	-0.10*	-0.03	0.01	0.00
	(0.06)	(0.02)	(0.07)	(0.02)
Ed_4	-0.22	-0.06	0.02	0.01
	(0.14)	(0.03)	(0.12)	(0.04)
Ed_5	-0.42***	-0.10	-0.25*	-0.07
	(0.13)	(0.02)	(0.15)	(0.04)
Ed_6	-0.39***	-0.09	-0.36***	-0.10
	(0.10)	(0.02)	(0.12)	(0.03)
Ed_7	-0.35***	-0.09	-0.27***	-0.08
	(0.10)	(0.02)	(0.12)	(0.03)
Ed_8	-0.34***	-0.08	-0.27***	-0.08
	(0.10)	(0.02)	(0.11)	(0.03)
Ref: Couple				
Single person	0.09	0.02	-0.13	-0.04
	(0.09)	(0.02)	(0.11)	(0.03)
Single family	0.46***	0.14	0.20*	0.06
	(0.09)	(0.03)	(0.12)	(0.04)
Couple with children	0.39***	0.12	-0.03	-0.01
	(0.09)	(0.03)	(0.12)	(0.03)
Other type	0.10	0.02	-0.15	-0.04
	(0.13)	(0.04)	(0.15)	(0.04)
Age	-0.01***	-0.00***	-0.01***	-0.00***
	(0.00)	(0.00)	(0.00)	(0.00)

(Continue)

	In 2001		In 2013	
	Recipients		Recipients	
	Coef (Robust Std. Err.)	Marg. Effects (Robust Std. Err.)	Coef (Robust Std. Err.)	Marg. Effects (Robust Std. Err.)
Selection effect for tenant	0.07**	0.02	0.08**	0.02
	(0.03)	(0.01)	(0.04)	(0.01)
Selection effect for recipient	-0.15	-0.04	0.72***	0.22
	(0.20)	(0.06)	(0.25)	(0.08)
Intercept	-0.74***		-0.82***	
	(0.14)		(0.17)	
Nb of obs	5,324	5,324	4,845	4,845
Log pseudolikelihood	-1,986,660	-2,621	-2,440,958	

Robust Standard Errors are between Parentheses.

*** p<0.01, ** p<0.05, * p<0.1 for the significance level of the coefficients

Table 4: Determinants of Difficulties paying rent or charges for non-recipients over the last 24 months.

	In 2001		In 2013	
	Non-recipients		Non-recipients	
	Coef	Marg. Effects	Coef	Marg. Effects
	(Robust Std. Err.)	(Robust Std. Err.)	(Robust Std. Err.)	(Robust Std. Err.)
Event A	0.41***	0.06	0.46***	0.09
	(0.05)	(0.01)	(0.06)	(0.01)
Event B	0.10*	0.01	0.08	0.01
	(0.06)	(0.01)	(0.06)	(0.01)
Event C	0.10*	0.01	0.012	0.00
	(0.05)	(0.01)	(0.06)	(0.01)
Ed_0: ref				
Ed_1	-0.19*	-0.02	-0.38***	-0.05
	(0.11)	(0.01)	(0.12)	(0.01)
Ed_2	-0.25**	-0.03	-0.27**	-0.04
	(0.12)	(0.01)	(0.13)	(0.02)
Ed_3	-0.10	-0.01	-0.25***	-0.04
	(0.09)	(0.01)	(0.08)	(0.01)
Ed_4	-0.26*	-0.03	-0.13	-0.02
	(0.16)	(0.01)	(0.11)	(0.02)
Ed_5	-0.42***	-0.04	-0.51***	-0.07
	(0.15)	(0.01)	(0.14)	(0.01)
Ed_6	-0.54***	-0.05	-0.40***	-0.06
	(0.13)	(0.01)	(0.12)	(0.01)
Ed_7	-0.47***	-0.05	-0.61***	-0.08
	(0.12)	(0.01)	(0.11)	(0.01)
Ed_8	-0.61***	-0.07	-0.70***	-0.10
	(0.11)	(0.01)	(0.10)	(0.01)
Ref: Couple				
Single person	0.17***	0.02	0.12*	0.02
	(0.07)	(0.01)	(0.07)	(0.01)
Single family	0.49***	0.09	0.66***	0.16
	(0.11)	(0.03)	(0.12)	(0.04)
Couple with children	0.28***	0.04	0.40***	0.08
	(0.08)	(0.01)	(0.09)	(0.02)
Other type	0.28**	0.05	0.33***	0.07
	(0.13)	(0.03)	(0.12)	(0.03)
Age	-0.01***	-0.00***	-0.01***	-0.00***
	(0.00)	(0.00)	(0.00)	(0.00)

(Continue)

	In 2001		In 2013	
	Non-Recipients		Non-recipients	
	Coef (Robust Std. Err.)	Marg. Effects (Robust Std. Err.)	Coef (Robust Std. Err.)	Marg. Effects (Robust Std. Err.)
Selection effect for tenant	0.06 (0.08)	0.01 (0.01)	-0.15 (0.10)	-0.02 (0.02)
Selection effect for recipient	-0.07 (0.06)	-0.01 (0.01)	-0.15* (0.09)	-0.03 (0.02)
Intercept	-0.98*** (0.16)		-0.72*** (0.15)	
Nb of obs	7,074	7,074	6,171	6,171
Log pseudolikelihood	-1,538,688	-1,920	-2,160,326	-2,058

Robust Standard Errors are between Parentheses.

*** p<0.01, ** p<0.05, * p<0.1 for the significance level of the coefficients

Table 5: Determinants of Unpaid rent or charges for at least two months over the last two years.

	Recipients		Non-recipients	
	Coef	Marg. Effects	Coef	Marg. Effects
	(Robust Std. Err.)	(Robust Std. Err.)	(Robust Std. Err.)	(Robust Std. Err.)
Event A	0.39***	0.07	0.50***	0.04
	(0.05)	(0.01)	(0.07)	(0.01)
Event B	0.08	0.01	0.05	0.00
	(0.06)	(0.00)	(0.08)	(0.00)
Event C	0.06	0.01	0.07	0.00
	(0.06)	(0.01)	(0.07)	(0.00)
Ed_0: ref	No diploma or certificate of primary school			
Ed_1	-0.06	-0.01	-0.17	-0.01
	(0.10)	(0.01)	(0.13)	(0.01)
Ed_2	-0.00	-0.00	-0.42**	-0.02
	(0.11)	(0.02)	(0.17)	(0.00)
Ed_3	-0.06	-0.01	-0.20*	-0.01
	(0.07)	(0.01)	(0.11)	(0.00)
Ed_4	-0.28*	-0.04	-0.57***	-0.02
	(0.17)	(0.02)	(0.22)	(0.00)
Ed_5	-0.57***	-0.06	-0.77***	-0.02
	(0.17)	(0.01)	(0.22)	(0.00)
Ed_6	-0.49***	-0.06	-0.80***	-0.02
	(0.12)	(0.01)	(0.17)	(0.00)
Ed_7	-0.62***	-0.07	-0.78***	-0.02
	(0.14)	(0.01)	(0.16)	(0.00)
Ed_8	-0.62***	-0.07	-0.84***	-0.03
	(0.12)	(0.01)	(0.14)	(0.00)
Ref: Couple				
Single person	0.14	0.02	0.19*	0.01
	(0.11)	(0.02)	(0.10)	(0.00)
Single family	0.47***	0.09	0.55***	0.05
	(0.12)	(0.03)	(0.16)	(0.02)
Couple with children	0.50***	0.09	0.51***	0.04
	(0.11)	(0.02)	(0.12)	(0.01)
Other type	0.02	0.00	0.39**	0.03
	(0.18)	(0.03)	(0.17)	(0.02)
Age	-0.01***	-0.00	-0.01***	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)

(Continue)

	Recipients		Non-recipients	
	Coef (Robust Std. Err.)	Marg. Effects (Robust Std. Err.)	Coef (Robust Std. Err.)	Marg. Effects (Robust Std. Err.)
Selection effect for tenant	0.11***	0.02	0.03	0.00
	(0.03)	(0.00)	(0.10)	(0.00)
Selection effect for recipient	-0.38	-0.06	-0.23***	-0.01
	(0.23)	(0.04)	(0.09)	(0.00)
Intercept	-1.05***		-1.27***	
	(0.17)		(0.21)	
Nb of obs	5,324	5,324	7,074	7,074
Log pseudolikelihood	-1,258,165	-1,660	-764,018	-954

Robust Standard Errors are between Parenthesis.
*** p<0.01, ** p<0.05, * p<0.1 for the significance level of the coefficients

Data are from the Housing Survey of 2001. In 2013, the variable unpaid rent of at least two months over the last two years has been discontinued.

Table 6A: Difference in Probability between Recipients and Non-recipients for Difficulties Paying the Rent or Charges.

	Difference in probability in 2001	Difference in probability in 2013
At sample mean	0.10	0.09
No event, Ed_2, couple with children, average age	0.12	0.16
Event A, Ed_2, couple with children, average age	0.19	0.24
No event, Ed_3, couple with children, average age	0.06	0.13
No event, Ed_5, couple with children, average age	0.04	0.09
Event A, Ed_2, couple with children, young (=30 years old)	0.21	0.26
Event A, Ed_5, single family, young (=30 years old)	0.08	0.18
Number of observations at sample mean	30,774	25,983

Table 7: Difference in Probability between Recipients and Non-recipients for Unpaid Rent or Charges.

	Difference in probability
At sample mean	0.04
No event, Ed_2, couple with children, average age	0.05
Event A, Ed_2, couple with children, average age	0.09
No event, Ed_3, couple with children, average age	0.04
No event, Ed_5, couple with children, average age	0.01
Event A, Ed_2, couple with children, young (=30 years old)	0.16
Event A, Ed_5, single family, young (=30 years old)	0.06
Data are from the Housing Survey of 2001. In 2013, the variable" unpaid rent of at least two months over the last two years" has been discontinued.	

[i] http://europa.eu/economy_finance/db_indicators/tab/#

[ii] In 2013, the variable rent arrears of at least two months in the last two years is not available anymore. But there is another variable about existing arrears at the moment of the survey. The risk factors for recipients are events A and C, having no education, being a lone parent or being young.

[iii] In 2013, event B does not jeopardize financial health (recipients or non-recipients of housing allowances).

[iv] In 2013, only lone parents are more at risk of financial difficulties than couples without children.

[v] In 2013, the selection effect for receiving housing allowances is positive suggesting that for non-recipients the estimated probabilities of financial difficulties would have been lower than it is for recipients.

[vi] In 2013, the probabilities of financial difficulties have increased both for recipients and non-recipients but recipients remain slightly more adversely affected by those difficulties than non-recipients are. Expected probabilities are equal to 0.16 and 0.24 in 2013 versus 0.12 and 0.19 in 2001 for a couple with secondary school vocational education who respectively did not suffer and who suffered from event A (see the second and third rows of Table 6).