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Housing Benefit and the Labour supply
Evidence from the French Minimum Income Program

C. AFSA ESSAFI[1]

[1] CREST – INSEE, Département de la Recherche.
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Abstract

Housing benefit is generally considered as a disincentive to work especially among the "minimum integration income" (French Revenu Minimum d'Insertion) recipients because it causes high contribution rates on earned income. In fact, this prediction is supported by a simple economic model. Using a new source combining administrative information with survey data and limiting our coverage to personal minimum integration income recipients (i.e. those without a spouse or children), we estimated a discrete choice econometric model explaining working situations by the expected growth in housing benefit conditional on the working choice made. The results of the estimate contradict the theoretical predictions. We then proposed another model that explicitly introduces housing as a consumer good and assumes a two-stage budgeting process. Bearing in mind that housing benefit, by construction, never covers the entire rent, we introduced the "remainder to be paid" notion, which is the share of rent remaining to be paid by the tenant once the housing benefit has been deducted. This model predicts that the remainder to be paid has a positive effect on working. The estimation of the accordingly specified econometric model confirms this prediction.

JEL classification : I38, J22.

Résumé

L'aide au logement est généralement considérée comme désincitant à la reprise d'activité, tout particulièrement chez les allocataires du RMI, parce qu'elle taxe lourdement les revenus tirés du travail. De fait, cette prédiction peut être justifiée par un simple modèle économique. Restreignant le champ aux seuls allocataires isolés du RMI (c'est-à-dire sans conjoint ni enfant), et utilisant une nouvelle source qui combine des informations administratives et des données d'enquête, nous avons estimé un modèle économétrique à choix discrets, expliquant les situations d'activité par l'évolution anticipée de l'aide au logement conditionnellement au choix d'activité effectué. Les résultats de l'estimation contredisent les prédictions du modèle théorique. Nous avons alors proposé un autre modèle, introduisant explicitement le logement comme bien de consommation, et faisant l'hypothèse d'un processus d'allocation budgétaire en deux étapes. Rappelant que l'aide au logement, par construction, ne couvre jamais l'intégralité du loyer, nous avons introduit la notion de « reste à charge », qui est la part du loyer restant à la charge du locataire une fois défalquée l'aide au logement. Ce modèle prédit un effet positif du reste à charge sur l'activité. Les estimations du modèle économétrique spécifié en conséquence confirment la prédiction.

1. Introduction

The effect of the unemployed's welfare benefits on the labour supply is often analysed from the point of view of the marginal contribution rate. This is the percentage that the social transfer system deducts *de facto* from earned income. The sum of benefits received generally depends on the level of resources declared by their recipients and decreases as these resources rise. Consequently, the total income of the unemployed who go back to work does not rise with their wage gains since the sum of transfers they receive decreases correlatively. His earned income is therefore (implicitly) taxed.

A great deal has been written on this subject (see, for example, Atkinson and Mogensen (1993), Atkinson (1995) and, more recently, Blundell and MaCurdy (1999)). Most of these studies focus on the tax credit and supplementary benefits systems. Little attention has been paid to another category of social transfers designed to counterbalance some specific expenditure. A typical example of this is housing benefit. It may well seem unwarranted to isolate this category of benefits from all the transfers paid to households in order to study its effect on the labour supply. However, a number of analyses have found that housing benefit acts as a disincentive in both France (Hornung, 1996) and abroad (Evans, 1996a, 1996b, 1996c; and Monro, 1998).

This disincentive becomes even more acute when aid is combined with a supplementary benefit, since the rates of contributions on earned income are then particularly high. The case of "minimum integration income" (French *Revenu Minimum d'Insertion* or *RMI*) recipients is particularly illustrative of this phenomenon. Minimum integration income recipients who receive housing benefit can, in certain cases, lose out financially if they take a part-time job paid at the minimum wage. This loss is caused by the reduction in their housing benefit due to their taking a job.

Yet, to our knowledge, no empirical studies have been made in France of the specific link between housing benefit and the labour supply among minimum integration income recipients to test the disincentive theory. The only exception might be found in the recent work by Laroque and Salanié (1999). Their approach is more general than ours and they do not have the selection bias problems that we encountered by studying solely minimum integration income recipients. However, Laroque and Salanié had to impute the welfare benefit amounts to the individuals assumed to receive them, since this information is absent from the data they use. Yet the imputation

procedures are inadequate for the case of minimum integration income and housing benefit.

The purpose of this paper is hence to study the extent to which housing benefit might be a disincentive for minimum integration income recipients to return to work and to empirically test this disincentive assumption. To do this, we first construct an economic model derived directly from the standard theory to render the link between housing benefit and the labour supply. The corresponding econometric model is hence written in a reduced form. It explains the decision to concentrate on unearned resources (including housing benefit in particular). Controls take the form of a number of individual characteristics and environment variables. We have chosen a discrete choice model rather than the number of hours worked to represent the labour supply. We deemed this better suited to the segmented nature of the employment market entered by minimum integration income recipients. This type of model is relatively seldom used to analyse transitions on the labour market (Moffit, 1999).

For reasons explained later in this paper, we have restricted our study to personal minimum integration income recipients, i.e. without a spouse or dependent children. The theoretical model predicts, in certain circumstances, a lesser propensity to work among housing benefit recipients. Our estimates draw on unique data combining administrative information with survey data to contradict this theoretical effect.

We then propose a simple two-stage budgeting model (Deaton and Muellbauer, 1980). This model is based on the fact that housing benefit is only granted to those who actually pay their rent: the benefit is suspended in the event of non-payment. The consumption of the housing good, i.e. payment of the rent, hence forms the first budgeting stage. We then introduce the “remainder to be paid” notion, which is the proportion of the rent still to be paid by the individual once the housing benefit has been deducted. It is worth knowing that one of the characteristics of housing benefit in France is that it never pays the entire rent, but leaves a more or less large proportion to be paid by the tenant. This model predicts, in certain circumstances, that the remainder to be paid has a positive effect on the labour supply. Our estimates confirm this effect.

This article is organised as follows. A brief description of minimum integration income and housing benefit is followed by a presentation of the theoretical framework used for the estimates. The next section presents the data used with an analysis of their advantages and disadvantages. We then detail the econometric models before moving onto the findings of the estimates, which we comment on. A brief conclusion closes the article.

2. Minimum integration income and housing benefit

Minimum integration income was created in December 1988 as a safety net for those with no or few resources who are not entitled to other existing benefits such as unemployment benefits and category-specific supplementary benefits. However, recipients need to be at least 25 years old unless they have children. The purpose of this benefit is twofold. It guarantees a minimum level of income and encourages social and occupational reintegration, in particular by means of the "integration contract". The contract's contents can cover as much occupational issues as health, housing and training. In practice, employment is by far the most frequent subject (Zoyem, 1999). Moreover, minimum integration income recipients are frequently steered towards government-assisted jobs, especially the Contrat Emploi Solidarité (CES), which provides a part-time job paid at the minimum wage.

The number of minimum integration income recipients reached the million mark in late 1996 (total for continental France and the French overseas departments). Three in five are personal recipients (without a spouse or dependent children). The others are, in equal proportions, lone parent families and couples with or without children.

The minimum integration income paid is called "differential". It provides recipients who already have resources of whatever kind (earned income or welfare benefits) with a complement to bring them up to a minimum level. This level depends on the size of the family. Note that the minimum integration income is a family entitlement and not an individual entitlement. It is supposed to cover the basic needs of all the members of the "minimum integration income household" and is calculated based on their total resources.

There are two major exceptions to the differential nature of the benefit. The first is what is called the incentive (in French : *intéressement*). Unemployed individuals who go back to work can concurrently keep all or part of their earned income along with their minimum integration income. In short,[1] they are entitled to both the benefit and their earned income in their entirety in the first three months. Over the ensuing twelve months, only half of their earned income is considered for the calculation of the benefit amount.[2] If the total resources taken into account are below the minimum integration income level (which is the case for a CES), recipients continue to receive the benefit.

[1] The rules governing the concurrent receipt of minimum integration income with earned income remain complicated despite their being reviewed in late 1998. For more details, see the Social Security Department circular of 22 January 1999.

[2] In the case of a CES, two-thirds of the wage is taken and the period of concurrency ends with the end of the contract.

However, if their resources exceed the minimum integration income level (e.g. in the case of a full-time job paid at the minimum wage), the benefit is first administratively suspended: although these individuals no longer receive it, they continue to be entitled to "related" benefits such as health insurance and "full-rate" housing benefit (see below). Then, generally at the end of four months, they are no longer entitled to minimum integration income unless their employment situation has changed in the meantime. At the end of this period of twelve to fifteen months, the incentive rules no longer apply: the wage is taken in its entirety for the assessment of their resources. A part-time job paid at the minimum wage disqualifies the individual from entitlement to the benefit.

The second exception to the differential nature of the minimum integration income allowance concerns housing benefit. This remains excluded from the resources taken into account to calculate the allowance. Housing benefit appreciably supplements resources: in the case of single unemployed individuals, for example, it adds an average 50% to their minimum integration income.

Housing benefit is designed to help its recipient attain and maintain residential independence. Housing benefit claimants must prove that they have financial charges in the form of a rent to pay or a homeowner loan to be reimbursed. This means that they live in separate housing. Those lodging with family or friends – the case of nearly 40% of single minimum integration income recipients – are not entitled to housing benefit. In addition, the housing must satisfy minimum health and equipment requirements.

The housing benefit calculation method is particularly complicated, so we will just present the main rules here. The benefit is proportional to the amount of rent paid (or the monthly payment of the loan):

$$a = k(\overline{\ell} - \ell_0 + ch),$$

where *k* is the benefit payment coefficient depending on resources and household size, $\overline{\ell}$ is the rent or monthly loan instalment depending on household size and area of residence, ℓ_0 is the "minimum rent" depending on resources and household size, and *ch* is a flat-rate sum of charges depending solely on household size. Coefficient *k* takes the value 0.90 or 0.95 (depending on the benefit category) when resources are zero and decreases at an average rate of 10% per 10,000-French-franc bracket of annual resources. A geographically set ceiling is placed on rent $\overline{\ell}$ from which the benefit is calculated. So housing benefit helps its recipient up to a certain level of housing

expenditure. In other words, the remainder of the rent above this level is entirely payable by the tenant. This case concerns 53% of personal minimum integration income recipients receiving housing benefit who are left, on average, with 45% of their rent to pay (Amrouni, 2000). Lastly, the minimum rent ℓ_0 is close to 0 when resources are zero, and increases with these resources. In general, the benefit never covers the entire rent and the tenant always has to pay a proportion, even when the rent is below the ceiling.

Housing benefit for month *m* is generally paid to its recipient at the beginning of month *m+1* on presentation of the rent receipt. If the rent is not paid, the benefit is suspended. In the case of social housing, the benefit is deducted directly from the rent. Tenants pay the remainder to their "landlord".

The housing benefit sum is theoretically recalculated once a year, on 1 July, based on the resources declared for the previous calendar year. So the income earned in the first half of the year is actually taken into account three semesters later. Moreover, the benefit is adjusted when there are significant changes in situation. For example, all the earned or replacement income that individuals might have received is cancelled out as soon as they enter the minimum integration income system. They therefore receive the maximum housing benefit as long as they remain on minimum integration income. This type of system is designed to enable people to continue to pay their rent and hence maintain their residential independence. When they leave the minimum integration income system, their housing benefit is recalculated based on the resources declared two years previously (if they left the system in the first half of the calendar year) or one year previously (if they left in the second six months).

To conclude, it is important to keep in mind the following consequences of the minimum integration income and housing benefit rules :

- The housing benefit recipient always has to pay a proportion of then rent ;
- Deductions from earned income are zero in the very first months of going back to work, since the minimum integration income is combined with wages ;
- The contribution rate at its highest when the minimum integration income's incentive period ends and the housing benefit has been recalculated based on the new earned income, i.e. more than twelve months after starting work again.

3. The theoretical framework

As we have seen, residential independence is a necessary condition for entitlement to housing benefit. The impact of housing benefit on the labour supply is consequently *a priori* the result of two effects: the specific effect of the residential situation (e.g. residential independence could be the sign of improved social integration conducive to employability), and the purely monetary effect of the benefit. In other words, the problem here is one of identification: proving the disincentive effect of housing benefit means estimating the "monetary" effect of the benefit, which assumes being able to control its "residential" effect.

Two possible ways of unravelling these two aspects immediately jump to mind. The first is to explicitly study individual mobility decisions and jointly model both labour market and residential trajectories. The other solution is to "use" the population group not entitled the benefit even though they have residential independence: this group covers home owners that have fully reimbursed their loan and therefore no longer have any housing charges. Yet, for empirical reasons alone, we have rejected these two possibilities. We do not have enough data to empirically validate the joint mobility and labour supply model (which, in any case, remains to be written) and we do not know how to correctly handle the specific nature of the sub-population of home owners not receiving housing benefit.

Given these circumstances, we have limited our scope to the study of the labour supply h as a function of unearned resources y, resources derived mainly from housing benefit. In other words, it is not the effect of housing benefit as such on the labour supply that is analysed, but its indirect effect via the budget set that it helps to build.

In view of this, the reckoning that high contribution rates act as a disincentive on the labour market is a medium-run reasoning, since it is based on the full rates, i.e. after the minimum integration income incentive period and after the housing benefit recalculation (see above). In economic terms, it assumes that agents decide whether to work based on their total budgetary expectations, i.e. the resources they will actually receive one or two years later (assuming they are capable of anticipating them accurately and their working situation remains stable).

The unearned resources of single people (without spouse or dependent children) are restricted to minimum integration income and housing benefit. Hence let $\bar{r}$ be the minimum integration income level and a be the amount of housing benefit received. If h

is the number of hours worked and *w* the wage rate, the amount of housing benefit is a function of rent ℓ and earned resources *wh*: $a = a(\ell, wh)$. A first-order development of resources *wh* gives:

$$a(\ell, wh) \approx a_0 - t.wh, \quad \text{with } a_0 = a(\ell, 0) \text{ and } t = \left.\frac{\partial a(\ell, wh)}{\partial wh}\right|_{h=0} > 0.$$

Rate *t* depends in particular on ℓ. We can, without too much difficulty, assume that *w* is exogenous since the vast majority of minimum integration income recipients who find a job are paid at the minimum wage (Rioux, 2000). Lastly, let *c* be the consumption of a basket of goods whose price is normalised to 1. The budget constraint is written:

$$c \leq \max(wh, \bar{r}) + a_0 - t.wh.$$

Since the "right side" of the budget is a piecewise, convex linear, the budget set is non-convex. Two scenarios are possible:

- Individuals have a job that keeps them on minimum integration income: $wh < \bar{r}$; they continue to receive housing benefit at the "full rate": $a = a_0$; the budget constraint is hence:

  $$c \leq \bar{r} + a_0,$$

  and there is no economic point in the individuals' working.
- Individuals have a job that means they are no longer entitled to minimum integration income; their housing benefit, calculated on their earned income, decreases; the budget constraint is written:

  $$c \leq wh(1-t) + a_0,$$

  the earned income is hence taxed and the effect on the labour supply is *a priori* indeterminate, since it is the result of two contradictory effects, a negative substitution effect and a positive income effect.

In any case, since we are faced here with a non-convex budget set, other hypotheses are needed, especially as regards the utility function, to predict the labour supply. Here we take the example of a Stone-Geary function:

$$U(c, h) = \alpha \ln c + \beta \ln(T - h),$$

where the two parameters are positive to ensure that utility increases with consumption and decreases with work and where $\alpha + \beta = 1$ for normalisation reasons. Here, we look at the case where the job found terminates the individual's entitlement to minimum integration income. Once all the calculations have been made, the first-order conditions result in:

$$h^* = \alpha\left[T - \frac{\beta}{\alpha}\frac{a_0}{w(1-k)}\right].$$

h^* must verify that $wh^* > \bar{r}$. Yet h^* is a decreasing function of *k* and the higher the relative proportion β/α spent on leisure, the sharper the decrease. For sufficiently large values of *k*, the labour supply can be zero.

Secondly, we propose an alternative and quite different model to the first. It introduces housing as a consumption good in addition to bundle *c* and work *h*. The housing good is deemed fixed and a good that the individual receiving the benefit must consume: the benefit is paid only if individuals pay their rent. The model is hence based on a two-stage budgeting process in the tradition of Strotz (1957) and Gorman (1959). In our particular case, the three goods can be separated into two groups with the housing in one group and consumption and work in the other. Individuals first earmark a proportion of their resources to pay their rent ℓ. They then choose between consumption and work based on their remaining resources. Unlike the previous model, we assume that their choice takes their (very) short-term budget constraint into consideration. In this case, minimum integration income and earned income are fully combined and housing benefit is paid at the "full rate" ($a(\ell, wh) = a(\ell, 0)$). Consequently, at the end of the first stage, the disposable income is:

- $wh + \bar{r} + a(\ell,0) - \ell$ if the individual receives housing benefit;
- $wh + \bar{r}$ if not.

The quantity $\ell - a(\ell,0) = rbp(\ell)$ is the "remainder to be paid", i.e. the proportion of the rent not covered by the benefit, which is always strictly positive as we have seen. To sum up, the budget constraint considered in the second stage can be written:

$$c \leq wh + \bar{r} - rbp(\ell) = wh + y,$$

where *y* is all the unearned resources, with $rbp(0) = 0$. If work is an inferior good, $\partial h/\partial y < 0$. Consequently, $\partial h/\partial rbp = -\partial h/\partial y > 0$: the remainder to be paid should have a positive effect on the labour supply. Lastly, note that $rbp(\ell)$ is a growing function of the rent.

4. The data

The main source used here is the survey on the situation of minimum integration income recipients. This survey is unique in that it combines administrative data with information collected directly from the people surveyed.

A representative sample of individuals who were minimum integration income recipients in December 1996 was drawn from databases held by the Family Allowance Funds[3] in charge of paying the benefit. Certain information on the individuals' rights to different benefits was selected.

This method has a number of advantages. First of all, it ensures that the target population, minimum integration income recipients in this case, is representative. The usual household surveys cannot guarantee this. For example, the Employment Survey (*Enquête Emploi*) often used to study the labour supply states that there are 136,000 minimum integration income recipients without a spouse or dependent children and that 17,000 (13%) of this number live with their family or friends. The minimum integration income survey estimates these figures at 338,000 and 139,000 (41% lodgers) respectively. Secondly, the measurement of the variables taken from the bases is, by definition, error free. Experience has shown that individuals' answers to administrative questions are often inaccurate, especially when respondents have to think back a long way to answer the questions. Probably the best example of this is the date on which minimum integration income was first claimed. This information is among the data collected directly from the Family Allowance Fund databases. The survey also put this question to the respondents. A comparison of the two shows that half of the recipients had got the date wrong, with a deviation of at least six months. Bear in mind that the maximum time that one-third of the recipients can receive the minimum integration income is estimated to be six months (Afsa, 1999). We therefore saw good reason to have recorded information with guaranteed accuracy. Entitlement to housing benefit in December 1996, which plays a core role in the estimates, is one such case in point.

The survey itself consisted of interviewing the sampled individuals once in January and again in September 1998. The questions concentrated on employability problems with the main aim of producing a monthly work calendar. Other horizontal issues were addressed such as housing, health, experience and social relations.

[3] The Family Allowance Funds cover 97% of the minimum integration income recipients in continental France. Excluded are those who come under the agricultural mechanisms. Note that the French overseas departments are also excluded from the survey's coverage.

A second statistical source was used in the form of a local database, which provided various socio-economic data on each employment area (numbering 350 in continental France). This information proved decisive for the study since it gave us both data on the individual's environment and a pertinent instrumental variable. The information on the place of residence of each individual in the minimum integration income survey was used to import the corresponding employment area based on the correspondence table between commune and the employment area's identifying code.

Nevertheless, the data used have two major drawbacks. The first is that they cover individuals in a given administrative category. This means that these individuals have already been "selected", in particular from all the individuals who find it hard to enter the labour market, based on rules and behavioural considerations beyond our control. In other words, we have a selection bias on our hands. The estimates are hence necessarily conditional on the fact that the individual received the minimum integration income in December 1996 and hypotheses have to be used to correctly interpret the findings. For example, it has to be assumed that the start of receipt of the minimum integration income is not correlated with receiving housing benefit. The second drawback is that a stock file is used. This is a snapshot of minimum integration income recipients on a given date, namely December 1996. We would have liked to have made use of the monthly employment calendar by estimating, for example, duration models. However, we did not have the past information at our disposal to correct the endogenous selection bias.

We restricted the study to personal minimum integration income recipients (i.e. without a spouse or children). There were a number of reasons for this. Firstly, these individuals make up nearly 60% of the recipient population. Secondly, if we had studied a couple's labour supply, we would have had to take the working patterns of two adults into consideration since minimum integration income is a family benefit. This would have required joint models, which are more complicated to specify and estimate. In any case, we did not have the data to do this correctly. Last but by no means least, housing benefit is in principle the only welfare benefit that a single individual can combine with minimum integration income and earned resources. In the other configurations, especially where children are present, all possible benefits have to be considered and consumption unit reasoning is required since the minimum integration income scale is itself constructed using its own specific equivalence scale. The sample contains a total

of 1,699 single individuals, one-third of whom were receiving housing benefit in December 1996. In 22% of cases, the first job held in the first half of 1997 was part time. Only 10% held a full-time job. The remaining 68% reported that they had not worked from January to June 1997.

Two categories of variables were introduced into the econometric models: individual characteristics and environment variables. These latter variables are supposed to capture some of the environment effects that could place a constraint on individual decisions. The individual variables are age, gender, qualifications, nationality, date of first claiming minimum integration income, and receiving housing benefit along with its amount in December 1996. The last three variables were taken directly from the databases managed by the welfare institutions in charge of minimum integration income. We considered the date of first claiming minimum integration income to be an exogenous variable. This assumption is open to criticism since the individuals who started receiving minimum integration income in 1992, for example, and who were still receiving it four years later most probably have particular characteristics that cannot be observed. We found no instrument capable of dealing with this possible endogeneity. However, we took the risk of a bias on the other parameters by choosing the seniority variable, since it provides some interesting information, as we will see later. The environment variables are the size of the minimum integration income recipient's town of residence and the probability of the employment area's 1990 start-ups still running after five years, which is supposed to measure the local economic situation. Table 1 presents some descriptive statistics of the study population.

[Table 1]

5. The econometric models

In the two econometric models specified below, the individual's working situation is measured based on the monthly working calendar for the first half of 1997. An individual is considered to be in employment if he or she declared at least one month of work in the first six months of 1997. He or she is considered to be working part time (*resp*. full time) if the first job held in the first half of 1997 was part time (*resp*. full time).

The first econometric model corresponds to the first theoretical model, which introduces the contribution rate applied by the housing benefit system. We decided to represent work by discrete choices rather than by the (continuous) choice of the number of hours worked. Basically, we endeavoured to model a three-state working situation: non-employment, part-time work and full-time work. We felt this method to be more suited to the characteristics of the employment market for minimum integration income recipients, where the government intervenes by proposing[4] partly government-subsidised part-time jobs paid at the minimum wage mainly in the form of the Contrat Emploi-Solidarité (CES). In fact, the distribution of hours worked by recipients in employment in January 1998 is distinctly bimodal (Chart 1).

[Chart 1]

This type of model generally seems appropriate for modelling constraint situations (Hausman, 1981).

The econometric model is hence a trinomial probit. Each working situation j (j = 0, 1, 2) is associated with a utility U_j, which is assumed to depend linearly on exogenous characteristics:

$$U_j = \beta'_j x + u_j , \qquad j = 0,1,2 ,$$

where the residuals u_j are trivariate normal. The fact that an individual has job j is tantamount to saying that his or her utility function for job j is greater than the two others:

$$\Pr ob(j) = \Pr ob(U_j > U_{j'}) = \Pr ob(U_j - U_{j'} > 0) , \ \forall j' \neq j .$$

Utility deviations are therefore involved. We therefore establish one of the three statuses as the "reference" status, e.g. j = 0, corresponding to non-employment. Setting down $\gamma_1 = \beta_1 - \beta_0$ and $\gamma_2 = \beta_2 - \beta_0$, $v_1 = u_1 - u_0$ and $v_2 = u_2 - u_0$, the model is written:

$$\begin{cases} U_1 - U_0 = \gamma'_1 x + v_1 \\ U_2 - U_0 = \gamma'_2 x + v_2 \end{cases}$$

The (v_1, v_2) pair complies with the bivariate normal law of zero mean and variance:

[4] In some cases, a small minority in practice, work may be imposed on the recipient in the form of an integration contract. The law governing minimum integration income provides for the benefit to be suspended in the event of a refusal to sign the integration contract (Article 16 of the law of 1 December 1988).

$$\begin{pmatrix} \sigma_1^2 & \rho\sigma_1\sigma_2 \\ \rho\sigma_1\sigma_2 & \sigma_2^2 \end{pmatrix}$$

We could have chosen a multinomial logit model. However, such a model is based on the assumption of independence of irrelevant alternatives, which is to be treated with caution when studying working patterns, especially in the presence of involuntary part-time work.

The probit model nonetheless raises identifiability problems. Even with the parsimonious specification proposed by Bunch (1991), whereby standard deviations σ_1 and σ_2 are normalised to 1, Keane (1992) showed that identification remained fragile if exclusion relations were not imposed on the variables, i.e. if variables z_j characteristic of the choices were not introduced by specifying utility as follows:

$$U_j = \beta'_j x + \delta z_j + u_j, \qquad j = 0,1,2,$$

where δ is an independent parameter of *j*.

In our case, these exclusion relations are provided by the explicit inclusion in the model of the contribution rates applied by housing benefit. In other words, individuals receiving housing benefit in December 1996 receive this benefit at the full rate since they receive minimum integration income. We hence calculate the benefit amount they would receive if they worked part time and also if they worked full time. In both cases, the wage is assumed to be equal to the minimum wage (the majority of minimum integration income recipients who are re-employed are paid at this rate) and the part-time work is assumed to be a half-time job. From this, we deduce the difference between the benefit amount in December 1996 and the recalculated amount. The only problem is that we do not know the (ceiling) rent amount based on which the December 1996 benefit was calculated. However, we can get by without it by proceeding as follows. As mentioned before, the benefit amount is equal to $a = k(\overline{\ell} - \ell_0 + ch)$. We know the December 1996 values of *a* (information collected from the Family Allowance Fund databases), *k* and ℓ_0 (since the resources are zero) and *ch* (which is a set lump sum). From this, we deduce the value of $\overline{\ell}$. We can then use the two assumptions of part-time work and full-time work paid at the minimum wage to calculate the basis of resources assessment and hence parameters *k* and ℓ_0. Since we have reconstituted $\overline{\ell}$, we can calculate the two new values of *a* (one for each employment hypothesis) and hence deduce the two differences $(\Delta a)_1$ corresponding to part-time work and $(\Delta a)_2$ corresponding to full-time work.

What then remains is to take into account the potential endogeneity of these two quantities, non-zero if and only if the individual receives housing benefit. We have therefore made housing benefit instrumental using two variables, the rate of unoccupied housing in the employment area and the existence of children not living with the recipient. The relevance of these instruments will be discussed in the following section. The complete model is written in the form:

$$\begin{cases} U_1 - U_0 = \gamma_1' x_1 + \delta(\Delta a)_1 . \mathbf{1}(al^* > 0) + v_1 \\ U_2 - U_0 = \gamma_2' x_1 + \delta(\Delta a)_2 . \mathbf{1}(al^* > 0) + v_2 \\ al^* = \gamma_3' x_2 + v_3 \end{cases} \quad (1)$$

where al^* is the latent variable associated with housing benefit and observed by the binary variable *al* (*al* = 1 if the individual received housing benefit in December 1996 and *al* = 0 if not), and Δa represents the difference in housing benefit (in absolute value) between the initial situation (on minimum integration income) and the employment situation (in part-time or full-time work). Variables x_1 are age, qualifications, gender, nationality, the size of the individual's town of residence and the rate of business survival cross-referenced with the recipient's seniority in the minimum integration income system (to show the different effects of economic context by seniority). Variables x_2 contain two instrumental variables in addition to all the variables x_1. Residuals (v_1, v_2, v_3) are trivariate normal:

$$N\left[\begin{pmatrix} 0 \\ 0 \\ 0 \end{pmatrix} , \begin{pmatrix} 1 & \rho_1 & \rho_2 \\ \rho_1 & 1 & \rho_3 \\ \rho_2 & \rho_3 & 1 \end{pmatrix}\right].$$

The model is estimated by maximum likelihood. The theoretical model posits that parameter δ should be negative (deviation Δa is equal to *t.wh*, taking the notations from the theoretical section).

The choice of two instruments rather than one not only improves the accuracy of the estimates, but also means that a validity test of these instruments can be proposed by adapting the classic Sargan test. The estimated parameters are used to calculate residuals $\hat{v}_1$ and $\hat{v}_2$:

$$\begin{cases} \hat{v}_1 = \mathbf{1}(U_1 - U_0 > 0) - \Phi[\hat{\gamma}_1' x_1 + \hat{\delta}(\Delta a)_1 . \mathbf{1}(al = 1)] \\ \hat{v}_2 = \mathbf{1}(U_2 - U_0 > 0) - \Phi[\hat{\gamma}_2' x_1 + \hat{\delta}(\Delta a)_2 . \mathbf{1}(al = 1)] \end{cases}$$

The two residuals are then regressed on the two instruments. Their statistical validity is hence proved by the absence of significance in the regression's four parameters.

The second econometric model corresponds to the two-stage model. It associates working situation (employment/non-employment) with the "remainder to be paid", i.e. the amount of rent left to be paid by the individual after deduction of the housing benefit. As mentioned before, this remainder to be paid is always strictly positive when individuals receive housing benefit. The problem here is that it is not observed since we do not know how much rent was paid by tenants in December 1996. However, we can come close to this rent using the following method. When individuals have no housing expenses and hence receive no benefit, the remainder to be paid is by definition zero. Otherwise, it is higher for individuals whose rent exceeds the rent ceiling. At least some of those in this case can be identified from the sample: these people correspond to the accumulation points in the distribution of housing benefit amounts.

Overall, we can distinguish three groups of individuals able to be ranked in order of the size of the remainder to be paid: those with no rent to pay, those with housing benefit and a rent below the ceiling, and those with housing benefit and a rent above the ceiling. The remainder to be paid can therefore be modelled and estimated by an ordered probit. The econometric model is hence written:

$$\begin{cases} e^* = \beta_1' x_1 + \delta r^* + u_1 \\ r^* = \beta_2' x_2 + u_2 \end{cases} \qquad (2)$$

where e^* is the latent variable associated with the working situation in the first half of 1997 (e = 1 if the individual has worked during the six-month period and e = 0 if not), and where r^* is the latent variable representing the remainder to be paid. Exogenous variables x_1 and x_2 in model (2) are the same as for model (1). The theoretical model posits that parameter δ should be positive.

The instrument validity test was carried out as follows. We first estimated the remainder to be paid by $\hat{r} = \hat{\beta}_2' x_2$ and then estimated the employment equation residuals by:

$$\hat{u}_1 = \mathbf{1}(e = 1) - \Phi(\hat{\beta}_1' x_1 + \hat{\delta}\hat{r}) .$$

These estimated residuals were then regressed onto the two instruments. The absence of significance in the latter regression's parameters statistically validates the two instruments.

6. The results

Before presenting and commenting on the results of the estimates, a discussion of the validity of the two instruments used to handle the potential endogeneity of the resources derived from housing benefit is called for.

The two instruments are a) the rate of unoccupied housing observed by the 1990 general population census (seven years before the survey) in the individual's employment area of residence, and b) the existence of one or more children who are not actually dependent on the minimum integration income recipient, i.e. do not live with him or her. The choice of the first instrument is justified by the government housing policy measures to help underprivileged households, which were introduced in particular by the law of 31 May 1990, known as the Besson law. These measures are designed to help the inadequately housed attain residential independence by endeavouring to right the imbalance between housing supply and demand. One of the ways of doing this is to rehabilitate the stock of unoccupied housing. Hence the underprivileged, especially as regards housing, had all the more opportunity to attain "real" independent housing since there was a great deal of unoccupied housing in 1990. However, there is normally no reason why this unoccupied housing rate should have any effect on an individual's working situation in 1997.

The second instrument assumes slightly stronger hypotheses about individual behaviour in order to be pertinent. First of all, having children who do not live in the parental home can cover a variety of situations. In addition to the probable majority of cases whereby the children have established their own residential independence, children may be looked after by other family members or may be in care. Whatever the case, the pertinence of this instrument is based on the idea that the people concerned, or at least some of them, live in housing where the child lived. We also make the ostensibly reasonable assumption that the presence of a child can only have an effect on the employment trajectory if that child is actually looked after by the individual.

Table 2 presents the results of the trinomial probit model estimation

[Table 2]

Note first of all the positive and highly significant effect of the two instrumental variables on housing benefit (third column). In addition, the validity of the instruments is confirmed: the Wald test (see above) does not reject the joint null hypothesis of the

four parameters (the p-value is 0.520). Moreover, age has a positive effect on receiving housing benefit, since residential independence is attained over a lifetime and is found less among the young and more among the older. Three other rather more unexpected findings are worth mentioning. They are harder to interpret, especially in view of the selection bias imposed by the study's coverage (minimum integration income recipients). The first finding is that women are at a relative advantage as regards receiving housing benefit. This finding can be compared with the observations made of the general population concerning the differentiation between residential trajectories by gender: women leave the parental home earlier and are less likely to return. Moreover, it may well be that women get more help from the social services than men in finding independent housing. The last two findings from the estimate concern the environment data. Housing benefit is found less frequently in rural communes and small towns. Lodging with family members may be fostered by denser family networks in these types of commune. The local economic situation also has a significantly positive effect. This may be due to minimum integration income selection processes and non take-up phenomena (whereby those entitled to a benefit do not take it up). We could assume that, in an upbeat local economic situation, young people living with their parents and entitled to minimum integration income are less likely to apply since they consider that they can manage "alone".

The main finding in terms of the working situation concerns the effect of the benefit and its expected growth. Contrary to the expectations derived from the economic model, parameter δ is significantly positive (at the 5% level). The theoretical model is therefore inconsistent with the estimated results. Before presenting the alternative model estimates, it is worth noting some of the trinomial probit results. Admittedly, most of them were expected. For example, youth, like the level of education, fosters access to employment. Yet it is interesting to note that qualifications have a differentiated effect: the part-time/full-time selection is made not at the intermediate levels of education, but at the highest levels (A-level equivalent or higher). The deviation between the "A-level equivalent or higher" parameter for full-time work and the "A-level equivalent or higher" parameter for part-time work is significant at the 10% level (it takes the value 0.290 with a standard deviation of 0.167). Moreover, women are more part-time orientated than men (the deviation for the women between the full-time and part-time parameters takes the value 0.498 to the detriment of full-time work with a standard deviation of 0.157). Last but not least, the effect of the local economic situation is moderated by the recipient's seniority in the minimum integration income system. It

therefore has a positive effect for recent minimum integration income recipients (significance at the 5% level for part-time work and at the 10% level for full-time work). However, the effect is not significant for the most senior recipients, which is a sign of either their low employability or their discouragement.

The estimation of the two-stage budgeting model produced the results presented in Table 3.

[table 3]

The main finding is the positive sign, significant at the 5% level, of the parameter attached to the remainder to be paid in the employment equation. This is in line with the corresponding economic model's predictions and lends the remainder-to-be-paid notion economic pertinence in explaining the working situation of minimum integration income recipients. The other findings differ little qualitatively from those of the previous model. Lastly, note that the two instruments chosen easily pass the validity test (the Fisher statistic's significance level is 99.4%).

These findings provide two pieces of information. Firstly, the two-stage budgeting model appears to correspond better to the observed decision-making processes. This model assumes that individuals decide based on a very short-term budgetary constraint, which takes account of the possible combination of earned income with minimum integration income allowed by the incentive rules.

The second observation is that the pertinent variable for describing labour market trajectories is not housing benefit, but the remainder to be paid (the difference between rent and housing benefit): a high remainder to be paid boosts the transition from non-employment to employment.

Incidentally, this second point runs into the identification problem already mentioned. Measuring the remainder to be paid by all the (personal) minimum integration income recipients and using it as a motivation variable to describe the transitions to employment entails combining two qualitatively different populations: those with no rent and hence no housing benefit, whose remainder to be paid is by definition zero, and those with rent to pay and hence housing benefit, whose remainder to be paid is positive due to the way the benefit is set up. The two populations are fundamentally different in that the former have no residential independence while the latter live in their own housing. Our estimated effect of the remainder to be paid on the

working situation hence encompasses two phenomena that are not identified as such here: the benefit's monetary transfer aspect and the individual's residential situation. To identify the benefit's "purely" monetary effect, we would have to be able to separate the rent (i.e. housing independence) from the benefit. Yet these two aspects (somewhat merged by the remainder-to-be-paid notion, since it is the difference between the two) are closely linked since housing independence is an essential condition for receiving the benefit. In other words, the principle of housing benefit is to help individuals attain and maintain their residential independence.

7. Conclusion

Housing benefit is a potential disincentive for going back to work, especially among minimum integration income recipients, because the combination of minimum integration income and housing benefit causes high contribution rates on earned income that are crippling when the job is (highly) part time.

This disincentive hypothesis is nonetheless based on two implicit and different assumptions. The first is that the individual decides based on expected contribution rates. In reality, these rates are particularly high *once* the transitional rules combining minimum integration income with earned income (incentive rules) no longer apply and the housing benefit is recalculated on the basis of the new earned resources. These rates come into full effect *at least one year after* going back to work. The second assumption posits that the disincentive effect of housing benefit can be identified as such, i.e. in its "purely" monetary form. Yet receiving housing benefit is conditional on the individual's residential independence, which can itself have an effect on working. Since we do not think it possible (or at least not testable based on the data at our disposal) to separate out these two effects, the study concentrates on the way in which housing benefit defines the individual's budget set and the effect of this set on the working situation. In this context, we can construct a simple economic model that theoretically confirms the impact of high contributions on the working situation.

In any case and to our knowledge, this disincentive prediction had never been compared with actual observations of minimum integration income recipients' working situations. We therefore used a new source combining administrative information with survey data, whose decisive advantage is to accurately measure the housing benefit variables. We limited our coverage to personal minimum integration income recipients,

i.e. those without a spouse or children. In this case, the only possible unearned resources are minimum integration income and any housing benefit. We therefore estimated a discrete choice econometric model explaining working situations by the expected growth in housing benefit conditional on the working choice made. The results of the estimate contradict the theoretical model's predictions.

We then proposed another model that explicitly introduces housing as a consumer good and assumes a two-stage budgeting process: the first consisting of consuming the housing good (i.e. paying the rent) and the second of choosing between consuming other goods and work based on the remaining resources. This model is a very short-run model: the budgetary whole is that which holds in the very first months of going back to work when the minimum integration income incentive applies in its entirety. Bearing in mind that housing benefit, by construction, never covers the entire rent, we introduced the "remainder to be paid" notion, which is the share of rent remaining to be paid by the tenant once the housing benefit has been deducted. This model predicts that the remainder to be paid has a positive effect on working. The estimation of the accordingly specified econometric model confirms this prediction.

Hence, the two-stage economic model based on the remainder-to-be-paid notion would appear to be the most suited to explaining minimum integration income recipients' working situations, regardless of whether they receive housing benefit or not. The reasoning in terms of the contribution rates applied to housing benefit does not correspond to the patterns actually observed.

However, these preliminary findings need to be confirmed since they are relative to the limits imposed by the data. The first problem is due to the observation coverage. The population studied had already been "selected" by the minimum integration income system from among individuals at a disadvantage on the labour market. The results of the estimates are therefore conditional on the fact that the individual received minimum integration income in December 1996. The second problem is due to the fact that the sample is subject to an endogenous selection bias. Since it is representative of recipients in December 1996, it combines individuals who have just entered the scheme with those who have been receiving the income for a long time. It hence over-represents long periods on minimum integration income. Our data are not detailed enough to correct this bias and endeavour, for example, to estimate a search model that would better describe the trajectories.

Lastly, the data do not cover a long enough period to take two phenomena into account. The first is residential mobility. The economic model chosen assumes that

housing is a fixed good. A possible development would be to jointly model residential and working trajectories. The second phenomenon unable to be identified by the data is the possible disincentive after the fact. The unsuitability, in practice, of the contribution-based model could be explained by an individual's inability to forecast how his or her benefit will evolve. Individuals would therefore find out by how much their income drops after the fact, following the adjustment of their benefit to their earned resources. This could lead them to revise their decision to work.

Despite these limits the study pointed out some notable facts. Housing benefit cannot be considered as a "purely" monetary income, as it is intended to help its recipient to acquire or maintain his residential independence. Consequently its effect on labour supply combines to possibly contradictory effects : a negative one – the desincentive effect – due to the "purely" monetary aspect ; a (potentially) positive one due to the purpose of the benefit, i.e. the residential autonomy which may be conducive to employability. In addition, the economic variable which seems to be pertinent for analysing labour supply is not the amount of the benefit received by the tenant but the difference between this amount and the expenditure that the benefit is supposed to counterbalance.

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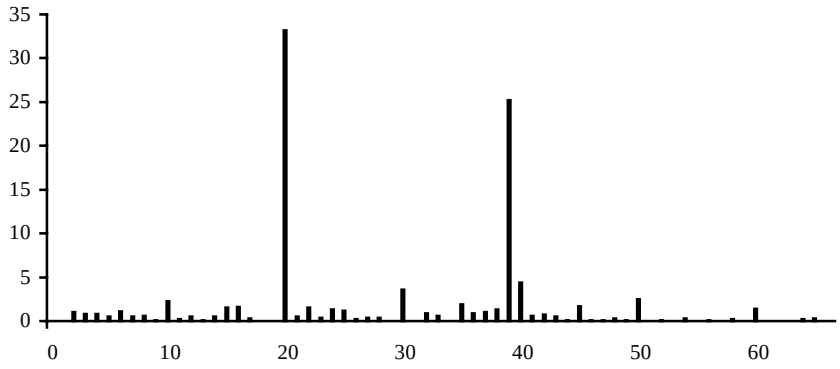
Table 1
Descriptive Statistics

Variables	Percentage	Variables	Percentage
Age (brackets)		*Nationality*	
25-29	34.6	French	87.7
30-34	19.1	Non-French	12.3
35-39	12.3		*100.0*
40-44	9.9	*Year of registration for minimum integration income*	
45-49	10.8	1996	32.9
50 and over	13.3	1995	20.1
	100.0	1993 or 1994	22.7
Qualifications		1992 or before	24.3
None or primary leaving certificate	45.5		*100.0*
GCSE equivalent, vocational training or technical school certificate	29.1	*Housing benefit in Dec 96*	
A-level equivalent or higher education	25.4	No	67.6
	100.0	Yes	32.4
Gender			*100.0*
Male	67.6	*Size of town*	
Female	32.4	Rural or < 5,000 inhab.	19.4
	100.0	5,000 to 200,000 inhab.	36.0
		200,000 inhab. and over	44.6
			100.0

Sources: 1998 Minimum Integration Income Survey and local INSEE database.

Chart 1 *– Distribution of minimum integration income recipients by hours worked per week*



Source: 1998 Minimum Integration Income Survey. The weekly hours are those worked in January 1998 as declared by (former) December 1996 minimum integration income recipients in work one year later.

Table 2

Employment (part-time/full-time) and housing benefit amount

Variables	**Part time *vs* non-employment**	**Full time *vs* non-employment**	**Housing benefit**
Constant term	- 0.096 (0.1961)	- 0.051 (0.300)	- 2.026*** (0.197)
Age	- 0.024*** (0.004)	- 0.032*** (0.007)	0.015*** (0.004)
Qualifications			
None or primary leaving certificate	*ref*	*ref*	*ref*
GCSE equivalent, vocational training or technical school certificate	0.158** (0.081)	0.180 (0.129)	- 0.072 (0.072)
A-level equivalent or higher education	0.155* (0.093)	0.445*** (0.124)	0.067 (0.080)
Gender			
Male	*ref*	*ref*	*ref*
Female	0.165** (0.075)	- 0.333*** (0.119)	0.198*** (0.066)
Nationality			
French	*ref*	*ref*	*ref*
Non-French	- 0.139 (0.112)	- 0.067 (0.159)	0.001 (0.090)
Size of town			
Rural or < 5,000 inhab.	*ref*	*ref*	*ref*
5,000 to 200,000 inhab.	- 0.096 (0.093)	- 0.134 (0.145)	0.581*** (0.089)
200,000 inhab. and over	- 0.421*** (0.096)	- 0.170 (0.141)	0.367*** (0.090)
Survival rate of companies x minimum integration income seniority			
surv × (less than 2 years)	0.594*** (0.219)	0.611* (0.336)	0.231 (0.197)
surv × (2 years and over)	0.250 (0.220)	- 0.111 (0.341)	0.413** (0.199)
Share of unoccupied housing	-	-	0.887*** (0.185)
Existence of child outside of household	-	-	0.358*** (0.073)
Δ *Housing benefit* (10^{-2} F)	0.067** (0.031)		-
Correlations			
ρ_1	- 0.728 (0.639)		
ρ_2	- 0.321* (0.188)		
ρ_3	- 0.089 (0.089)		

Sources: 1998 Minimum Integration Income Survey and local INSEE database.

Between brackets is the standard deviation. ***: significant at the 1% level; **: significant at the 5% level; *: significant at the 10% level.

Table 3

Employment and remainder to be paid

Variables	**Remainder to be paid**	**Employment**
Constant term	- 1.782*** (0.187)	0.860** (0.328)
Age	0.011*** (0.004)	- 0.036*** (0.005)
Qualifications		
None or primary leaving certificate	*ref*	*ref*
GCSE equivalent, vocational training or technical school certificate	- 0.031 (0.066)	0.208*** (0.078)
A-level equivalent or higher education	0.058 (0.075)	0.354*** (0.084)
Gender		
Male	*ref*	*ref*
Female	0.231*** (0.060)	- 0.019 (0.080)
Nationality		
French	*ref*	*ref*
Non-French	- 0.078 (0.086)	- 0.106 (0.102)
Size of town		
Rural or < 5,000 inhab.	*ref*	*ref*
5,000 to 200,000 inhab.	0.500*** (0.083)	- 0.225* (0.113)
200,000 inhab. and over	0.358*** (0.082)	- 0.493*** (0.106)
Survival rate of companies x minimum integration income seniority		
surv × (less than 2 years)	0.055 (0.192)	0.861*** (0.201)
surv × (2 years and over)	0.194 (0.187)	0.204 (0.216)
Share of unoccupied housing	0.949*** (0.179)	-
Existence of child outside of household	0.338*** (0.068)	-
Remainder to be paid	-	0.311** (0.156)
Threshold μ *(ordered probit)*	0.680*** (0.032)	-
Correlation	- 0.212 (0.151)	

Sources: 1998 Minimum Integration Income Survey and local INSEE database.
Between brackets is the standard deviation. ***: significant at the 1% level; **: significant at the 5% level; *: significant at the 10% level.