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Welfare and Labor Earnings:
An Evaluation of the Financial Gains to Work

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ABSTRACT

Welfare and Labor Earnings: An Evaluation of the Financial Gains to Work *

In this paper, we estimate the difference in long-run after-tax and transfer income from employment and from non-employment available in January 1998 to families in France that received the Guaranteed Minimum Income (RMI) in December 1996. Based on estimated wages we compute potential increases in disposable income (without accounting for opportunity costs such as child care or transportation). The observed wages received by welfare recipients are very low because of a high probability of part-time work, including for men. Based on the wage distribution, and supposing that the adult in the household with the highest potential earnings is the one employed, we find that 74% of welfare households would have an increase in disposable income if they were to be employed, relative to their disposable income in the absence of employment, and that the median gain would be around 198 euros per month. Very low gains are frequent however. In addition, single mothers are the group for which the fewest number of households (43%) would gain from employment. The share of households that would have in increase in income grows to 96% when we focus exclusively on couples and consider both members working. As the wage distribution used is very atypical, we build an upper bound estimate, using a representative survey of the working population in 1998. This is equivalent to assuming that RMI beneficiaries do not differ from the rest of the population in terms of their unobserved heterogeneity. The share of households that have an increase in disposable income from working goes from 74% to 89%, with the shares for single mothers still the lowest.

JEL Classification: I38, J31, C34

Keywords: Welfare, labor earnings, transfers, tax system

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1 Introduction

The debate surrounding the policy of a guaranteed minimum income has been lively, both in the popular press and in the scientific literature. Economists have tended to focus on the possible disincentive effects that such a policy might provide with respect to labor force participation, as well as the consequences of a guaranteed minimum income for fiscal equilibrium. The vast majority of these studies have focused on the North American (and the United States in particular) labor markets, while it seems clear (in a prima facie sense) that the policy of a guaranteed minimum income is likely to be more important in European countries, and France in particular, as the level and ubiquity of these policies is much more important on the eastern shore of the Atlantic.

This paper addresses a small share of the questions concerning the guaranteed minimum income program in France, notably by estimating the size of what has been called the "inactivity trap", i.e. the gap between expected labor market earnings and the level of welfare, and by decomposing its distribution with respect to activity status. Although there are clearly many sources of non-labor market income that could further aggravate the inactivity trap, for reasons of clarity we focus primarily on the main guaranteed minimum income program with unrestricted access, called the RMI (*Revenu Minimum d'Insertion*).

We model both hourly wages and weekly hours as a function of individual characteristics and the labor market environment. We also treat the employment probability as endogenous and dependent on the characteristics that determine earnings (and thereby eligibility for the RMI), and consider the role of selection bias in our estimates of expected labor earnings. Our estimates allow us to reconstitute the distribution of expected earnings for both em-

ployed and not employed individuals, and thus to characterize the distribution of the size of difference between labor earnings and transfer income. Our approach also allows us to analyze separately the role of wages and hours in the determination of this difference.

The majority of studies currently available for France are essentially accounting exercises based on "representative households" of different types, sometimes reweighting to construct a measure that is intended to be globally representative of the inactivity trap.[1] In these analyses, labor earnings are attributed to welfare households for comparison with their transfer income. However, the labor earnings that are considered are arbitrarily determined, typically being the minimum wage or one-half the minimum wage (to account for part-time work), which has the clear disadvantage of ignoring the differences across individuals in their labor market perspectives. Our approach, on the other hand, takes into account the heterogeneity of individuals and the different situations they face on the labor market. This is particularly relevant in comparison to the "representative household" approach, since this latter approach tends to find diametrically opposite results depending on the labor earnings attributed to the household (gains when the minimum wage is attributed, losses when $\frac{1}{2}$ of the minimum is assigned).

It is worth noting that, whereas we focus on the difference between expected labor earnings and welfare, we do not address the implications of variations in the size of this difference on individual behavior. Laroque and Salanié (2000), on the other hand, concentrate on this aspect of the debate. They estimate that inactive women living in a couple would need, on average, and extra 579 Euros per month in order to participate, single women would be willing to accept a reduction in labor income of 305-610 before withdrawing from the labor

[1] See, for example, Padieu (1997), Join-Lambert (1998) and Gautié and Gubian (2000).

force (although single mothers would need to see their earnings increase to enter the labor force), and that the majority of men, single or in a couple, would be willing to work even at lower earnings levels than they currently receive. Laroque and Salanié, however, exclude part-time jobs from their data and have very incomplete information on household income.

The structure of the rest of this paper is as follows. In section 2, a brief account of the French welfare system is presented with an emphasis on the RMI. In section 3 we lay out a model and the econometric techniques employed for estimating expected labor market earnings conditional on observable characteristics. Section 4 briefly describes the data we used for the estimation, drawn primarily from the survey "Outcomes for RMI Recipients" (*Devenir des personnes sorties du RMI*) which derives its sampling frame from households that received the RMI in 1996. Section 4 also provides some basic descriptive analysis and discusses the coefficients resulting from the estimation of the models derived in section 3. Section 5 describes the distribution of the size of the "inactivity trap" implied by the estimates in section 4, and decomposes this distribution by activity status. Section 5 also considers the roles of heterogeneity and state dependence in the evaluation of potential gains to employment and constructs several counterfactual situations, notably estimating the expected wage and hours distributions on the basis of a sample that is representative of the entire French workforce drawn from the French Labor Force Survey (*Enquête sur l'emploi*). Section 6 concludes.

2 Welfare income in France

This paper focuses on the guaranteed minimum income, RMI, a welfare program accessible to any person over 25,[2] provided that the sum of all resources available to his or her household is below a threshold that depends on family composition. In 1996, 882,000 households received RMI (989,000 including overseas *départements*), corresponding to approximately 3% of the population (CNAF, 1996). It takes the form of a monetary transfer that brings household resources up to the threshold. It also entitles household members to social security, and provides for debt rescheduling. In addition, beneficiaries are subject neither to income taxes nor to property taxes. Other guaranteed income programs (with restricted access) do exist, such as those for the elderly (*Minimum vieillesse*) and handicapped persons (*Minimum invalidité*, *Allocation aux adultes handicapés*), widows and widowers (*Allocation veuvage*) and single parents (API, or *Allocation de parent isolé*). These other programs are typically more generous than RMI, and the transfers for the handicapped and the elderly cover a large number of people (700,000 for the handicapped, 950,000 for the elderly), while the population covered by the widow/widower benefits is rather limited. However the role of these transfers in affecting the labor market behavior of those concerned is likely to be quite different from that of the RMI. Finally, the unemployed who have exhausted their unemployment benefits have access to a specific benefit whose amount is similar to that of RMI (ASS, or *Allocation de solidarité spécifique*).[3]

When comparing labor incomes with welfare incomes, additional transfers, such as those

[2] This age restriction does not apply for people with underage dependents.

[3] Unfortunately, the sampling frame of our base data does not allow us to observe individuals who receive the API or the ASS, and our supplementary data do not allow us to identify these revenue sources.

related to family composition and housing, must be considered. Among the family composition-based benefits, every household responsible for at least 2 children is entitled to a transfer that increases with the number of children, and this benefit is not means tested (*Allocations familiales*). Households with at least 3 children over 3 years old receive an additional transfer subject to a means test (*Complement familial*). Furthermore, the presence of children under 3 makes one eligible for an additional transfer (*Allocation pour jeune enfant*), which applies the same means test as the *Complement familial*. Finally, a further transfer (*Allocation de rentrée scolaire*) is available for school age children subject to a means test.[4]

Among the housing-based benefits, households who rent their lodging (or own it and are paying interest) are eligible for a subsidy that depends on taxable income at a decreasing marginal rate, which varies with family composition and on the amount of the rent, and is subject to different thresholds based on the zone of habitation (*Allocation logement*).[5] When taxable income is zero and the rent is below the threshold, the subsidy covers to 90% of the rent.[6] All of these transfers are included in the household resources when considering eligibility for the RMI, but the housing subsidy receives a specific treatment. Only a fixed amount (F), which is less than the actual allowance (AL), is included when calculating available resources for those households which are homeowners paying off a mortgage or renting and which receive the *Allocation logement*.

[4] An additional subsidy for children in school which was introduced in 1995 (*Aide à la scolarité*) is not considered here. We also exclude the *Allocation parentale d'éducation*, which is available to every household with at least 2 children, of which one is less than 3 years old, provided one of the spouses does not work or works part time and can justify at least 2 years of work over the last 5 or 10 years (depending on the number of children).

[5] The taxable income considered is that of the previous year, something that we do not explicitly take into account in the simulations. This is equivalent to imposing a form of stationarity in the income process.

[6] A similar scheme applies to public sector housing (*Aide personnalisée au logement*), but this will not be considered here since we cannot distinguish private from public sector housing in our data.

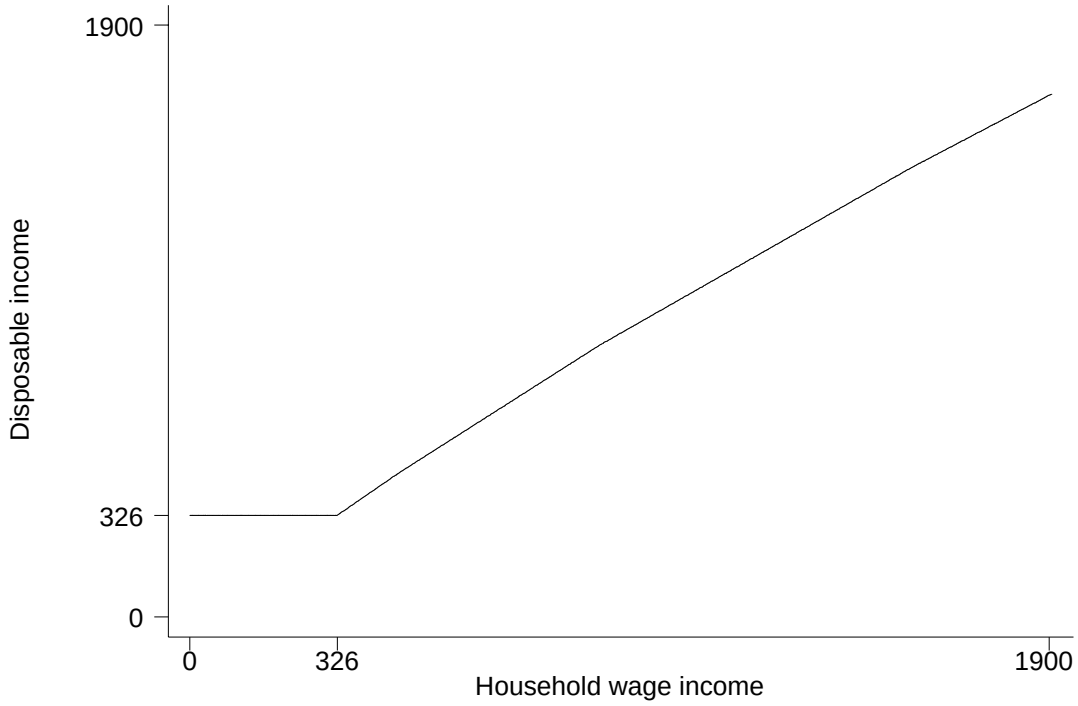
This complex system gives rise to a characteristic profile for the beneficiaries of the RMI for the effective marginal tax rate on labor income. Below the income threshold T, the marginal tax rate is 100% because resources remain at $T + (AL - F)$ for beneficiaries of the housing subsidy and T for other households.[7] When labor income plus transfers crosses the T threshold (or $T - F$ for beneficiaries of the housing subsidy and mortgage-paying homeowners), the marginal tax rate depends on the income tax profile as well as on the means-tested structure of family and housing related transfers. Figure 1 depicts primary labor income versus disposable income of a single person that does not receive the housing subsidy.[8] His or her guaranteed income is 326 Euros per month (less than half of what would be earned by working a month full-time at the minimum wage), which corresponds to the RMI threshold of 370 less the fixed amount F. For earnings beyond this amount, labor income is taxed at a marginal rate of about 8%.

If this person were to receive a housing subsidy (assuming that his or her rent exceeds the threshold), the disposable income would follow the shape given in Figure 2. The person is now entitled a housing subsidy $AL = 293$ Euros, of which only $F = 44$ is taken into account when considering eligibility for the RMI. As a result, this person leaves RMI when labor income exceeds $370 - 44 = 326$ Euros. Note that the (guaranteed) income level under the RMI is $370 + AL - F = 619$ euros, and thus his or her disposable income strictly decreases with the first additional franc that renders the individual ineligible for the RMI (equivalent to a marginal tax rate of infinity). This is because labor income is considered in the means-

[7] In fact, an RMI beneficiary who starts a job may cumulate 50% of his labor earnings with his RMI receipt for the first 750 hours of work. We do not treat this transitory situation below, as we assume a stationary (or long-term) perspective.

[8] In this figure and the following two figures, the rules that were in effect in April 1996 are applied.

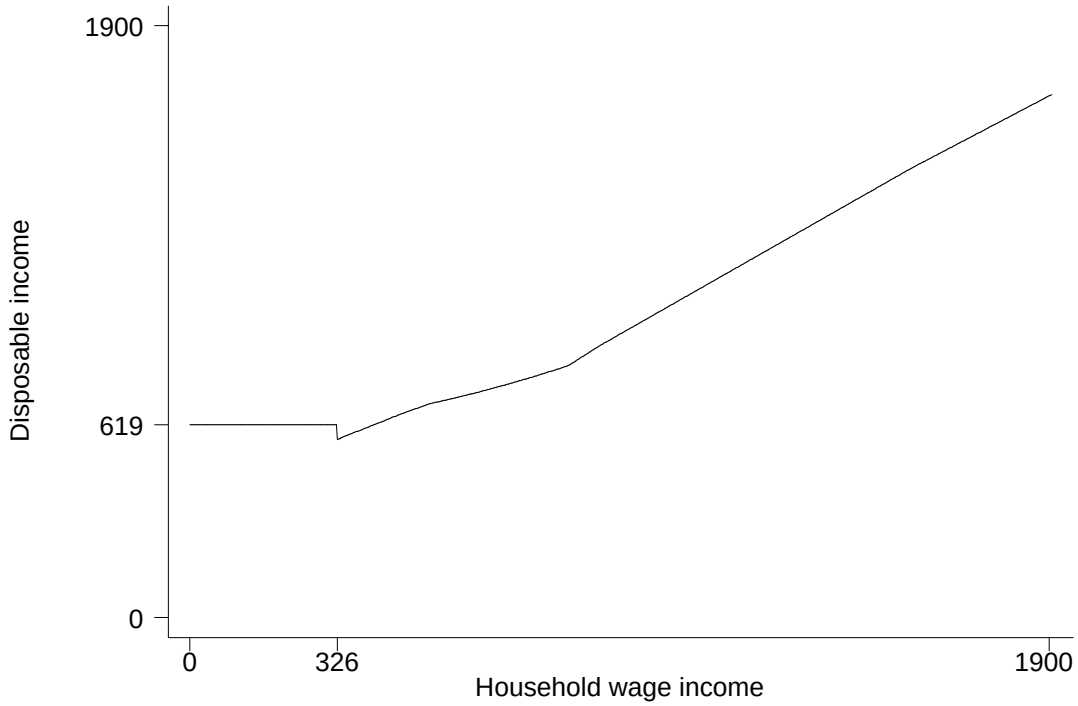
Figure 1: Household Labor Income and Disposable Income: Single with No Housing Benefit



tested housing subsidy as soon as the person has left RMI (while income from RMI is not); as a result, the subsidy drops to $AL = 244$ Euros at this point. Furthermore, this income is taxed through the income tax and is subject to the AL means-test. At the income levels considered in the figure, the progressiveness of the marginal tax rate is primarily the result of AL rather than income tax (unlike figure 1).

At the other end of the spectrum, consider a couple with 3 children, one below 3, which receives a housing subsidy (Figure 3). Their resources are 1,177 Euros under the RMI (the threshold being 926 Euros, to which the one adds the housing subsidy less the fixed deduction). The household becomes ineligible for the RMI once labor earnings exceed 421 Euros since, after adding in family benefits, the household attains the RMI threshold. The marginal effective tax rate drops below 100% for household earnings beyond 421 Euros

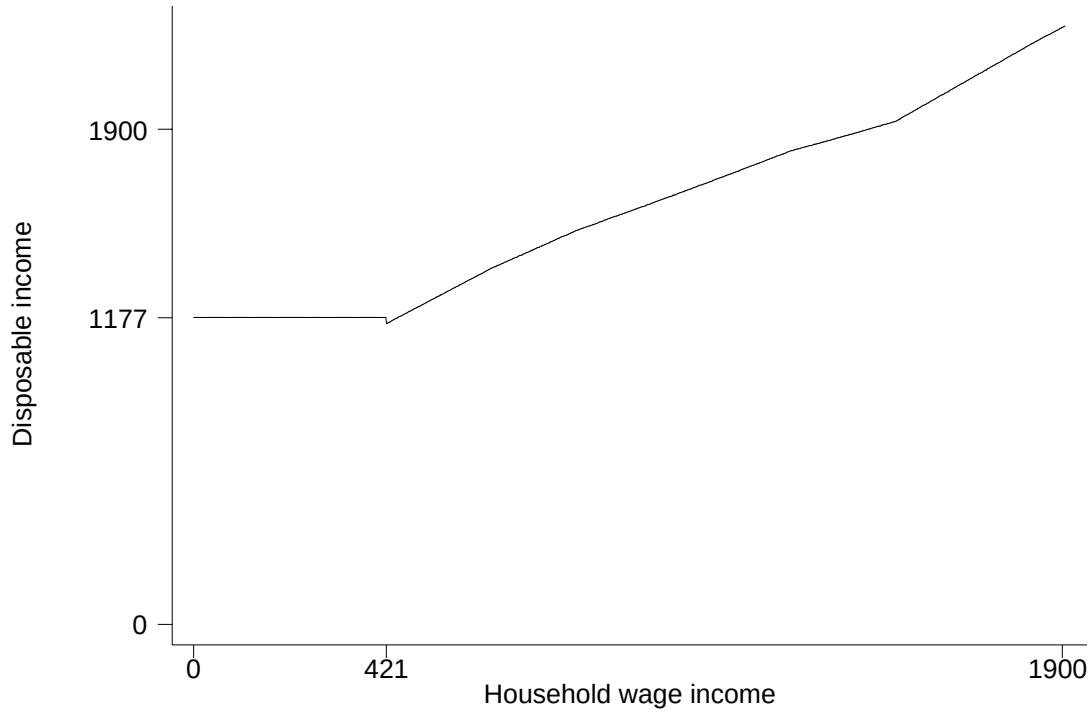
Figure 2: Household Labor Income and Disposable Income: Single with Housing Benefit



(although there is still the infinite marginal tax rate associated with the loss of the housing subsidy at 422 Euros of labor earnings), but remains at 30% on average until labor income reaches almost 1500 Euros. This is because of the importance of means tested family-related transfers for this type of household. The tax rate then drops to less than 5% once it depends solely on the income tax, which is very favorable to large families.

It is clear that the French welfare system imposes very high effective marginal tax rates on labor income, up to 100% (and locally infinity), over a large range of labor earnings due to its complexity and the accumulation of means-tested schemes. This point has often been noted in the literature (by Laroque and Salanié (1999), among others) and the issue of its disincentive effects on labor supply is subject to active debate. Although the entire profile of the tax rate is of interest, labor supply behavior is often discontinuous in nature, and

Figure 3: Household Labor Income and Disposable Income: Couple with 3 Children and Housing Benefit



thus certain ranges of figures 1-3 may be more relevant than others. One aim of this paper is to identify precisely the points that are relevant to the actual beneficiaries of RMI, and compare their potential incomes with their resources on welfare. In particular, we consider potential annual labor income, given observed and unobserved characteristics, to be the relevant point.

3 The Econometric Specification

3.1 The Basic Structural Model

In order to estimate the size of the differential between labor market earnings and the RMI, we need to be able to impute expected labor market earnings for those individuals who receive the RMI. This implies the estimation of a model for the determination of labor market earnings that can be compared to the amount that the individual can expect to receive as a guaranteed minimum income. However, since this model will only be estimable for the individuals for whom we observe labor market earnings, there is likely to be a selection bias in the estimates of the coefficients of the earnings model if we do not account for the fact that employment in the labor market could be correlated with the wage or hours that a worker could expect if he or she were to participate.

Formally, we suppose that employers propose jobs that can be characterized by an hourly wage rate (w) and a number of hours worked (h) over the time period. Given the diversity of employers and jobs available in the labor market, a large number of (w, h) pairs will be proposed in the economy to each individual with a given set of productive characteristics (X). The set of proposed wage-hours pairs forms the labor demand curve for the individual, which can be described by the density $f(w, h|X)$. In particular, we describe the joint conditional

distribution of w and h as follows.

$$\log w = X\beta + u \tag{1}$$

$$\log h = X\delta + v \tag{2}$$

where u and v are residuals that are assumed to follow a bivariate normal distribution with $V(u) = \sigma_u^2$, $V(v) = \sigma_v^2$ and $cov(u, v) = \sigma_{uv}$. The vector X contains the characteristics that are important for the employer, such as the sex of the individual and his or her human capital (proxied by education, nationality and experience in the labor market). Furthermore, we assume that demographic characteristics, family status and household wealth do affect labor supply but do not affect productive capacities, and are thus not included in the vector X that determines the labor demand curve. These additional variables are regrouped into the vector Z.

Our final objective is to estimate correctly the parameters of equations (1) and (2) in order to be able to describe the set of offers that each individual might receive, regardless of whether he or she is actually employed at the time of the survey. In particular, labor market earnings for each individual, conditional on X, can be written as

$$\log W = \log w + \log h = X(\beta + \delta) + u + v \tag{3}$$

where W is total labor earnings.

This conditional earnings level combines the individual's specific hourly wage rate with the constraints that he or she might face in terms of imposed part-time work. Given the increasing prevalence of part-time work in the French labor market, it is important to be able to distinguish the role of imposed part-time work. One simple way of doing this is to

compare the estimated earnings distribution with a simulated earnings distribution in which we arbitrarily assign full-time jobs to everyone without conditioning the wage distribution on full-time work.

This model can be situated with the context of the literature on job search. Individuals draw job offers from the joint distribution described by equations (1) and (2). They derive their labor supply function, expressed in terms of hours of work, as

$$h^S(w, Z). \tag{4}$$

This function varies across individuals with their characteristics Z (which determine the preference structure), which is why observed labor hours are not simply a function of wages w but also of characteristics Z.

The labor supply literature typically assumes that individuals will only accept jobs that lie on their labor supply curves, i.e. the set of (w, h) pairs that satisfy

$$h = h^S(w, Z).$$

This is likely to be too restrictive, as such an approach will fail to account for workers who are employed in jobs where the part-time hours are imposed by the employer (rather than chosen by the individual). As a result, we take an alternative, reservation utility, approach. We suppose that a person will accept any offer (w, h) which provides at least a reservation level of utility U^*, even if this job does not lie on the labor supply curve. This reservation utility level is determined in part by the household's disposable income if the individual does not work. However, in the context of the search approach to the labor market, this reservation utility level should also depend on the distribution $f(w, h|X)$ from which the individual draws his or her job offers. Thus the reservation utility level can be expressed as

a function $U^*(X, Z, \varepsilon)$, where X and Z are as defined above and ε represents unobserved individual heterogeneity.

We suppose that an individual's utility is a function of consumption[9] and hours worked, conditional on Z and ε, i.e. $U(wh + y_0, h; Z, \varepsilon)$, where y_0 is non-labor income and thus $wh + y_0$ represents steady-state weekly consumption. With this notation, a job (w, h) is accepted if

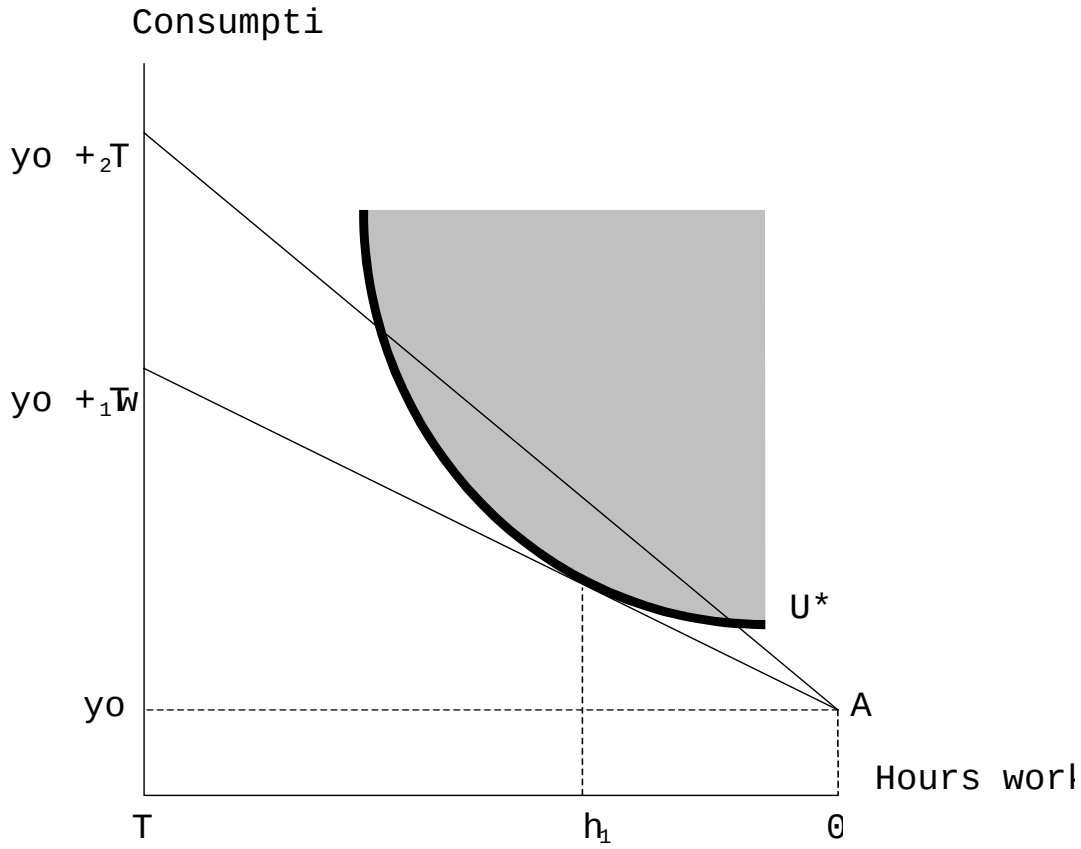
$$U(wh + y_0, h; Z, \varepsilon) \geq U^*(X, Z, \varepsilon). \tag{5}$$

In figure 4, we have drawn the indifference curve (for strictly convex preferences) corresponding to the reservation utility level $U^*(X, Z, \varepsilon)$ in consumption-hours of work space. Note that hours worked increases from 0 to a maximum T as one moves *from right to left* along the horizontal axis. The shaded area designates the set of acceptable jobs and the lines passing through the point A represent different budget sets corresponding to different hourly wages. In the absence of (anything but lump-sum, non-means-tested) transfers, the absolute value of the slope of the budget set corresponds to the hourly wage. At point h_1, an hourly wage of w_1 implies a unique acceptable (w, h) pair which provides a utility level exactly equal to the reservation utility U^*. Thus, as one would expect, for the same number of labor hours h_1, any hourly wage above w_1 (such as w_2) will provide the individual with a strictly higher level of utility.[10] We exploit this property as a means of characterizing condition (5), which determines employment.[11]

[9] Given that we assume stationarity throughout this paper, we do not directly consider the question of savings and the intertemporal allocation of consumption.

[10] Without further assumptions concerning the functional form of U, we cannot determine whether such points would be on the labor supply curve or not. Typically one would assume that leisure is a normal good, which would suggest that the labor supply curve would be positively sloped, and not vertical, on this diagram.

Figure 4: The Acceptable Job Set



Let w^* be the hourly wage which, for a given number of hours h satisfies

$$U\left(w^*h + y_o, h; Z, \varepsilon\right) = U^*.$$

If utility is increasing in consumption and preferences are strictly convex, then U is a strictly increasing function of w^* (as seen above), and therefore its inverse exists. We can thus write

$$w^* = g(U^*, h; Z, \varepsilon)$$

and we can rewrite condition (5) that defines the set of (w, h) pairs that are associated with acceptable jobs as

$$\begin{aligned} U\left(wh + y_o, h; Z, \varepsilon\right) &\geq U\left(w^*h + y_o, h; Z, \varepsilon\right) = U^*\left(X, Z, \varepsilon\right) \\ \text{or} \qquad w &\geq w^* = g(U^*(X, Z, \varepsilon), h; Z, \varepsilon) \end{aligned} \tag{6}$$

Condition (5) rewritten as condition (6) allows us to describe employed individuals in terms of their wages and hours, as well as their characteristics X and Z. In our model (unlike what is typically done in the literature on work hours), we do not introduce demographic characteristics directly into the hours worked equation (2) but rather in the employment selection equation (6). We use the exogenous variation in the labor supply curves (or rather job acceptance regions) coming from Z to identify the labor demand curves defined by (1) and (2).

The model described above can be estimated directly only if we are willing to make additional functional form assumptions on U. This would allow us to recover the function

[11] In the presence of the current system of transfers in France, the budget sets shown in figure 4 would be even more non-linear. Nevertheless, with the exception of the discontinuity at the RMI, the result concerning the increase in utility with wages, conditional on hours, still holds. Laroque & Salanié (2000) estimate a structural model that takes into account the form of the budget constraints, but without accounting for h as a choice variable. Here, we use this model only to provide a theoretical foundation for the selection mechnism at work, considering a simple linear *approximation* of the clearly non-linear, discontinuous budget set.

h^S which can not be directly estimated as the individuals observed in our data will not, in general, be on their labor supply curves. In particular, if we know the function form of U then we can determine exactly the function g. We have set ourselves a more modest goal in this paper, as condition (6) is only used to justify our statistical control of selection effects in the estimation. Thus we prefer a more reduced form approach, in which we take simple linear approximations to the more general functions $g\left(U^*, h; Z, \varepsilon\right)$ and $U^*\left(X, Z, \varepsilon\right)$.

Before discussing the econometric specification in more detail, it is worth noting that we have not explicitly modeled participation, but rather employment. We have specified our model in order to avoid the need to refer to declared participation in our survey data, since Jones and Riddell (1999) have demonstrated that the distinction between declared unemployment and declared non-participation only partially captures the difference in reemployment probabilities across individuals, and that different individuals seem to interpret the terms "unemployment" and "non-participation" differently. Our specification treats inactivity and unemployment symmetrically, as situations in which the probability that and individual receives a job offer (w, h) that provides him or her with at least the reservation utility level U^* is very low. In this case, U^* is close to the utility level attained when $h = 0$.

When situating this model with respect to the job search literature, it would appear that we have left out the offer arrival intensity. This will depend on the person's labor market perspectives (which are a function of X) and the individual's search intensity (which will be a function of Z). Without further functional form assumptions, we would be unable to separately identify these factors. However, since we are only interested in the reduced form of condition (5), and since we will take a first-order approximation to the arbitrary functional forms described by condition (6), one can consider that differences in offer arrival

intensity are also implicitly captured in our estimation. The only assumption necessary here is that there be no discontinuity between unemployment and inactivity; an inactive individual continues to search, but perhaps with a very weak intensity.

3.2 Econometric Treatment of Selection Bias

Consider a linear approximation of condition (6) of the form[12]

$$\alpha_0 \log w \geq Z\gamma + X\gamma_x + \alpha_1 \log h + \varepsilon \tag{7}$$

Note that this expression imposes separability between the different model variables, although interactions between the X and Z variables could also be included (especially when using large data sets such as the French Labor Force Survey). On the other hand, adding flexibility in terms of w and h would make the model significantly more complicated.[13] In our reduced form estimation, however, this restriction only really constrains the second moments of the distribution of the residuals.

The full model thus consists of condition (7) and equations (1) and (2). The model parameters are β, δ, γ, γ_x, α_0, α_1 and all of the parameters that characterize the variances and covariances of u, v and ε. Of course, not all of these parameters are identified, on the one hand because condition (7) can be arbitrarily renormalized[14] , and on the other hand because if v and ε are correlated, $\log h$ and ε will also be correlated in condition (7). However, since $\log h$ is a linear function of X while the X vector also appears in condition (7), we do not

[12] Condition (7) is expressed in logarithms to facilitate the incoporation of equations (1) and (2). Other approximations, for example in levels as opposed to logs, would also be valid.

[13] A more satisfactory specification along these lines would allow for higher orders and interactions between the $\log w$ and $\log h$ terms. Such a specification would require the implementation of estimation methods that involve numerical simulations. This constitutes an avenue for future research.

[14] This feature is derived from the fundamental invariance of preference orderings to monotonically increasing transformations of the underlying utility function.

have an exogenous source of variation to identify α_1. The same reasoning holds for $\log w$ and α_0. Intuitively, even if we were to normalize $V(\varepsilon)$, it would not be possible to separately identify γ_x, α_0, α_1, $cov(u,\varepsilon)$ and $cov(v,\varepsilon)$. We examine this issue in further detail below.

Substituting for $\log w$ and $\log h$ in condition (7) gives

$$\widetilde{\varepsilon} = \alpha_0 u - \alpha_1 v - \varepsilon \geq Z\gamma + X(\gamma_x - \alpha_0\beta + \alpha_1\delta). \tag{8}$$

Define $\sigma_{u\varepsilon} = cov(u,\varepsilon)$ and $\sigma_{v\varepsilon} = cov(v,\varepsilon)$. The probability that condition (8) is satisfied, i.e. that a person will be observed in employment, includes a term corresponding to the variance of $\widetilde{\varepsilon}$. Since $V(\widetilde{\varepsilon})$ can not be identified exclusively on the basis of a dichotomous variable, one must normalize $V(\widetilde{\varepsilon})$, and the normalization typically chosen is $V(\widetilde{\varepsilon}) = 1$. The empirical variance of $\log w$ and its covariance with X allows us to identify β and σ_u^2, the empirical variance of $\log h$ and its covariance with X allows us to identify δ et σ_v^2 and the covariance between $\log w$ and $\log h$ allows us to identify σ_{uv}. Furthermore, the observation of employment status as a function of Z and X allows us to identify γ and the expression $(\gamma_x - \alpha_0\beta + \alpha_1\delta)$. The correlation between $\log w$ and Z identifies $\sigma_{u\varepsilon}$ just as the correlation between $\log h$ and Z identifies $\sigma_{v\varepsilon}$. Thus there remain 4 parameters, γ_x, α_0, α_1 and $V(\varepsilon)$ to identify off of 2 elements ($(\gamma_x - \alpha_0\beta + \alpha_1\delta)$ and the normalization). Clearly, the model in this general form is underidentified.

It is, however, possible to estimate all of the parameters of equations (1) and (2), as well as the parameters $\sigma_{u\varepsilon}$ and $\sigma_{v\varepsilon}$ which, with the nomalization $V(\widetilde{\varepsilon}) = 1$, is sufficient to obtain consistent estimators of the parameters of interest and to allow us to simulate wages an hours as we need below. It is indeed possible to better identify the model, in particular with the help of addition assumptions on the functional form of the utility function. We prefer,

however, to restrain ourselves to the minimum number of assumptions necessary to estimate the parameters we need. The likelihood function derived from this model is detailed in the appendix.

4 Data and Results

In this section, we begin by describing the data we use for our analyses, drawn primarily from the French "Outcomes for RMI Recipients" (*Devenir des personnes sorties du RMI*) Survey. We next provide some basic descriptive analysis concerning the jobs that RMI recipients obtain when they leave the RMI (as found in our data), and then we present the results of estimating the model in section 3.

4.1 The Data

We use several data sources for our econometric estimation and for our simulations of disposable income. Our primary data source is the Outcomes for RMI Recipients Survey (Lhommeau, forthcoming), which was undertaken by the French National Institute for Statistics and Economic Studies (INSEE) in collaboration with several other public institutions. A representative sample of RMI recipients was surveyed in December of 1996, then 1 year later in January 1998. We exploit this second cross-section which includes, along with demographic and household characteristics, information concerning the activity status of the RMI recipient, in particular his or her monthly earnings and hours (if employed) as well as all of the information necessary to reconstruct the other transfers to which the household is eligible. This last point is particularly important, since the housing subsidies introduce a highly nonlinear, and sometimes discontinuous, relation between labor earnings and disposable income (see section 2); it is thus critical to be able to identify households that have

access to this subsidy and to adjust their disposable income accordingly..

We use the survey both to estimate the structure of wages and hours available to RMI recipients and to simulate the potential gains to employment for the entire population of RMI recipients. We restrict our attention to people between 17 and 55 years old, and we exclude students and retirees, which leaves us with 3,010 households out of the original 3,415. We also eliminate self-employment income for the estimation. We assume 100 percent take-up of transfers for which the household is eligible in the simulations.[15] This provides us with a lower bound on the share of households that would gain from employment.

In order to compare the situation of RMI recipient households to that of the general population of households, we also use the French sample of the European Household Panel Survey, also run by INSEE. We use the 1996 cross-section and apply the same sample selection criteria as above for comparability with the Outcomes of RMI Recipients survey, as both surveys are representative of their respective populations in that year. The European Household Panel Survey also contains sufficient information to reconstruct the set of transfers for which a given household is eligible. One technical difficulty, however, rests in the fact that a household, by the definition of the statutes that govern the RMI, does not correspond to INSEE's traditional definition of a household; a given INSEE household may contain multiple households in the RMI sense. In particular, children over 25 (or with their own dependent children) of the reference person in the household can constitute a distinct household for the purpose of receiving welfare transfers. We thus generate new, independent households from the over-25 children, and from the children who are themselves parents, who reside

[15] Our data do not contain sufficient information to measure takeup rates (see Gilles-Simon and Legros (1996) for a quantitative analysis of benefit takeup in France).

with their parents in the European Household Panel Survey. This exercise leaves us with a sample of 3,444 households.

In the final part of this paper, we reestimate the structure of wages and hours on the entire (metropolitan) French population, and not just on RMI recipient households. We do not use the European Household Panel Survey for these analyses, since earnings are only available on an annual basis, with a monthly activity calendar describing months worked full-time, long part-time and short part-time. This introduces two sources of error: partial months worked and imprecision concerning hours worked. As a result, we use a third survey, the French Labor Force Survey of 1998 (which allows the measured wages to be comparable with the January 1998 follow-up of the Outcomes of RMI Recipients Survey). The French Labor Force Survey has a structure similar to the American Current Population Survey and it has the advantage of covering a large, representative sample; we retain (with our selection criteria) 33,737 men, of which 28,098 are employed at the sample date (March 1998), and 38,554 women, of which 24,975 are employed at the sample date.

The comparisons based on the different surveys are made easier by the fact that all of the samples are representative of their respective populations, all were undertaken by INSEE and all use the same variable codings and nomenclatures. In particular, The French sample from the European Household Panel Survey and the French Labor Force Survey are very similar in terms of descriptive statistics.

4.2 Realized Outcomes of the RMI Recipient Population

Before considering potential gains to employment for the RMI recipient population, it is useful to analyze the realized outcomes for those whom, at a point in time, are actually

employed, even though this constitutes a possibly non-representative subset of the full RMI recipient population. Even though there exist several statistical means of describing the structure of wages and hours, the only data source that allows such a detailed analysis is the Outcomes of RMI Recipients survey.

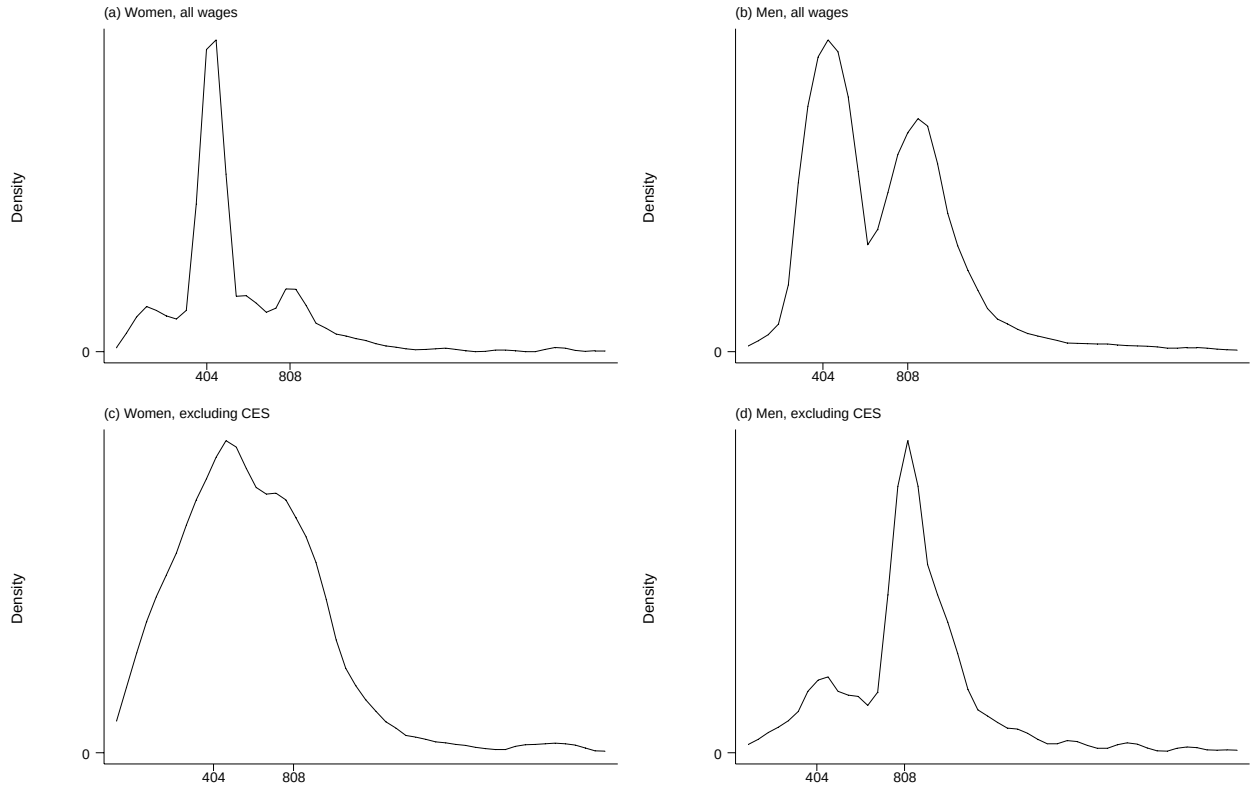
As noted above, the January 1998 sample is a follow-up survey, 1 year later, of the representative December 1996 sample. Of the initial December 1996 sample, one-third are employed a year later, only 10% of whom are in self-employment. Among those in regular employment, 34% are employed under a special fixed-term, subsidized contract called the Employment Solidarity Contract (*Contrat emploi solidarité*, or CES). These jobs are half-time jobs paid at the minimum wage and they are run through the government's active labor market policies. Zoyem (1999) shows that this sort of contract is frequently proposed to RMI recipients, and is occasionally incorporated in and individual's "reinsertion contract".[16]

These contracts are clearly visible when tracing the empirical distribution of monthly earnings for the employed (but not self employed) subsample of the January 1998 survey, as in panels (a) and (b) of figure 5. The CES contracts induce spikes in the distributions at the part-time minimum wage for women and at both the part-time and full-time minimum wage for men. When we retrace the earnings distributions excluding those on CES contracts, the spikes at the part-time minimum wage are dramatically reduced (panels (c) and (d) of figure 5).

Figure 5 makes clear that the earnings of RMI recipients, once reemployed, are extremely low and concentrated around the half-time and full-time minimum wage. It is also clear that

[16] Reinsertion contracts are negotiated between the RMI recipient and his or her caseworker, and are intended to help the RMI recipient plan his or her transition from welfare back into work (Zoyem, 1999).

Figure 5: Kernel Distributions of Monthly Earnings for Employed Subsample in January 1998.



active labor market policy, in the form of CES contracts, plays an important role in this phenomenon. This suggests that the gains to employment that will be presented below are likely to be sensitive to the position of the economic cycles as well as the attitude of policy makers toward active labor market policy.

We base our estimates of the gain to reemployment on these observed earnings. Nevertheless, it is not clear that the set of jobs observed in our sample is representative of the set of jobs proposed by employers, as shown in section 3.1. Since it is only the jobs that provide a sufficient level of utility that will be accepted, we will not be able to estimate correctly the full distribution of jobs offered.[17] In particular, if we observe individuals with certain characteristics disproportionately in employment, our estimates of β and δ in equations (1) and (2) may be biased (Heckman, 1979). Since we use these estimates to simulate earnings for the entire RMI population (including those not observed in employment), such a bias could have far-reaching consequences, and so we will test for its presence below.

4.3 Estimation Results

The results of estimating the earnings functions are presented in table 1, separately for men and women, and including CES contracts. Tests of the hypothesis that there is no selection bias when using the employed sample relative to the full Outcomes of RMI Recipients sample in 1998 (not shown here) cannot be rejected at standard significance levels. As a result, the results presented in table 1, corresponding to equation (3), can be estimated by Ordinary Least Squares.[18]

[17] Our parametric assumption of joint normality of the disturbances in equations (1) and (2) will allow us to reconstruct the full joint distribution, provided that we can obtain unbiased estimators of the coefficients β and δ.

[18] This is a simplified version of the more complete model presented in section 3. Maximum likelihood estimation of the full model is used in section 5.3.

Table 1: Earnings Equations for RMI Recipients: Log Monthly Earnings

	Women		Men	
Education:				
Graduate School	0.4466*	(0.2360)	0.5265**	(0.1603)
4-year College	0.2577	(0.2291)	0.4213**	(0.1556)
2-year College (incl. technical)	0.3913*	(0.2054)	0.5098**	(0.1414)
High School	-0.0281	(0.1627)	0.2279*	(0.1313)
Voc. or tech. training (long)	-0.0090	(0.1795)	0.3664**	(0.1376)
Junior High School	-0.1660	(0.1308)	0.0313	(0.1043)
Voc. or tech. training (short)	-0.0444	(0.1349)	0.1752*	(0.0964)
Primary or no education	ref.	ref.	ref.	ref.
Age	-0.0018	(0.0525)	0.0552	(0.0443)
Age^2	-0.0004	(0.0005)	0.0003	(0.0004)
Age x School leaving age	0.0008	(0.0016)	-0.0046**	(0.0012)
School leaving age	0.0341	(0.1049)	0.2700**	(0.0772)
School leaving age^2	-0.0015	(0.0019)	-0.0036**	(0.0014)
French Nationality	-0.2123*	(0.1121)	-0.0012	(0.0704)
Intercept	8.1150	(1.7104)	5.0095**	(1.3479)
R^2	0.14		0.13	

Source: Outcomes for RMI Recipients Survey.

Notes: Standard errors in parentheses. * : significant at the 10% threshold;
** : significant at the 5% threshold. Ordinary least squares estimates.

Our specification includes education as a set of indicator variables corresponding to the highest degree obtained, a quadratic specification in the number of years of schooling (via the school leaving age) and an interaction of school leaving age with the age at the date of the sample.[19] Although this specification provides us with considerable flexibility (which is useful in the simulation exercises below), it renders the precise interpretation of the education coefficients more difficult.

For a given degree level and at a given age, earnings increase with the number of years of schooling in a concave fashion. Age does not have a significant impact on its own, although

[19] In light of the complexity of the French educational system, our limited number of degree categories suggests that each category will itself be somewhat heterogeneous. Thus an additional year of schooling for a given degree category may signify either obtention of a degree that requires a longer amount of schooling within the category or repetition of a year to obtain a particular degree. Theory suggests that the first possibility should lead to higher earnings, while the second should lead to lower earnings. Thus the interpretation of the additional years of schooling term is ambiguous.

the return to an additional year of school seems to be lower for older men than for younger men. The absence of an age effect on monthly earnings is due to age having a positive impact on wages but a negative effect on hours.[20] The coefficients on the degree categories suggest a significant earnings premium for higher education for both men and women, with a jump for those with degrees above a high school diploma (baccalauréat). For men, the returns to both sorts of vocational and technical training, as well as a high school diploma, are also significant (relative to no education). This does not seem to be the case for women, however, in part due to the fact that the large mode at the half-time minimum wage reduces the variability in the data left to be explained. In fact, the models shown in table 1, in which we restrain our attention to the variables that would have a direct impact on the labor demand curve facing an individual (the X variables in section 3.1), have a relatively low explanatory power, roughly half of what is typically obtained for this type of model on French data. As a result, out simulations are likely to be relatively imprecise at the individual level. Fortunately, however, this imprecision at the individual level does not bias the aggregate shares that interest us below.

5 The Gains to Employment

We use the results from table 1 to assign to each household in the full (representative) sample a level of earnings in employment. This is done according to equation (3), where we use the estimated β and δ from table 1 and adding a draw from the nonparametric distribution of residuals from the table 1 regression. This is preferable to simply using expected wages in that it does not reduce the variance as much and allows us to recover much of the bimodality

[20] These results come from auxillary regressions not shown here, but available from the authors on request.

in earnings described in figure 5. The distribution of earnings thus obtained is representative of the distribution of job offers that this population might receive.

Given each household's labor earnings, we apply the system of taxes and transfers present in France in 1998, and described in section 2, to obtain a measure of disposable income. For comparison (and calculation of the gain to employment), table 2 describes the disposable income available to different types of households in January 1998 were they to live exclusively on welfare (the RMI). On average, this comes to 559 Euros per month.

Table 2: Disposable Income on RMI by Household Type (Francs per Month)

	Disp. income on RMI		Housing benefit			% of house-holds	No. of obs.
	Mean	S. D.	Mean	S. D.	% Elig.		
All households	559	248	184	98	59%	100%	3010
Single men	384	93	161	88	36%	32%	949
Single women	412	106	180	81	48%	18%	553
Single with one child	602	114	171	102	79%	12%	363
Single with two children	730	117	198	104	88%	5%	209
Single with more than two children	948	170	196	116	87%	3%	116
Couple with no child	629	106	202	77	80%	5%	145
Couple with one child	714	116	193	98	81%	7%	223
Couple with two children	839	115	198	100	86%	6%	207
Couple with more than two children	1094	207	222	120	82%	6%	245

Source : Outcomes for RMI Recipients Survey, authors' computations, weighted data.

Of course, the overall average hides much household-level heterogeneity. For example, average disposable income is only 393 Euros per month for single households without children, while couples with at least 3 children receive on average 1,094 Euros per month. Furthermore, there is substantial heterogeneity even within the same type of household, despite the

fact that the RMI only depends upon household structure. This is reflected by the large standard deviations in table 2 and comes from the fact that the housing benefit is cumulable with the RMI and induces substantial variation in transfer amounts based on whether the household receives the benefit and its amount. For this reason, it is important to have data sufficiently detailed to be able to evaluate the amount of housing subsidy per household.

Table 3 details the potential financial gains to employment with respect to disposable income on welfare as described in table 2. The first thing to note is that 74% of RMI households would gain financially from employment; these households would see their disposable income increase were they to be employed, even beyond the (fixed) period during which a welfare and labor income can be cumulated (the *interessement* period). Figure 6 shows the distribution of these gains. A small share of RMI households (around 3%) would have a net decrease in disposable income; these are the households which find themselves in the paradoxical situation where their new labor earnings, by rendering them ineligible for the RMI, induce a disproportionately large decrease in the housing subsidy that exceeds the additional labor income. There is a large mode at zero, corresponding to households whose labor income is sufficiently low that they would continue to receive the RMI (as a complement to labor income) even while working and would benefit from the same treatment of their housing subsidy as if they did not work at all. This is followed by a large range with strictly positive gains, although small gains are the most frequent.

Table 3: Increase in Monthly Disposable Income Relative to RMI: Different Labor Earnings Scenarios

	Share of positive gains	Increase in disp. inc. when gain is positive	
		Mean	Median
Potential wage allocated to one household member	74%	273	202
Observed wage (employed population)	72%	284	195
Potential wage allocated to each household member	79%	348	259
Potential wage allocated to each household member (couples only)	96%	539	484
Full time minimum wage allocated to one household member	100%	340	358

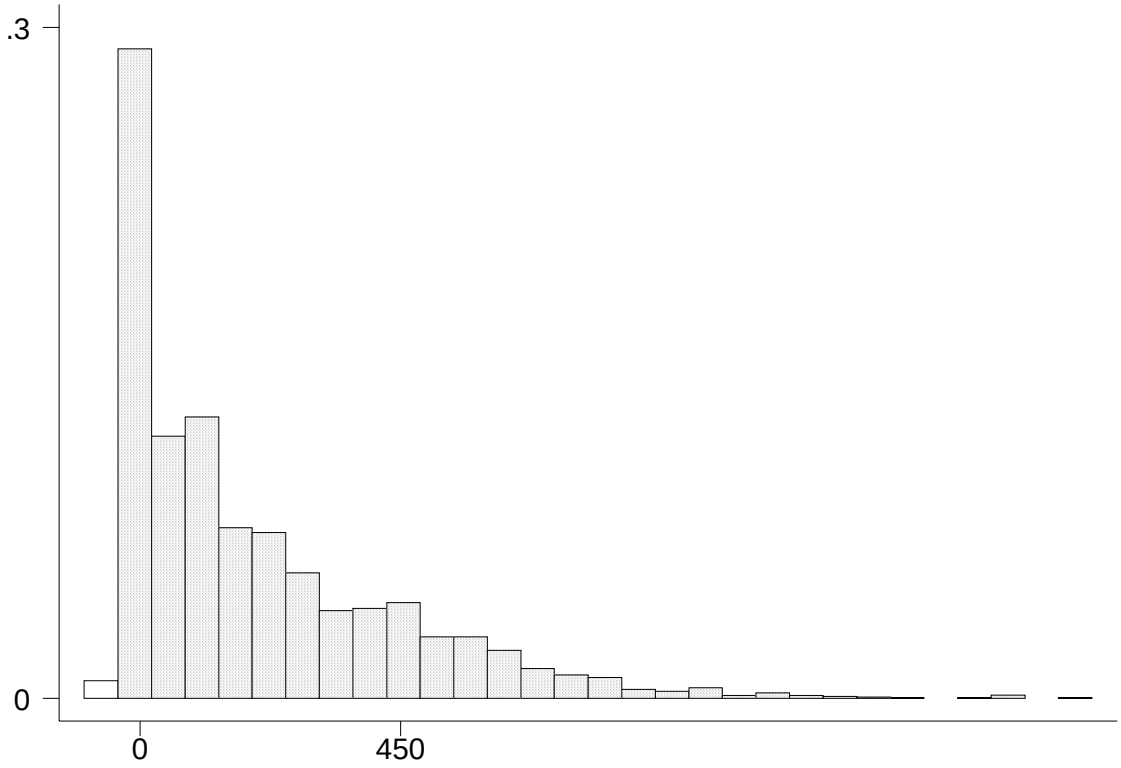
Source : Outcomes for RMI Recipients Survey, authors' computations, weighted data.

Notes: As computation makes use of draws from the empirical distribution of residuals, figures could be slightly different for another draw. Due to missing values, sample size is only 2978.

Table 3 also describes the distribution of positive gains. The average increase (for those who gain from employment) is around 275 Euros and the median gain is approximately 200 Euros, a difference resulting from the skewness of the distribution of positive gains. In addition, one quarter of those who gain from employment have potential increases of less than 90 Euros per month, although another quarter of these households have gains of over 410 Euros per month. Relative to the level of the RMI, the average gain corresponds to a 63% increase in disposable income but the median gain is only 37% higher. In other words, half of the population of RMI-recipient households has a potential disposable income when employed that is over one third higher than their disposable income while on welfare.

When we restrict our attention to the subsample of the original December 1996 sample that is actually employed in January 1998, the results remain very similar, despite the fact that their realized disposable incomes are slightly higher than the potential disposable

Figure 6: Distribution of Changes in Disposable Income on Becoming Employed



incomes that we estimate for the rest of the sample. For 72% of these employed households disposable income increases, and the mean of the net positive gains is slightly higher than 275 Euros. This seeming inconsistency is explained by the fact that the employed households are disproportionately couples or households with dependent children, and thus disposable income on the RMI is higher as well. When controlling for household structure, the employed households do seem to have slightly larger net gains from employment than the not employed households.

For the simulations up to this point, we have assumed that only one person in the couple (the one with the highest potential labor earnings) would work. We can also consider the case where both members of the couple work, but this changes little in the overall percentages because couples represent a small share of RMI recipients. Furthermore, the second salary that we add is the lower of the two (typically the woman's). In this scenario, 79% of RMI households would have a net financial gain to employment, and the mean of these gains increases to 350 Euros per month while the median jumps up to 260 Euros per month. This represents a increase of 60-75 additional Euros in disposable income relative to the case where only one of the members of the household works.

Finally, in order to compare with the "representative household" type analyses, we attribute the minimum wage for a month of full time work to each household, ignoring the implications of the estimations in table 1. In this case almost all households would gain from being employed, and the mean and median increases in disposable income are 335-350 Euros per month. This is dramatically different from the results of our simulations, and demonstrates the importance of part-time jobs as an employment opportunity for RMI recipients.

5.1 Decomposition by Household Structure

The discussion above concerns the full set of RMI households and does not distinguish by household structure. However, as noted in section 2, the amount of the transfers, with or without the RMI, depends largely on household structure. As a result, there is wide variability within the RMI population in gains to employment, as shown in table 4. Single households with children (95% of which are women) have the smallest gains to employment among RMI households. Less than half (43%) have a net gain in disposable income associated with employment, and the amounts of these gains are rather modest (less than 150 Euros for over half of the households with a positive net gain).[21] In general, these women tend to be young and poorly educated, and they tend to end up at the bottom of the distribution of potential labor earnings. However, the presence of children means that their transfer income will tend to be higher than average. This combination of low labor earnings and high transfer income places them in the least favorable position with respect to gains from employment. Furthermore, it is precisely these households for which child care is likely to be an important obstacle, especially if they are subject to unusual work hours. As might be expected, their poor potential earnings performance is largely due to a prevalence of part time work. If we were to attribute the level of income associated with a month of full time wor at the minimum wage to these households, 96% of them would have a net increase in disposable income associated with employment and the median gain would double.

[21] Some of these households with young children would be eligible for the API, for which a similar logic would hold and for which the gains would be even smaller and less frequent, due to the larger associated transfer (Gurgand and Margolis, 2000).

Table 4: Increase in Monthly Disposable Income Relative to RMI by Household Type and Wage Attributed to One Household Member

	Potential Wage Attributed			
	% with positive gains	Increase in disposable income for positive gains		
		Mean	Median	1^{st} quartile
Single men	90%	303	221	101
Single women	72%	234	131	73
Single with one child	37%	184	139	55
Single with two children	46%	198	139	69
Single with more than two children	66%	256	175	118
Couple with no child	61%	267	215	97
Couple with one child	66%	255	196	102
Couple with two children	73%	237	208	102
Couple with more than two children	89%	334	297	150
All households	74%	273	202	93
	Full Time Minimum Wage Attributed			
	% with positive gains	Increase in disposable income for positive gains		
		Mean	Median	1^{st} quartile
Single men	100%	398	456	365
Single women	100%	370	546	255
Single with one child	100%	259	230	198
Single with two children	99%	305	296	283
Single with more than two children	98%	470	499	456
Couple with no child	100%	180	124	84
Couple with one child	98%	202	211	105
Couple with two children	98%	227	200	168
Couple with more than two children	99%	381	387	346
All households	100%	340	358	227

Source : Outcomes for RMI Recipients Survey, authors' computations, weighted data.
Notes: As computation uses random draws of residuals, figures could be slightly different for another draw. Due to missing values, sample size is only 2978.

A diametrically opposite situation holds for single households without children, which make up more than half of all RMI-recipient households. 85% of these households would see their disposable income increase with employment (relative to 74% for the overall population) and their median gain would be 200 Euros. The relatively large share with gains and high conditional net gains are due to two factors that work in the same direction. On one hand, these household are disproportionately male, which (in light of table 1) implies that their

potential labor earnings will be higher. On the other hand, their transfer income will be lower since they are both single households and without dependents.

Table 4 also suggests a rather interesting mechanism inherent in the system of transfers: net gains to employment first decrease, then increase with the number of children. The initial drop comes from the fact that transfers to households with no dependents are relatively low, which leads to relatively large gains to employment. However, the extra transfers derived from the various child benefits become relatively more important than the increases in the RMI as the number of children increases. As a large share of these transfers are not means tested (and are thus available independent of employment status), this leads to larger gains to employment for households with at least 3 children.

5.2 Heterogeneity and State Dependance

Our simulations thus far have shown that roughly one quarter of RMI-recipient households would have no long term gain in disposable income associated with employment.[22] This share is identical whether or not we focus on the group of households that is actually employed. Does this mean that all of the employed households are willing to work even when there is no financial gain to doing so? Not necessarily. It is possible that individuals will accept very poorly paid jobs in our sample because of the *interessement* mechanism, which allowed people (in 1998) to cumulate labor earnings and part of their RMI transfers for the first 750 hours of work. This mechanism is even more likely to be relevant in the case of workers employed on CES contracts, since the 750 hour limit does not apply to these jobs

[22] In considering our simulations to measure long term gains, we implicitly assume that the household maintains the labor earnings that we attribute to it beyond the period of transitory income fluctuations, including the period during which labor earnings and the RMI can be cumulated (the *interessement* period).

and welfare receipt can continue throughout the duration of the CES contract. As a result, the fact that a household has no increase in disposable income on the basis of our simulations should not be directly interpreted as a measure of short-term financial incentives. In other words, the long term labor earnings that we simulate are not to be confused with the sum of all sources of revenue (which are difficult to accurately measure) received by the household at the survey date.

This line of thought leads us to reconsider our interpretation in terms of long term gains to employment. Since the CES contracts are so prevalent in the Outcomes of RMI Recipients Survey data, and since these labor earnings are always combined with simultaneous welfare receipt, in what sense can we estimate "long term" labor earnings based on these data? In fact, if we were to eliminate these jobs from our data, which is equivalent to assuming that CES employers do not contribute to labor demand for RMI recipients (a clearly unrealistic assumption), and reestimate the table 1 model, we would find substantially different results. 79% of households in this case, relative to 74% of households before, would have a gain to employment, and the average net gain for those with positive gains jumps to 380 Euros per month from 275 Euros when we consider all contracts.

Of course, this problem applies to all jobs that are accessible to RMI recipients and not just CES contracts. Suppose that certain types of jobs, those that we observe in the Outcomes of RMI Recipients Survey, are disproportionately associated with certain types of unstable, short term employment. In this case, basing long term labor earnings calculations upon these jobs might be misleading, as few of these jobs ever actually last into the "long term".

The appropriate manner of dealing with this problem is related to the way in which

we interpret the fact that the population of RMI recipients in December 1996 that we observe employed in January 1998 receive particularly low labor earnings. It may be the case that the population of RMI recipients has certain intrinsic characteristics that make them less productive for employers. In this case, the low labor earnings would be due to individual heterogeneity and, even if these individuals were to reenter the workforce in a permanent fashion, they would always earn less than the rest of the population. If this is the correct scenario, then our simulations will accurately capture their long term labor earnings potential.

On the other hand, what if the reason that these workers are ill-paid is due to their status as recent RMI recipients, the fact that they have little valuable labor market experience, short-term cash flow problems, stigmatization of RMI recipients by employers or caseworkers, etc...? In this case, the employed earnings that we observe in the January 1998 survey would be drawn from a state-dependent labor earnings distribution. If this were the case, the observed earnings distribution in our sample would be inappropriate for drawing inferences on the long term, while the relevant job offer distribution would be that of the population as a whole.

Our goal here is not to determine the relative importance of these different arguments, which in any case would be impossible based on the data which we have available. However, the thrust of this argument remains pertinent: simulations based on the Outcomes of RMI Recipients Survey are relevant if individual heterogeneity is the relevant mechanism, while reestimating the table 1 model on the full population and simulating gains for the RMI population using these coefficients would be more appropriate in the case of state dependence. Thus the simulations presented above, in combination with those that we present below, serve

to frame the debate on long term gains in light of the possible presence of heterogeneity and state dependence.

5.3 Simulations Based on the French Labor Force Survey: An Upper Bound Estimate of the Gain to Employment

We use a representative sample of the population of metropolitan France (i.e. excluding French overseas departements and territories) drawn from the 1998 wave of the French Labor Force Survey to reestimate the determinants of labor earnings, independent of prior receipt of the RMI. We then simulate labor earnings for the Outcomes of RMI Recipients Survey sample based on these coefficients. This allows us to describe their gains to employment using the same returns to observable characteristics as in the population as a whole.

The richer structure of the French Labor Force Survey data allow us to decompose monthly labor earnings into hourly wages and weekly hours (the likelihood expression is detailed in the appendix). We will not explicitly comment on the role of selection bias for these models,[23] except to say that it seems weak in all models except hourly wages for women. In this case, the unobserved characteristics that increase the hourly wage seem also to increase the probability of being observed in employment. Table 5 presents the results of estimating these models on log hourly wages and log weekly work hours. As a whole, the coefficients are very significant and the signs and sizes are as expected. Wages increase with education and with age, the latter along a concave profile. We have introduced job seniority as an explanatory variable so as to be able to simulate recently obtained jobs, i.e. jobs with low seniority. Were we to omit job seniority, our simulated labor earnings would attribute to

[23] Gurgand and Margolis (2000) estimate these models on data from 1994-1996 and comment extensively on the selection bias coefficients. The results found here for 1998 are similar.

each RMI recipient the average job seniority observed in the population (roughly 10 years), which would tend to bias the simulated gains upwards.[24] Furthermore, age and school leaving age are interacted with job seniority in order to allow for returns to experience and returns to education to vary with the entry cohort into a job (Margolis, 1996).

Table 5: Earnings Equations
French Population, Log Hourly Wages and Log Hours Worked

	Log Hourly Wage			
	Women		Men	
Education:				
Graduate School	0.6834**	(0.0178)	0.6355**	(0.0141)
4-year College	0.5739**	(0.0159)	0.5167**	(0.0151)
2-year College (incl. technical)	0.3831**	(0.0135)	0.3277**	(0.0120)
High School	0.2018**	(0.0122)	0.1812**	(0.0110)
Voc. or tech. training (long)	0.1827**	(0.0135)	0.1675**	(0.0113)
Junior High School	0.1305**	(0.0111)	0.1455**	(0.0100)
Voc. or tech. training (short)	0.0808**	(0.0103)	0.0719**	(0.0084)
Primary or no education	ref.	ref.	ref.	ref.
Age	0.0242**	(0.0031)	0.0272**	(0.0024)
Age^2	-0.0003**	(0.0000)	-0.0003**	(0.0000)
Age x School leaving age	0.0002*	(0.0001)	0.0005**	(0.0001)
School leaving age	0.0490**	(0.0067)	0.0405**	(0.0049)
School leaving age^2	-0.0009**	(0.0001)	-0.0011**	(0.0001)
French Nationality	0.0021	(0.0122)	-0.0039	(0.0089)
Tenure:				
6 months or less	ref.	ref.	ref.	ref.
7 to 12 months	-0.0101	(0.0118)	0.0147	(0.0107)
1 to 5 years	0.0360**	(0.0079)	0.0607**	(0.0075)
more than 5 years	0.0742**	(0.0095)	0.1160**	(0.0089)
Tenure (months) x Sc. leaving age	0.0001**	(0.0000)	0.0000**	(0.0000)
Tenure (months) x Age	0.0000	(0.0000)	0.0000**	(0.0000)
Intercept	2.1758**	(0.1145)	2.3791**	(0.0770)

Source: French Labor Force Survey 1998.

Notes: Standard errors in parentheses. * : significant at the 10% threshold; ** : significant at the 5% threshold. Maximum likelihood estimates (selection equation not presented).

[24] We do not take the endogeneity of job seniority into account during the estimation procedure. Furthermore, we simulate our labor earnings below assuming less than 6 months of job seniority. We could alternatively simulate wages with 7 to 12 months of seniority, to be more in line with the "long term" interpretation that we would like to maintain, but the difference in expected log earnings between the two seniority levels is not significant.

Table 5 (continued): Earnings Equations
French Population, Log Hourly Wages and Log Hours Worked

	Log Weekly Hours Worked			
	Women		Men	
Education:				
Graduate School	0.1565**	(0.0209)	0.1165**	(0.0099)
4-year College	0.0033**	(0.0186)	-0.0906**	(0.0106)
2-year College (incl. technical)	0.1160**	(0.0155)	0.0321**	(0.0084)
High School	0.1234**	(0.0145)	0.0314**	(0.0077)
Voc. or tech. training (long)	0.1229**	(0.0157)	0.0371**	(0.0079)
Junior High School	0.0900**	(0.0134)	0.0221**	(0.0070)
Voc. or tech. training (short)	0.0914**	(0.0123)	0.0144**	(0.0059)
Primary or no education	ref.	ref.	ref.	ref.
Age	0.0019	(0.0035)	0.0076**	(0.0017)
Age^2	0.0000	(0.0000)	-0.0001**	(0.0000)
Age x School leaving age	-0.0004**	(0.0001)	0.0001	(0.0001)
School leaving age	0.0479**	(0.0077)	0.0158**	(0.0035)
School leaving age^2	-0.0005**	(0.0002)	-0.0005**	(0.0001)
French Nationality	0.0761**	(0.0142)	0.0170**	(0.0062)
Tenure:				
6 months or less	ref.	ref.	ref.	ref.
7 to 12 months	0.0679**	(0.0144)	0.0502**	(0.0075)
1 to 5 years	0.1203**	(0.0097)	0.0763**	(0.0053)
more than 5 years	0.2420**	(0.0117)	0.1008**	(0.0062)
Tenure (months) x Sc. leaving age	-0.0001**	(0.0000)	0.0000**	(0.0000)
Tenure (months) x Age	0.0000**	(0.0000)	0.0000**	(0.0000)
Intercept	4.0825**	(0.1175)	4.7346**	(0.0539)

Source: French Labor Force Survey 1998.

Notes: Standard errors in parentheses. * : significant at the 10% threshold; ** : significant at the 5% threshold. Maximum likelihood estimates (selection equation not presented).

The number of hours worked per week tends to increase with education, although it drops off for people with 2- or 4-year college educations (relative to those with a high school diploma). Age and school leaving age both have positive but concave impacts on hours worked. The interaction term between age and school leaving age is negative for women, perhaps suggesting that the age effect is less important for the women with the most education. Finally, the people who have been with their current employer the longest also tend to work the longest hours.

We use this earnings structure to simulate potential labor earnings for our RMI recipient

sample, and the net gains that result are summarized in table 6. As expected, the increase in disposable income associated with employment is much larger when we simulate earnings based on the full population coefficients. The proportion of the sample with a positive net gain goes from 74% to 89%, and the average increase for those who gain from employment increases to 500 Euros per month on average, and 430 Euros at the median. However, the heterogeneity across household types observed in table 4 persists, as only 67% of single mothers have a potential net increase in disposable income associated with working (with an average gain of 244 Euros per month), while 95 percent or more of couples on welfare would gain financially from employment.

Table 6: Increase in Monthly Disposable Income Relative to RMI: Simulation Based on Labor Earnings Estimated from the French Labor Force Survey

	Population of RMI beneficiaries			
	Share of positive gains	Increase in disposable income when the gain is positive		
		Mean	Median	1^{st} quartile
Single men	99%	647	577	399
Single women	82%	364	229	108
Single with one child	68%	264	178	80
Single with two children	68%	247	162	83
Single with more than two children	75%	348	259	182
Couple with no child	95%	512	396	278
Couple with one child	95%	462	373	214
Couple with two children	98%	495	383	242
Couple with more than two children	97%	567	482	334
All households	89%	506	433	217
	Total French population			
	Share of positive gains	Increase in disposable income when the gain is positive		
		Mean	Median	1^{st} quartile
Single men	95%	647	530	336
Single women	81%	332	268	114
Single with one child	73%	456	306	152
Single with two children	72%	488	399	232
Single with more than two children	86%	481	410	259
Couple with no child	92%	614	511	295
Couple with one child	93%	618	514	282
Couple with two children	94%	683	503	313
Couple with more than two children	96%	796	646	450
All households	91%	627	503	294

Source : Outcomes for RMI Recipients Survey and European Household Panel Survey, authors' computations, weighted data.

Notes: As computation makes use of draws from the empirical distribution of residuals, figures could be slightly different for another draw. Due to missing values, sample size is only 2978 for RMI recipients and 3440 for the overall population.

It is also interesting to compare our simulated distributions of gains between the sample of RMI recipients and that which we would simulate for the 17-55 year old population as a whole.[25] Although nothing in our analysis allows us to establish a behavioral link between RMI perception and financial gains to employment, one could reasonably ask if the RMI

[25] These comparisons are based on the French sample of the European Household Panel Survey.

recipients in our sample actually do have smaller increases in disposable income associated with employment on average than the population as a whole, or not. Our approach allows such differences to arise only through differences in the distributions of age, education and nationality between the samples. Table 7 summarizes these differences. The population of RMI recipients is younger, less educated and less often of French nationality than the population as a whole, all differences that tend to lead to lower expected earnings. In addition, family structure tends to be different between the two populations, with the RMI households tending to be more often single people without children. Table 6 shows that we simulate net financial gains slightly more often (92% of households) in the full population than in that population of RMI recipients, and average gains tend to be substantially higher for the population as a whole. But when one controls for the differences in family structure by looking at particular subgroups, things become less clear. In general, larger households have smaller gains outside of the RMI population, due largely to differences in the housing subsidy since RMI households tend to pay lower rents. Thus, among those households that are eligible for the housing subsidy, the amount will tend to be higher when calculating disposable income without labor earnings for the full population than for the RMI sample.

Table 7: Distribution of Household Head Characteristics

	RMI Recipients	French Population
Age	37.33	39.58
School leaving age	17.28	18.15
Graduate School	3%	7%
4-year College	4%	4%
2-year College (incl. technical)	6%	10%
High School	8%	8%
Voc. or tech. training (long)	4%	7%
Junior High School	21%	11%
Voc. or tech. training (short)	32%	39%
Primary or no education	22%	14%
Single	56%	26%
Single parent	20%	7%
Couples	24%	67%
French Nationality	88%	94%
Number of observations	2978	3440

Source : Outcomes for RMI Recipients Survey and European Household Panel Survey, authors' computations, weighted data.

This last point suggests a limit to our analysis. The amount of rent paid is endogenous with respect to income in reality, whereas we treat it as fixed in our simulations. To improve upon this point would require simultaneous estimation of a model of housing demand, which is beyond the scope of this paper. As a result, one must interpret the comparisons across populations with care, as the welfare and non-welfare populations are likely to choose different sorts of housing (and thus be eligible for different levels of housing benefits). On the other hand, comparing employment and non-employment within the same population is less problematic, since it comes down to treating rent as a sunk cost when making labor supply decisions (Afsa, forthcoming).

6 Conclusion

The evaluation of potential labor earnings for RMI recipients is a conceptually and technically delicate exercise. It remains, nevertheless, an indispensable piece of information in the debate

concerning the incentive effects of welfare. Simulations for "representative households" and calculations based exclusively on estimated effective marginal tax rates are inadequate, in that they do not account for heterogeneity in labor market conditions that RMI recipients face. In this paper, we have considered the interaction between the labor market and the system of taxes and transfers in effect in France in 1998 (with the exception of local taxes and local transfers). Still, the choice of the distribution of earnings to consider depends on the perspective (short or long term) and the hypothesis made on the origin of the differences in earnings between populations (heterogeneity or state dependence). Since RMI recipients tend to be very different from the population as a whole in terms of their reemployment labor earnings, we found it necessary to rely on a RMI-centered survey. But since the sorts of jobs to which RMI recipients can aspire tend to be rather particular, most notably due to the predominance of CES contracts, it is useful to complement this analysis so as to be able to provide a range of estimates within which the true gains to employment will likely be found.

This range is rather broad, in that somewhere between 74 and 89 percent of households would have a potential increase in disposable income associated with working. As a whole, this proportion seems high to us, and the levels of the gains are not negligeable *on average*, although a significant share faces small expected amounts. Yet, even small amounts could be significant for those who initially have very low income.[26] . But it is precisely for this reason that one must keep in mind that small changes, either in the levels of the transfers or in the simulated monthly earnings, can have a large impact on the results.

[26] Recall that our simulations exclude supplementary transfer income through the *interessement* mechanism, which would tend to generate positive gains in the short run even more frequently than we report here.

Furthermore, the earnings potential attainable by this population remains limited, mostly because of a preponderance of part time work. This explains another robust result: the type of households with the least to gain (or the most to lose, if we add in child care costs) from employment are those headed by single mothers. Their situation being fundamentally different from many other welfare recipients, a special transfer program destined specifically for single parents might be desirable, but its justification would be more in terms of demographic policy than employment policy. Nevertheless, the poverty in which some of these households find themselves is worrisome on its own.

To conclude, remember that our calculations of financial gains and losses associated with employment do not have a behavioral counterpart in terms of labor market activity per se, even less so when we consider the importance of labor demand in the decision process. As Laroque and Salanié (2000) have recently shown, some people will work in exchange for a large financial gain while others are willing to work even when doing so causes their disposable income to fall. Our estimates should in no way be interpreted as measures of incentive or disincentive effects inherent in France's system of taxes and transfers, since we do not discuss the behavioral responses to these incentives. Instead, we provide elements that are (hopefully) useful for advancing the public debate.

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Appendix: derivation of the likelihood function

It can be shown that

$$\widetilde{\varepsilon} = \frac{1}{\sigma_v^2\sigma_u^2 - (\sigma_{uv})^2}\left\{\left(\sigma_v^2\sigma_{u\varepsilon} - \sigma_{uv}\sigma_{v\varepsilon}\right)u + \left(\sigma_u^2\sigma_{v\varepsilon} - \sigma_{uv}\sigma_{u\varepsilon}\right)v\right\} + \varepsilon',$$

where ε' is the part of $\widetilde{\varepsilon}$ which is orthogonal to u and v.[27] It follows that

$$V(\varepsilon') = 1 - \frac{1}{\sigma_v^2\sigma_u^2 - (\sigma_{uv})^2}\left[\sigma_v^2\sigma_{u\varepsilon}^2 + \sigma_u^2\sigma_{v\varepsilon}^2 - 2\sigma_{u\varepsilon}\sigma_{v\varepsilon}\sigma_{uv}\right]$$

where we have imposed the normalization $V(\widetilde{\varepsilon}) = 1$. In what follows, it will be convenient (for the estimation) to rewrite the model in terms of correlation coefficients rather than variances, imposing the constraint that the correlations lie between -1 and 1 during the estimation. We denote the correlation coefficients ρ to which we assign the appropriate indices.

The contribution to the likelihood function for a person who is not working can be written

$$P(\widetilde{\varepsilon} \leq Z\gamma + X\gamma') = \Phi(Z\gamma + X\gamma')$$

where Φ is the cumulative distribution function for a standard normal and $\gamma' = (\gamma_x - \alpha_0\beta + \alpha_1\delta)$ is the identifiable parameter. Applying Bayes law, we can write the contribution to the likelihood for an individual employed in a job (w, h) as

$$P(\widetilde{\varepsilon} \geq Z\gamma + X\gamma' | \log w, \log h)\, f(\log w, \log h)$$

where $f(\log w, \log h)$ is the joint density of $\log w$ and $\log h$.

[27] One can write $\widetilde{\varepsilon} = au + bv + \varepsilon'$ and solve for the a and b which satisfy $cov(\widetilde{\varepsilon}, u) = cov(au + bv, u)$ and $cov(\widetilde{\varepsilon}, v) = cov(au + bv, v)$.

First, consider the conditional probability of employment:

$$\begin{aligned}
& P\left(\widetilde{\varepsilon} \geq Z\gamma + X\gamma' \middle| \log w, \log h\right) \\
= \; & P\left(\frac{1}{(1-\rho_{uv}^2)}\left(\left(\rho_{\widetilde{\varepsilon}u} - \rho_{uv}\rho_{\widetilde{\varepsilon}v}\right)\frac{u}{\sigma_u} + \left(\rho_{\widetilde{\varepsilon}v} - \rho_{uv}\rho_{\widetilde{\varepsilon}u}\right)\frac{v}{\sigma_v}\right)\right. \\
& \left. -2\alpha_2\left(X\delta\right)v + \varepsilon' \geq Z\gamma + X\gamma' + \alpha_2\left(X\delta\right)^2 \middle| \, u, v\right) \\
= \; & P\left(\varepsilon' \geq Z\gamma + X\gamma' + \alpha_2\left(X\delta\right)^2 + 2\alpha_2\left(X\delta\right)\left(\log h - X\delta\right)\right. \\
& \left. -\frac{1}{(1-\rho_{uv}^2)}\left\{\left(\rho_{\widetilde{\varepsilon}u} - \rho_{uv}\rho_{\widetilde{\varepsilon}v}\right)\frac{\left(\log w - X\beta\right)}{\sigma_u} + \left(\rho_{\widetilde{\varepsilon}v} - \rho_{uv}\rho_{\widetilde{\varepsilon}u}\right)\frac{\left(\log h - X\delta\right)}{\sigma_v}\right\}\right) \\
= \; & 1 - \Phi\left(\left[\frac{1}{\sqrt{V\left(\varepsilon'\right)}}\right]\left(Z\gamma + X\gamma' + \alpha_2\left(X\delta\right)^2 + 2\alpha_2\left(X\delta\right)\left(\log h - X\delta\right)\right.\right. \\
& \left.\left. -\frac{1}{(1-\rho_{uv}^2)}\left\{\left(\rho_{\widetilde{\varepsilon}u} - \rho_{uv}\rho_{\widetilde{\varepsilon}v}\right)\frac{\left(\log w - X\beta\right)}{\sigma_u} + \left(\rho_{\widetilde{\varepsilon}v} - \rho_{uv}\rho_{\widetilde{\varepsilon}u}\right)\frac{\left(\log h - X\delta\right)}{\sigma_v}\right\}\right)\right)
\end{aligned}$$

where the variance of ε' can be written, in terms of correlation coefficients, as

$$V\left(\varepsilon'\right) = 1 - \frac{1}{1-\rho_{uv}^2}\left(\rho_{\widetilde{\varepsilon}u}^2 + \rho_{\widetilde{\varepsilon}v}^2 - 2\rho_{\widetilde{\varepsilon}u}\rho_{\widetilde{\varepsilon}v}\rho_{uv}\right).$$

Finally, the joint distribution of wages and hours can be written as

$$f\left(\log w, \log h\right) = \frac{1}{2\pi\sigma_u\sigma_v\sqrt{1-\rho_{uv}^2}}$$

$$\times \exp\left(\frac{-1}{2\sqrt{1-\rho_{uv}^2}}\left(\frac{\left(\log w - X\beta\right)^2}{\sigma_u^2} + \frac{\left(\log h - X\delta\right)^2}{\sigma_v^2} - 2\rho_{uv}\frac{\left(\log w - X\beta\right)}{\sigma_u}\frac{\left(\log h - X\delta\right)}{\sigma_v}\right)\right).$$

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