Assessing Unemployment Traps in Belgium using Panel Data Sample Selection Models

Anna Cristina D'Addio[*], Isabelle De Greef[†] and Michael Rosholm[‡§]

May 31, 2002

Abstract

In this paper we investigate whether unemployment traps exist and are significant in the transition from unemployment into employment in Belgium. In order to assess them, we use panel data sample selection models. Specifically, we estimate by maximum likelihood techniques a parametric random effects model composed by a wage equation and a selection equation. For the empirical analysis, led separately on (unbalanced) samples of men and women, we exploited the data extracted from the 1993-1997 waves of the Panel Study of Belgian Households. We compute replacement rates for every individual in the sample by using the predicted wages obtained from the estimation of the wage equation corrected for sample selectivity. The estimation results suggest that the experience of long periods of unemployment in the past negatively affects both participation and earnings: Long unemployment spells are likely to have a "scarring" effect on subsequent earnings. Moreover, the computation of income ratios highlights the importance of unemployment traps for the women present in the sample. Indeed, their expected wage is often lower than their income while being unemployed. A significant proportion of the available samples (men and women) is shown to enter employment although this transition is accompanied by a substantial loss in their disposable income.

Keywords: Panel data sample selection models, wage equation, predicted wages, unemployment traps, scarring effect

JEL Classifications: C33, C34, J33

[*]CIM, Aarhus School of Business; Department of Economics, University of Aarhus; CERISIS, Université catholique de Louvain. Mailing address: Department of Economics, Building 326, University of Aarhus, DK-8000 Aarhus; Denmark. Phone number: +45-89422140; Fax: +45-86136334. e-mail: adaddio@econ.au.dk

[†]IRES, Université catholique de Louvain.e-mail: degreef@ires.ucl.ac.be

[‡]Department of Economics, University of Aarhus; CIM and IZA. e-mail: MRosholm@econ.au.dk

[§]The authors acknowledge financial support from the Marie Curie Fellowship Scheme of the European Commission (contract n. HPMF-CT-2000-00771) and from the Danish Research Agency. We are especially grateful to Bruno van der Linden and to the participants at the AFSE 2002 and the AEA Conference 2002. The usual disclaimer applies.

1 Introduction

The combination of unemployment benefits, high taxes on labour income, social contributions, and conditional transfers such as additional child benefits, may reduce the willingness of unemployed workers - especially the low-skilled - to find and/or to accept a job (OECD, 1996, 1999). Low returns associated with being employed rather than unemployed may affect the decision of moving into employment and thereby contribute to the persistence of unemployment. The situation in which households or individuals have no - financial and/or non-financial - incentives to leave unemployment for employment is termed an "unemployment trap". To assess whether unemployment traps exist and affect the transition into employment is particularly important for policy concerns, increasing the participation rate in the labour market being one of the priorities of most European countries.

The computation of the replacement rates, i.e. the ratios between the household/individual disposable income when employed and the household/individual disposable income when unemployed, is crucial to gather insights about the presence/absence of the mentioned traps. Obviously in computing this ratio, the assumptions made on the wages of the individuals that are out of work are crucial.

Two main approaches have been adopted in the study of financial unemployment traps. The first is based on representative households/individuals and

computes the replacement rates using specific assumptions (see e.g. OECD, 1996, 1997), while the second approach exploits real data and econometric techniques in doing so (see e.g. OECD, 2002; Pedersen and Smith, 2001; Kyyrä, 1999; Gurgand and Margolis, 2001; Gregg et al., 1999; Holm et al., 1999). Various studies have also focused on whether past unemployment experience has a *scarring* effect on subsequent earnings, a phenomenon which would contribute to the explanation of the existence of unemployment traps for individuals, some of whom have previously been successful in the labour market (see e.g. OECD, 2002; Arulampalam, 2000; Nickell et al., 1999; Jacobson et al., 1993; Ruhm, 1991; Stevens, 1997).

For Belgium, in which we are interested, most of the evidence on unemployment traps has been provided within the approach based on representative households (De Lathouwer and Bogaerts, 2001; De Lathouwer, 2000; Defeyt, 1998; Valenduc, 2001; De Greef, 2000). Despite the fact that this literature is undoubtedly useful since it provides a sort of benchmark by identifying those households/individuals that are more likely to be trapped, it is based on some *ad hoc* assumptions not necessarily satisfied in the reality. For this reason, among others, in our analysis we have adopted the approach based on real data.

In this article we investigate whether unemployment traps exist in the transition into employment in Belgium, exploiting the data extracted from the waves 3 to 7 (covering the years 1993-1997) of the Panel Study of Belgian Households (PSBH), about individuals who have experienced at least one spell of unemployment during the survey period. In leading our analysis, we specify and estimate

by maximum likelihood techniques a parametric panel data random effects model composed by a wage equation and a selection equation. The correction for the sample selection problem is meant to avoid a potential bias caused by unobserved heterogeneity that affects both the probability of being employed and the wage level: If the decision to work is affected by expected earnings, it is likely that individuals who are currently working have higher wages than those that would be earned by unemployed individuals. In that sense, the correction for potential selection bias (Heckman, 1979) accounts for the non-randomness of the selection process into employment since wages are observed only for those who are employed, i.e. those who have received job offers and for whom the offered wage exceeds the reservation wage.

Most of the empirical analyses on unemployment traps assume that the sample selection process is constant over time, and the argument crucial to this assumption is that fixed effect type estimators eliminate sample selection bias since they difference out both the unobserved individual-specific effect and the sample selection effect (see e.g. Jensen et al., 2002). Since there is no reason to believe that the sample selection process is time-invariant (unobservable time-varying variables may occur in both the selection equation and the equation of interest, and they may exhibit a complex correlation structure) we have used panel data estimation techniques and explicitly accounted for the sample selection problem in that framework.

Based on the estimations of the wage equations corrected for sample selectiv-

ity, we have computed expected wages and used them to calculate replacement rates for all individuals in the sample (including those that have not moved out of unemployment during the survey period). This allows us to compute an *observed* and an *estimated* income ratio as in Kyyrä (1999). While the observed income ratio is based on the observed wage earned by workers who move into work, the estimated one is based on the expected wage for workers who have not moved into employment.

The paper is organized as follows. Section 2 surveys some of the previous evidence on unemployment traps. Section 3 briefly outlines the Belgian tax system as well as its unemployment insurance scheme. Section 4 presents the econometric model applied. Section 5 describes the dataset; section 6 reports and discusses the estimation results. Some conclusions are drawn in section 7.

2 Previous Evidence on Unemployment Traps

Most of the evidence on unemployment traps has been provided within the approach using representative households/individuals (see e.g. OECD, 1997). Assuming the level of (potential) wages, this approach computes the change in the household/individual's disposable income associated with the transition from unemployment into employment, with the aim of identifying family/individual types with high probabilities of being financially trapped. This way of proceeding is relevant and rich on details. However it is based on specific, and somewhat arbitrary, assumptions concerning e.g. the hourly wage rate and the previous

length of unemployment. In addition, the unemployed are assumed to have a fully rational behavior, although this does not always correspond to the reality (e.g. due to a lack of knowledge of the rules of the tax and benefits systems) and their unobserved heterogeneity is not accounted for. Furthermore, commuting costs, additional intervention in health care and social housing which are likely to increase the occurrence of financial traps are frequently ignored in this literature.

Fewer studies have adopted the approach exploiting real data and econometric techniques owing mainly to the lack of appropriate data on earnings as well as to some methodological problems. A majority of those studies have focused on the earning losses associated with the experience of unemployment (e.g. Arulampalam, 2000)[1]; only a small number of authors have investigated how the transition into employment is affected by unemployment compensation schemes (e.g. Gurgand and Margolis, 2001; Pedersen and Smith, 2001; Kyyrä, 1999). A large part of this literature has conventionally assumed that the wages of workers who have experienced an unemployment spell are equal to those earned by employed individuals with the same observable characteristics (see Layard et al., 1991). In this approach, expected wages of individuals who are currently out of work are either estimated or derived from the surveys' questionnaire and therefore are not "arbitrarily" assumed. Some studies have used the wage earned in the

[1] See also Laurent (2001); Pedersen and Westergard-Nielsen (1993). For the literature on displaced workers see e.g. Fallick (1996); Kletzer (1998).

last job prior to unemployment. Others have exploited the unemployed workers' own expectations about the wages they would get in a future job (Pedersen and Smith, 2001), or the average wage obtained by people who are employed. Some are based on the expected wage adjusted for selectivity, on the wage obtained by workers after an unemployment experience (post-unemployment wages), and finally, some are based on post-unemployment wages corrected for sample selection bias in a cross sectional framework (Kyyrä, 1999; Holm et al., 1999).

Three important results should be emphasized on the grounds of the studies mentioned above. First, some transitions from unemployment to employment are associated with a decrease or only a modest increase of the disposable income. Second, unemployed workers get re-employed at lower wages than the ones they enjoyed in their previous job. Third, the wage losses suffered by workers that have experienced a period of unemployment are persistent; the average wage rate tends to remain below the expected average wage rate without job loss for several years after the unemployment spell.

For Belgium, more particularly the main results can be summarized as follows: Single-parent families and some households with only one source of income are more exposed to unemployment traps than others types of households (De Lathouwer and Bogaerts, 2001; De Lathouwer, 2000; Defeyt, 1998; Valenduc, 2001; De Greef, 2000).

There are several ways to explain why it may be meaningful in some cases to accept a job associated with negative short-term financial returns. Unemployed

may give a very large importance to the intertemporal perspectives; they are likely to expect higher wages in the future (promising career prospects) or to anticipate falling unemployment benefits simultaneously with a depressing effect of long unemployment periods on the post-unemployment wage. Some individuals may even be willing to accept a job that is associated with long-term income losses if they enjoy working or if they simply feel "ashamed" about being unemployed.

Furthermore, theory suggests several reasons for why a period of unemployment may be followed by wage losses. The first one concerns job tenure; jobs associated with post-unemployment wages are by definition short-tenure at the time at which one observes them (no tenure effect). Lower post-unemployment wages may also result from a deterioration of skills or a loss of firm-specific (or sector-specific) human capital which is not transferable to a new job. A reduction in the post-unemployment wages may also be caused by a lower quality of the job match between the worker and the firm. Further, a decrease in the reservation wage over time can lead to acceptance of a job with a lower wage. The decline of the reservation wage can be justified for instance by a (expected) decrease in the level of unemployment benefits, (e.g. see Van den Berg, 1990). Finally employers may rank workers on the grounds or their employment/unemployment experience.

3 Unemployment insurance and Tax schemes in Belgium during the nineties

Different studies have shown how important and persistent the problem of unemployment is in Belgium. Besides arguments about the structural nature of the problem, the features of the existing tax scheme are likely to make people less willing to accept jobs. Furthermore, the sudden removal of conditional transfers (such as additional child benefits) occurring when moving into employment reduces work incentives, especially so for temporary jobs. Since January 2000 some measures have been taken up in order to make work more attractive. However the data used in this study covers the years 1993-1997, therefore we describe both the unemployment insurance scheme and the tax system prevailing over that period. All the amounts reported in this section concerns the year 1997.

3.1 Unemployment Insurance Scheme

The Belgian unemployment insurance scheme is characterized by a generous level of benefits (see De Lathouwer and Bogaerts, 2001; De Lathouwer, 2000), especially for persons with low incomes, and by an indefinite entitlement period. The payment of unemployment benefits may however be suspended for unemployed people who live with a working partner or their parents (referred to as "cohabitants") depending on various conditions (see De Greef, 2000). Moreover, all unemployed people may be sanctioned for a wide range of reasons e.g. adminis-

trative reasons, unavailability to take on jobs and the like (see Grubb and Martin, 2001; OECD, 1997).

In order to be eligible for unemployment benefits, a workers must have been employed for a relatively long period. The length of the required employment period depends on the age of the worker; for instance, on the first day of unemployment, individuals aged less than 36 must have been employed for 312 days during the latest 18 months. To receive unemployment benefits unemployment should be involuntary, the worker should be available for and actively seeking employment. Moreover, the entitlement to unemployment benefits depends on schooling curricula and on the receipt of unemployment benefits in the past.

The level of unemployment benefits depends on four characteristics: the composition of the household, the length of unemployment, the age, and the previous wage. Since 1987, unemployed have had the opportunity to increase the amount of benefits by working for an *Agence locale pour l'emploi* (Local Agency for Employment) with a maximum of 45 hours per month and they receive 3.72 euros for each hour worked. With some exceptions, people working for these agencies are registered as unemployed.

Concerning household composition, three categories are identified; heads of household, singles, and cohabitants. Heads of household are entitled to a high level of benefits, singles are qualified to a medium level of benefits, and cohabitants receive the lowest level of unemployment benefits. In addition, the amount of the unemployment benefits is constant over time for the heads of household

(60% of the previous wage) while it decreases for singles (from 60 % the first year to 42 % the second year) and for cohabitants (from 55 % the first year to 35 % the first quarter of the second year and to a lump sum the second quarter of the second year). However, if a cohabitant has been employed for more than 20 years, he/she benefits indefinitely of the second period compensation (35% of the previous wage).

The amount of unemployment benefits depends on previous labour earnings but it is upwards and downwards bounded; e.g. for heads of household they are set between a maximum of 864.9 euros and a minimum of 759.3 euros.

Finally, the level of benefits depends on the age. Unemployed individuals aged more than 50 receive an additional amount. This supplement, conditional on having worked more than 20 years, varies with the household type and the age of the individual.

3.2 The tax system

The tax system consists of social security contributions and a progressive income tax. Social security contributions paid by the employees correspond to 13.07 per cent of gross earnings. Spouses are taxed separately. However, if they have no labour income or if the labour income of one of the spouses is less than 30 per cent of the household's labour earnings, 30 per cent of the net household labour income (minus the labour income of the spouse) is attributed to the partner. The amount that may be fictionally transferred to the spouse with low or no labour

income is limited to a maximum of 7,362.4 euros.

Several tax allowances exist in the Belgian tax scheme. Each individual is granted a personal income exemption which depends on household's composition. The other main tax allowances are related to the number of children, child care costs, work related expenses. The amount of the tax exemption is higher for replacement incomes (e.g. pensions, unemployment benefits) than for labour earnings. Table 1 details the tax schedule prevailing in Belgium in 1997. An additional local income tax is levied on taxable income at an average rate of 7 per cent.

[Table 1 to be inserted here]

4 Methodology

The selection process into employment may be non-random. If not adequately controlled for, sample selectivity may bias the parameters of interest.

Despite the greater complexity of the methodology to be applied, the panel structure of the data needs to be accounted for when dealing with sample selection. In general, two main approaches have been followed in the development of panel data sample selection model estimators; two-step estimators following the idea of Heckman (1979)[2], and maximum likelihood estimators. We have chosen

[2]Two step estimators are not quite suited to our present purposes; either they are of the fixed effect type (e.g. Kyriazidou, 1997), or the correlation structure of the error components is specificed *ad hoc* (e.g. Wooldridge, 1995; Verbeek and Nijman, 1996; Vella and Verbeek, 1999).

the latter. Further, although one can choose between a random and a fixed approach, in this study we prefer the random effects approach. In the fixed effect approach, time-invariant covariates are absorbed in the fixed effects and therefore cannot be used to gather insights into the factors determining wages.

The model we consider can be formulated as follows:

$$y_{it}^* = x_{it}'\beta + \alpha_i + \varepsilon_{it} \quad (1)$$

$$d_{it}^* = z_{it}'\gamma + \eta_i + v_{it} \quad (2)$$

$$d_{it} = 1 \text{ if } d_{it}^* > 0,\ 0 \text{ otherwise} \quad (3)$$

$$y_{it} = y_{it}^* \cdot d_{it}, \quad (4)$$

where i $(i = 1, ..., N)$ denotes the individual and t $(t = 1, ..., T)$ denotes the time period; d_{it} is an indicator for having an observed wage, y_{it} denotes the log of the observed wage, x_{it} and z_{it} are vectors of explanatory variables, possibly with common elements, and definitely with an exclusion restriction. The equation of interest is (1) and the selection process is described by (2). β and γ are the unknown parameter vectors to estimate. The α_i and η_i are unobservable time-invariant individual-specific components which are possibly correlated with each other. Finally, ε_{it} and v_{it} are unobserved disturbances, possibly correlated with each other. The variable y_{it}^* is observed only if the indicator variable $d_{it} = 1$, that is, if the person i is employed in period t.

Jensen et al. (2002) contains a survey of avaiable panel data sample selection estimators.

Since we estimated (1) and (2) simultaneously by maximum likelihood, we had to specify the joint distribution of the error components ε_{it} and v_{it}. Specifically, we assumed that the idiosyncratic error terms follow a bivariate normal distribution

$$(\varepsilon_{it}, v_{it}) \sim N(0, 0, \Sigma), \text{where} \, \Sigma = \begin{bmatrix} \sigma_{\varepsilon}^2 & \rho\sigma_{\varepsilon} \\ \rho\sigma_{\varepsilon} & 1 \end{bmatrix} \tag{5}$$

Let $\theta = [\beta, \gamma, \sigma_{\varepsilon}, \rho, p, \alpha, \eta]$ denote the parameter vector. The likelihood of a single observation, conditional on the random effects is then

$$\begin{aligned} L_{it}(\theta) &= f(\varepsilon_{it}, v_{it} | \alpha_i, \eta_i, x_{it}, z_{it}) \qquad (6) \\ &= \left[\left(1 - \Phi_{v|\varepsilon}(-z_{it}'\gamma - \eta_i | y_{it} - x_{it}'\beta - \alpha_i) \right) \cdot \phi_{\varepsilon}(y_{it} - x_{it}'\beta - \alpha_i) \right]^{c_{it} \cdot d_{it}} \\ &\quad \cdot \left[\Phi_v(z_{it}'\gamma + \eta_i) \right]^{(1-c_{it}) \cdot d_{it}} \cdot \left[\Phi_v(-z_{it}'\gamma - \eta_i) \right]^{1-d_{it}}, \end{aligned}$$

where the conditional distribution $v|\varepsilon \tilde{} \, N\left(\frac{\rho\varepsilon}{\sigma_{\varepsilon}}, (1-\rho^2)\right)$; Φ and ϕ are the standard normal distribution and probability density function respectively for the variables referred by subscripts. The random effects are assumed to follow a bivariate discrete distribution with 2×2 points of support, and we assume independence between idiosyncratic errors and random effects. c_{it} is an indicator taking the value 1 if the wage is observed for an individual who finds employment (in some cases, it is not, see section 5).

Let $\alpha = \{\alpha_1, \alpha_2\}$, $\eta = \{\eta_1, \eta_2\}$, $p = \{p_{11}, p_{12}, p_{21}, p_{22}\}$, where $p_{kj} = \Pr[\eta_k, \alpha_j]$.

For a single individual, the likelihood contribution is then

$$\begin{aligned} L_i(\theta) &= \int_{-\infty}^{\infty}\int_{-\infty}^{\infty}\left[\prod_{t=1}^{T_i} f(\varepsilon_{it}, v_{it}|x_{it}, z_{it}, \eta_i, \alpha_i)\right] dG(\eta_i, \alpha_i) \qquad (7) \\ &= \sum_{j=1}^{2}\sum_{k=1}^{2} p_{kj}\prod_{t=1}^{T_i} f(\varepsilon_{it}, v_{it}|x_{it}, z_{it}, \eta_k, \alpha_j) \end{aligned}$$

where $G(\cdot)$ is the joint CDF of the random effects.

In order to be able to compute the income ratio for each individual in the sample (i.e. also for the individuals who never find employment) we compute the expected log wages as in Husted et al. (2001a,b).

Conditional on the entire path of participation indicators, the expected log wage for an individual is (see Husted et al., 2001a,b)

$$\begin{aligned} & E\left[y_{it}|d_{i1}, ..., d_{iT_i}, \mathbf{x}_{it}, \mathbf{z}_{i1}, ..., \mathbf{z}_{iT_i}\right] \qquad (8) \\ = \; & \mathbf{x}_{it}\boldsymbol{\beta} + E\left(\alpha_i|d_{i1}, ..., d_{iT_i}, \mathbf{z}_{i1}, ..., \mathbf{z}_{iT_i}\right) + E\left(\varepsilon_{it}|d_{it}, \mathbf{z}_{it}\right) \end{aligned}$$

where T_i is the maximum number of time periods over which an individual is observed. The expected values of the error components of the wage equation are

$$E\left(\alpha_i|d_{i1}, ..., d_{iT_i}, \mathbf{z}_{i1}, ..., \mathbf{z}_{iT_i}\right) = \sum_{j=1}^{2}\alpha_j q_{ji}^{\alpha} \qquad (9)$$

$$E\left(\varepsilon_{it}|d_{it}=1, \mathbf{z}_{it}\right) = \rho\sigma_{\varepsilon}\sum_{k=1}^{2} q_{kit}^{\eta}\frac{\phi(\mathbf{z}_{it}\gamma+\eta_k)}{\Phi(\mathbf{z}_{it}\gamma+\eta_k)} \qquad (10)$$

$$E\left(\varepsilon_{it}|d_{it}=0, \mathbf{z}_{it}\right) = -\rho\sigma_{\varepsilon}\sum_{k=1}^{2} q_{kit}^{\eta}\frac{\phi(\mathbf{z}_{it}\gamma+\eta_k)}{1-\Phi(\mathbf{z}_{it}\gamma+\eta_k)} \qquad (11)$$

The term q_{ji}^{α} denotes the parameters of the individual specific probabilities of

α_i. Its expression is

$$q_{ji}^{\alpha} = \frac{\sum_{k=1}^{2} p_{kj} \prod_{t=1}^{T_i} \left[\Phi \left(\mathbf{z}_{it}\gamma + \eta_k \right)^{d_{it}} \left[1 - \Phi(\mathbf{z}_{it}\gamma + \eta_k) \right]^{1-d_{it}} \right]}{\sum_{l=1}^{2} \left[\left(p_{l1} + p_{l2} \right) \prod_{t=1}^{T_i} \left[\Phi \left(\mathbf{z}_{it}\gamma + \eta_l \right)^{d_{it}} \left[1 - \Phi(\mathbf{z}_{it}\gamma + \eta_l) \right]^{1-d_{it}} \right] \right]} \tag{12}$$

and q_{kit}^{η} denotes the parameters of the individual and time specific probability of η_i

$$q_{kit}^{\eta} = \frac{\sum_{j=1}^{2} p_{kj} \Phi \left(\mathbf{z}_{it}\gamma + \eta_k \right)}{\sum_{j=1}^{2} \left[\left(p_{1j} \Phi \left(\mathbf{z}_{it}\gamma + \eta_1 \right) + p_{2j} \Phi(\mathbf{z}_{it}\gamma + \eta_2) \right] \right.} \tag{13}$$

5 Data

5.1 The sample

The empirical analysis is based on the Panel Study of Belgian Households (PSBH). This survey was carried out for the first time in the spring of 1992 (wave 1). Since the questions about incomes and the employment status have been modified from 1994 onwards, we considered the waves 3 to 7 (spring 1994 to spring 1998) that contain information about 9,398 individuals aged at least 16, as both the questions concerning income and the definition of employment have been modified from 1994 onwards. The information we use is retrospective, therefore the analysis covers the years 1993 to 1997.

At each survey date, individuals report their labour market status at that time and for each of the preceding twelve months. They also declare (if they work) their annual income for the previous year net of taxes and social contributions.

The sample used in this study consists of individuals who have experienced at least one unemployment spell. They are followed from that moment until the

end of the observation period. The sample thus consists of both unemployed individuals having moved towards employment, and unemployed persons who remain unemployed throughout the observed period. Individuals who moved from unemployment into self-employment have been excluded from the analysis. The reason for discarding those individuals resides mainly in the fact that for them it is difficult to distinguish the wage from profits.

1,338 persons have been unemployed at least once during the observation period experiencing 1,948 unemployment spells. We focus only on those spells involving unemployment benefits payment (1,661). Half of the unemployment spells end with a transition into employment (paid work and self-employment); 35% of the unemployment spells are right-censored. The 12 % of the unemployment spells which end with a transition into non-participation (retirement, housekeepers and students) and the 3 % ending in a so-called "other activity" have been discarded. After that, our sample consists of 1,341 spells of unemployment, experienced by 959 individuals. We will use separate samples for men (601 spells) and women (740 spells). The sample is unbalanced and individuals are observed from one to five times.

5.2 The dependent variables

The dependent variables are an employment indicator and the individuals' monthly net (log)-wage.

The employment indicator takes a value of 1 if the individual moves from

compensated unemployment into paid work in a given year, and it is 0 if the individual remains unemployed in that year. To be considered as employed in the PSBH, people have to work at least 15 hours per week. To determine this status, we have used the hours actually worked since labour income covers also extra-hours worked.

The dependent variable of the wage equation is the (log) monthly net wage including tips, commissions, bonus and holiday earnings that we deflated by the consumer price index (base 1997). Its introduction is justified here in the context of labour supply theory (see D'Addio and De Greef, 2001).

At each survey date the interviewed individuals report wages net of taxes and social contributions. However, for 25 % of the unemployment spells which ended with a transition into employment, the information concerning the wages is missing. This problem is accounted for in the estimation procedure (see section 4). For each of the five waves, we use the number of months in which the individual is unemployed or employed to compute the monthly in-work and out-of-work income. Monthly wages are then computed by dividing annual salaries by the number of months worked[3]. This computation does not allow us to separate the wages associated with different jobs when the worker has been employed in more than one job during a year.

[3]The same methodology is applied for unemployment benefits.

5.3 The explanatory variables

Broadly speaking, only human capital and work-related variables (i.e. experience and its square, educational attainments, a part-time indicator, a supervision-tasks indicator, an indicator of previous professional experience) have been used in the wage equation. In order to capture the effects of financial (and to some extent non-financial) incentives, many other variables appear in the selection equation. Tables 2 and 3 present descriptive statistics for available samples of men and women.

[Tables 2-3 to be inserted here]

We start with the description of the variables used in the wage equation.

Experience refers to "potential" work experience and it is computed as the difference between the age at the survey date and the age when the individual left school. We also introduced its quadratic form to capture concavity in the experience-wage profiles as postulated by human capital theory. Another variable indicates whether the individual had any actual work experience in the past. Further, to capture the level of responsibility associated with previous job-experience we have introduced an indicator taking on the value 1 if the individual has never supervised other workers in the past.

To verify whether the experience of previous long unemployment spells has a "scarring" effect on subsequent earnings, we have included an indicator taking the value of 1 if the individual has been unemployed for more than twelve months

at the start of the year t

We have used an indicator for part-time employment, which is a striking feature in female labour market participation: for women 31.5 per cent of the transitions from unemployment into employment are made in the form of part-time jobs; for men only 7 per cent of the transitions from unemployment into employment are into part-time jobs.

Education is introduced in our specification through a set of indicators for the highest level of formal education attained. Five educational levels are considered; primary school or without education (the reference), lower secondary school (3 years after primary school), upper secondary school (6 years after primary school), high school (2 to 4 years after the secondary school) and university.

Other variables commonly thought to have an effect on wages such as type of job, sector of the firm, firm size and union coverage have not been introduced mainly owing to the lack of information about them in the available dataset.

Besides the individual's age, its square, educational attainments and the long-term unemployment indicator, the following additional variables are used in the selection equation.

Two variables account for the health of the individuals. While the first states their degree of physical health, the second refers to individuals' mental distress (see De Greef, 2000).

A measure of social involvement (see Sweeney, 1998) is used to differentiate people socially active from the others. Individuals are ranked as socially active if

they are member of an association (e.g. a sport club, a cultural or a humanitarian association) or if they have a very active network of friends.

To measure the effect of additional public financial support received when unemployed, a dummy variable has been introduced. It takes the value of one if the unemployed or his household is granted e.g. social housing with low rent or food-stamps.

Three variables related to pecuniary difficulties have been used. First, a dummy indicates if the individual, or another member of his/her household, is in debt (excluding mortgage loans). A second dummy takes the value 1 if the person has any financial difficulties in paying bills related to e.g. rent, heating etc. The third dummy is equal to 1 if the person is unsatisfied about his financial situation.

A home ownership dummy indicates whether the individual owns the accomodation he/she is living in.

Some variables are included to account for household composition. These are the number of children, the presence of children aged less than three, being married, being a single parent, not being head of the household, and being entitled to additional child benefits. The variable for nationality indicates Belgian nationality. Finally, we have introduced a dummy stating whether the individual lives in Flanders.

6 Estimation results

6.1 Wage and Selection equation

The estimation of (1) and (2) simultaneously by maximum likelihood on the samples of men and women gives the results reported in Tables 4 to 6. In order to test their robustness, we also estimated an ordinary random effects probit model of the selection equation and a random effects (GLS) wage equation. These results are available on request, and they show that most of the parameter estimates are very robust across the two different specifications. The main gain from the panel data sample selection model thus consists in the modelling of the correlation structures in the error components, which are used in the calculation of expected wages.

[Tables 4, 5 and 6 to be inserted here]

Observing the results, we first notice some significant differences in the behaviour of males and females. Moreover sample selectivity seems to affect women more than men. These issues are discussed further below.

Considering the selection equation results, we notice that previous long term unemployment status reduces dramatically the transition probability into employment for both men and women. Not being the household head is also associated with a much lower transition probability into employment for both samples, while being married leads to an higher transition probability for women.

Moreover, for women eligibility to additional child benefits strongly reduces the transition probability. Male homeowners have higher transition probabilities, but their transition probability is reduced the more children they have. Bad health is also an important hindrance to finding employment for men, but apparently not for women. University education is associated with better employment prospects for women, while for men this is true for most education beyond primary school.

In summary, many variables associated with financial incentives were highly important in the transition from unemployment to employment, particularly for women.

Let us turn now to the wage equation results. For both sub-samples, the experience of long-term unemployment in the past has a significant negative effect on earnings prospects, through lowering the post-unemployment (log) wage. Similar results have been found by Gregory and Jukes (1997) and Nickell et al. (1999) who point at the fact that in the UK, long unemployment spells are associated with larger wage losses (see also for converse evidence Arulampalam, 2000).

For women, the best earnings prospects are associated with the highest educational attainments while for men the educational level does not seem to affect the wage very much. Women having exerted some supervision tasks in the past have also a comparative advantage.

Potential work experience improve considerably the earnings prospects of unemployed individuals. As suggested by human capital theory, the significance of the quadratic term of work experience confirms concave experience-wage profiles

for both samples.

Let us turn now to the issue of sample selection. We notice from table 6 that the correlation coefficient of the idiosyncratic error terms is significantly different from 0 (and positive) only for women. Moreover, for them the probabilities associated with the support points of the random effects are significant, while for men they are not (only one of them is). This suggests that the sample selection issue is particularly important for women. The significant correlation coefficient and its positive sign is consistent with good economic sense; those who find wage offers relatively high with respect to their characteristics are also more likely to be hired.

To summarize the overall results, we notice that previous long term unemployment experience has a negative and significant impact for the two samples considered; it reduces individuals' probability of moving into employment and it lowers the earnings prospects. The hypothesis concerning the depreciation of human capital during unemployment is thus confirmed in our study; long-term unemployment is likely to have a *scarring* effect on subsequent earnings.

The results suggest also that more experienced workers earn higher wages and that workers holding higher qualification levels perform better in terms of earnings compared to those holding only a basic educational level.

Let us turn now to the discussion about unemployment traps.

6.2 Estimated and observed income ratios

In order to evaluate whether unemployment traps affect the transition into employment for the available sample, we have computed three different income ratios, in the spirit of Kyyrä (1999). The key tool in computing them is the wage that is however observed only for those that move into work.

To be able to compute the income ratios also for the individuals who either have been unemployed for the entire survey period (i.e. those we term "fictionally" employed) or have not reported the wage at the date of the interview, we have used the expected wage calculated on the basis of (8) in section 4. For individuals moving into work we used both the observed (OW) and the expected (EW) wage.

In Table 7, we present the mean of the different wages used in the computation of the income ratios. Three mean wages have been calculated for those who find jobs. These are (a) the mean observed wages; (b) the mean expected wage; (c) and the mean expected wage for those with a missing wage observation. For those who do not move into work, we could only compute the mean expected wage.

[*Table* 7 to be inserted here]

The mean predicted wage is very similar to the mean observed one. However, those who do not have an observed wage have a considerably lower mean expected wage than the overall mean. This holds for both men and women, but the difference is larger for women. Furthermore, those who do not find jobs have

expected wages that are on average 9 per cent below the expected wages of those that do find employment for men. For women this difference is 21 per cent. In addition, there are remarkable differences between men and women. In fact, the wages earned by women who manage to obtain employment are 22 per cent lower than those of men.

In computing the three different income ratios the numerator is the individuals' disposable income when employed (obtained by summing up the wages and other non-related work incomes, NWI) and the denominator is the individuals' disposable income when unemployed (derived by summing up the unemployment benefits, UB, and other non-work related incomes, NWI). For those observations having missing unemployment benefits we estimated their amount (251 spells). Since we don't know the wage earned in the last job prior to employment, this estimation is based only on three components out of four, i.e. age, unemployment duration and household composition. In the ratios below we imputed the maximum and minimum unemployment benefit. Since the results are very similar in both cases we decided to report those obtained with the maximum imputation. The others are available on request.

The income ratios computed are (1) an observed income ratio (OIR) which can only be computed for the individuals that move into jobs during the observation period and who have an observed wage,

$$OIR = \frac{NWI + OW}{NWI + UB} \tag{14}$$

(2) an estimated income ratio (EIR_1) calculated imputing the expected wage to the entire sample

$$EIR\_1 = \frac{NWI + EW}{NWI + UB} \tag{15}$$

and (3) a combination of both of them (EIR_2): for those who find employment and have an observed wage we used the observed wage and for the remainder of the sample we use the expected wage. It writes as

$$EIR\_2 = \frac{NWI + OW \cdot \mathbb{I}_{\{\text{found job and wage is observed}\}} + EW \cdot \mathbb{I}_{\{\text{did not find job or no observed wage}\}}}{NWI + UB} \tag{16}$$

Since disposable income is likely to vary with household composition, we have subsequently classified the households in five categories. We have distinguished between (1) singles; (2) couples, i.e. those living with a partner and without children below 6; (3) Couples with young children, i.e. those living with a partner and having at least one child aged less than 6; (4) single parents with old children, i.e. individuals living alone with children aged more than 6; (5) single parents with young children, i.e. individuals living without a partner and having at least one child aged less than 6.

The presence of unemployment traps is revealed by an income ratio smaller than 1. When the ratio equals 1 individuals are likely to choose between working and not working on the basis of their preferences for leisure, the social network associated with employment etc. When the ratio is above 1 individuals have a financial incentive to move into work. Obviously according to the value that a

person gives to the fact of having a job, different scenarios may appear.

We have summarized the results obtained when each of the previous ratios is smaller or equal to 1 in tables 8-10.

[Tables 8,9 and 10 to be inserted here]

From Table 8 reporting the ratio lower or equal to 1 for those that move into employment (i.e. the OIR), we learn that 4.17 per cent of men and 12.95 per cent of women who have accepted employment experienced a reduction in their disposable income. There is not much variation in the ratio across household types, but we remark that 19 per cent of women having experienced long-term unemployment in the past accepts a reduction in their disposable income when moving to employment compared to only 4 per cent of the men. It is also interesting to notice from Table 11 below (reporting the CDF of estimated and observed income ratios for the different samples), that 24 per cent of the employed women accepts either this reduction or less than a 20 percent increase in their disposable income. For men, this issue is less important, but still, for almost 13 per cent of them the gain is relatively small.

[Table11 to be inserted here]

When considering Table 9, reporting EIR_1, we observe that for almost 3 per cent of the men, and for more than 22 per cent of the women, finding employment is or will be associated with a financial loss. This situation is even

worse for single women with children aged less than six (49 per cent) and for those having experienced a long unemployment spell in the past (30 per cent). From Table 11, observe that 14 per cent of all men and 37 per cent of all women in the sample would gain less than 20 percent, should they find employment. The numbers for the combined income ratio EIR_2 in Table 10 are very close to those in Table 9.

In Table 12 we summarize the results for those who have been unemployed throughout the survey period.

[*Table* 12 to be inserted here]

We remark that 5.5 per cent of the men and 28 per cent of the women would have no immediate financial incentive to move into work since this transition would be associated with a considerable reduction in the disposable income. Single men (8 per cent), and couples with children (13 per cent) are those more exposed to the risk of these traps**.** Women having experienced long-term unemployment are very likely to have no incentives to accepts jobs since the wages they would earn will be lowered by the negative influence of their previous carrier and this confirms once again the importance of the previous history on the labour market for this population. Note also from Table 11 that 38 per cent of the women who do not find jobs would gain less than 20 per cent should they accept employment.

Finally in table 13 we report the mean estimated and observed income ratios

for those individuals having moved into employment (and having reported the wage) during the observation period.

[*Table* 13 to be inserted here]

7 Conclusion

In this paper we investigated whether unemployment traps affect the transition into employment of Belgian individuals interviewed in the waves 3 to 7 of the Panel Study of Belgian Households. To this end, we have estimated their post-unemployment wage and a selection equation (for finding employment) using a panel data sample selection model. Specifically we have adopted a parametric random effects model specification that has been estimated simultaneously by maximum likelihoods techniques on (unbalanced) samples of men and women. We have then used these estimates to predict wages for all individuals in our sample, and subsequently calculate income ratios, i.e. the ratios between income as employed and as unemployed, which are useful to detect the presence (absence) of financial traps.

Although significant differences appear between men and women, a common striking factor affecting both their wage levels and their participation decisions is the experience of long periods of unemployment in the past: long-term unemployed people have higher difficulties in (re-)integrating into the labour market and they obtain lower salaries when they succeed in finding jobs. Still, more

experienced workers have the best earning prospects on the labour market. Nevertheless for better educated women, who participate more and earn more compared to those holding a basic educational level, the wages offered are always lower than those offered to men, *ceteris paribus.*

The problem of sample selection seems to be particularly important for women, suggesting that, for this population, the transition back into work is highly selective. Furthermore, the computation of the observed income ratio suggests that a high proportion of their transitions into work are associated with important financial losses, while for men this appears to be an unimportant problem. This finding is confirmed by the estimated income ratio computed either for all the individuals present in the sample and for those "fictionally" employed. Especially for the latter, our analysis shows that 6 per cent of men and 28 per cent of women are "trapped" financially in the unemployment state since the their transition into work would be accompanied by a substantial reduction in their disposable income. This is particularly true for single women with children aged less than 6. The fact of having had a long-term unemployment experience in the past worsens the picture: almost 31 per cent of the women and 7 percent of the men who did not find jobs and who have experienced past long-term unemployment are likely not to have incentives to accept jobs.

The results of our analysis leads different considerations. First, since long-term unemployment significantly (and negatively) affects both the earnings and the participation decisions, policies oriented in preventing people from becom-

ing long-term unemployed could have as a consequence an improvement in the incentives these people have to enter the labour market and eventually to lower unemployment itself. Second, since experience matters significantly, it would be possible to increase the propensity of people to participate in the labour market by making them more experienced, even through temporary jobs which interrupt unemployment and allows them to accumulate general human capital. Third, as the transition into work is very frequently associated with a loss or a very small increase in the disposable income, and this especially for women, the value given to the fact of having a job seems to matter heavily for this population. Finally, the fact that women are granted lower wages on the labour market and are those more at risk to be "trapped" in the unemployment state, is very important for policy concerns. Increasing the employment of women through the design of incentives schemes (like those linked to child care) could indeed contribute to alleviating their labour market problems and to lowering the overall unemployment rate. Moreover, general abandonment of the right to eternal unemployment benefits, or a more dramatic time-variation in unemployment benefits could help in providing the right incentives to take employment, as could the abandonment of the right to "unemployment-state-specific" additional support.

References

Arulampalam, W., 2000. Is unemployment really scarring? effects of unemployment experience on wages, IZA Discussion Paper n.189.

D'Addio, A. C., De Greef, I., 2001. Un modèle d'offre de travail pour l'étude des incitants financiers liés à la transition chômage-emploi pour la Belgique, Université catholique de Louvain, Belgique.

De Greef, I., 2000. Les pièges financiers en belgique. Aperçu de la législation du chômage, des spécificités institutionnelles et études de cas types. Revue Belge de Sécurité Sociale June.

De Lathouwer, L., 2000. Les pièges à l'emploi en Belgique, CSB-Berichten, Antwerpen.

De Lathouwer, L., Bogaerts, K., 2001. Financiële incentieven en laagbetaald werk. de impact van hervormingen in de sociale zekerheid en de fiscaliteit op de werkloosheidsval in België, CSB-Berichten, Antwerpen.

Defeyt, P., 1998. Lutter contre les pièges financiers: Analyse et propositions, Institut pour un Dèveloppement durable, Belgique.

Fallick, B., 1996. A review of the recent empirical literature on displaced workers. Industrial and Labour Relations Review October, 142–155.

Gregg, P., Johnson, P., Reed, H., 1999. Entering work and the british tax and benefit system, Institute for Fiscal Studies, London.

Gregory, M., Jukes, R., 1997. The effects of unemployment on subsequent earnings: A study of British men 1984-1994, CEPR, Discussion Paper n. 21.

Grubb, D., Martin, J. P., 2001. What works and for whom: a review of OECD countries experiences with active labour market policies, Working Paper nř 2001-14, IFAU, OECD, Paris.

Gurgand, M., Margolis, D., 2001. Rmi et revenus du travail: une évaluation des gains financiers à l'emploi. Economie et Statistique 6/7, 346–347.

Heckman, J., 1979. Sample selection bias as a specification error. Econometrica 47, 153–161.

Holm, P., Kyyrä, T., Rantala, J., 1999. Household economic incentives, the unemployment trap and the probability of finding a job. International Tax and Public Finance 6(3), 361–378.

Husted, L., Nielsen, H., Rosholm, M., Smith, N., 2001a. Qualifications, discrimination, or assimilation? An extended framework for analyzing immigrant wage gaps, IZA Discussion Paper n. 365, Bonn.

Husted, L., Nielsen, H. S., Rosholm, M., Smith, N., 2001b. Employment and wage assimilation of male first-generation immigrants in Denmark. International Journal of Manpower 22(1/2), 39–68.

Jacobson, L. S., Lalonde, R. J., Sullivan, D. G., 1993. Earnings losses of displaced workers. American Economic Review 83, 685–709.

Jensen, P., Rosholm, M., Verner, M., 2002. A comparison of different estimators for panel data sample selection models, Working Paper 2002-1, University of Aarhus, Denmark.

Kletzer, L., 1998. Job displacement. The Journal of Economic Perspectives 12, 115–136.

Kyriazidou, E., 1997. Estimation of a panel data sample selection model. Econometrica 65, 1335–1364.

Kyyrä, T., 1999. Post-unemployment wages and economic incentives to exit from unemployment, Valtion Taloudellinen Tuktimuskeskus Research Report n.56, Helsinki.

Laurent, S., 2001. Capital humain, emploi et salaire en Belgique et ses régions, Quatorzième Congrès des Economistes Belges de Langue Française, Liège.

Layard, R., Nickell, S., Jackman, R., 1991. Unemployment, Macroeconomic Performance and the Labour Market. Oxford University Press.

Nickell, S., Jones, T., Quintini, G., 1999. A picture of the job insecurity facing British men, In The Labour Market Consequence of Technical and Structural Change, CEPR Discussion Paper n. 42.

OECD, 1996. Employment Outlook. OECD, Paris.

OECD, 1997. Employment Outlook. OECD, Paris.

OECD, 1999. Benefit Systems and Work Incentives. OECD, Paris.

OECD, 2002. Income Changes when moving in and out of work. OECD, Social Policy Division.

Pedersen, P., Smith, N., 2001. Unemployment traps: Do financial dis-incentives matter?, IZA Discussion Paper n. 274, Bonn.

Pedersen, P., Westergard-Nielsen, N., 1993. Unemploymen: a review of the evidence from panel data. OECD Economic Studies 20, 65–95.

Ruhm, C., 1991. Are workers permanently scarred by job displacements? American Economic Review 81, 319–324.

Stevens, A., 1997. Persistent effects of job displacement: The importance of multiple job losses 15, 165–188.

Sweeney, J., 1998. Why hold a job? The labour market choice of the low skilled, Katholique Universiteit Leuven, Leuven, 263 p.

Valenduc, C., 2001. La réforme de l'impôt des personnes physiques: ses effets sur l'imposition des salaires, l'incitation à l'emploi et sur la distribution des revenus, Belgique, 36 p.

Van den Berg, G. J., 1990. Search behaviour, transitions to non-participation and the duration of unemployment. Economic Journal 100 (402), 842–865.

Vella, F., Verbeek, M., 1999. Two-step estimation of panel data models with censored endogenous variables and selection bias. Journal of Econometrics 90, 239–263.

Verbeek, M., Nijman, T., 1996. Incomplete panels and selection bias. In: Mátyás, L., Sevestre, P. (Eds.), The Econometrics of Panel Data, 1st Edition. Kluwer Academic Publishers, New York.

Wooldridge, J., 1995. Selection corrections for panel data models under conditional mean indipendence assumptions. Journal of Econometrics 68, 115–132.

Tables

Table 1: Belgian Tax Schedule: year 1997

Annual earnings in euros	*Marginal income tax rate in percent*
0 – 6,271.7	25.0
6,271.7 – 8,304.4	30.0
8,304.4 – 11,849.3	40.0
11,849.3 – 27,268.3	45.0
27,268.3 – 40,902.4	50.0
40,902.4 – 59,990.2	52.5
≥ 59,990.2	55.0

Table 2: Descriptive Statistics -Men

	Spells 'E'		Spells 'U'		Spells 'E'+'U'	
Number of observations	363		238		601	
Continuous variables	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.
Age	31.7	8.8	39.1	12.9	34.6	11.2
Experience	16.	12.5	21.3	13.9	16.0	12.5
Children	0.5	0.9	0.7	1.2	0.6	1.0
Dummies	Frequence		Frequence		Frequence	
Educational dummies						
Primary school or no education	9.4		25.6		15.8	
Lower secondary school	27.8		32.4		29.6	
Upper secondary school	36.6		25.2		32.1	
High school	16.3		10.1		13.8	
University	9.9		6.7		8.7	
Household dummies						
Children under 3 years	10.7		8.8		10.0	
Not head of household	48.5		76.0		59.4	
Married	40.2		48.5		43.5	
Not married	52.3		37.6		46.5	
Divorced, separated or widowed	7.5		13.9		10.0	
Single	9.1		15.1		11.5	
Couple	82.1		81.9		82.0	
Single-parent	8.8		3.0		6.5	
Additional child benefits	2.7		5.0		3.7	
Regional membership dummies						
Brussels	11.8		12.2		12.0	
Wallonia	55.1		54.6		54.9	
Flanders	33.1		33.2		33.1	
Job attributes dummies						
Part-time	5.5					
No responsability	83.7		94.1		87.9	
Previous work	92.8		91.6		92.3	
Time dummies						
1993	20.7		11.3		17.0	
1994	22.6		7.6		16.6	
1995	18.2		10.9		15.3	
1996	20.9		10.1		16.6	
1997	17.6		60.1		34.5	
Others dummies						
Bad health	9.1		27.3		16.3	
High mental distress	10.2		15.1		12.1	
Financial support from the state	11.6		17.2		13.8	
Long-term unemployment	29.8		78.1		48.9	
In debt	38.0		31.1		35.3	
Pecuniary difficulties	35.0		41.2		37.4	
Worse financial situation	29.7		41.2		34.3	
Householder	62.5		54.2		59.2	
Belgian	88.7		84.4		87.0	

Table 3: Descriptive Statistics -Women

	Spells 'E'		Spells 'U'		Spells 'E'+'U'	
Number of observations	398		342		740	
Continuous variables	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.
Age	30.1	7.7	36.5	10.7	33.1	9.7
Experience	10.6	8.5	18.2	11.9	14.4	11.0
Children	0.8	0.9	0.8	1.0	0.8	1.0
Dummies	Frequence		Frequence		Frequence	
Educational dummies						
Primary school or no education	5.3		17.5		10.9	
Lower secondary school	18.3		31.6		24.5	
Upper secondary school	38.7		37.4		38.1	
High school	29.7		11.7		21.4	
University	8.0		1.8		5.1	
Household dummies						
Children under 3 years	18.8		16.7		17.8	
Not head of household	84.2		93.3		88.4	
Married	47.5		47.2		47.4	
Non married	42.7		24.4		34.2	
Divorced, separated or widowed	9.8		28.4		18.4	
Single	8.3		7.6		8.0	
Couple	75.6		70.2		73.1	
Single-parent	16.1		22.2		18.9	
Additional child benefits	4.0		18.1		10.5	
Regional membership dummies						
Brussels	11.1		10.8		11.0	
Wallonia	47.7		48.8		48.2	
Flanders	41.2		40.4		40.8	
Job attributes dummies						
Part-time	22.86					
No responsibility	93.5		96.2		94.7	
Previous work	91.5		85.7		88.8	
Time dummies						
1993	21.6		8.2		15.4	
1994	20.3		5.6		13.5	
1995	19.1		8.2		14.1	
1996	18.6		6.4		13.0	
1997	20.4		71.6		44.0	
Others dummies						
Bad health	8.0		13.2		11.4	
High mental distress	20.4		25.2		22.6	
Financial support from state	9.1		20.2		14.2	
Long-term unempl oyment	32.7		86.0		57.3	
In debt	30.7		33.3		31.9	
Pecuniary difficulties	24.1		41.5		32.2	
Worse financial situation	21.1		36.3		28.1	
Householder	53.3		51.5		52.4	
Belgian	94.2		91.2		92.8	

Table 4: Results from the estimation of (1) and (2) by ML - Selection equation

Coefficients	Men		Women	
η_1	-0.2788	(1.3838)	0.0823	(1.6746)
η_2	1.1511	(1.4816)	1.7633	(1.6985)
Age	0.1167	(0.0717)	0 .1064	(0.1026)
Age^2	-0.0023**	(0.0098)	-0.0025	(0.0015)
Social activity	0.2228	(0.1891)	-0.2309	(0.1875)
House allowances	0.2699	(0.2862)	-0.3152	(0.2644)
Long Term unemployment	-1.1699**	(0.1959)	-1.6434**	(0.2341)
Having loans	0.1643	(0.1911)	-0.0748	(0.1791)
Financial Difficulties	0.0574	(0.1931)	-0.1669	(0.2127)
Mental distress	-0.1872	(0.278)	0.1327	(0.1816)
Kids less than 3 years	-0.0508**	(0.354)	-0.2112	(0.2351)
Bad health	-0.5948	(0.2533)	-0.1199	(0.3285)
Financial satisfaction	-0.2678	(0.1959)	-0.1577	(0.1855)
Not head of the household	-1.2931**	(0.2588)	-1.1742**	(0.3105)
Householder	0.4449*	(0.2178)	0.1728	(0.1978)
Number of children	-0.2786**	(0.121)	-0.0139	(0.1093)
Belgian nationality	-0.1561	(0.277)	0.2182	(0.3253)
Lower secondary school	0.2217	(0.2887)	0.2058	(0.323)
Upper secondary school	0.6405*	(0.3191)	0.3797	(0.319)
High school	0.5419	(0.3951)	0.4605	(0.3641)
University	0.7112	(0.4126)	0.9875*	(0.4851)
Married	-0.3341	(0.2359)	0.5058**	(0.2196)
Lone parenthood	-0.0819	(0.2317)	0.328	(0.287)
Additional child benefits	0.2158	(0.4509)	-0.9416**	(0.3814)
Living in Flanders	0.2761	(0.2185)	-0.0975	(0.1855)

Standard errors in parenthesis: *: 5%; **:2%

Table 5: Estimation Results of (1) and (2) by ML: Wage equation

	MEN		*WOMEN*	
Wage equation				
α_1	10.0082**	(0.132)	9.7449**	(0.1855)
α_2	10.6209**	(0.1255)	10.2367**	(0.1798)
Experience (# years)	0.0254**	(0.007)	0.0355**	(0.0095)
Squared experience	-0.0051**	(0.0022)	-0.0095**	(0.0037)
Long term unemployed	-0.1407**	(0.0485)	-0.1772**	(0.0563)
Part-time worker	0.0251	(0.0538)	-0.0485	(0.0742)
No Responsibility	-0.0481	(0.0742)	-0.1497**	(0.0409)
Previous professional experience	-0.002	(0.0741)	-0.0217	(0.074)
Lower secondary school	-0.1821*	(0.0881)	0.1143	(0.1404)
Upper secondary school	-0.0706	(0.0955)	0.0862	(0.138)
High school	0.1359	(0.0993)	0.3574**	(0.1427)
University	0.1175	(0.1041)	0.4632**	(0.1489)

Table 6: Estimation Results of (1) and (2) by ML: Other parameters

	MEN		*WOMEN*	
ρ	-0.2051	(0.3310)	0.6500**	(0.1465)
σ^2_ε	0.0617**	(0.005)	0.0600**	(0.0081)
P11	0.1104	(0.0733)	0.1462	(0.0945)
P12	0.5771**	(0.1835)	0.3491**	(0.1124)
P21	0.0672	(0.0522)	0.1978**	(0.0616)
P22	0.2453	(0.1836)	0.3069**	(0.0939)
Log-likelihood	-330.8721		-394.7893	
Number of cases	601		740	

Table 7: Mean Observed and Expected Wages

	Men	*Women*	*Men*	*Women*
Mean wage for individuals moving into work	*FB*		*€*	
a) Observed wage:	43,345.97	33,966.95	1,074.52	842.02
b) Expected wage as predicted using (4)	43,031.76	32,622.26	1,066.73	808.68
c) Expected wage imputed when wage missing	42,207.88	30,173.39	1,046.31	747.98
Mean wage for individuals not moving into work				
d) Expected wage as predicted using (4)	39,668.18	26,801.66	983.35	664.40

1• = 40.3399 FB

Table 8: Observed Income Ratio

Observed Income Ratio: OIR (workers with observed wage)						
	Men		Women		Men	Women
	N° of cases		N° of cases		%	%
	Total	OIR<1	Total	OIR<1		
Everybody	288	12	278	36	4.17	12.95
Singles	27	1	33	3	3.7	12
Couples	70	4	50	7	5.71	14
Couples with children	164	5	163	22	3.05	13.5
Single parents	3	0	2	0	0	0
Single parents with children	24	2	38	4	8.33	10.53
Long Term unemployment	81	4	90	17	4.94	18.89

Table 9: Estimated Income Ratios : EIR_1

Estimated Income Ratio: EIR_1 (whole sample)						
	Men		Women		Men	Women
	N° of cases		N° of cases		%	%
	Total	EIR<1	Total	EIR<1		
Everybody	601	16	740	164	2.66	22.16
Singles	69	1	59	16	1.45	27.12
Couples	164	11	151	26	6.71	17.22
Couples with children	329	3	390	56	0.91	14.36
Single parents	5	0	4	0	0	0
Single parents with children	34	1	136	66	2.94	48.53
Long Term unemployment	294	14	424	126	4.76	29.72

Table 10: Estimated Income Ratios: EIR_2

Estimated Income Ratio: EIR_2 (whole sample)						
	Men		Women		Men	Women
	N° of cases		N° of cases		%	%
	Total	EIR<1	Total	EIR<1		
Everybody	601	27	740	160	4.49	21.62
Singles	69	2	59	13	2.9	22.03
Couples	164	15	151	29	9.15	19.21
Couples with children	329	8	390	57	2.43	14.62
Single parents	5	4	4	0	80	0
Single parents with children	34	2	136	61	5.88	44.85
Long Term unemployment	294	18	424	121	6.12	28.54

Table 11: CDF of observed and estimated income ratios

	Income ratio				
	0.8	0.9	1.0	1.1	1.2
OIR			CDF		
Men	1.7	2.4	4.2	8.0	12.5
Women	5.8	9.4	12.9	16.2	24.1
EIR_1					
Men	0.2	0.7	2.7	7.0	14.1
Women	5.7	13.2	22.2	29.3	36.5
EIR_2					
Men	1.0	1.8	4.5	10.0	16.8
Women	6.6	13.6	21.6	27.0	33.1
EIR for those who do not find jobs					
Men	0.4	0.8	5.5	13.4	23.1
Women	8.5	18.1	27.8	33.9	38.0

Table 12: Estimated Income Ratios for the fictionally employed ((EIR_2=EIR_1)<1)

Estimated Income Ratio: EIR for the Unemployed						
	Men		Women		Men	Women
	N° of cases		N° of cases		%	%
	Total	EIR<1	Total	EIR<1		
Everybody	238	13	342	95	5.46	27.78
Singles	36	3	126	3	8.33	2.38
Couples	82	1	77	7	1.22	9.09
Couples with children	113	9	163	22	7.96	13.5
Single parents	2	3	2	0	150	0
Single parents with children	5	0	74	4	0	5.41
Long Term unemployment	186	12	294	90	6.45	30.61

Table 13: Mean Observed and Estimated Income Ratios for workers

	MEN		*WOMEN*	
Variable	N°	Mean	N°	Mean
Mean (OIR)	288	2.2693	278	1.8158
Mean (EIR_1)	288	2.2763	278	1.6721
Mean (EIR_2)	288	2.2693	278	1.8158