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# ABSTRACT

## Assessing Unemployment Traps in Belgium Using Panel Data Sample Selection Models

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 a parametric random effects models composed by a wage equation and a selection equation by maximum likelihood techniques. The income ratios have been computed for every individual in the sample by using the predicted wages obtained from the estimation of the wage equation corrected for sample selectivity. The empirical analyses has exploited the data extracted from the waves 1993-1997 of the Panel Study of Belgian Household and has been led separately on (unbalanced) samples of men and women. The estimation results suggest significant differences in the behaviour of these two groups. The experience of long periods of unemployment in the past is particularly important: long-term unemployed people have difficulties in re-integrating the labour market and they obtain low salaries when they succeed in finding employment. Long unemployment spells are likely to have a "scarring" effect on subsequent earnings. Moreover, the computation of income ratios for all individuals 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.

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# 1 Introduction

The combination of unemployment bene...ts, high taxes on labour income, social contributions, and conditional transfers such as additional child bene...ts, may reduce the willingness of (low-skilled) unemployed workers to ...nd and/or to accept a job (OECD, 1996; 1999). Insigni...cant ...nancial returns associated with being employed rather than unemployed may a¤ect the decision of moving into employment, especially for low-educated unemployed workers, and thereby contribute to the persistence of unemployment. The situation in which households or individuals have no incentives (...nancial or non-...nancial) to leave unemployment for employment is termed an "unemployment trap".

In this study, we investigate unemployment traps by studying the ...nancial rewards linked to the transition from unemployment to employment for Belgian workers. In doing this, we use micro-data extracted from the Panel Study of Belgian Household (PSBH). Speci...cally, the sample used in this paper is drawn from the waves 3 to 7 of the PSBH corresponding to the years 1993 to 1997, and is constructed by using the retrospective calendar of activity and the annual net income of the sampled individuals.

Our study is thus based on real data and this allows us to obtain estimates of the "real-life" incentives. Moreover, it di¤ers from the majority of studies that have been carried out within this research area. Whereas some of those studies use longitudinal data (e.g. Pedersen and Smith, 2001; Kyyrä, 1999), they do not duly account for the sample selection problem in the wage equation. In the present paper we address the question of unemployment traps by using panel data estimation techniques and at the same time correcting for the sample selection problem (Heckman, 1979) within that modelling framework.

Sample selection models are frequently estimated in applied microeconometric work using cross-sectional data, but they are less frequently applied when panel data are available. By ignoring this aspect of the data, the sample selection process is therefore supposed to be constant over time, and the argument crucial to this assumption is that ...xed e¤ect type estimators eliminate sample selection bias since they di¤erence out both the unobserved individual-speci...c e¤ect and the sample selection e¤ect (see e.g. Jensen et al., 2001). Nevertheless, we believe that the natural way of dealing with the sample selection problem is to specify a panel data sample selection model, since, in general 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. Therefore, we specify and estimate a parametric panel data random e¤ects model composed of two equations; a wage equation and a selection equation.

The construction of the wages that unemployed people would earn when employed is crucial. Indeed, ...nancial incentives are measured through the estimation of the individuals' replacement ratios, de...ned as the ratio between the individual disposable income when employed and the individual disposable income when unemployed. A crucial component of the disposable income is the wage. However, re-employment wages can be observed only for people moving into employment from unemployment.

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We have calculated the expected wage based on the estimations obtained from the panel data sample selection model, and we have used these expected wages to compute replacement ratios 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 replacement ratio and an estimated replacement ratio as in Kyyrä (1999). While the observed replacement 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. In Section 2, we present a survey of the studies dealing with the issue of ...nancial incentives in the transition out of unemployment. Section 3 brie‡y outlines the Belgian tax system and the Belgian unemployment insurance scheme. Section 4 presents the econometric model applied. Section 5 is devoted to a description of the dataset, section 6 reports and discusses the results obtained. Some conclusions are drawn in section 7.

## 2  Previous evidence on unemployment traps

Two main approaches have been used in the investigation of unemployment traps, that is, the lack of ...nancial rewards linked to the transition from unemployment to employment. In addition, several authors have focused on whether past unemployment experience has a scarring e¤ect on subsequent earnings, a phenomenon which would contribute to an explanation of the existence of unemployment traps for individuals, some of whom have previously been successful in the labour market. In this section, we discuss some of the main insights that may be obtained from these studies.

The key variable in the analysis of ...nancial incentives is the net replacement ratio, that is, the income while being employed relative to unemployment bene...ts. The computation of the replacement ratio varies according to the modelling approach chosen (see Atkinson and Micklewright, 1991).

A ...rst approach computes replacement ratios for representative households and/or individuals with the aim of identifying family types with high probabilities of being ...nancially trapped. The analysis with representative households is relevant and rich on details, but the detection of ...nancial traps by using representative households does not necessarily imply that individuals are really in‡uenced by them. Considering for instance, the same net income gap between work and unemployment, it may happen that one individual decides to move into employment whereas another refuses the job because the ...nancial incentives are too low. The studies with representative households do not take the heterogeneity of individuals into account. Moreover, 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 concerning the rules of the tax and bene...ts systems.

A second approach uses empirical data and econometric techniques to calculate replacement ratios. Our study is within that framework.

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Within the literature using representative households/ individuals, unemployment traps arise when the replacement ratio is close to or above 100 per cent. This ratio can be computed either at the individual level or at the household level; for instance, the individual replacement ratio calculated by the OECD since 1961 is based on the earnings of an average production worker (APW)[1].

For Belgium, the studies with representative households (De Lathouwer et al., 2001, and Defeyt, 1998) compute replacement ratios at the same time for a maximal and a minimal level of unemployment bene...ts. Their 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. The gap between wage and unemployment bene...ts is obviously important. However, the unemployment trap also depends on the end of entitlement to conditional transfers, which occurs when an unemployed worker decides to move into work. This sudden change does not favour the transition to employment and especially to temporary jobs.

Various studies have been developed within the approach based on real data. Some of these studies explicitly focus on how the probability of moving from unemployment into employment is in‡uenced by the unemployment compensation schemes - unemployment traps (see e.g. OECD, 2002; Pedersen and Smith, 2001; Kyyrä, 1999; Gregg et al., 1999; and Holm et al., 1999), while others focus on the earnings losses associated with an experience of unemployment (e.g. Nickell et al., 1999; Arulampalam, 2000).

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 (e.g. Layard et al., 1991). In order to avoid a potential bias caused by unobserved heterogeneity that a¤ects both the probability of being employed and the wage level, some studies adopt a correction for sample selection; if the decision to work is a¤ected 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 accounts for the non-randomness of the selection process into employment; wages are observed only for those who are employed, i.e. those who have received o¤ers of employment and for whom the o¤ered wage exceeds the reservation wage.

The assumptions enabling the computation of expected wages of individuals who are currently out of work crucial, and they vary across the di¤erent studies. Some studies have used the wage earned in the 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 ...nally, some are

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[1]The average production worker is de...ned as "an adult full-time production worker in the manufacturing sector whose wage earnings are equal to the average wage earnings of such workers".

based on post-unemployment wages corrected for sample selection bias (Kyyrä, 1999).

Some authors (Gregg et al., 1999, and Kyyrä, 1999) argue that the use of average or expected wages - even if they have been adjusted for selectivity - to study the ...nancial incentives faced by the unemployed may produce upward-biased estimates of the returns to employment, since the experience of unemployment, particularly the length of the unemployment spell, may a¤ect productivity as well as the reservation wage.

Gregg et al. (1999) compare the distribution of hourly wages for employed workers with the distribution of hourly re-entry wages (wages reported by individuals moving from non-employment into employment). They show that the shape of the wage distribution of employed workers di¤ers from the shape of the re-entry wage distribution. The former is close to a normal distribution whereas the latter is more concentrated on lower wage levels; the re-entry wage distribution has a lower mean than the overall wage distribution while the median re-entry wage is around 69 per cent of the median for the overall wage distribution. A large part of the divergence between the two distributions is shown to depend on di¤erences in individual characteristics (e.g. job tenure) and on di¤erences in job attributes in the two populations. In order to derive the wages that individuals who are out-of-work would be able to earn should they ...nd employment, Gregg et al. (1999) also compare the results across different wage estimation strategies; based on the overall wage distribution, based on the overall wage assumption adjusted for self-selection, and based on the re-entry wage distribution (without selectivity correction). They ...nd that the expected wages for the individuals currently out-of-work are lower if the re-entry wage distribution is used. Finally, in analyzing the entry/re-entry into work after a period of unemployment or inactivity in United Kingdom, they compute replacement ratios and inferred that these are higher when the re-entry wage distribution is used.

The study of Kyyrä (1999) for Finland, reports that the distribution of post-unemployment wages (that is, re-entry wages) is left-skewed and more compressed than the overall wage distribution. The author compares the results obtained from two estimations of a wage equation; one is based on the overall wage distribution and the second is based on wages reported by individuals who leave the unemployment register for employment (post-unemployment wages). Financial incentives are studied in a cross-sectional framework (although the sample is of the panel form). The wages earned by individuals who leave unemployment for employment are used to predict wages for the whole sample, and these estimated post-unemployment wages are used to compute the expected change in the disposable income of the household that would result from the transition to employment of the unemployed member. Two income ratios are computed; an observed income ratio and an estimated income ratio. Kyyrä ...nds that 31 per cent of those who actually move from unemployment into employment (the observed income ratio) record an increase of their household's disposable income less than or equal to 25 per cent. Moreover, 4 per cent of those who leave unemployment for employment accept a job leading to a decrease in their household's disposable income. Concerning the estimated

income ratio, 8 per cent of the sample are facing a ratio less than 1 and 43 per cent are estimated to be unable to increase their household's disposable income more than 25 per cent.

The recent study of Pedersen and Smith (2001) analyzes the importance of economic disincentives faced by unemployed and low paid workers in Denmark, using a panel survey merged with administrative registers for the years 1993 and 1996. For this purpose, they compute an individual net income ratio between collecting unemployment bene...ts and working in a full-time job. For the individuals unemployed during the week when the interview took place no information is available about the wages, but in this study, the unemployed workers' own expectations about the wage they would obtain in a future job are used to compute the income ratio. Pedersen and Smith do not develop a predicted wage rate based on an estimated wage equation; the use of own expectations avoids the correction of wages for sample selection bias. Their analysis of replacement ratios shows that around 10 per cent of the unemployed workers were in an unemployment trap. Unemployed women are more exposed to ...nancial disincentives than unemployed men. The net income ratios were also computed for people working during the week of the interview. The results for suggest that for about 8 per cent of them the disposable income in work was lower than the one that would be obtained receiving unemployment bene...ts. Exploiting the panel aspect of the data, Pedersen and Smith show that around 20 per cent of those who were trapped in unemployment in 1993 had not escaped the trap in 1996.

Several empirical studies have examined the earnings losses associated with a period of unemployment (Jacobson et al., 1993; Ruhm, 1991; Stevens, 1997; OECD, 2002; Arulampalam, 2000; Nickell, 1999 ). The general ...ndings from these studies suggest that the cost resulting from job loss is not limited to a loss of earnings in the period of unemployment; unemployed workers are usually re-employed at lower wages than the ones they earned in their previous jobs. Moreover, despite di¤erent methodologies and data sets, consistent evidence has been found concerning the persistence of reductions in wages following displacement (see Fallick, 1996 for a survey of the recent empirical literature on displaced workers; see also Kletzer, 1998).

Theory suggests several reasons for why a period of unemployment may be followed by wage losses. The ...rst one concerns job tenure; jobs associated with post-unemployment wages are by de...nition short-tenure at the time at which one observes them (no tenure e¤ect). Lower post-unemployment wages may also result from a loss of ...rm-speci...c (or sector-speci...c) 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 ...rm. 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 justi...ed for instance by a (expected) decrease in the level of unemployment bene...ts, see e.g. van den Berg (1990).

To conclude, 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 su¤ered 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.

# 3    Tax and Unemployment insurance schemes in Belgium

Di¤erent studies have shown how important and persistent the problem of unemployment is in Belgium. Besides arguments about the structural nature of the problem, it is likely that the features of the existing tax scheme contribute to making people less willing to accept jobs. In addition to the fact that unemployed individuals do not pay social security contributions, unemployment bene…ts - more generally all replacement incomes - are subjected to a higher level of tax exemption than labour earnings.

Some speci…c support is granted to low-income households. For instance, although there are no housing bene…ts in Belgium, families with low incomes could bene…t of social housing for which they pay a moderate rent. Furthermore, unemployed workers (heads of households) having spent at least six months in unemployment, are entitled to additional child bene…ts. These additional child bene…ts are withdrawn if the unemployed accepts a job for more than 14 days. It is also the case that unemployed people moving into work are granted a tax exemption for each child. The sudden removal of conditional transfers reduces work incentives, especially so for temporary jobs. The legislation concerning additional child bene…ts has been recently improved and some additional measures have been taken up in order to make work more attractive. Four major reforms have been implemented since January 2000 on work incentives. Since the data used in this study covers the years 1993-1997, the following description of both the unemployment insurance scheme and the tax system concerns this period. All the amounts reported in this section are related to the year 1997.

## 3.1    Unemployment Insurance Scheme

The Belgian unemployment insurance scheme is characterized by a generous level of bene…ts, especially for persons with low incomes, and by an in…nite entitlement period. In order to be eligible for unemployment bene…ts, 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 …rst day of unemployment, individuals aged less than 36 must have been employed for 312 days during the latest 18 months. To receive unemployment bene…ts unemployment should be involuntary, the worker should be available for and actively seeking employment.

Moreover, the entitlement to unemployment bene…ts depends on schooling curricula and on the receipt of unemployment bene…ts in the past. The level of unemployment bene…ts depends on four characteristic; the composition of the

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household, the length of unemployment, the age, and the previous wage.

Concerning household composition, three categories are identi...ed; heads of household, singles, and cohabitants. Heads of household are entitled to a high level of bene...ts, singles are quali...ed to a medium level of bene...ts, and cohabitants receive the lowest level of unemployment bene...ts. In addition, the amount of the unemployment bene...ts is constant over time for the heads of household (60 per cent of the previous wage) while it decreases for singles (from 60 per cent the ...rst year to 42 per cent the second year) and for cohabitants (from 55 per cent the ...rst year to 35 per cent the ...rst 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 bene...ts inde...nitely from the second period compensation (35% of the previous wage).

The amount of unemployment bene...ts depends on previous labour earnings but it is upwards and downwards bounded. For instance, unemployment bene...ts for heads of household are set between a maximum of 864.9 euros and a minimum of 759.3 euros.

Finally, the level of bene...ts 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.

Since 1987, unemployed have had the opportunity to increase the amount of bene...ts 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.

## 3.2   The tax system

The tax system consists of social security contributions and a progressive income tax; an additional local income tax is levied on taxable income at an average rate of 7 per cent. 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 ...ctionally transferred to the spouse with low or no labour income is limited by a maximum of 7,362.4 euros.

Several tax allowances exist in the Belgian tax scheme. Each individual is granted a personal income exemption; the amount of this tax allowance depends on the family composition. If a married partner can not use his own income tax exemption because his personal labour income is too low, this amount may be attributed to the spouse. The other main tax allowances are related to the number of children, child care costs, work related expenses. In addition, the amount of the tax exemption is higher for replacement incomes (e.g. pensions, unemployment bene...ts) than for labour earnings.

# 4 Methodology

In the study of ...nancial incentives associated with unemployment to employment transitions, it is important to note that the selection process into employment may be non-random. If not adequately controlled for, sample selectivity is likely to bias the parameters of interest. The availability of panel data allows us to follow individuals and their behaviour over time. The appropriate estimator in that case is one that exploits the panel structure of the data and corrects for sample selection bias.

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), and maximum likelihood estimators. Although one can choose between a random and a ...xed approach, in this study we prefer the random e¤ects approach. In the ...xed e¤ect approach, time-invariant covariates are absorbed in the ...xed e¤ects and therefore cannot be used to gather insights into the factors determining wages. Therefore, we specify and estimate a parametric panel data random e¤ects model. The model we consider can be formulated as follows:

$$
\begin{aligned}
y_{it}^{\pi} &= x_{it}^{0}{}^{-} + \circledR_i + "_{it} \\
d_{it}^{\pi} &= z_{it}^{0}{}^{\circ} + {}^{\prime}_i + v_{it} \\
d_{it} &= 1 \text{ if } d_{it}^{\pi} > 0; \ 0 \text{ otherwise} \\
y_{it} &= y_{it}^{\pi} \, \text{¢} \, d_{it};
\end{aligned}
\tag{1}
$$

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 de...nitely with an exclusion restriction. The equation of interest is the ...rst one in (1) and the selection process is described by the second equation in (1). Here, $^-$ and $^\circ$ are the unknown parameter vectors that we have to estimate. The $\circledR_i$ and ${}^{\prime}_i$ are unobservable time-invariant individual-speci...c components which are possibly correlated with each other. Finally, $"_{it}$ and $u_{it}$ are unobserved disturbances, possibly correlated with each other. The variable $y_{it}^{\pi}$ is observed only if the indicator variable $d_{it} = 1$, that is, if the person $i$ is employed in period $t$: This means that sample selectivity should be accounted for.

In the estimation procedure the selection process and the equation of interest are estimated simultaneously by maximum likelihood.[2] For this purpose it is necessary to specify the joint distribution of the error components in the selection equation and the equation of interest. Speci...cally, we assume that the idiosyncratic error terms follow a bivariate normal distribution

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[2] Two step estimators have also been developed for panel data sample selection models, but they are not quite suited to our present purposes; either they are of the ...xed e¤ect type (e.g. Kyriazidou, 1997), or the correlation structure of the error components is speci...ced ad hoc (e.g. Wooldridge, 1995, and Vella and Verbeek, 1999). Jensen et al. (2002) contains a survey of avaiable panel data sample selection estimators.

$$(\varepsilon_{it}, v_{it}) \sim N(0, 0, \S); \text{ where } \S = \begin{pmatrix} \sigma_\varepsilon^2 & \rho\sigma_\varepsilon \\ \rho\sigma_\varepsilon & 1 \end{pmatrix}$$

The likelihood of a single observation, conditional on the random effects is then (see Husted et al., 2001, Nielsen et al., 2001, or Jensen et al., 2002, for more details)

$$
\begin{aligned}
L_{it}(\tilde{A}, \mathbb{R}_i, \gamma_i) &= f(\varepsilon_{it}, v_{it} | \mathbb{R}_i, \gamma_i, x_{it}, z_{it}) \\
&= \left[ \frac{1}{\sigma_\varepsilon} \phi_{vj\varepsilon}\left( \frac{z_{it}^0 \delta - \gamma_j y_{it} - x_{it}^0 \beta - \mathbb{R}_i}{\sigma_\varepsilon} \right) A_\varepsilon (y_{it} - x_{it}^0 \beta - \mathbb{R}_i) \right]^{c_{it} d_{it}} \\
&\quad \times \left[ \Phi_v(z_{it}^0 \delta + \gamma_i) \right]^{(1-c_{it})d_{it}} \times \left[ \Phi_v(-z_{it}^0 \delta - \gamma_i) \right]^{1-d_{it}};
\end{aligned}
$$

where the conditional distribution $vj\varepsilon \sim N\left( \frac{\rho\varepsilon}{\sigma_\varepsilon}; 1 - \rho^2 \right)$; $\Phi$ and $A$ 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 $2 \times 2$ 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 $\mathbb{R} = \{\mathbb{R}_1, \mathbb{R}_2\}$, $\gamma = \{\gamma_1, \gamma_2\}$, $p = \{p_{11}, p_{12}, p_{21}, p_{22}\}$; where $p_{kj} = \Pr[\gamma_k, \mathbb{R}_j]$; and let $\mu = [\beta; \delta; \sigma_\varepsilon; \rho; p; \mathbb{R}; \gamma]$ denote the parameter vector. For a single individual, the likelihood contribution is as follows:

$$
\begin{aligned}
L_i(\mu) &= \int_{-1}^{1} \int_{-1}^{1} \left[ \prod_{t=1}^{T_i} f(\varepsilon_{it}, v_{it} | x_{it}, z_{it}, \gamma_i, \mathbb{R}_i) \right] dG(\gamma_i, \mathbb{R}_i) \\
&= \sum_{j=1}^{2} \sum_{k=1}^{2} p_{kj} \prod_{t=1}^{T_i} f(\varepsilon_{it}, v_{it} | x_{it}, z_{it}, \gamma_k, \mathbb{R}_j)
\end{aligned}
$$

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. (2001) and Nielsen et al. (2001):

Conditional on the entire path of participation indicators, the expected log wage for an individual is

$$
\begin{aligned}
& E[y_{it} | d_{i1}, \ldots, d_{iT_i}, x_{it}, z_{i1}, \ldots, z_{iT_i}] \\
&= x_{it}\beta + E(\mathbb{R}_i | d_{i1}, \ldots, d_{iT_i}, z_{i1}, \ldots, z_{iT_i}) + E(\varepsilon_{it} | d_{it}, z_{it})
\end{aligned}
\tag{2}
$$

The expected values of the error components of the wage equation are

$$
E(\mathbb{R}_i | d_{i1}, \ldots, d_{iT_i}, z_{i1}, \ldots, z_{iT_i}) = \sum_{j=1}^{2} \mathbb{R}_j q_{ji}^{\mathbb{R}}
\tag{3}
$$

$$
E(\varepsilon_{it} | d_{it} = 1, z_{it}) = \rho\sigma_\varepsilon \sum_{k=1}^{2} q_{kit} \frac{A(z_{it}^0 \delta + \gamma_k)}{\Phi(z_{it}^0 \delta + \gamma_k)}
$$

$$
E(\varepsilon_{it} | d_{it} = 0, z_{it}) = -\rho\sigma_\varepsilon \sum_{k=1}^{2} q_{kit} \frac{A(z_{it}^0 \delta + \gamma_k)}{1 - \Phi(z_{it}^0 \delta + \gamma_k)}
\tag{4}
$$

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The term $q_{j|i}^{\circledR}$ denotes the parameters of the individual speci…c probabilities of $\circledR_i$: Its expression is

$$q_{j|i}^{\circledR} = \frac{\sum_{k=1}^{2} p_{kj} \prod_{t=1}^{T_i} \Phi(z_{it}^{\circ} + \gamma_k)^{d_{it}} [1 - \Phi(z_{it}^{\circ} + \gamma_k)]^{1-d_{it}}}{\sum_{l=1}^{2} (p_{l1} + p_{l2}) \prod_{t=1}^{T_i} \Phi(z_{it}^{\circ} + \gamma_l)^{d_{it}} [1 - \Phi(z_{it}^{\circ} + \gamma_l)]^{1-d_{it}}},$$

and $q_{kit}^{\gamma}$ denotes the parameters of the individual and time speci…c probability of $\gamma_i$ (see Nielsen et al., 2001)

$$q_{kit}^{\gamma} = \frac{\sum_{j=1}^{2} p_{kj} \Phi(z_{it}^{\circ} + \gamma_k)}{\sum_{j=1}^{2} [(p_{1j} \Phi(z_{it}^{\circ} + \gamma_1) + p_{2j} \Phi(z_{it}^{\circ} + \gamma_2)^{1-d_{it}}]}$$

# 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 …rst time in the spring of 1992 (wave 1) and contains a variety of information. We have decided to consider the waves 3 to 7 (spring 1994 to spring 1998) because both the questions concerning income and the de…nition of employment have been modi…ed from 1994 onwards. Since the information we use is retrospective, the analysis covers the years 1993 to 1997. The waves 3 to 7 contains information about 9,398 individuals aged at least 16. The sample is unbalanced, so individuals are observed from one to …ve times.

At each survey date, individuals report their labour market status at the time of the interview and for each of the preceding twelve months. At the same time, people are interviewed about their annual income for the previous year net of taxes and social contributions.

1,338 persons have been unemployed at least once during the observation period. We observe a total of 1,948 unemployment spells. However, we focus only on those that involve unemployment bene…t payments. For this reason we consider 1,661 unemployment spells experienced by 1,142 individuals. Half of the unemployment spells end with a transition into employment (paid work and self-employment); 12 per cent of the unemployment spells end with a transition into non-participation (retirement, housekeepers and students); 35 per cent of the unemployment spells are right-censored, and 3 per cent of the unemployment spells end in a so-called "other activity". 67 per cent of the right-censored observations concern individuals who remain unemployed at the end of the observation period, and 33 per cent are due to panel attrition.

The sample used in this study thus consists of individuals who have had at least one unemployment period. They are followed from the …rst year of that unemployment period 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 di¢cult to distinguish the wage from pro…ts.

After having discarded these observations, 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).

## 5.2   The dependent variables

The dependent variables are an employment indicator and the individuals' monthly net wage.

The employment indicator takes a value of 1 if the individual moves from compensated unemployment to 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. The information available in the survey concerning hours of work is about hours as speci…ed in the job-contract and hours actually worked. We have chosen the last de…nition since labour income covers also extra-hours worked.

The dependent variable of the wage equation is the monthly net wage including tips, commissions, bonus and holiday earnings. At each survey date the interviewed individuals report wages net of taxes and social contributions. For each of the …ve 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. This computation does not allow us to separate the wages associated with di¤erent jobs in the case where the worker has been employed in more than one job for the same year.[3] The wage is de‡ated by the consumer price index (base 1997). For 25 per cent 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. The introduction of the log monthly wage is justi…ed here in the context of labour supply theory (see D'Addio and De Greef, 2001).

## 5.3   The explanatory variables

Broadly speaking, only human capital and work-related variables (i.e. experience and its square, educational attainment, 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 e¤ects of …nancial (and to some extent non-…nancial) incentives, many other variables appear in the selection equation.

Tables 1 and 2 in the Appendix presents descriptive statistics of the samples of men and women.

[Table 1-2 to be inserted here]

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[3] The same methodology is applied for unemployment bene…ts.

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. For this variable, we also introduced a quadratic form to capture concavity in the experience-wage proﬁles as postulated in human capital theory. A variable indicates also 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.

In order to capture the "scarring" eﬀect linked to the experience of previous long unemployment spells on subsequent earnings, we have included in the speciﬁcation an indicator for the experience of long term unemployment (if the individual has been unemployed for more than twelve months at the start of the year).

We have used an indicator for part-time employment, which is a striking feature in female labour market participation. Indeed, the available information on hours worked suggests that for women 31.5 per cent of the transitions from unemployment into employment are made in the form of part-time jobs. Conversely, 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 and its square, educational attainments and the long-term unemployment indicator, several 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.

A measure of social involvement (see Sweeney, 1998) has been built in order to diﬀerentiate people socially active from the others. Individuals are ranked as socially active if there are member of an association as a sport club, a cultural or a humanitarian association or if they have a very active circle of friends.

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

Three variables related to pecuniary diﬃculties have been used in the model. First, a dummy indicates if the individual, or another member of his/her household, is in debt (excepting mortgage loans). A second dummy takes the value 1 if the person has any ﬁnancial diﬃculties concerning the paying of bills re-

lated to e.g. rent, heating etc.. The third dummy is equal to 1 if the person is unsatis...ed about his ...nancial situation.

A home ownership dummy indicates whether the individual owns the acco-modation he/she is living in. Some variables are included to account for house-hold 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 bene...ts. The variable for nationality indicates Belgian nationality. Finally, owing to the peculiar struc-ture of Belgium, made of three regions (Brussels, Wallonia and Flanders) and since one of them presents lower unemployment problems, we have introduced a dummy stating whether the individual lives there (Flanders).

# 6   Estimation results

## 6.1   Wage and Selection equation

The results from the estimation of (1) on the samples of men and women sep-arately are reported in Tables 3-5.

[Tables 3-5 to be inserted here]

In order to test the robustness of the estimation result, we also estimated ordinary random e¤ects probit models of the selection equation and a random e¤ects (GLS) wage equation. These results are available on request, and they show that most of the parameter estimates are very robust across the two di¤erent speci...cations. 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.

Looking at the results obtained through estimation of (1) by maximum likelihood, we ...rst notice some signi...cant di¤erences in the behaviour of males and females. Moreover sample selectivity seems to a¤ect women more than men. These issues are discussed further below.

Considering the results of the selection equation, we notice that previous long term unemployment status is very important for both men and women; having experienced long-term unemployment reduces the transition probability into employment dramatically. Not being the household head is also associated with a much lower transition probability into employment for men and women, while being married leads to an higher transition probability for women. More-over, for women being eligible for additional child bene...ts 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 ...nding employment for men, but ap-parently not for women.

University education is associated with better employment prospects for women, while for men most education beyond primary school leads to better employment probabilities.

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In summary, many variables associated with ...nancial 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 signi...cant negative e¤ect 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, while Arulampalam (2000) does not ...nd any signi...cant e¤ect linked to the duration of the previous unemployment spells.

As to the educational attainments we notice the totally di¤erent results for the two samples considered. While for women, the best earnings prospects are associated with the highest educational attainments, for men the educational level does not seem to a¤ect the wage very much. Women having exerted some supervision tasks in the past have also comparative advantage over those whose previous work experience did not include this feature. This result can be justi...ed by thinking that supervision tasks are associated frequently to more important jobs.

Potential work experience improve considerable the earnings prospects of unemployed individuals. As suggested by human capital theory, the quadratic term of work experience con...rms concave experience-wage pro...les for both samples.

Let us turn now to the issue of sample selection. We notice from table 5 that the correlation coe¢cient of the idiosyncratic error terms is signi...cantly di¤erent from 0 and positive for women, while for men it is not signi...cantly di¤erent from 0. Moreover, for women the probabilities associated with the support points of the random e¤ects are signi...cant, while for men they are not (only one of them is). This suggests that the sample selection issue is particularly important for women. The signi...cant correlation coe¢cient and its positive sign is consistent with good economic sense; those who ...nd wage o¤ers 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 signi...cant impact for the two samples considered; it is 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 con...rmed in our study; long-term unemployment is likely to have a scarring e¤ect on subsequent earnings.

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

Let us turn now to the discussion of the results concerning the presence of unemployment traps.

## 6.2   Estimated and observed income ratios

In order to evaluate whether unemployment traps are important in the transition from unemployment to employment for unemployed Belgian workers, we have computed three di¤erent income ratios, in the spirit of Kyyrä (1999).

The key tool in computing these di¤erent ratios is the wage. However, for some observations in the sample the wage is missing either because the individuals have been unemployed for the entire survey period (i.e. those that we will consider in the following as "...ctionally" employed) or because they did not report the wage at the date of the interview. In order to compute the income ratios we have used the expected wage calculated on the basis of (2) in section 4. In addition, for the sample of individuals making the transition into employment, the observed wage is available.

In Table 5, we present the mean of the di¤erent wages used in the computation of the income ratios. First, we calculate three mean wages for those who ...nd jobs; these are the mean observed wages (OW), the mean expected wage (EW_1); and the mean expected wage for those withth a missing wage observation (EW_2). Moreover, for those who do not move into work, we calculate the mean expected wage.

[Table 6 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 di¤erence is larger for women. Furthermore, those who do not ...nd jobs have expected wages that are on average 9 per cent below the expected wages of those that do ...nd employment for men. For women this di¤erence is 21 per cent. In addition to these di¤erences, there are remarkable di¤erences 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.

As mentioned above, we have computed three di¤erent income ratios where, generally, 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 bene...ts, UB; and other non-work related incomes, NWI). Some observations had missing values for unemployment bene...ts. Therefore, we have had to estimate the amount of unemployment bene...ts associated with those spells. As mentioned in section 2, the level of the unemployment bene...ts to which the unemployed is entitled depends on four components; the age, the unemployment duration, the type of family and the previous wage. The estimation that we use is based on the ...rst three elements since the information concerning the wage earned in the last job prior to employment is not available. Therefore, when the information about the unemployment bene...ts is missing, we have decided to impute the maximum unemployment bene...t in our calculations.

The income ratios computed are (1) an observed income ratio (OIR); (2) an estimated income ratio (EIR_1); and (3) a combination of both of them

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(EIR_2):

The ...rst ratio can only be computed for the individuals that move into jobs during the observation period. It writes as

$$OIR = \frac{NWI + OW}{NWI + UB} \tag{5}$$

The second one writes as

$$EIR\_1 = \frac{NWI + EW\_1}{NWI + UB} \tag{6}$$

and is calculated for the entire sample. The third one is a combination of the previous two ratios; for those who ...nd employment and have an observed wage, we used the observed income ratio, and for the remainder of the sample we use the estimated income ratio. It writes as

$$EIR\_2 = OIR \cdot I_{\text{ffound job and wage is observedg}} + EIR\_1 \cdot I_{\text{fdid not ...nd job or no observed wageg}} \tag{7}$$

Since disposable income is likely to vary with the household composition, we have subsequently classi...ed the households in ...ve 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 workers have a ...nancial incentive to move into work.

We have summarized the results obtained when each of the previous ratios is smaller or equal to 1 in tables 7-9 for the entire sample.

[Tables 7-9 to be inserted here]

From Table 7 reporting the ratio lower or equal to 1 for those that move into employment, we notice 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 10 below 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.

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

behaviors could be justi...ed for instance by the fact that the unemployed 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 bene...ts simultaneously with a depressing e¤ect 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.

[Table10 to be inserted here]

When considering Table 8, reporting the estimated income ratio for all the individuals in the sample, we observe that for almost 3 per cent of the men, and for more than 22 per cent of the women, ...nding employment is or will be associated with a ...nancial 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 10, 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 ...nd employment. The numbers for the combined income ratio in Table 9 are very close to those in Table 8.

In Table 11 we summarize the results for those who have not found employ-ment during the survey period.

[Table 11 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 ...nancial 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. Note also from Table 10 that 38 per cent of the women who do not ...nd jobs would gain less than 20 per cent should they accept employment. For women, the striking results associated with the experience of past long-term unemployment con...rms once again the importance of the history on the labour market for this population. Women in this situation are very likely to have no incentives to accepts jobs since the wages they would earn will be lowered by the negative in‡uence of their previous carrier paths.

Finally in table 12 we report the mean estimated and observed income ratios for those indivuals having moved into employment (and having reported the wage) during the observation period.

## 7    Conclusion

In this paper we investigated whether unemployment traps exist and are im-portant for unemployed Belgian workers. In order to assess them, we have estimated their post-unemployment wage and a selection equation (for ...nding employment) using a panel data sample selection model. Speci...cally we have adopted a parametric random e¤ects model speci...cation that has been esti-mated simultaneously by maximum likelihoods techniques. We have then used

these estimates to predict wages for all individuals in our sample, and subsequently calculate income ratios, that is the ratio between income as employed and as unemployed. The income ratios are useful to determine the presence of ...nancial traps.

The empirical analyses has exploited data extracted from the waves 1993-1997 of the Panel Study of Belgian Household and has been led separately on (unbalanced) samples of men and women. The estimation results suggest signi...cant di¤erences in the behaviour of these two groups. A common striking factor a¤ecting both the level of the wages and the participation decisions is the experience of long periods of unemployment in the past; long-term unemployed people have higher di¢culties in (re-)integrating into the labour market and they obtain lower salaries when they succeed in ...nding jobs. Still, more experienced workers have the best earning prospects on the labour market. Finally, better educated women participate more and earn more compared to those holding a basic educational level. However, it should be noticed that the wages o¤ered to women are always lower than those o¤ered 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.

The computation of the observed income ratio suggests that for women a high proportion of the transitions into work are associated with important ...nancial losses, while for men this appears to be an unimportant problem. This ...nding is con...rmed by the results of the estimated income ratio either for all the individuals present in the sample and for those "...ctionally" employed. Especially for them, our analysis shows that 6 per cent of men and 28 per cent of women are "trapped" ...nancially 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. Further, 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 ...nd jobs and who have experienced past long-term unemployment are likely not to have incentives to accept jobs.

The results of our analysis leads di¤erent considerations. First, since long-term unemployment signi...cantly (and negatively) a¤ects both the earnings and the participation decisions, policies oriented in preventing people from becoming long-term unemployed could have as a consequence an improvement in the incentive these people have to enter the labour market and eventually to lower unemployment itself. Second, since experience matters signi...cantly, 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 that interrupt unemployment and allows them to accumulate general human capital. 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 lowering the overall unemployment rate and by there alleviate their labour market problems. Moreover, general abandonment of the right to

eternal unemployment bene...ts, or a more dramatic time-variation in unemployment bene...ts could help in providing the right incentives to take employment, as could the abandonment of the right to 'unemployment-state-speci...c' additional support.

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# 8 Appendix : Tables

## 8.1 Tables

<h2>Table 1: Descriptive Statistics -Men</h2>

| | 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 unemployment | 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 2: 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 unemployment | 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 3: Results from the estimation of (1) - Selection equation

| | MEN | | WOMEN | |
|---|---|---|---|---|
| **Selection equation** | | | | |
| η₁ | -0.2788 | (1.3838) | 0.0823 | (1.6746) |
| η₁ | 1.1511 | (1.4816) | 1.7633 | (1.6985) |
| Age | 0.1167 | (0.0717) | 0 .1064 | (0.1026) |
| Age² | -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) |

## Table 4: Wage equation from (1)

|  | MEN |  | WOMEN |  |
|---|---|---|---|---|
| **Wage equation** |  |  |  |  |
| $\alpha_1$ | 10.0082** | (0.132) | 9.7449** | (0.1855) |
| $\alpha_2$ | 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 5: Other parameters from (1)

|  | MEN |  | WOMEN |  |
|---|---|---|---|---|
| $\rho$ | -0.2051 | (0.3310) | 0.6500** | (0.1465) |
| $\sigma^2_\varepsilon$ | 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 6: Mean Observed and Expected Wages

|  | Men | Women | Men | Women |
|---|---|---|---|---|
|  | FB | | € | |
| **Mean wage for individuals moving into work** |  |  |  |  |
| 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 7: Observed Income Ratio (<=1)

| Observed Income Ratio: OIR | | | | | | |
|---|---|---|---|---|---|---|
| | 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 8: Estimated Income Ratios for all the individuals (EIR_1<=1)

| Estimated Income Ratio: EIR_1 | | | | | | |
|---|---|---|---|---|---|---|
| | 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 9: Estimated Income Ratios for all the individuals (EIR_2<=1)

| Estimated Income Ratio: EIR_2 | | | | | | |
|---|---|---|---|---|---|---|
| | 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 10: 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 ...nd jobs | | | | | |
| Men | 0.4 | 0.8 | 5.5 | 13.4 | 23.1 |
| Women | 8.5 | 18.1 | 27.8 | 33.9 | 38.0 |

Table 11: Estimated Income Ratios for all individuals ...ctionally 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 12: 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 |

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