Do UI benefit levels or benefit duration have an impact on perceived job security?

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Abstract

We question the relation between the perception of job security held by a worker and the UI benefit level she would received if she was to lose her job. The data set used is the French sample of the ECHP, which interviews from 1994 to 2001 the same group of persons. This data set has the advantage of providing all the information needed to simulate the potential monthly sequence of UI benefits: the duration of contribution payments, the previous before tax labor earnings, and the age of the claimant. Therefore we are able to compute for each employed worker: (i) the maximum benefit duration; (ii) the benefit paid at the beginning of the unemployment spell; (iii) the average benefit. To control for selection bias in contract types, we estimate a bivariate probit model with random effects. We also implement a simulated pseudo maximum likelihood method. We find that workers feel more secure when UI benefit level is more generous. Both the benefit paid at the beginning of the unemployment spell and the average benefit have a positive effect on perceived job satisfaction. However, workers are more sensitive to the average benefit, which suggest they are well aware of the decreasing sequence of benefits. At the opposite, and quite surprisingly, we find that a longer maximum benefit duration does not improve perceived job security.

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1 Introduction

Workers face two labor market risks: the risk of job loss and the risk of income loss due to unemployment. Job loss is the major risk, as income loss is only the outcome of job loss. Two labor market institutions are designed to protect employees from these risks: employment protection legislation (EPL) and unemployment insurance (UI) benefits. EPL is intended to protect employees from the risk of job loss, while unemployment insurance provides workers who have lost their job through no fault of their own with monetary payments for a given period of time or until they find a new job. In other words, unemployment benefits reduce the cost of job loss, while EPL reduces the probability of job loss. Their respective impact on the probability of job loss and on the cost of job loss, that is on job security, has been extensively investigated in the literature.

In contrast, much less attention has been paid to the impact of labor market institutions on the perception of job security held by workers. Yet this question is of importance, as the public debate on "social insecurity" has grown significantly in recent years and policymakers are sensitive to concerns expressed by the population. Specifically, we are aware of only two articles that focus on this question. Using individual data on 12 countries from the European Community household Panel (ECHP), Clark and Postel-Vinay (2005) consider the relation between worker's perceived job security and labor market institutions. They first construct an indicator of the perception of job security, which allows them to rank the countries. In a second step, they relate this indicator to the OECD measures of employment protection legislation strictness on the one hand and unemployment insurance benefit generosity on the other hand. They find that workers feel more secure in countries where unemployment insurance benefits are more generous and less secure in countries where jobs are more protected. This finding is corroborated by Böckerman (2004) on 16 countries from the 1998 "Employment Options for the Future" survey. However, the measure of benefit generosity used here (the OECD indicator) poses two problems (well-recognized by Clark and Postel-Vinay). First, it is an average of replacement rates calculated for various "typical-cases", whereas typical cases can never be fully representative of the actual situation. Second, it does not properly account for eligibility requirements.

Our contribution in this work is to overcome these problems by relating the perception of job security directly to the unemployment benefits that would be paid in case of job loss. This article thus provides microeconomic estimates of the impact of benefit levels and benefit duration on subjective job security and allows to answer to the following questions. Do workers feel more secure when UI compensation is more generous? Are they more sensitive to the benefit level or the maximum benefit duration? Are they more sensitive to the benefit paid at the beginning of the unemployment spell or the average benefit? These effects are more easily identified for Europe, where UI benefit levels and benefit durations are generous. One data set, the European Community Household Panel (ECHP), provides all the information necessary to quantify these elasticities for the 15 pre-enlargement members of the European Union between 1994 and 2001. Among these countries, we focus on France mostly because the French unemployment compensation system is one of the very few that remained unchanged in this period.

To help clarify the impact on perceived job insecurity of an increase in the maximum benefit duration or in the benefit level, we first develop a nonstationary job search model which incorporates the main institutional features of unemployment compensation, namely the decreasing sequence of benefits over the unemployment spell and the limited duration of insurance benefits. In this framework, we interpret the probability of job loss multiplied by the change in value functions associated to job loss as a subjective measure of job insecurity. We show that this subjective measure falls with an increase in the benefit level or in the maximum benefit duration.

We then confront the predictions of the stylized job search model with the empirical evidence. The data set used, the French sample of the ECHP, has the advantage of providing all the information necessary to construct the monthly sequence of UI benefits that would be received by the employed upon separation. From this we get four indicators of UI benefit generosity for each employed worker: (i) the maximum benefit duration; (ii) the benefit paid at the beginning of the unemployment spell; (iii) the maximum amount of benefits that can be received; (iv) the average benefit. We estimate a reduced-form of the theoretical model, explicitly controlling for worker selection into different labor contract durations. Two methods are used and their results compared. First we estimate a bivariate probit model with correlated random effects by maximum likelihood. Second, we implement a simulated pseudo maximum likelihood method that requires less strong assumptions.

We find that perceived job security is correlated with some objective characteristics of the employee and, above all, of her job. As expected, the main variable is contract length. Permanent employees appear logically quite more satisfied with their job security than temporary ones. For temporary workers, perceived job security increases with contract length. Furthermore, we find that contract duration is not significantly endogenous in the equation of perceived insecurity.

The predictions of the stylized job search model are partially confirmed by the empirical evidence. On the one hand, workers feel more secure when UI benefit is more generous, which is consistent with the model. Both the benefit received at the beginning of an unemployment spell and the average benefit over the spell have a positive effect on perceived job satisfaction. However, workers are more sensitive to the average benefit, which suggest they are well aware of the decreasing sequence of benefits. On the other hand, workers do not seem sensitive to the maximum benefit duration, while the model predicts the opposite result.

The paper is organized as follows. Section 2 presents the subjective measure of job insecurity we use and the method implemented to simulate the benefit levels that would be paid to an individual if she was to lose her job. In section 3 we develop a stylized nonstationary job search model and derive the impact of an increase in either the benefit level or the maximum benefit duration on job insecurity. An empirical implementation is proposed in section 4. In section 5, we present and discuss the estimation results.

2 The data

The data used are drawn from the 1994 to 2001 waves of the French sample of the ECHP. Three sorts of information are provided. First, at each interview date (in October), individuals over 17 are asked to provide standard information on their personal characteristics and income. More original, if the individual is employed, she has also to report her satisfaction with respect to her labor earnings, job security, type of work, number of working hours, and working conditions. In this paper, we focus exclusively on one issue, satisfaction with job security. Finally, the respondant has to retrospectively state her monthly labor market status during each month of the previous calendar year. As a result, the monthly (self-declared) labor market status (employed or unemployed) of 9,686 individuals is available between January 1993 and December 2000.

The sample is restricted to private sector workers. Self-employed workers are dropped for two reasons. First, they are more sensitive to earnings uncertainty than to job instability. Second, they do not contribute to the financing of unemployment insurance and, as a result, are not covered by the unemployment compensation system. Public sector workers are also excluded since, when they hold a permanent contract, they are protected from the risk of job loss.

2.1 The subjective measure of job insecurity

The ECHP use qualitative questions to elicit expectations. Specifically, the question on job security asks: "How satisfied are you with your present job or business in terms of job security?". Individuals are required to respond on a six-point scale, ranging from 1 (not satisfied at all) to 6 (fully satisfied). In other surveys[1], workers are asked to rate their expectations of job loss, with either a qualitative question ("Thinking about the next twelve months, how likely do you think it is that you will lose your job or be laid-off: very likely, fairly likely, not too likely, or not at all likely?") or a probabilistic question ("What do you think is the percent chance that you will lose your job during the next 12 months?").[2]

In contrast, the question asked in the ECHP is larger. More precisely, satisfaction with job security expresses both an assessment of the risk of lay-off and anxiety about the consequences of

[1] as the General Social Survey or the British Household Panel Survey.

[2] For an interesting discussion of the wording of job security questions, see Dominitz and Manski (1997), or Clark and Postel-Vinay (2005). As argued by Ferraro and LaGrange (1987), Manski (1990), or Dominitz and Manski (1997), probabilistic expectations questions have the potential to yield more informative responses than do qualitative questions.

job loss. These consequences are of three sorts. First, the individual suffers an income loss during the unemployment spell. Second, her human capital depreciates. Finally, she can be forced to accept a lower paying job, because either of human capital depreciation or stigmatization. Unemployment benefits protect workers against income loss due to unemployment. Moreover, recent evidence also suggests that workers receiving unemployment insurance are able to obtain jobs with higher job security (Tatsiramos, 2004), higher wages, and more benefits such as improved health care coverage (Boushey and Wenger, 2005). As a result, higher benefits should lead to higher satisfaction scores with job security. Following Clark and Postel-Vinay (2005), we interpret satisfaction scores as the probability of job loss multiplied by the change in value functions associated to job loss.

There is no definitive way to assess the seriousness with which respondents answer the questions. Any way we should keep in mind the following points. First the scale used by one individual can differ from the one used by someone else. As a result, two workers in the same position can report different satisfaction scores. Second, satisfaction is a relative concept, which depends on the differences between the characteristics of the current job and that of the reference job (Hamermesh, 1977; Clark, 1996, 1997)).

The responses 1 (not satisfied at all), 2 (not very satisfied) and 3 (not fairly satisfied) have been rarely chosen. Therefore the responses 1 to 3 have been merged into a new category: "not satisfied", while the responses "fairly satisfied", "satisfied" and "fully satisfied" have been kept unchanged. The measure of satisfaction used from now will be this variable, measured on a scale of 1 (not satisfied) to 4 (fully satisfied).

The frequencies of responses on the four-point scale presented in Figure 1 show bunching towards the top of the scale. On average over the period 1995-2001, 28.8% of French workers feel insecure. Nevertheless, 2 workers over 3 are "fairly satisfied" or "satisfied" with their job security, while a very small fraction (5.6%) reports very high satisfaction scores.

The percentage of unsatisfied workers falls from 31.7% in 1995 to 23% in 2001, compensated by an increase in the number of the "fairly satisfied" and the "satisfied". This improvement in job security satisfaction is consistent with the economic recovery underway at the time.

2.2 Unemployment insurance compensation

While the data set does not contain any direct information on the unemployment insurance benefit the individual would receive if she was to lose her job, all the information needed to "reconstruct" this variable is provided: the duration of contribution payments, the previous labor earnings, and the age of the claimant.

According to the unemployment insurance rules, the age of the claimant and her contribution payments duration both determine the benefit category (among nine) to which she is assigned (Table 1). Each benefit category is characterized by a maximum benefit duration, T (from 0 month in category 0 to 60 in category 8). The benefit categories remained roughly the same over the period 1994-2001 covered by the data set.[3] Eligibility for insurance benefits requires 4 months of contribution during the 8 months that preceded the unemployment spell. The unemployed who fail to meet this eligibility criterion are assigned to category 0. At the opposite, benefit categories 7 and 8 require 27 months of contribution during the 36 months that preceded the unemployment spell. The maximum benefit duration is then of 45 months for the 50-55 years old, and of 60 months for the more than 55 years old.

As a result, to determine the benefit category the individual would be assigned to if she was to lose her job, we only need to know her age and her employment history during the 24 (respectively 36) months preceding the entry into unemployment if she is less than 50 years old (respectively more than 50 years old). The first variable is directly available in the data set and the second one can be computed using the activity history data set. In principle, this method should be applied after December 1994 for the less than 50 years old and after December 1995 for the more than 50 years old. However, in practice, we are able to compute the benefit catagory for almost every one from October 1995.

The benefit paid at the beginning of the unemployment spell (named "full-rate benefit") depends on the reference wage, denoted by rw and defined as the previous labor earnings (inclusive of social contributions paid by the employee) over (at most) the last 12 months. As the data set provides the net wage, we first compute the reference wage from the net wage, and then the full-rate benefit from the reference wage. The full rate benefit[4] is given by the following formula:

$$b(1) = \min\left[\max\left\{c + 0.404 \times rw,\ 0.574 \times rw,\ \underline{b(1)}\right\},\ 0.75 \times rw,\ \overline{b(1)}\right],$$

where c denotes a constant, $\underline{b(1)}$ the lower bound of the full-rate benefit, and $\overline{b(1)}$ the upper bound. $b(1)$ is thus a non linear function of the reference wage.

Until July 2001, the time-sequencing of UI benefits is declining: after some time (every 4 months until December 1996 and every 6 months from January 1997) the benefit is paid at a reduced rate. However, a minimum allowance is guaranteed. After July 2001, the benefit is constant over time. Applying the unemployment insurance rules (Table 1), we then simulate the benefit net of social contributions paid to an individual i who is unemployed for t months, $b_i(t)$, $\forall t \in \{1, ..., T_i\}$.

On this basis, we define four measures of the generosity of unemployment benefits:

(i) The maximum benefit duration, T_i.

(ii) The full rate benefit, $b_i(1)$.

[3] Except a minor change for category 1 in July 2001.

[4] The benefit calculated using this formula is inclusive of social contributions paid by the individual, while we are interested in the benefit net of social contributions.

(iii) The maximum amount of benefits (defined as the total benefits she will receive if she exhausts her UI entitlement), $\sum_{t=1}^{T_i} b_i(t)$.

(iv) The average monthly benefit (defined as the maximum amount of benefits she can receive divided by her maximum benefit duration), $\overline{b}_i = \frac{\sum_{t=1}^{T_i} b_i(t)}{T_i}$.

Therefore we are able to distinguish between two components in the generosity of UI compensation: benefit level and benefit duration. (ii) and (iv) propose different measures of benefit levels, while (i) refers to maximum benefit duration. (iii) mixes both components. Using these indicators, we can answer to the following questions. Do workers feel more secure when UI compensation is more generous? Do benefit levels or benefit duration have a stronger impact on perceived job security? Are workers more sensitive to the benefit paid at the beginning of the unemployment spell or to the average benefit?

Table 2 shows how the workers currently employed would be assigned to one of the nine compensation categories if they were to lose their job. Only 2.19% of the currently employed workers do not verify the criterion required for UI eligibility, while 75.5% would be assigned to category 5. It is worth noting that these percentages are quite different from those observed for the individuals actually entering unemployment.

3 A theoretical interpretation of satisfaction with job security

To help clarify the impact on job security satisfaction of an increase in benefit duration or benefit level, this section outlines a nonstationary job search model which incorporates the main institutional features of unemployment insurance. In this framework, the probability of job loss multiplied by the change in value functions associated to job loss can interpreted as a subjective measure of job insecurity.

The labor market is described by a discrete time search model in the fashion of Mortensen (1977), but where, in contrast with Mortensen, employees lose their job with some probability. Let $U_i(t)$ denote the expected flow of utility for an agent i who is unemployed for t months. This agent receives a duration-dependent benefit $b_i(t)$. We make three important assumptions on unemployment insurance. First $b_i(t)$ is non-increasing over the unemployment spell.[5] Second the maximum benefit duration is $T_i < +\infty$, which means that from date T_i the individual receives $b_i = 0$. Thirdly, an individual is eligible for UI benefit if and only if she was employed and laid-off.[6] The arrival rate of job offers is λ_i and the wage associated to a job offer is a random drawing from a cdf $F_i(.)$. r is the subjective discount rate. Finally let $E_i(w_i)$ denote the value of employment at wage w_i and δ_i be the rate at which jobs are being lost. To keep the model as simple as possible, we assume that $F_i(.)$, δ_i and λ_i are time-invariant. Nonstationarity thus

[5] We thus allow the benefit to decrease over the duration of entitlement or to be constant.

[6] In other words, we do not take into account that UI eligibility requires a minimum duration of contribution payments.

originates only from the duration-dependence in benefits. This implies that the environment becomes stationary from date T_i.

In this framework, the change in value functions associated to job loss is equal to $[E_i(w_i) - U_i(1)]$ while the probability of job loss is simply δ_i. Therefore $P_i = \delta_i [E_i(w_i) - U_i(1)]$ can be interpreted as measure of the perception of job insecurity held by worker i. This measure of job insecurity is subjective as it depends on the subjective discount rate.[7] With the above assumptions and notations, P_i can be derived.

$E_i(w_i)$ and $U_i(1)$ verify:

$$rE_i(w_i) = w_i + \delta_i [U_i(1) - E_i(w_i)] \tag{1}$$

$$(1+r) U_i(1) = U_i(2) + b_i(1) + \lambda_i \int_{R_i(2)}^{+\infty} [E_i(x) - U_i(2)] \, dF_i(x) \tag{2}$$

Let $R_i(t)$ denote the reservation wage of an agent i who is unemployed for t units of time, $1 \leq t \leq T_i$. The reservation wage at date t verifies: $(r + \delta_i) U_i(t) = R_i(t) + \delta_i U_i(1)$.

Substituting $E_i(x)$ from (1) into (2) and remplacing $U_i(2)$ by $\frac{R_i(2)+\delta_i U_i(1)}{r+\delta_i}$ in the integral, we obtain:

$$rU_i(1) = U_i(2) - U_i(1) + b_i(1) + \lambda_i \int_{R_i(2)}^{+\infty} \left[\frac{x - R_i(2)}{r + \delta_i} \right] dF_i(x) \tag{3}$$

Then equations (1)-(3) give:

$$P_i = \delta_i [E_i(w_i) - U_i(1)] = \frac{\delta_i [w_i - R_i(1)]}{r + \delta_i} \tag{4}$$

where

$$(1+r) R_i(t) + \delta_i R_i(1) = R_i(t+1) + (r + \delta_i) b_i(t) + \lambda_i \int_{R_i(t+1)}^{+\infty} [x - R_i(t+1)] \, dF_i(x), \; t \leq T_i \tag{5}$$

and

$$r\overline{R}_i + \delta_i R_i(1) = \lambda_i \int_{\overline{R}_i}^{+\infty} \left[x - \overline{R}_i\right] dF_i(x), \; t > T_i \tag{6}$$

where $\overline{R}_i$ denotes the time-invariant reservation wage.

Equation (4) states that perceived job insecurity depends on the rate at which jobs are being lost and on the difference between the reservation wage in the first month of unemployment and the current wage. This implies that the effect of a change in T_i or in $b_i(t)$ on perceived job insecurity goes only through the reservation wage at date 1.

Equations (5) and (6) describe the sequence of reservation wages over a spell of unemployment. At each date t, the reservation wage depends on the reservation wage at date 1, as an

[7] And also because value functions represent the expected discounted flows of utility associated to the different labor market states.

individual finding a job now can be laid-off at some future date. Using backward induction, we find that $R_i(1)$ depends on the sequence of UI benefits ($b_i(t)$, $1 \leq t \leq T_i$), the subjective discount rate (r), the rate at which jobs are being lost (δ_i), the arrival rate of job offers (λ_i), and the distribution of wage offers ($F_i(.)$). This leads to the following proposition.

Proposition 1 *Let* $b_i^0(t) \geq b_i^0(t+1)$, $t \leq T_i$, *and* $b_i^0(t) = 0$, $t > T_i$.

- *Assume* $b_i(t) = b_i^0(t) + \Delta$, $t \leq T_i$, *and* $b_i(t) = b_i^0(t)$, $t > T_i$. *Then* $\frac{\partial R_i(1)}{\partial \Delta} < 0$ *and* $\frac{\partial P_i}{\partial \Delta} < 0$.
- *Assume* $b_i(t) = b_i^0(t)$, $t \leq T_i$, $b_i(T+1) \leq b_i(T)$, *and* $b_i(t) = b_i^0(t)$, $t > T_i + 1$. *Then* $\left.\frac{\partial R_i(1)}{\partial b_i(T+1)}\right|_{b_i(T+1)=0} < 0$ *and* $\left.\frac{\partial P_i}{\partial b_i(T+1)}\right|_{b_i(T+1)=0} < 0$.

Proof. See the appendix ■

This proposition states that an improvement in either the benefit level or the maximum duration benefit increases the reservation wage at the beginning of a potential unemployment spell, which leads to a fall in perceived job insecurity. This stylized model thus provides a guide to the potential effects of an increase in T_i or $b_i(t)$ on perceived job insecurity. However, it is obviously over-simplified. In particular, the assumption that a worker automatically qualifies for UI benefits if she was previously employed and laid-off from her last job is out of line with the existing benefit systems in Europe. In the rest of the paper, we estimate a reduced-form of this model, and compare the predictions of the theoretical model with the empirical results.

4 The econometric model

4.1 The empirical implementation

In this section, we present the statistical framework that we use to analyze the relation between worker's perceived job security and the UI benefit she would perceived if she was to involuntary lose her job. Let P_{is} denote the perception of job security held by worker i at date s and P_{is}^* the latent variable associated to P_{is}.[8] P_{is}^* is written as:

$$P_{is}^* = \alpha g(b_{is}(t) \, | t = 1, ..., T_{is}) + \sum_{k=1}^{3} \gamma_k D_{k_{is}} + X_{1_{is}} \beta_1 + Z_{1_i} \lambda_1 + \varepsilon_{1_{is}}, \qquad s = 1, ..., 7, \qquad (7)$$

The notation is the following. First, $b_{is}(t)$ denotes the benefit net of social contributions paid to an individual who is unemployed for t months, $\forall t \in \{1, ..., T_{is}\}$, where T_{is} is the maximum benefit duration. The function $g(.)$ is a measure of the generosity of UI benefits and for the moment we do not specify more precisely its the functional form.

[8] Defining the thresholds a_0 to a_4, the relation between P_{is}^* and P_{is} verifies: $a_{m-1} \leqslant P_{is}^* < a_m \Longleftrightarrow P_{is} = m$, where $m \in \{1, ..., 4\}$, $a_0 = -\infty$, and $a_4 = +\infty$.

To keep close to the theoretical model developed above, we should integrate as covariates the wage (w_{is}), the subjective discount rate (r_i), the rate at which jobs are being lost (δ_{is}), the arrival rate of job offers (λ_{is}), and the distribution of wage offers ($F_{is}(.)$). However, apart from the wage, these variables are not directly provided by the data set. As we are not interested in their precise impact on perceived job security, we approximate them through different covariates. For instance, the probability of job loss is approximated by contract length, denoted by D_{is}[9], and by the other characteristics of the current job (job tenure, working time, sector). The arrival rate of job offers and the distribution of wage offers are approximated by the characteristics of the worker (age, sex, educational level) and the economic situation. Finally, to approximate the subjective discount rate, we introduce variables that describe the family situation (presence of children in the household, employment status of the partner). On the one hand these variables are likely to affect the perception of the cost of job loss. This cost is probably alleviated for someone who has no child or whose partner holds a very secure job. On the other hand, these family variables are likely to affect the scale used by the individual to evaluate her own job security. For example, the job held by another member of the household can be used as a reference. The vector of covariates $X_{1_{is}}$ consists of the wage and all the time-varying variables mentioned above (except D_{is}), while the vector Z_{1_i} includes the time-invariant variables.

It is difficult to reject the hypothesis that some unobservable variables (risk aversion, dynamism, ...) explain both perceived job security and contract duration, i.e. $E\left(\varepsilon_{1_{is}} \mid D_{k_{is}}\right) \neq 0$. As for risk aversion, the argument is the following. On the one hand, the willingness to accept a short-term contract depends negatively on risk-aversion: highly risk-averse agents will be more reluctant than slightly risk-averse ones. On the other hand, slightly risk-averse workers are more satisfied with their job security, everything else being equal. As a consequence, the estimates of the parameters α, γ_k and β_1 are likely to be biased. In order to control for this selection bias, we explicitly model worker selection into contract duration. Thus let D_{is}^* verifies[10]:

$$D_{is}^* = X_{2_{is}}\beta_2 + Z_2\lambda_2 + \varepsilon_{2_{is}}, \qquad s = 1, ..., 7 \tag{8}$$

where $X_{2_{is}}$ and Z_2 include the characteristics of the worker, the characteristics of her job, family variables and variables that account for the past work experience.

4.2 Two methods of estimation

In this section we present the two methods we use to estimate the bivariate probit model defined by equations (7) and (8).

[9] $D_{is} = 1$ if individual i holds a temporary or fixed-term contract whose duration is less than 6 months; $D_{is} = 2$ if the contract lasts between 6 and 12 months; $D_{is} = 3$ if the temporary contract lasts longer than 1 year; $D_{is} = 4$ if the individual holds a permanent contract.

[10] $D_{k_{is}} = 1\!\!1\,(D_{is} = k) = 1\!\!1\,(b_{k-1} \leqslant D_{is}^* < b_k)$, where $k \in \{1, ..., 4\}$, $b_0 = -\infty$, and $b_4 = +\infty$.

4.2.1 A bivariate probit model with correlated random effects

Assume the error term $\varepsilon_{1_{is}}$ can be decomposed into the sum of a random individual effect θ_{1_i} and an idiosyncratic error $u_{1_{is}}$: $\varepsilon_{1_{is}} = \theta_{1_i} + u_{1_{is}}$. Similarly, $\varepsilon_{2_{is}} = \theta_{2_i} + u_{2_{is}}$. θ_{1_i} and θ_{2_i} capture unobserved individual features that are given and do not change over time, such as optimism, dynamism or risk aversion. The idiosyncratic errors are supposed to be normally distributed with mean zero and variance 1 and serially uncorrelated. Moreover, as we want to allow for correlation between the explanatory variables and the individual effect, we assume that the random individual effect can itself be decomposed into two terms[11]:

$$\theta_{1i} = \overline{X}_{1_i}\mu_1 + \sum_{k=1}^{3} \pi_k \overline{D}_{k_i} + \sigma_1 \eta_{1_i}$$
$$\theta_{2_i} = \overline{X}_{2_i}\mu_2 + \sigma_2 \eta_{2_i}$$

where η_1 and η_2 are two individual effects normally distributed with mean zero and variance 1, and $\overline{X}_{1_i}$, $\overline{D}_{k_i}$, and $\overline{X}_{2_i}$ are the respective time-averages of $X_{1_{is}}$, $D_{k_{is}}$, and $X_{2_{is}}$, $s = 1, ..., 7$. We assume that $E\left(u_{j_{is}} \mid \overline{X}_{j_i}, \eta_{j_i}\right) = 0$ and $E\left(\eta_{j_i} \mid \overline{X}_{j_i}\right) = E\left(\eta_{j_i}\right) = 0$, $\forall\ j = 1, 2$. $\overline{X}_{1_i}$ and $\overline{X}_{2_i}$ are thus supposed to be uncorrelated with the idiosyncratic error in each time period and with the random individual effect.

Equations (7) and (8) can then be rewritten as follows:

$$P_{is}^* = \alpha g_s(b_{is}(t)\,|t = 1, ..., T_{is}) + \sum_{k=1}^{3} \gamma_k D_{k_{is}} + X_{1_{is}}\beta_1 + Z_1\lambda_1 + \overline{X}_{1_i}\mu_1 + \sum_{k=1}^{3} \pi_k \overline{D}_{k_i} + \sigma_1\eta_{1_i} + u_{1_{is}} \quad (9)$$

$$D_{is}^* = X_{2_{is}}\beta_2 + Z_2\lambda_2 + \overline{X}_{2_i}\mu_2 + \sigma_2\eta_{2_i} + u_{2_{is}} \quad (10)$$

Finally, we allow for correlation between the individual effects on the one hand and the idiosyncratic errors on the other hand, but not between random effects and error terms. This restriction on the full joint distribution of the time-constant unobservables and the idiosyncratic errors allows to identify the parameters ρ, ψ, σ_1 and σ_2.

$$\begin{pmatrix} u_{1_{is}} \\ u_{2_{is}} \\ \eta_{1_i} \\ \eta_{2_i} \end{pmatrix} \rightsquigarrow N\left(\begin{pmatrix} 0 \\ 0 \\ 0 \\ 0 \end{pmatrix}, \begin{pmatrix} 1 & \rho & 0 & 0 \\ \rho & 1 & 0 & 0 \\ 0 & 0 & 1 & \psi \\ 0 & 0 & \psi & 1 \end{pmatrix}\right)$$

Let $\Pr_{is}\left(m, k\left|\eta_{1_i}, \eta_{2_i}\right.\right)$ denote the probability (conditional on η_{1_i} and η_{2_i}) that at date s an individual i reports $P_{is} = m$ and $D_{is} = k$. Then,

$$\Pr_{is}\left(m, k\left|\eta_{1_i}, \eta_{2_i}\right.\right) = \Pr\left(a_{m-1} < P_{is}^* \leq a_m, b_{k-1} < D_{is}^* \leq b_k \left|\eta_{1_i}, \eta_{2_i}\right.\right) =$$
$$\Phi_2\left(a_m - E\left(P_{is}^*\right), b_k - E\left(D_{is}^*\right); \rho\left|\eta_{1_i}, \eta_{2_i}\right.\right) - \Phi_2\left(a_{m-1} - E\left(P_{is}^*\right), b_k - E\left(D_{is}^*\right); \rho\left|\eta_{1_i}, \eta_{2_i}\right.\right)$$
$$-\Phi_2\left(a_m - E\left(P_{is}^*\right), b_{k-1} - E\left(D_{is}^*\right); \rho\left|\eta_{1_i}, \eta_{2_i}\right.\right) + \Phi_2\left(a_{m-1} - E\left(P_{is}^*\right), b_{k-1} - E\left(D_{is}^*\right); \rho\left|\eta_{1_i}, \eta_{2_i}\right.\right)$$

[11] We use the Mundlack's (1978) version of the Chamberlain model (1980) that explicitly allows the unobservables to be correlated with some elements of X_{is}.

where Φ_2 denotes the CDF of the bivariate normal distribution.

At date s, the likelihood contribution (conditional on η_{1_i} and η_{2_i}) of an individual i can be written as:

$$L_{is}\left(\eta_{1_i},\eta_{2_i}\right)=\prod_{m=1}^{4}\prod_{k=1}^{4}\left[\Pr_{is}\left(m,k\left|\eta_{1_i},\eta_{2_i}\right.\right)\right]^{1(P_{is}=m,D_{is}=k)}$$

The unconditional likelihood is then given by:

$$L_i=\iint\prod_{s=1}^{7}L_{is}\left(\eta_{1_i},\eta_{2_i}\right)\varphi_2\left(\eta_{1_i},\eta_{2_i};r\right)d\eta_{1_i}d\eta_{2_i} \tag{11}$$

where φ_2 denotes the density of the bivariate normal distribution.

The parameters are estimated by maximizing the log-likelihood of the sample.

4.2.2 A simulated pseudo maximum likelihood method

Let assume now that the error term $\varepsilon_{1_{is}}$ can be decomposed into two terms, the time average of the covariates and an error term $\omega_{1_{is}}$: $\varepsilon_{1_{is}}=\overline{X}_{1_i}\mu_1+\sum_{k=1}^{3}\pi_k\overline{D}_{k_i}+\omega_{1_{is}}$. Similarly, let $\varepsilon_{2_{is}}=\overline{X}_{2_i}\mu_2+\omega_{2_{is}}$, where $\omega_{1_{is}}=\zeta\omega_{2_{is}}+\sqrt{1-\zeta^2}\upsilon_{is}$ and $\upsilon_{is}\hookrightarrow\aleph(0,1)$.

Replacing the error term $\varepsilon_{1_{is}}$ by its expression in equation (9) gives,

$$P_{is}^{*}=\alpha g_s(b_{is}\left(t\right)\left|t=1,...,T_{is}\right.)+\sum_{k=1}^{3}\gamma_k D_{k_{is}}+X_{1_{is}}\beta_1+Z_1\lambda_1+\overline{X}_{1_i}\mu_1+\sum_{k=1}^{3}\pi_k\overline{D}_{k_i}+\zeta\omega_{2_{is}}+\sqrt{1-\zeta^2}\upsilon_{is}. \tag{12}$$

Equation (12) can be estimated by drawing realizations of $\omega_{2_{is}}$ from the conditional distribution. In this aim, we implement a 4-step method:

1. equation (10) is estimated by a pooled probit, which gives estimators of β_2 and μ_2;

2. H error terms $\omega_{2_{ish}}$, $h=\{1,\ \ ,H\}$, verifying the observations are drawn from the normal distribution;

3. equation (12) is estimated by maximum likelihood, which gives estimators of α, β_1, γ_k, λ_1 and ζ;

4. bootstrap to estimate the standard errors.

4.2.3 Identification

Let us briefly discuss the identification of parameters α and γ_k, which is common to both methods. First, according to the unemployment insurance rules (Table 1), $g_s(.)$ is completely determined by three variables: the age, the wage, and the duration of contribution payments (over the last 8, 12, 24 or 36 months). As a result, to identify the parameter α, which measures the impact of $g_s(.)$ on P_{is}^*, one of these three variables must be excluded from $X_{1_{is}}$. Table 3 presents the results of the estimation of the bivariate probit model defined by equations (9) and (10) where $g_s(.)$ is excluded from the explanatory variables of perceived job security while the duration of contribution payments is added. It shows that the duration of contribution payments does not affect P_{is}^* and therefore can be excluded from the $X_{1_{is}}$, which identifies the parameter α. Second, the identification of the parameters γ_k is obtained by imposing that one variable in X_{2is} is not in X_{1is}: the existence of an unemployment spell before the current job.

5 Results

5.1 The determinants of satisfaction with job security

We first put aside the question of UI benefit level and maximum benefit duration, and concentrate on the other covariates. Table 4 reports results from the bivariate probit model with correlated random effects. The simulated pseudo maximum likelihood method gives very similar results.

The characteristics of the worker

Every thing else being equal, old workers (more than 55 years old) and young workers (less than 35 years old and, above all, less than 25 years old) feel more secure than their adult counterparts (between 35 and 55). Yet when looking at the determinants of contract length (Table 6), we find a quite different picture: the probability of occupying a permanent job increases significantly with age. Thus young workers hold more often fixed-term contracts. However, for a given contract length, they are more satisfied with their job security.

Gender is found to have no significant effect on job security satisfaction. This result is at variance with Clark (1997) who finds that in UK women report higher satisfaction scores with their earnings, job security or working conditions than men. College graduates are more satisfied with their job security than high school graduates and employees with no diploma or at most an elementary school diploma or a vocational diploma.

The family environment

The presence of children in the household is associated with a lower perceived job security. A possible explanation for this is that the cost of job loss is more severe for employees with dependent children. The effect of the employment status of the partner is more surprising. Employees whose partner himself/herself works in the public sector report significantly lower satisfaction scores than the others. Therefore, the idea that, when one member of the household holds a very secure job, this alleviates the consequences of losing their job for the other members and thus leads them to feel less anxious is proved false. Actually they feel more anxious. This striking finding may be interpreted in the following way. As already said, satisfaction is a relative concept, which depends on the differences between the characteristics of the current job and that of the reference job. The job held by the partner or by the rest of the family is probably used as a reference. When this is a very secure job (typically a permanent job in the public sector), workers are more likely to feel anxious for a given risk of job loss.

The characteristics of the job

Permanent employees appear logically quite more satisfied with their job security than temporary ones. Furthermore, for temporary workers, perceived job security increases with contract length. This result is at variance with Deloffre and Rioux (2004) who, using the European sample of the ECHP in 2000, find that a longer contract length does not help workers feel more secure.

The current wage is found to have no impact on perceived job security. This result is contradictory to the prediction of the job search model that a good wage increases the cost of job loss and thus decreases perceived job security.

Endogeneity of contract length

Let examine now the endogeneity of contract length. As already said, endogeneity is allowed by either the correlation between the error terms (ρ) or the correlation between the individual effects (ψ). The parameter ψ is found to be positive and significant. This means that some unobserved individual features that do not vary over time explain both contract length and perceived job security. For instance, dynamic individuals are more likely to hold a permanent contract (because they have searched more intensively for a job). They are also more likely to be satisfied with their job security. However, the correlation coefficient is very small: 10%. On the other hand, the parameter ρ is negative but non significant, which can be interpreted in the following way. The unobserved variables (changing over time) that explain contract length do not affect perceived job security. On the whole, contract duration is not significantly endogenous in the equation of satisfaction.

5.2 Benefit level versus maximum benefit duration

Let examine now how the two parameters of UI compensation, the benefit level and the maximum benefit duration, affect perceived job security. Table 5 reports the parameters estimates for different specifications of $f_s(b_{is}(t)\,|t=1,...,T_{is})$.

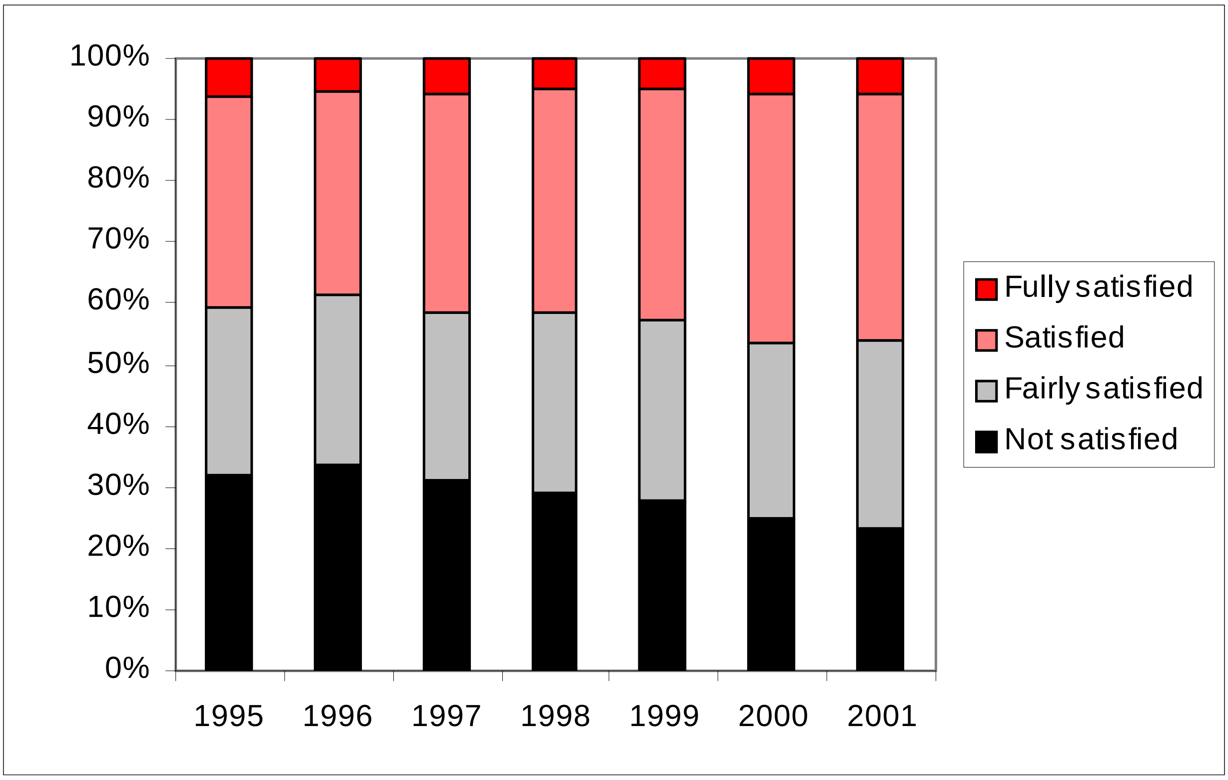
We first consider the impact of the maximum benefit level, defined as $\overline{b}_{is}.T_{is}$ (model (1)). The effect is strongly non linear, since individuals of the first quintile are more satisfied with their job security than individuals of the second and third quintiles, but less than individuals of the fourth and fifth quintiles.

The impact of the benefit level paid at t is likely to differ from that paid at t'. In particular, it is interesting to compare the impact of the benefit paid to a recently laid-off worker ($b_{is}(1)$) with the impact of the average benefit $\left(\overline{b}_{is}\right)$. In this aim we estimate models (2) and (3). Model (3) considers the relation between perceived job security and the quintiles of the distribution of $b_{is}(1)$, while model (2) examines the impact of $\overline{b}_{is}$. We find that both the benefit paid at the beginning of a potential unemployment spell ($b_{is}(1)$) and the average benefit ($\overline{b}_{is}$) have a positive effect on perceived job satisfaction. However, the model (2) with $\overline{b}_{is}$ performs better than the model (3) with $b_{is}(1)$. This suggests that individuals are well aware that UI benefit declines over time.

Finally model (4) examines the effect of the maximum benefit duration. Quite surprisingly, we find that the maximum benefit duration (T_{is}) has no impact on perceived job security.

The predictions of the stylized job search model are thus partially confirmed by the empirical evidence. On the one hand, workers feel more secure when UI benefit is more generous, which is consistent with the model. On the other hand, workers do not seem sensitive to the maximum benefit duration, while the model predicts the opposite result.

Figure 1: Job security satisfaction, 1995-2001, France



Appendix

To prove Proposition 1, we first establish the following Lemma.

Lemma 2 *Let* $b_i(t) \geq b_i(t+1)$, $t \leq T_i$, *and* $b_i(t) = 0$, $t > T_i$.
Then $R_i(t) > R_i(t+1)$, $1 < t \leq T_i$.

Proof. Lemma 2
Since $R_i(T_i) = \overline{R}_i + \left(\frac{r+\delta_i}{1+r}\right) b_i(T_i)$, the inequality holds for $t = T_i$.
Assume that $R_i(t+1) > R_i(t+2)$. Then $R_i(t)$ and $R_i(t+1)$ verify:
$(1+r)(R_i(t) - R_i(t+1)) = (r+\delta_i)(b_i(t) - b_i(t+1)) + R_i(t+1) - R_i(t+2)$
$+\lambda_i \int_{R_i(t+1)}^{+\infty} [x - R_i(t+1)]\, dF_i(x) - \lambda_i \int_{R_i(t+1)}^{+\infty} [x - R_i(t+2)]\, dF_i(x)$
Since $R_i(t+1) + \lambda_i \int_{R_i(t+1)}^{+\infty} [x - R_i(t+1)]\, dF_i(x)$ is an increasing function of R, it follows that $R_i(t) > R_i(t+1)$ ■

Proof. Proposition 1
We first prove the first part of Proposition 1.
Assume that $b_i(t) = b_i^0(t) + \Delta$, $1 < t \leq T_i$.
The reservation wage at date t is given by equation (5) where $b_i(t)$ is replaced by $b_i^0(t) + \Delta$.
Deriving this equation with respect to Δ gives:

$$(1+r)\frac{\partial R_i(t)}{\partial \Delta} + \delta_i \frac{\partial R_i(1)}{\partial \Delta} = (r+\delta_i) + [1 - \theta_i(t)]\frac{\partial R_i(t+1)}{\partial \Delta},\ t \leq T_i \tag{13}$$

$$\delta_i \frac{\partial R_i(1)}{\partial \Delta} = -\left(r + \overline{\theta}_i\right)\frac{\partial \overline{R}_i}{\partial \Delta} \tag{14}$$

where $\theta_i(t) = \lambda_i (1 - F_i(R_i(t+1)))$.

Substracting equations (13) at date T_i and (14) at date $T_i + 1$, we obtain:

$$(1+r)\left[\frac{\partial R_i(T_i)}{\partial \Delta} - \frac{\partial \overline{R}_i}{\partial \Delta}\right] = r + \delta_i$$

Thus $\frac{\partial R_i(T_i)}{\partial \Delta} > \frac{\partial \overline{R}_i}{\partial \Delta}$.
Now assume that $\frac{\partial R_i(t+1)}{\partial \Delta} > \frac{\partial R_i(t+2)}{\partial \Delta}$. Substracting equations (13) at date t and $t+1$ gives:

$$(1+r)\left[\frac{\partial R_i(t)}{\partial \Delta} - \frac{\partial R_i(t+1)}{\partial \Delta}\right] = [1 - \theta_i(t)]\frac{\partial R_i(t+1)}{\partial \Delta} - [1 - \theta_i(t+1)]\frac{\partial R_i(t+2)}{\partial \Delta}$$

Since $\theta_i(t) < \theta_i(t+1)$ (Lemma 2), it follows that $\frac{\partial R_i(t)}{\partial \Delta} > \frac{\partial R_i(t+1)}{\partial \Delta}$.
In particular, $\frac{\partial R_i(1)}{\partial \Delta} > \frac{\partial \overline{R}_i}{\partial \Delta}$. Moreover, $\frac{\partial R_i(1)}{\partial \Delta}$ and $\frac{\partial \overline{R}_i}{\partial \Delta}$ are of opposite sign from (14).
It follows that: $\frac{\partial R_i(1)}{\partial \Delta} > 0$, $\frac{\partial \overline{R}_i}{\partial \Delta} < 0$ and $\frac{\partial P_i}{\partial \Delta} < 0$.

We prove now the second part of Proposition 1.
Assume that $b_i(T_i+1) = \varepsilon$.
Deriving equation (5) with respect to ε gives:

$$(1+r)\frac{\partial R_i(t)}{\partial \varepsilon} + \delta_i \frac{\partial R_i(1)}{\partial \varepsilon} = [1-\theta_i(t)]\frac{\partial R_i(t+1)}{\partial \varepsilon},\ t \leq T_i \tag{15}$$

$$(1+r)\frac{\partial R_i(T_i+1)}{\partial \varepsilon} + \delta_i \frac{\partial R_i(1)}{\partial \varepsilon} = (r+\delta_i) + [1-\theta_i(t)]\frac{\partial \overline{R}_i}{\partial \varepsilon} \tag{16}$$

$$\delta_i \frac{\partial R_i(1)}{\partial \varepsilon} = -\left(r+\overline{\theta}_i\right)\frac{\partial \overline{R}_i}{\partial \varepsilon} \tag{17}$$

where $\theta_i(t) = \lambda_i(1-F_i(R_i(t+1)))$.
Substracting equations (16) at date T_i+1 and (17) at date T_i+2, we obtain:

$$(1+r)\left[\frac{\partial R_i(T_i+1)}{\partial \varepsilon} - \frac{\partial \overline{R}_i}{\partial \varepsilon}\right] = r+\delta_i$$

Thus $\frac{\partial R_i(T_i+1)}{\partial \varepsilon} > \frac{\partial \overline{R}_i}{\partial \varepsilon}$.
Now assume that $\frac{\partial R_i(t+1)}{\partial \varepsilon} > \frac{\partial R_i(t+2)}{\partial \varepsilon}$. Substracting equations (15) at date t and $t+1$ gives:

$$(1+r)\left[\frac{\partial R_i(t)}{\partial \varepsilon} - \frac{\partial R_i(t+1)}{\partial \varepsilon}\right] = [1-\theta_i(t)]\frac{\partial R_i(t+1)}{\partial \varepsilon} - [1-\theta_i(t+1)]\frac{\partial R_i(t+2)}{\partial \varepsilon}$$

Since $\theta_i(t) < \theta_i(t+1)$ (Lemma 2), it follows that $\frac{\partial R_i(t)}{\partial \varepsilon} > \frac{\partial R_i(t+1)}{\partial \varepsilon}$.
In particular, $\frac{\partial R_i(1)}{\partial \varepsilon} > \frac{\partial \overline{R}_i}{\partial \varepsilon}$. Moreover, $\frac{\partial R_i(1)}{\partial \varepsilon}$ and $\frac{\partial \overline{R}_i}{\partial \Delta}$ are of opposite sign from (17).
It follows that: $\frac{\partial R_i(1)}{\partial \varepsilon} > 0$, $\frac{\partial \overline{R}_i}{\partial \varepsilon} < 0$ and $\frac{\partial P_i}{\partial \varepsilon} < 0$ ■

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Table 1: The unemployment insurance rules in France

A – **January 1994 – December 1996**

Category	Contribution duration	Age	Duration at full rate (months)	Stage duration (months)	% of decrease	Compensation duration (months)
0	< 4 months during the last 8 months	Indifferent	0	0	0	0
1	4 months during the last 8 months	Indifferent	0	4	25	4
2	6 months during the last 12 months	Indifferent	4	4	15	7
3 4	8 months during the last 12 months	< 50 years ≥ 50 years	4 7	4 4	17 15	15 21
5' 5 6	14 months during the last 24 months	< 25 years 25-50 years ≥ 50 years	7 9 15	4 4 4	17 17 15	30 30 45
7 8	27 months during the last 36 months	50-55 years ≥ 55 years	20 27	4 4	15 8	45 60

B – **January 1997 – June 2001**

Category	Contribution duration	Age	Duration at full rate (months)	Stage duration (months)	% of decrease	Compensation duration (months)
0	< 4 months during the last 8 months	Indifferent	0	0	0	0
1	4 months during the last 8 months	Indifferent	4	0	0	4
2	6 months during the last 12 months	Indifferent	4	6	15	7
3 4	8 months during the last 12 months	< 50 years ≥ 50 years	4 7	6 6	17 15	15 21
5 6	14 months during the last 24 months	< 50 years ≥ 50 years	9 15	6 6	17 15	30 45
7 8	27 months during the last 36 months	50-55 years ≥ 55 years	20 27	6 6	15 8	45 60

C – **July 2001 – December 2001**

Category	Contribution duration	Age	Duration at full rate (months)	% of decrease	Compensation duration (months)
0	< 4 months during the last 8 months	Indifferent	0	0	0
1	4 months during the last 18 months	Indifferent	4	0	4
2	6 months during the last 12 months	Indifferent	7	0	7
3 4	8 months during the last 12 months	< 50 years ≥ 50 years	15 21	0 0	15 21
5 6	14 months during the last 24 months	< 50 years ≥ 50 years	30 45	0 0	30 45
7 8	27 months during the last 36 months	50-55 years ≥ 55 years	45 60	0 0	45 60

Table 2: Potential unemployment compensation categories

Category	Percentage	Compensation Duration
0	2.19	0
1	0.96	4
2	1.02	7
3	5.46	15
4	0.35	21
5	75.55	30
6	0.53	45
7	9.04	45
8	4.91	60

Source: French sample of the ECHP, 1995-2001.

Table 3: Identification of α in the equation of job security satisfaction

Duration of contribution payments	0.00	(0.58)
Age		
<25 years	0.30	(5.72)
25-35 years	0.11	(3.39)
35-45 years	*Ref.*	
45-55 years	-0.03	(-0.83)
> 55 years	0.29	(4.39)
Male	0.035	(0.97)
Educational level		
No diploma or elementary school	*Ref.*	
Vocational diploma	-0.02	(-0.59)
High school graduate	0.04	(0.82)
College graduate (≤ 2)	0.12	(2.07)
College graduate (> 2)	0.15	(2.28)
Reason for leaving previous job		
First job	0.01	(0.22)
Redundancy, dismissal	-0.15	(-2.99)
End of temporary contract	-0.07	(-1.42)
Voluntary quit	0.02	(0.47)
Same job since 1979	*Ref.*	
Contract length		
1-6 months	-1.75	(-14.71)
6-12 months	-1.39	(-14.93)
> 1 year	-0.99	(-10.53)
Permanent job	*Ref.*	
Wage	0.048	(2.95)
Working time		
Full-time	*Ref.*	
Voluntary part-time	0.13	(2.72)
Involuntary part-time	-0.20	(-3.82)
Presence of children	-0.16	(-5.79)
Employment status of partner		
No partner	0.17	(3.43)
Inactivity	0.12	(2.66)
Unemployment	0.15	(2.74)
Self-employment	0.14	(1.79)
Private sector	0.14	(3.21)
Public sector	*Ref.*	
a_1	-1.04	(-7.38)
a_2	0.06	(83.32)
a_3	2.02	(89.61)
σ_1	0.92	(54.89)
ρ	-0.05	(-1.09)
r	0.08	(2.16)

Source: private sector employees of the French sample of the ECHP, 1995-2001.
Note: t-ratio are in parentheses. Estimation of a bivariate probit model with correlated random effects by maximum likelihood. Explanatory variables include sector dummies and variables controlling for the economic situation.

Table 4: The determinants of job security satisfaction

Age		
<25 years	0.30	(6.11)
25-35 years	0.12	(3.63)
35-45 years	*Ref.*	
45-55 years	-0.06	(-1.64)
> 55 years	0.20	(3.00)
Male	0.017	(0.46)
Educational level		
No diploma or elementary school	*Ref.*	
Vocational diploma	-0.03	(-0.68)
High school graduate	0.04	(0.79)
College graduate (≤ 2)	0.13	(1.73)
College graduate (> 2)	0.14	(1.91)
Reason for leaving previous job		
First job	-0.04	(-0.78)
Redundancy, dismissal	-0.16	(-3.28)
End of temporary contract	-0.10	(-2.00)
Voluntary quit	-0.00	(-0.03)
Same job since 1979	*Ref.*	
Contract length		
1-6 months	-1.75	(-27.21)
6-12 months	-1.40	(-20.33)
> 1 year	-1.01	(-13.25)
Permanent job	*Ref.*	
Wage	0.015	(0.60)
Working time		
Full-time	*Ref.*	
Voluntary part-time	0.07	(1.31)
Involuntary part-time	-0.29	(-4.07)
Presence of children	-0.15	(-5.33)
Employment status of partner		
No partner	0.33	(7.01)
Inactivity	0.28	(6.02)
Unemployment	0.29	(5.32)
Self-employment	0.28	(3.49)
Private sector	0.25	(5.79)
Public sector	*Ref.*	
a_1	-1.19	(-8.76)
a_2	-0.09	(83.42)
a_3	1.86	(89.58)
σ_1	0.91	(54.89)
ρ	-0.047	(-1.10)
r	0.08	(2.16)

Source: private sector employees of the French sample of the ECHP, 1995-2001.

Note: t-ratio are in parentheses. Estimation of a bivariate probit model with correlated random effects by maximum likelihood. Explanatory variables include sector dummies and variables controlling for the economic situation.

Table 5: The effect of UI benefit level and benefit duration

		(1)		(2)		(3)		(4)	
$\bar{b} \times T$	Q1	0.19	(4.83)						
	Q2	0.13	(4.05)						
	Q3	*Ref.*							
	Q4	0.28	(8.25)						
	Q5	0.40	(8.38)						
$\bar{b}$	Q1			0.62	(13.80)				
	Q2			0.44	(12.68)				
	Q3			*Ref.*					
	Q4			0.68	(15.15)				
	Q5			0.98	(18.89)				
b(1)	Q1					0.37	(8.16)		
	Q2					0.28	(8.12)		
	Q3					*Ref.*			
	Q4					0.41	(11.62)		
	Q5					0.73	(13.88)		
T								0.002	(1.17)

Notes: *T* is the maximum benefit duration, *b(1)* is the full-rate benefit, $\bar{b}$ is the average benefit, and $\bar{b} \times T$ is the maximum benefit level. T-ratio are in parentheses. Estimation of a bivariate probit model with random effects by maximum likelihood.

Table 6: The determinants of contract length

Age		
<25 years	-1.61	(-17.63)
25-35 years	-0.35	(-4.76)
35-45 years	*Ref.*	
45-55 years	0.31	(3.27)
> 55 years	0.43	(2.43)
Male	0.05	(0.74)
Educational level		
No diploma or elementary school	*Ref.*	
Vocational diploma	0.29	(3.45)
High school graduate	0.15	(1.50)
College graduate (≤ 2)	0.20	(1.82)
College graduate (> 2)	0.35	(2.70)
Reason for leaving previous job		
First job	-0.72	(-6.57)
Redundancy, dismissal	-1.36	(-11.30)
End of temporary contract	-1.43	(-12.50)
Voluntary quit	-0.72	(-6.42)
Same job since 1979	*Ref.*	
Unemployment before current job	-0.44	(-4.85)
Working time		
Full-time	*Ref.*	
Voluntary part-time	-0.34	(-3.81)
Involuntary part-time	-0.75	(-9.87)
Presence of children	-0.07	(-1.21)
Employment status of partner		
No partner	-0.42	(-4.30)
Inactivity	0.11	(1.08)
Unemployment	-0.10	(-0.90)
Self-employment	0.50	(2.35)
Private sector	0.175	(1.81)
Public sector	*Ref.*	
b_1	-5.38	(-16.71)
b_2	-4.89	(-24.01)
b_3	-4.59	(-20.89)
σ_2	1.34	(29.48)
N	5 257	

Source: private sector employees of the French sample of the ECHP, 1995-2001.
Note: t-ratio are in parentheses. Estimation of a bivariate probit model with correlated random effects by maximum likelihood. Explanatory variables include sector dummies and variables controlling for the economic situation.