Incentive Effects of Unemployment Insurance Savings Accounts: Evidence from Chile

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Abstract

This study examines the determinants of job-finding rate of unemployment benefit recipients under the Chilean program. This is a unique, innovative program that combines social insurance with self-insurance in the form of unemployment insurance savings accounts (UISAs) - so as to mitigate the moral hazard problem of traditional unemployment insurance programs. Our study is the first one to empirically corroborate theoretical predictions that UISAs improve work incentives. Using a mixed proportional hazard rate model, we find that (i) for benefit recipients using the solidarity fund, larger UISA resources at the start of the unemployment spell (and thus lower potential benefits from the solidarity fund), cause a higher exit from unemployment of benefit recipients; (ii) for benefit recipient not entitled to use the solidarity fund, the amount of accumulation on the UISA does not affect the exit rate from unemployment, suggesting that such individuals internalize the costs of unemployment benefits, and (iii) for beneficiaries using solidarity fund, the unemployment duration dependence pattern is consistent with moral hazard effects, and for beneficiaries relying on UISAs only, the pattern is free of such effects.

Keywords: Unemployment insurance, unemployment duration, savings accounts

JEL codes: C41, H55, J64, J65

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1 Introduction

Unemployment insurance (UI) offers financial compensation to qualifying workers for income loss due to unemployment. By providing protection against unemployment risk, the program seeks to bring welfare gains: it increases the sense of security among employed workers and, thanks to its large coverage and wide-base pooling of risk, it typically enables strong smoothening of consumption patterns.[1]

While UI programs provide protection against the hardship of job loss, the evidence shows that such protection is typically produced at a cost of increased work disincentives and wage pressures, and, consequently, of increased unemployment. The problem of moral hazard in UI programs has been extensively studied and documented (see reviews of Holmlund 1998 and Vodopivec 2004). Spurred by adverse incentives created by UI programs, policymakers have often redesigned such programs, trying to reduce the moral hazard and striking a balance between the protection and disincentive effects.

There are several mechanisms that help reduce work disincentives in UI benefit programs: monitoring and benefit sanctions, work requirements, and financial incentives (compare Fredriksson and Holmlund, 2006a and 2006b).[2] First, recipients can be subject to monitoring of their job-search activities and labor market status, and if they do not meet certain performance criteria, they can be exposed to sanctions (such as benefit reductions). Second, work or other requirements can be imposed on benefit recipients, forcing them to participate in public works or training, for example, in order to retain benefits. And third, financial incentives can be introduced to make reemployment more attractive. Options include reducing benefit levels over time, introducing bonuses for speedy reemployment, lowering income tax rates or introducing employment subsidies (such as earned income tax credit), and unemployment insurance savings accounts (UISAs).

Among new approaches used to reduce work disincentives, UISAs are among the most radical and perhaps promising ones. Under the UISA system, each worker is required to save a fraction of earnings in his or her account, and draw unemployment benefits from it. By internalizing the costs of unemployment benefits, the UISA system is expected to reinforce worker incentives and thus to avoid or reduce the moral hazard inherent in traditional UI programs (Orszag and Snower, 2002) while, under some variants of the program, providing the same protection as the traditional UI system. The system is thus credited with a potential to substantially decrease overall unemployment and, by lowering

[1] For example, studies on the U.S. find that the welfare of benefit recipient households is on average only 3 to 8 percent lower than the welfare of otherwise identical households (Hamermesh and Sleznick,1995), and that in the absence of unemployment insurance, average consumption expenditures would fall by about 20 percent (Gruber, 1997).

[2] For evaluation of various mechanisms that help reduce work disincentives in UI programs, see overviews, for example, in Abbring et al. (2005), Lalive et al. (2006) and Van Ours and Vodopivec (2006).

payroll taxes, increase wages.[3]

In contrast to the other mechanisms used to address work disincentives in UI programs (or other cash benefit systems), studies on UISAs are rare and mostly limited to theoretical contributions. In particular, so far there have been no empirical evidence whether UISAs can reduce moral hazard problems plaguing traditional UI schemes, mainly because only a few countries in Latin America and Austria have introduced such a system, and non-availability of experimental approaches and heavy informational requirements have prevented such studies (for an overview of existing UISAs in Latin America, see Ferrer and Riddell, 2009). Taking advantage of the recently introduced, innovative Chilean unemployment benefit system, this paper is the first attempt to test empirically the theoretical prediction that UISAs reduce the moral hazard problems inherent in traditional UI schemes.

In 2002, Chile introduced a new UI program which combines social insurance with self-insurance. Unemployment contributions, paid by both workers and employers, are split between individual-level UISAs and a common, solidarity fund (SF), the latter being cofinanced by the government. To stimulate reemployment, benefit recipients first draw resources from their UISAs and, upon depletion, from the solidarity fund (to reach target replacement rates, solidarity funding may top resources drawn from UISAs also during initial withdrawals). Withdrawals from individual accounts are triggered by separation from the employer, regardless of the reason. Withdrawals from the common fund are triggered by insufficient resources on individual accounts, if the claimant satisfies the usual conditions of continuing eligibility under UI. Only those who prior to unemployment worked under permanent contracts and were laid off for reasons attributable to the employer can access solidarity funding, but even if they qualify, workers may opt not to choose the option of using SF (presumably, if they want to avoid additional conditions for continuing benefit eligibility imposed under SF option, see below). In August 2008, the program had 2.9 million active contributors, representing 77 percent of private sector wage and salary workers the target population, and distributed benefits to 105,000 members, approximately to one per every four of unemployed workers.

A natural, so far unanswered question thus arises: is the Chilean system by partly relying on savings accumulated on UISAs an effective tool to combat the moral hazard plaguing the traditional UI programs? That is, by drawing on UISAs (in a particular combination with solidarity funding), does the program improve job search incentives and/or reduce reservation wages, and thus increase the exit rate from insured unemployment as theoretical models predict? After all, individuals may be myopic and may discount heavily resources the access to which can only be gained after a long time, often a decade or more. Moreover, if people distrust the government, they may also distrust the scheme that

[3] In particular, Orszag and Snower (2002) show that UISAs reduce unemployment by both increasing on-the-job effort of employed workers as well as job-search effort of unemployed workers.

postpones the access to resources into a distant future, as they may see little guarantee for the present rules to be retained.

By analyzing transitions to work of the benefit recipients of the Chilean program, our paper is the first one providing answer to the above question. We find that the larger the resources on their UISA at the start of the unemployment spell (and thus the lower the potential benefits from SF), the higher the probability of exit from unemployment of benefit recipients that is, the disincentives become smaller as the resources on UISAs become larger. We also find that for persons not using solidarity fund because they are not entitled to, the amount of accumulation on the UISA does not affect hazard rate from unemployment. Had individuals treated those resources as solidarity funds, they would have lowered their probabilities of exit from unemployment (as empirical evidence elsewhere suggests) since our results show no such effects, this is additional evidence that the individual nature of the accounts reinforces work incentives.

These results thus corroborate theoretical predictions about the effects of UISAs. In line with many other studies, our other results also confirm the disincentive effects of solidarity funding. The organization of the paper is as follows. Section 2 provides a background by summarizing the literature on the UISAs and describing the Chilean unemployment benefit program. Section 3 describes the data, formulates the empirical strategy to identify incentive effects of the Chilean program. Section 4 analyses the determinants of opting for the actual use of the SF among those that are entitled to do so. Section 5 presents the results of the estimation of hazard rate models of exit from unemployment that identify work incentives under the Chilean program. Section 6 concludes.

2 Previous studies on UISAs and institutional background

2.1 Overview of studies on UISAs

According to theoretical modeling, the main rationale and key advantage of the UISA system as an alternative to the traditional UI system is its potential of improving the incentives of employed workers and job seekers while conceivably providing the same protection as traditional UI. As shown by several theoretical papers, UISAs would radically change workers incentives (Orszag and Snower, 2002; Orszag et al, 1999). By internalizing the costs of unemployment benefits, the UISA system avoids the moral hazard inherent in traditional UI. Orszag et al (1999) also recommend a comprehensive vs. a piecemeal approach when introducing savings accounts. They warn that a potential complementarity problem exists if the savings account is not set up for multiple uses: under the traditional unemployment system, workers who have built up substantial resources in their pension accounts have the incentive to withdraw from the labor force and claim unemployment benefits until they

retire. Setting up an integrated savings account reduces such incentives.[4]

Empirically, UISAs are still largely uncharted territory, and to best of our knowledge, except for the current study UISAs potential to cure the moral hazard problem associated with UI have not been studied yet. In a rare empirical study of UISAs, Kugler (2005) examines the effects of the 1990 conversion of Colombias severance pay program into a funded severance pay with individual accounts. She finds that the lions share of the costs of the transfer that firms make to individual workers accounts (7587 percent) shows up as a reduction in wages. She also finds that, in accordance with theoretical predictions, the conversion increased both firing and hiring. Her work does not shed light on the effects of UISAs on job-search incentives, though.

Faced with the dearth of empirical possibilities, several researchers have resorted to simulations, focusing on the following viability issue. By their very design, UISAs rely on intertemporal pooling of resources of individuals so as to be able to eliminate (or, in some versions, restrict) pooling across individuals. But if a significant proportion of workers cannot generate sufficient savings to draw upon during their unemployment spells, such a system may be non-viable. In other words, if unemployment is concentrated among a group of workers, these workers may not be able to finance their unemployment benefits by their own savings.

To investigate the viability of the system, Feldstein and Altman (1998) simulated the working of the UISA system for the U.S. In their simulations, the level and duration of benefits provided by the UISA system are completely the same as under the current UI system. They assume that the UISA benefits are financed by individual, interest-bearing UISA, to which workers contribute 4 percent of their wages. At retirement, a positive account balance is added to a pension account, and a negative balance is forgiven. Their simulations show that (i) over a 25 year period, only a small proportion of workers (5-7 percent) end their working life with negative balances (these estimates are conservative in the sense that they do not account for any behavioral responses to changes in incentives), and (ii) the cost to taxpayers is reduced by more than 60 percent. Feldstein and Altman thus conclude that the UISA system is a viable alternative to the standard UI system.

Applying a methodology similar to Feldstein and Altman (1998), to Fölster (1999, 2001) used Swedish panel data to simulate the effects of an introduction of a savings account

[4] There are also other advantages of the "Integrated Unemployment Insurance System." By combining several risks under one program, the system can offer not only superior provision of insurance and thus consumption smoothing, but also to significantly reduce disincentives as compared to the traditional UI system. For example, Stiglitz and Yun (2005) analyze a system in which a personal unemployment savings account is combined with pension program, allowing workers to borrow against their future wage income to finance unemployment benefits. They argue that integration of several social insurance programs with a pension program through an individual account is desirable unless the risks are perfectly correlated.

system, integrating unemployment benefits with sickness benefits, maternity leave, child support, welfare, rent support and disability benefits. His simulations show that 15 to 17 percent of all individuals would be confronted with a negative terminal balances on their savings accounts, and there would be a reduction in taxes by about 30 percent. Applying a similar simulation approach to Slovenias UI system, Vodopivec (2009) shows that the UISA system is a viable alternative to a modest, but not generous UI system. Under the modest regime, only one quarter of workers end their working life with negative cumulative balance and 43 percent ever experience a negative UISA balance; in contrast, under the generous regime, the respective numbers are much larger.

2.2 Chilean unemployment benefit program

In October 2002, Chile introduced a program of unemployment insurance that provides benefits through a combination of individual accounts and solidarity funding.[5] The system is mandatory for all wage and salary workers older than 18 when they start a new appointment in the private sector (public sector workers, as well as apprentices, domestic servants, and self-employed do not participate in the system). Workers can also join voluntarily, but there have been few such enrolments (by the end of 2008, they represented less than 2 percent of total membership).[6] Workers under open-ended contracts contribute 0.6% of their monthly salary to their UISAs, which is complemented by 1.6% contribution by the employer; the employer must also pay a contribution of 0.8% of the workers taxable earnings to the SF.[7] For workers with fixed-term contracts, the employer pays a 3 percent contribution to their UISAs. Because workers with fixed-term contracts are, by law, excluded from the access to solidarity funding, in continuation we focus on workers with open-ended contracts.

By August 2008, 5.7 million workers enrolled in the program (that is, had their contributions paid at least once), and 2.9 million of them contributed that month. About 58 percent of contributors hold an open-ended contract, and two thirds are men. By September 2008, a total of 3.5 million benefit claims were filed (with some workers filing more that one claim), of which 76 percent by fixed-term workers. Of the 759,220 claims made by workers who became unemployed under an open-ended contract, only 102,919 were financed partly by the SF (Figure 1). This can be explained by both a small proportion

[5] Prior to this system there was practically no unemployment benefits program except for a very modest and scarcely used unemployment subsidy administered at the local (municipal) level.

[6] Because enrolment is mandatory for all workers who start new jobs and because only a small share of workers enrolled voluntarily, young and more mobile workers are overrepresented in the program, as are industries that hire such workers (such as construction, agriculture and retail trade).

[7] The Chilean government makes an annual contribution to the SF of approximately 12 Million US dollars.

of open-ended contracts (22.7% of them) satisfying SF eligibility criteria and by the fact that only about half of the workers who qualified chose to do so. Note that workers can reject the access to the SF, in which case they finance their benefits exclusively out of their UISAs (see below about reasons that may lead workers to do so).

Eligibility conditions, as well as the level of benefits and the potential benefit duration, differ for the schedule based on "withdrawals from UISAs only" and the schedule based on "withdrawals from UISAs and SF." For the option of "withdrawals from UISAs only," there are only two starting eligibility conditions: payment of 12 monthly contributions, either continuously or non-continuously, and being unemployed (for any reason benefits are also paid to workers who separate voluntarily). The potential benefit duration (number of maximum monthly payments) is determined by the length of the contribution period the number of years and fraction over 6 months that the worker has contributed, with a maximum of 5 withdrawals. The level of benefit is also determined by the length of the contribution period. For 12 to 18 contributions, all money accumulated in the UISA is withdrawn in one payment; for contributions beyond 18, the benefit is level is determined by distributing the UISA balance over the potential benefit duration (see Table 1). Note that the recipients withdraw all the funds accumulated in the individual account in each unemployment event, as long as they remain unemployed sufficiently long.

For the option "withdrawals from UISAs and the SF," the following starting eligibility criteria apply: (i) 12 months of continuous contributions to the SF in the period immediately prior to the dismissal; (ii) non-fault dismissal (economic reasons or force majeure); (iii) insufficient UISA balances to fund the benefit as stipulated by the law; and (iv) unemployment status. To keep eligibility status under this option, recipients must pay monthly visits to Municipal Employment Offices (OMILs) and they have to be prepared to accept training programs or job offers provided by these offices paying at least 50% of their pre-unemployment wages. The level of the benefit is determined by a replacement rate (as a proportion of beneficiarys average wages in the last 12 months), with inflation-adjusted limits on the minimum and maximum. The replacement rate starts at 50% in the first month and decreases by 5 percentage points each subsequent month, reaching 30% in the 5th (last) month. Benefits are first drawn from the beneficiarys UISA and, upon exhausting the account, from the SF. Access to the SF is only granted for two unemployment spells per five years.

To illustrate the incentives for unemployed in the Chilean UB system, Figure 2a shows how the duration of contributions to the system affects the starting replacement rate (see above about the rules that determine subsequent ones).[8] After contributing for 12 months, the individual is entitled to a replacement rate of 27%. Larger number of contributions

[8] This concerns a worker with a monthly salary of 135,000 making a monthly contribution of 2970 (2.2%) and earning a 0,5% monthly rate of return.

gradually increases the replacement rate to 39%, but after 18 months of contributions (when the accumulation of contributions equals 42% of the beneficiary's wage) the benefit is distributed over 2 months, amounting to 22% in the first month and 23% in the second. After 30 months the benefit is distributed over 3 months, etc. Figure 2b shows the evolution of the replacement rate over the unemployment spell of a worker who starts collecting unemployment benefits after paying 36 (monthly) contributions, both for "withdrawals from UISAs only" and "withdrawals from UISAs and SF" schedules. Under "withdrawals from UISAs only," unemployment benefits last for three months; in contrast, under "withdrawals from UISA and SF," unemployment benefits last longer 5 months, and the replacement rate is higher. Clearly, there is a gain from accessing SF both in terms of higher replacement rate and longer potential benefit duration.

3 Description of data and empirical strategy

3.1 Data

Our study relies on administrative records of the contribution histories of and benefits paid to the workers participating in the Chilean unemployment benefit program. These records are maintained by the Superintendencia de Pensiones, the agency in charge of the regulation and supervision of the program. We selected samples of prime age males and females born between 1958 and 1981 who lost a permanent job before 2007. This gave us samples of 49,702 men and 26,276 women (see details in Appendix A).[9] For these individuals, apart from their records of contributions and benefits, we also have information on UISA account balance, educational attainment, and region of residence, and sector of activity of their pre-unemployment employer.

Table 2 provides the summary statistics of this sample, by sex and entitlement to access SF. While the characteristics of the sample differ between men and women, they are rather similar for those entitled and not entitled to access SF (except for unemployment duration); 68 percent of men and 63 percent of women has no right to access the SF. The average number of potential withdrawals from UISAs ranges from 1.7 to 1.9. For men not entitled to use the SF the average unemployment duration including incomplete spells is equal to 8.1 months, and the average duration of completed unemployment spells is 5.6 months. Men who are entitled to use the SF on average have a longer unemployment duration; 9.5 months for all spells and 6.7 months for completed spells. Women stay unemployed for a longer period; for them the average unemployment duration including incomplete spells is about 13 months, while the average duration of completed unemployment spells ranges

[9] Note that the samples do not contain personal identifiers. Also note that we removed individuals who have 5 potential withdrawals from their individual accounts from the sample since this concerns only a few individuals.

from 7.5 to 8.3 months.

3.2 Empirical strategy

The richness of the design of the Chilean program allows the empirical investigation of incentive effects of the program along several dimensions, and the present paper focuses on two of them. The central issue addressed is the impact of the program on re-employment incentives of the program, more precisely, on the exit rate from unemployment. The other issue addressed by the paper is the driving forces influencing the decision to actually use SF, given formal eligibility. While there are apparent gains from gaining access to SF (both higher replacement rate and longer potential benefit, see above), in practice only about half of eligible workers decided to do so - certainly a puzzling result that deserves consideration.[10]

In formulating research questions for our empirical investigation, it is useful to invoke the following theoretical prediction of Orszag and Snower (2002): " under the UA [Unemployment Accounts] system, workers stand to lose more from being unemployed than under the UB [Unemployment Benefits] system, since they internalize more of the costs Consequently, the unemployed have the incentive to search harder for jobs (take less leisure while unemployed)" (p. 11).[11] In order to use this theoretical prediction, let us remember that the Chilean program is, in fact, a "hybrid" system, the system where the unemployed are exposed to both to the "UA" and "UB" systems. Fortunately, regarding re-employment incentives, the program allows grouping of the individuals to regimes that are of "UA" and "UB" type. Beneficiaries not using SF (being on the "withdrawals from UISAs only" schedule, either because they are not entitled to SF or because they chose not to use it) fall under the "UA" regime, and beneficiaries using SF (being on the "withdrawals from UISAs and SF" schedule) fall under the "mixed" regime, because their benefits are paid partly from the individual accounts and partly from the solidarity fund. But for the beneficiaries of the latter group, one can expect that the higher the share of benefits that is potentially paid from SF (the lower the proportion of benefits financed by their UISAs), the more is their behavior akin to the "UB" regime.

[10] Questions such as does the program generate incentives for workers to exit from jobs to unemployment in order to access their UISAs funds, and how does the program affect, if at all, the quality of post-unemployment jobs, are left for future research.

[11] To compare incentives under Unemployment Accounts (UA) and Unemployment Benefits (UB), Orszag and Snower (2002) created a two-period model based on discounted lifetime utility maximization. Under the UA, they assume that workers are required to make ongoing contributions to their unemployment accounts, and the balances in these accounts are available to them during periods of unemployment. In contrast, under the UB each unemployed worker receives an exogenously given unemployment benefit that is financed through a payroll tax.

Under the design features of the Chilean unemployment benefit program, the above prediction of Orszag and Snower can be reformulated as follows:

- **For beneficiaries using SF** (being on the "withdrawals from UISAs and SF" schedule), one can expect to detect some disincentives effects of the UI program. In particular, during the potential benefit duration period (in the Chilean case, during the first five months of unemployment), they will be less likely to exit from unemployment than beneficiaries not using SF. Moreover, applying the same logic of internalization of costs, the larger the share of potential benefits that they can finance out of their UISA at the start of the unemployment spell, the more likely they will exit from unemployment (that is, employment disincentives become smaller as the resources obtainable from SF become smaller).

- **For beneficiaries not using SF** (being on the "withdrawals from UISAs only" schedule), one can expect that the amount of accumulation on their UISAs will not affect their exit rate from unemployment, nor will their time pattern of exit from unemployment be affected by the payment of unemployment benefits, as the costs of unemployment benefits is completely internalized.

The above conclusions, of course, are based on the assumption of "other things being equal", the assumption we will try to accommodate by controlling for observable and unobservable characteristics of the individuals included in our econometric estimations.

We also address the selection issues that arise because some beneficiaries are given an option to select between the "withdrawals from UISAs only" and "withdrawals from UISAs and SF" schedules, and so these two groups may differ in some important unobservable characteristics affecting the exit rate from unemployment. We start our empirical analysis by investigating the determinants of the SF use, and proceed with the analysis of the job-finding rate.

It also needs to be emphasized that to identify the incentive effects that UISAs accumulations have on job-finding rate, we exploit the leverage provided by exogenous variations in such accumulations. Even if they face a common withdrawal schedule (the same replacement rate and potential benefit duration, such as the case if they follow the "withdrawals from UISAs and SF" schedule), beneficiaries differ in the amount of accumulated savings on their UISAs in the way that is unrelated to their individual characteristics. Indeed, given that the system is still in the starting period, this amount is determined, above all, by a lay off decision of the employer, the timing of which triggers the enrollment of the worker in the unemployment benefit program and thus determines the length of the contribution period and hence the amount accumulated on UISAs.

4 Determinants of solidarity fund use

As mentioned above, only about half of people who are eligible to access SF decide to do so. In this section we examine the factors that influence this decision, focusing on the number of potential UISAs withdrawals an indication of the size of the individual savings available to finance unemployment benefits as a possible determinant.

While the entitlement to use SF is not a matter of choice, the actual use of SF is. As described above, eligibility to use the SF is determined by technical rules that individuals cannot affect (see above on the starting eligibility criteria for "withdrawals from UISAs and the SF" schedule). In contrast, there is a clear monotonic relationship between the actual use of the SF and the number of potential withdrawals from UISAs: the higher the number of potential withdrawals, the lower the use of the SF the finding that applies to both men and women (Table 3). For example, among the men who are entitled to use the SF and having one potential withdrawal, 61% uses the SF, and among men entitled to use SF and having four potential withdrawals, only 27% uses the SF.

To investigate how the number of potential withdrawals from the UISAs and personal characteristics affect the use of the SF conditional on entitlement we performed a logit estimates. Thus $\Pr(y) = \Lambda(x'\gamma)$, where Λ is an indicator of the logistic cumulative distribution function, y indicates whether or not an individual uses the SF, x is a vector of explanatory variables, and γ is a vector of parameters.[12] Conditional on the observed characteristics, parameter estimates show that the higher the number of potential withdrawals (that is, the larger individual accumulations and hence the lower the potential gain from using the solidarity fund), the lower the probability of the use of the SF (Table 4). This has a simple, intuitively clear interpretation: the more the unemployed can rely on their own funds, the less likely they apply for the SF, because the usage of SF is associated with certain costs, above all, the transaction costs of contacting the employment offices and of satisfying continuing eligibility requirements (that include accepting suitable job offers) and possible stigmatization of persons using employment office services. Other results show significant effects from industry, region, educational attainment, and birth cohort. Moreover, the results show that individuals who entered unemployment in 2005 and 2006 where less likely to use the SF than those in previous years.

5 Empirical analysis of job finding rates

In this section we report the results of econometric estimation of mixed proportional hazard rate models that allow us to investigate the validity of the predictions about the job-finding

[12] The x refers to a vector of personal characteristics and variables related to the unemployment benefit program presented in Table 2. For simplification a subscript referring to individual is omitted.

incentives generated by the Chilean unemployment benefit program. To obtain a better understanding of the job-finding process, we start with graphical analysis of exit rates and survival in unemployment for key groups of beneficiaries.

Figure 3 shows the exit rates and survival rates for prime age men, separately for workers who are not entitled to access SF, for those who are entitled but do not use the SF and for those that use the SF. The main differences occur at the start of the unemployment spell, with the job-finding rate for workers not using the SF exceeding the job-finding rate of workers who use the SF. In fact, the job finding rate of the latter group is increasing over the first 5 months of unemployment, and from the sixth month onward the differences in job finding rate between the three groups become small (Figure 3a). Consistent with above, the survival function shows that workers who use the SF stay in unemployment longer than workers who do not use the SF (Figure 3b).

Figure 4 gives a similar overview of exit rates and survival rates for prime age women. The exit rates are lower but the patterns are very similar to those of men. Women who use the SF have a low and increasing exit rate in the earlier months of unemployment. Women who do not use the SF initially have a higher unemployment exit rate but after about 5 months their exit rates are similar to the exit rate for women who use the SF.

5.1 Econometric modeling of the job-finding rate

We analyze transitions from unemployment using mixed proportional hazard rate models. In our model the job-finding rate at time (unemployment duration) t conditional on observed characteristics x and unobserved characteristics u can be specified as:

$$\theta(t|x) = \lambda(t)\exp(x'\beta + u) \tag{1}$$

where β is a vector of parameters and the $\lambda(t)$-functions represent individual duration dependence. Individual duration dependence is modeled in a flexible way by using step functions:

$$\lambda(t) = \exp(\Sigma_k \lambda_k I_k(t)) \tag{2}$$

where k (= 1,..,N) is a subscript for time-intervals, and $I_k(t)$ are time-varying dummy variables that are one in N subsequent time-intervals. The parameters k measures the pattern of duration dependence. The conditional density function of the completed unemployment duration t can be written as

$$f(t|x,u) = \theta(t|x,u)\exp(-\int_0^t \theta(s|x,u)ds) \tag{3}$$

Finally, the unobserved heterogeneity is assumed to follow a discrete distribution with two points of support v_a and v_b, with $\Pr(u = u_a) = p$ and $\Pr(u = u_b) = 1 - p$ and p has a

logit specification: $p = \exp(\alpha)/(1+\exp(\alpha))$. The two points of support are random effects assumed to be orthogonal to the observed characteristics of the individuals. Because we also estimate a constant we normalize $u_a = 0$. We remove the unobserved components by taking expectations:

$$f(t|x) = E_u[f(t|x,u)] \tag{4}$$

The parameters are estimated separately for men and women for each of the three groups of benefit recipients. We use the method of maximum likelihood, taking into account that some durations are right-censored while the complete durations are known in discrete months.

The above model is suitable to estimate the job-finding rate for the group of beneficiaries not entitled to use SF. For the group that is entitled to use SF, however, we have to account for the fact that it comprises both individuals who decided to use SF and individuals who decided not to use SF, and that this decision may not be exogenous to the exit rate. It may well be the case that individuals who expect to be unemployed for a long period are more inclined to use the SF than those who expect to be unemployed for short period (see also Berstein et al., 2007). Thus it may be the case that unobserved worker characteristics affect both the exit rate and the inclination to use the SF.

To address the above concern, we investigated whether the distribution of unobserved heterogeneity is the same for workers who entitled to use the SF and who opt to use it as compared to those who are entitled to use the SF but choose not to use it.

5.2 Parameter estimates

In Tables 5 and 6, we present the results of the estimation of both above-described proportional hazard rate models. Table 5 contains the parameter estimates for males, table 6 shows the results for females. Key findings are as follows:

- **For the beneficiaries who used the SF** (following the schedule "withdrawals from UISAs and SF"), the results show that the higher accumulation of the UISAs, the higher the probability of exit from unemployment, as evident from the positive coefficients of the dummy variables for the number of potential withdrawals. Moreover, there is a monotonous increase in the exit rate in the first 6 months of unemployment, and a steady reduction of the exit rate thereafter, for both men and women. This is indeed a pattern consistent with (dis)incentives related to the receipt of benefits, as the exit rate is lower at the beginning of the unemployment spell (reflecting the "waiting" effect moral hazard connected with the use of SF), the effects in place over the period of potential receipt of benefit (5 months in this case).

- **For beneficiaries who were not entitled to use the SF** (relying on UISAs only), the number of potential withdrawals has no effect on the exit rate out of unemployment. This means that the UISA accumulation of beneficiaries relying on UISAs only does not affect exit rates. Moreover, the time pattern of exit from unemployment as determined by the coefficients of monthly dummies shows no correspondence to payment of unemployment benefits. For both men and women these coefficients show strong and monotonic negative duration dependence.

- **For the group of beneficiaries not using the SF because they chose so**, the parameter estimates are very similar to those not using SF because they did not qualify for the use SF: for men job finding rates are unaffected by the number of potential withdrawals, and the exit rates for both men and women show negative duration dependence throughout the unemployment spell.

We find that for all groups unobserved heterogeneity is present, and we can identify two groups of workers, one with high and one with low job-finding rate. For both men and women the first group with a high job-finding rate is always larger than the second group with a substantially lower exit rate. The fact that we are able to identify unobserved heterogeneity indicates that the observed personal characteristics are insufficient to cover all determinants of the exit rates out of unemployment. For males we find no significant selectivity in the use of the SF. We cannot reject the hypothesis that there is no selectivity in the use of the SF.[13] For females we can reject this hypothesis. Apparently there is selectivity in the choice of using the SF. The group of women who choose to use the SF on average has a weaker labor market position or is less motivated to find a job.

6 Concluding remarks

The study examined work incentives generated under the Chilean unemployment benefit program. This is a unique, innovative program combining social insurance with self-insurance in the form of savings accumulated on UISAs, designed so as to mitigate the moral hazard problem present in traditional UI programs. The study estimated the determinants of the job-finding rate of unemployment benefit recipients and, taking advantage of the design features of the program, was able to identify work incentives generated by the program, separately by the UISAs and SF component of the program.

Our results render a strong support to the idea that UISAs can improve work incentives. We find that for beneficiaries that take advantage of SF, the probability of exit from unemployment of benefit recipients is positively associated with the amount of savings

[13] This is tested by imposing that that the distribution in unobserved heterogeneity is the same for those who choose or not choose to use the SF.

on recipients UISA at the start of the unemployment spell, and that there is no such association for the beneficiaries that rely on their own UISAs savings only a clear sign that individuals internalize the costs of unemployment benefits and treat UISAs resources as their own. Our results also reveal the unemployment duration dependence pattern consistent with moral hazard effects, for beneficiaries using SF, and the pattern free of such effects, for beneficiaries relying on UISAs only. Interestingly, because the total benefit does not depend on the source of funding, the disincentive effects we find for beneficiaries that use SF should be totally attributed to moral hazard behavior, as opposed to the "liquidity" effects of benefits (compare Chetty, 2008).

The above findings have strong policy implications, particularly important for developing countries. By providing empirical support to the so far only theoretically grounded claims that UISAs can reduce work disincentives connected by OECD-style UI programs, they provide a strong endorsement for ideas of reforming traditional UI programs by introducing an UISAs component (for the U.S., see recent proposals by Kletzer and Rosen, 2006, and in particular, Kling, 2006). And the introduction of UISAs seems particularly attractive for developing countries, because they face a large informal sector and they lack the administrative capacity needed for an effective implementation of the standard UI system (particularly of checking continuing eligibility conditions that requires monitoring of job-search behavior and of labor market status).

Our study also prompts questions about the design of the UISAs program. Our results show that participants in the Chilean program face work disincentives through the SF component of the program, although the vast majority of benefits are not paid using the SF. Hence the question of what is the appropriate scope for the SF component and, moreover, what is the scope for monitoring and sanctions in such a system, as our results also show that the likelihood of using SF depends on the perceived costs of using SF. Another open question relates to the relative size of the UISA and SF components. In fact, our results point to an important interrelation between the two, as increasing the UISAs component (perhaps even by partial government matching of contributions) may encourage job-finding rate and reduce the resources needed for solidarity funding.

The answer to these questions, however, does not lie exclusively in the job finding incentives of the program. The ultimate design of any UI scheme must respond to the main objective of smoothing consumption while creating improved conditions for job transitions and even achieving some redistributive impact. To strike the balance between UISAs (which essentially consist on self-insurance) and other forms of risk pooling, such as a Solidarity Fund, policy makers must consider their effects on these outcome variables as well as on the job finding incentives we have studied on this paper.

7 References

- Abbring, J.H., G.J. van den Berg, and J.C. van Ours (2005) The effect of unemployment insurance sanctions on the transition rate from unemployment to employment, Economic Journal, 115, 602-630.
- Acevedo, G., P. Eskenazi, and C. Pags (2005) The Chilean unemployment insurance: a new model of income support available for unemployed workers? Working Paper, World Bank, Washington D.C.
- Berstein, S., E. Fajnzylber, P. Gana, and I. Poblete (2007) Cinco Años de Funcionamiento del Seguro de Cesanta en Chile, Working Paper No 23, Superintendencia de Pensiones, Santiago, Chile.
- Bover, O., M. Arellano and S. Bentolila (2002) Unemployment duration, benefit duration and the business cycle, Economic Journal, 112, 223-265.
- Chetty, R. (2008) Moral hazard versus liquidity and optimal unemployment insurance, Journal of Political Economy, 116, 173-234.
- Feldstein, M. and D. Altman (1998) Unemployment insurance savings accounts, NBER Working Paper 6860.
- Fölster, S. (1999) Social insurance based on personal savings, Economic Record, 75, 5-18.
- Fölster, S. (2001) An evaluation of social insurance savings accounts, Public Finance and Management, 1 (4), 420-448.
- Fredriksson, P. and B. Holmlund (2006a) Improving incentives in unemployment insurance: a review of recent research, Journal of Economic Surveys, 20, 3, 357-386.
- Fredriksson, P. and B. Holmlund (2006b) Optimal unemployment insurance design: time limits, monitoring, or workfare? International Tax and Public Finance, 13, 5, 565-585.
- Gruber, J. (1997) Consumption-smoothing effects of unemployment insurance, American Economic Review, 87 (1), 192-205.
- Hamermesh, D.S., and D. T. Slesnick (1995) Unemployment insurance and household welfare: microeconomic evidence 1980-93, NBER Working Paper No. 5315, National Bureau of Economic Research, Cambridge, MA.

- Holmlund, B. (1998) Unemployment insurance in theory and practice, Scandinavian Journal of Economics, 100, 113-141.
- Kletzer L. G and H.F. Rosen (2006) Reforming unemployment insurance for the twenty-first century workforce, The Brookings Institution, Discussion paper 2006-06.
- Kling J.R. (2006) Fundamental restructuring of unemployment insurance: wage-loss insurance and temporary earnings replacement accounts, The Brookings Institution, Discussion paper 2006-05.
- Kugler, A. (2005) Wage-shifting effects of severance payments savings accounts in Colombia, Journal of Public Economics, 89, 487-500.
- Lalive, R., J.C. van Ours, and J. Zweimüller (2006) How changes in financial incentives affect the duration of unemployment, Review of Economic Studies, 73, 4, 1009-1038.
- Orszag, J.M., D.J. Snower, and J.E. Stiglitz (1999) The impact of individual accounts: piecemeal vs. comprehensive approaches. Paper presented at the Annual Bank Conference on Development Economics, World Bank, April 29, 1999.
- Orszag, M. and D. Snower (2002) From unemployment benefits to unemployment accounts, Discussion Paper no. 532, IZA, Bonn.
- Stiglitz J.E.,and J. Yun (2005) Integration of unemployment insurance with retirement insurance, Journal of Public Economics, 89, 2037-2067
- Van Ours, J.C. and M. Vodopivec (2006) How shortening the potential duration of unemployment benefits affects the duration of unemployment: evidence from a natural experiment, Journal of Labor Economics, 24, 2, 351-378.
- Vodopivec, M. (2004) Income support for the unemployed: issues and options, The World Bank, Regional and Sectoral Studies Series.
- Vodopivec, M. (2009) How viable are unemployment insurance savings accounts: simulation results for Slovenia, Comparative Economic Studies, forthcoming.

8 Appendix A: Details about the data

There are two datasets available that contain information on beneficiaries and their labor history. The first, called "Relaciones", contains all the labor relationships between October 2002 and January 2008 of workers who have claimed unemployment benefits from their individual account or from the Solidarity Fund. The second database "Beneficiarios" contains all the information of each benefit claimed by each worker. In total, the datasets contain 1,702,008 observations. On average, the number of labor relations per person is equal to 5.63 and the average length of a relation is equal to 9.31 months. The average number of benefits claimed by a person is equal to 2.12, which means that not every ending of a labor relation results in a benefit claim. The first and most important definition we have to deal with is unemployment. The difficulty with defining unemployment is that there are many changes between jobs for a lot of individuals. It is not always clear that an individual is actually without a job and some individuals have multiple jobs at the same time. So it can happen for instance, that a new labor relationship starts before the end of the previous relationship. It is also possible that a second relationship lies completely within the period of a different labor relationship. A benefit claimed by a worker is thus frequently done while the person is actually employed (by a different employer). Unemployed who came from a fixed term job are never entitled to benefits from the SF. Furthermore, workers with a fixed term contract often have multiple jobs, so that the incentive structure when becoming unemployed from one of these jobs is not clear. Therefore, the analysis is restricted to persons who lose a job with a permanent contract. This restriction gives a sample of 973,326 persons of which 77,553 persons never had a fixed term contract during the observation period.

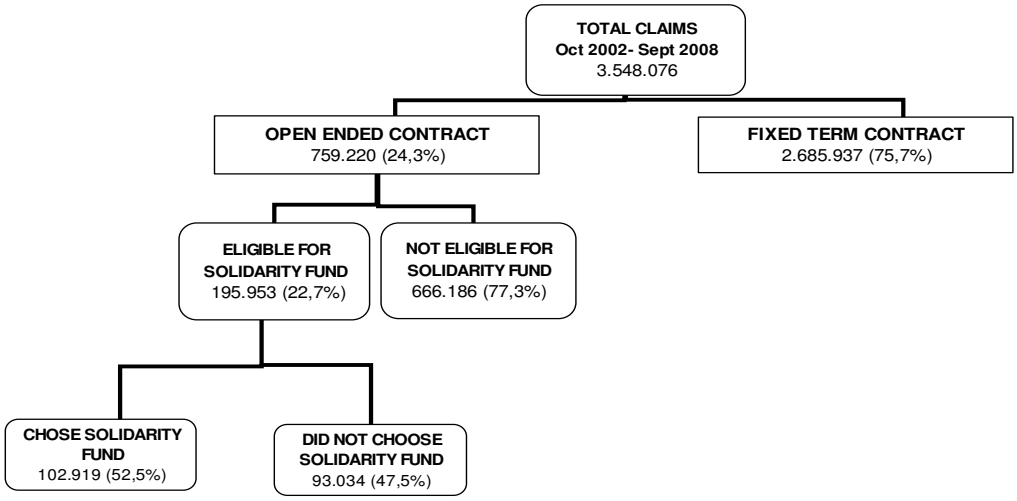
The procedure to establish the periods of unemployment is as follows. First, the database "Relaciones" is used to find for every worker the (first) month without contributions between the pair "worker-employer" where the contract is permanent. Out of the 973,326 persons who had a permanent contract in the observation period, 885,326 have an unemployment period as defined above. Next, the month of the last contribution payment is compared to the dates of the benefits claimed by each worker. If the start of the period without contributions corresponds to the date of the ending of a contract that generates the benefit or lies between the date of the benefit claim and the ending of the contract (given in "Beneficiarios"), the benefit claim is kept in the database. If not, the observations of the person are not used.[14] This reduces the sample enormously to 245,471 persons. Finally, the employer identification number of the benefit claim is used from "Relaciones" to establish the exact labor relation. We removed 58,090 persons from the dataset because

[14] It could be the case that a second period of unemployment does result in an benefit claim, but these are not taken into account.

there was no labor relation with a fixed contract present before the benefit claim. Then 187,381 persons remain.

The beginning of the period without contributions, which is compared to the dates of the benefits claimed by each worker, does not always correspond with a benefit claim or with the end of the contract variable which is also mentioned in the database "Beneficiarios". The differences can be quite substantial but more than 90% of the claims fall in the same month as the last contribution payment. After removing persons about whom not all personal characteristics are available we are left with a sample of 147,217 individuals from which we draw our samples of prime age males and females.

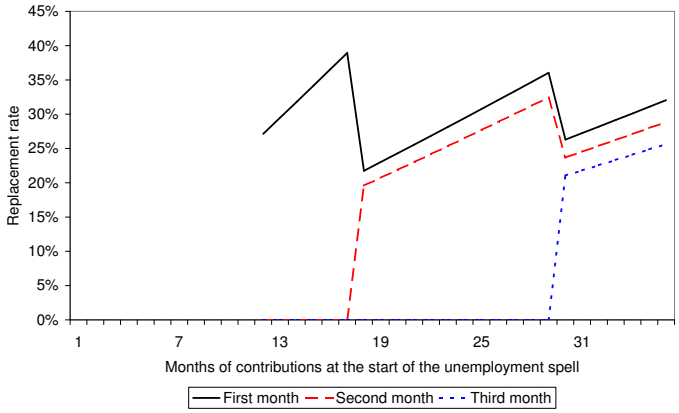
Fig. 1: **Overview of Claims October 2002 – September 2008**



9 Grahps and Tables

Fig. 2: **Replacement rates in the Chilean UB system**

a. Effect of months of contributions on the replacement rate; by month of unemployment



b. Replacement rate by unemployment duration; SF and individual accounts; worker who paid contributions for 36 months

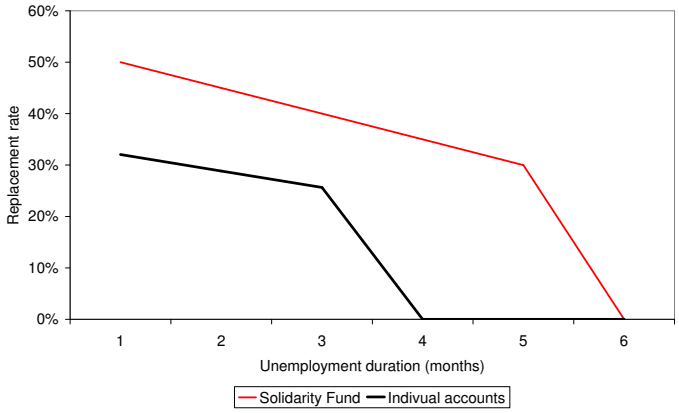


Fig. 3: **Exit rates and survival rates; prime age males**

a. Exit rates out of unemployment

b. Survival rates

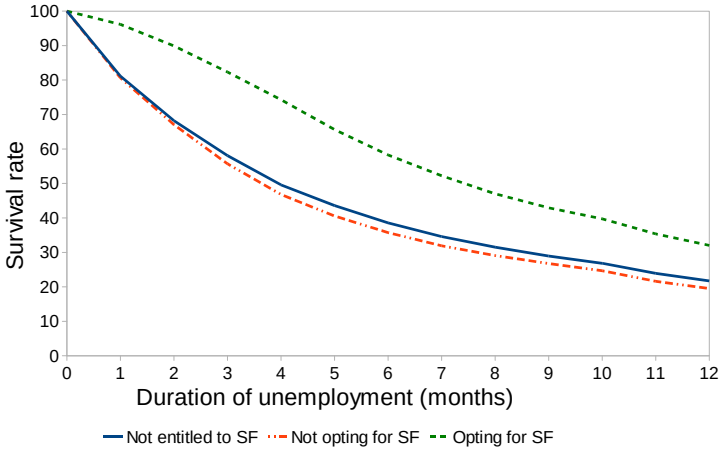
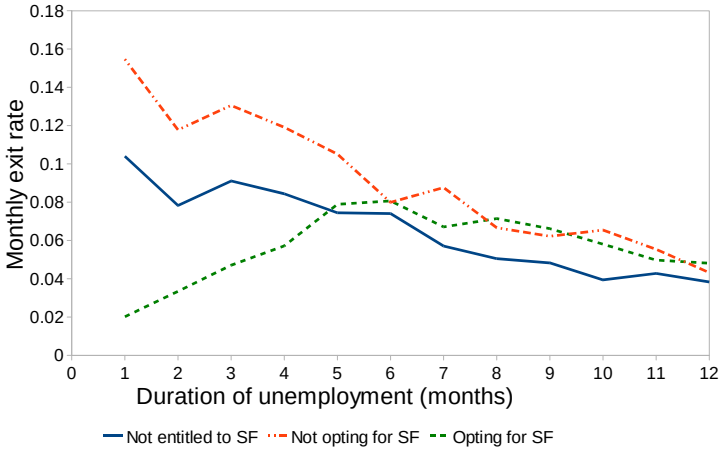
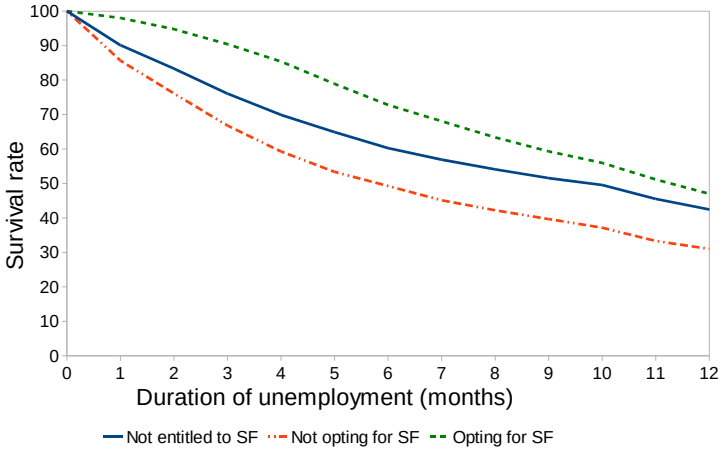


Fig. 4: **Exit rates and survival rates; prime age females**

a. Exit rates out of unemployment



b. Survival rates



Tab. 1: Determination of the unemployment benefit levels for withdrawal from UISAs only

Years of contribution	Number of withdrawals	Factor
1–1.5	1	1.0
1.5–2.5	2	1.9
2.5–3.5	3	2.7
3.5–4.5	4	3.4
> 4.5	5	4.0

Note: The unemployment benefit of the first payment is obtained by dividing the UISAs balance at the time of separation by the factor shown in the second column of the table; the levels in the second to fourth month correspond to 90%, 80% and 70% of that amount, respectively. The fifth withdrawal equals to the remaining balance on the UISA.

Tab. 2: Summary statistics samples of prime age men and women

	Males		Females	
	Not entitled to use SF	Entitled to use SF	Not entitled to use SF	Entitled to use SF
Used SF	–	0.55	–	0.69
Potential withdrawals				
1	0.51	0.33	0.50	0.37
2	0.33	0.47	0.34	0.46
3	0.14	0.17	0.14	0.15
4	0.02	0.03	0.02	0.02
Education 3	0.50	0.49	0.47	0.46
Education 4	0.30	0.34	0.35	0.38
Education 5	0.08	0.08	0.11	0.11
Other education	0.12	0.09	0.07	0.05
Birthyear $<$ 1965	0.22	0.24	0.17	0.22
Birthyear 1965-69	0.20	0.21	0.17	0.18
Birthyear 1970-74	0.24	0.24	0.23	0.24
Birthyear 1975-79	0.24	0.23	0.30	0.25
Birthyear $\geq$ 1980	0.10	0.09	0.13	0.10
Year 2004	0.23	0.21	0.22	0.20
Year 2005	0.34	0.34	0.34	0.34
Year 2006	0.43	0.45	0.44	0.46
Potential withdrawals	1.7	1.9	1.7	1.8
Duration (months)				
Total	8.1	9.5	13.1	13.2
Completed duration	5.6	6.7	7.5	8.3
N	33,909	15,793	16,657	9,619
N – completed duration	29,027	12,980	11,077	6,574

Tab. 3: Entitlement and use of the Solidarity Fund by number of potential withdrawals from the individual account

	Males			Females		
Potential withdrawals	Entitled (% of total)	Used SF (% of entitled)	Total (%)	Entitled (% of total)	Used SF (% of entitled)	Total (%)
1	23	61	45	30	76	46
2	40	57	38	44	70	38
3	36	43	15	39	52	14
4	35	27	2	40	38	2
Total	32	55	100	37	69	100

Tab. 4: Parameter estimates use of the Solidarity Fund conditional on eligibility; logit specification

	Males	Females
Potential withdrawals 2	-0.04 (0.9)	-0.16 (2.8)**
Potential withdrawals 3	-0.57 (10.7)**	-0.86 (11.6)**
Potential withdrawals 4	-1.26 (10.7)**	-1.42 (9.1)**
Education 3	-0.14 (2.3)**	-0.23 (1.8)*
Education 4	-0.29 (4.4)**	-0.46 (3.5)**
Education 5	-0.75 (8.8)**	-0.79 (5.6)**
-Loglikelihood	9,990.1	5,345.1
N	15,793	9,619

Note: All estimates contain a constant and dummy variables for industry (15), region (14), birth year cohort (4) and year of entrance (2); absolute t-statistics in parentheses; a ** (*) indicates significance at a 95% (90%) level.

Tab. 5: Parameter estimates exit rates out of unemployment – males

	Not entitled to SF	Opting for SF	Not opting for SF
Potential withdrawals 2	0.03 (1.1)	0.29 (7.5)**	0.05 (1.2)
Potential withdrawals 3	0.01 (0.3)	0.37 (6.7)**	0.01 (0.2)
Potential withdrawals 4	0.08 (0.5)	0.07 (0.5)	0.15 (1.6)
Education 3	0.03 (1.1)	-0.01 (0.3)	0.03 (0.5)
Education 4	-0.03 (1.0)	-0.13 (0.5)	-0.08 (1.1)
Education 5	-0.25 (6.8)**	-0.12 (1.4)	-0.22 (2.6)**
Duration dependence			
Month 2	-0.13 (6.4)**	0.55 (7.9)**	-0.08 (1.8)*
Month 3	-0.15 (6.3)**	0.85 (12.6)**	0.00 (0.0)
Month 4	-0.11 (3.8)**	1.05 (15.4)**	0.03 (0.4)
Month 5	-0.25 (7.2)**	1.29 (18.9)**	-0.08 (1.1)
Month 6	-0.24 (5.9)**	1.31 (18.1)**	-0.13 (1.4)
Month 7	-0.29 (6.3)**	1.28 (16.6)**	-0.16 (1.5)
Month 8	-0.39 (7.2)**	1.31 (15.7)**	-0.27 (2.3)**
Month 9	-0.42 (7.0)**	1.22 (13.4)**	-0.31 (2.3)**
Month 10	-0.48 (7.3)**	1.12 (11.3)**	-0.27 (1.8)*
Month 11	-0.49 (6.8)**	1.11 (10.5)**	-0.31 (1.9)*
Month 12	-0.55 (7.0)**	1.08 (9.4)**	-0.40 (2.3)**
Month $\geq$ 13	-0.62 (7.7)**	0.99 (8.5)**	-0.53 (3.0)**
Unobserved heterogeneity			
α	1.09 (9.5)**	0.97 (5.1)**	1.00 (5.5)**
u^b	-1.74 (27.7)**	-1.91 (17.4)**	-1.81 (12.9)**
-Loglikelihood	87,894.5	24,127.9	17,851.4
Test on selectivity			
α	–	0.96 (8.1)**	
u^b	–	-1.88 (22.6)**	
-Loglikelihood	–	41,979.5	
LR test	–	0.4	
N	33909	8708	7085

Note: All estimates contain a constant and dummy variables for industry (15), region (14), birth year cohort (4) and year of entrance (2); absolute t-statistics in parentheses; a ** (*) indicates significance at a 95% (90%) level.

Tab. 6: Parameter estimates exit rates out of unemployment – females

	Not entitled to SF	Opting for SF	Not opting for SF
Potential withdrawals 2	-0.04 (1.3)	0.33 (6.6)**	0.19 (3.0)**
Potential withdrawals 3	-0.05 (1.1)	0.38 (5.0)**	0.22 (2.8)**
Potential withdrawals 4	0.04 (0.3)	0.43 (2.0)**	0.12 (0.8)
Education 3	0.17 (3.0)**	0.43 (4.1)**	0.35 (2.3)**
Education 4	0.36 (5.9)**	0.49 (4.6)**	0.45 (2.9)**
Education 5	0.26 (3.6)**	0.66 (5.3)**	0.43 (2.6)**
Duration dependence			
Month 2	-0.23 (5.8)**	0.52 (4.7)**	-0.23 (3.0)**
Month 3	-0.02 (0.4)	0.89 (8.4)**	-0.09 (1.2)
Month 4	-0.03 (0.6)	1.12 (10.8)**	-0.14 (1.6)*
Month 5	-0.09 (1.6)	1.49 (14.6)**	-0.22 (2.4)**
Month 6	-0.02 (0.4)	1.57 (15.1)**	-0.45 (4.3)**
Month 7	-0.22 (3.1)**	1.45 (13.2)**	-0.32 (3.0)*
Month 8	-0.28 (3.6)**	1.57 (13.9)**	-0.55 (4.4)**
Month 9	-0.27 (3.2)**	1.56 (13.0)**	-0.58 (4.4)**
Month 10	-0.42 (4.5)**	1.49 (11.8)**	-0.49 (3.0)**
Month 11	-0.31 (3.1)**	1.37 (10.1)**	-0.64 (4.3)**
Month 12	-0.36 (3.4)**	1.40 (9.8)**	-0.84 (4.8)**
Month $\geq$ 13	-0.43 (3.9)**	1.32 (9.3)**	-0.99 (8.2)**
Unobserved heterogeneity			
α	0.36 (1.8)*	0.32 (1.6)	1.95 (13.0)**
u^b	-2.12 (24.2)**	-2.04 (17.0)**	$-\infty$
-Loglikelihood	42,070.2	17,012.9	7,649.8
Test on selectivity			
α	–	0.54 (3.2)**	
u^b	–	-2.04 (17.3)**	
-Loglikelihood	–	24,666.1	
LR test	–	6.8**	
N	16657	6602	3017

Note: All estimates contain a constant and dummy variables for industry (15), region (14), birth year cohort (4) and year of entrance (2); absolute t-statistics in parentheses; a ** (*) indicates significance at a 95% (90%) level.