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**Duration of Temporary Layoffs, Impact of Tenure and Enterprise Characteristics:  
Evidence from Sweden**

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Temporary layoffs tend to represent an important source of worker-firm attachment. We investigate the determinants of the duration of temporary layoffs using matched employee-employer dataset from Sweden. The impacts of covariates and the shapes of hazard functions vary depending on the destination of transition: recall or new job. We reject the hypothesis that firms tend to recall workers who approach the unemployment benefit exhaustion. However, we are not able to rule out the possibility that firms behave strategically through prioritizing rehiring the individuals with relatively short periods of unemployment compensation entitlement.

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Abstract

Temporary layoffs tend to represent an important source of worker-firm attachment. We investigate the determinants of the duration of temporary layoffs using matched employee-employer dataset from Sweden. The impacts of covariates and the shapes of hazard functions vary depending on the destination of transition: recall or new job. We reject the hypothesis that firms tend to recall workers who approach the unemployment benefit exhaustion. However, we are not able to rule out the possibility that firms behave strategically through prioritizing rehiring the individuals with relatively short periods of unemployment compensation entitlement.

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## 1. Introduction

Recent studies examine the frequency of temporary layoffs (recalls, rehires) and an effect of temporary layoffs on the duration of unemployment spells. They also provide insights into the relationship between firms' "recall policies" and individuals' job-search behavior. A number of studies show that temporary layoffs, defined as the unemployment periods that end in reemployment with the previous employer, are common in North America and Europe and they are an important potential source of worker-firm attachment.<sup>1</sup>

Part of the theoretical models of temporary layoffs is closely related to the literature on the implicit contracts. These studies (e.g. Feldstein, 1976; Bailey, 1977; Haltiwanger, 1984) emphasize the demand-side relationships assuming that firms alone make a decision to recall a worker. Firms tend to choose to rehire previously dismissed worker because of her existing firm-specific skills and the screening costs associated with hiring an outsider. Temporary laid-off workers would prefer to be rehired rather than search for a new employer because of their firm-specific human capital investment, seniority based compensations and limited outside opportunity options. The theory predicts that in the absence of full "experience-rating", provision of unemployment benefits would likely increase the incidence of temporary layoffs. Nevertheless, unemployment benefits would effect the duration of unemployment spell, which would be primarily determined by the firm's decision to recall workers and not by the individual job-search behavior.

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<sup>1</sup> Feldstein (1978), Robertson (1989), Jensen and Westergaard-Nielsen (1990), Fisher and Pichelmann (1991), Mavromaras and Rudolph (1998), Roed and Nordberg (2003), Alba-Ramirez and Munoz-Bullon (2004)

A number of studies (e.g. Pissarides, 1982; Katz, 1986; Jurajda, 2004) address the issue of a job-search behavior of temporary dismissed workers. These papers derive an optimal job-search behavior of workers and recall strategies of firms. According to these models, the presence of recall prospects would decrease the incidence of finding a new job by workers. The major difference comparing to the implicit contract literature lies in the fact that firms' decision to recall is affected by workers' job-search behavior. Unemployment insurance influences the duration of unemployment spell and distorts the incentives to search for a new job.

Katz and Meyer (1990) was among the first empirical papers to analyze the individuals' duration of unemployment spells accounting for a possibility of recall. The authors show that the recalls have an affect on the composition of unemployment. The impact of covariates and unemployment insurance depends on the destination of transition from unemployment: recall or employment with a new employer.

Recent evidence for Sweden (Janasson, 2002) indicates that temporary layoffs are fairly common in the Swedish labor market. The author finds that about 45% of all transitions from unemployment in his sample are to the previous employers, which translates into a 10% stock measure of unemployed who are waiting to be rehired.

In this paper we provide additional insights into the issue of temporary layoffs by simultaneously accounting for the characteristics of firms and the workers. Contrary to Janasson (2002), who used the survey data to identify recall incidences, we rely on the information from the Business Registry and the Unemployment Registry. The results on the frequencies of recalls are similar to Janasson (2002). Approximately 47% of unemployed, who found a job, were rehired by the previous employers. An important

result of our study concerns the impact of enterprise characteristics and employees' seniority on the probability of recall and the duration of unemployment spell. We find that the workers' tenure affects differently the risk of transition to a new job and the risk of recall. Moreover, the impact of tenure is non-linear in age. Given same tenure, younger workers tend to be recalled sooner comparing to older workers.

Section 2 presents an overview of the institutional setup of the Swedish labor market. Section 3 describes the data. Section 4 presents descriptive statistics and results for the determinants of probability recall. Section 5 models the determinants of the risk of transition from unemployment to competing destinations: new job or recall. Section 6 concludes the paper.

## **2. Institutional setup**

The legal origin of Sweden and other Nordic countries falls out of classification into common and French civil law traditions and constitute a separate Scandinavian legal group. This group is characterized by a relatively high degree of employment security and well developed social protection, (Botero et al., 2004).<sup>2</sup>

In the event of unemployment workers in Sweden are entitled for generous unemployment compensation lasting for 300 working days (450 days for individuals

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<sup>2</sup> Review of Swedish labor law is presented in Fahlbeck (1997). Comparison of the Swedish labor protection to that of other countries is presented in van Peijpe and Blanpain (1998). Issues of employment protection is discussed in Holmlund, and Storrie (2002).

older 57), which is financed from the tax on individuals.<sup>3</sup> The level of benefits cannot exceed 80% of previous wage and is bounded to 570 SEK (63.20 EUR) a day. To qualify for unemployment insurance one needs to work for six months. Those who do not qualify for unemployment insurance may receive cash assistance, paid during 150 days and amounts to 240 SEK (26.15 EUR) a day.

Employment relations in Sweden are regulated by the Swedish Employment Protection Act (*Lagen om anställningsskydd, LAS*) which was adopted in 1974. The law introduced fundamental restrictions on firms' rights to dismiss workers and defines possible scope of deviations through collective agreements.<sup>4</sup> The law covers virtually all categories of workers and contains provisions on types of employment, dismissal procedure, notification period, and priority rules in cases of workers layoff and recall.

The LAS defines two types of layoffs: layoff due to redundancy and temporary layoff with fixed recall date (*permittering*). The latter is allowed only if provided in collective agreement. In case of temporary layoff workers, as a rule, do not register with the employment office and do not engage in job search. Since 1985 firms bear all costs of *permittering* and their attractiveness is substantially reduced. This paper focuses primarily on layoffs due to redundancy.

According to recall rules, defined in *LAS*, dismissed workers can return to the previous employer if a new position becomes available within one year after dismissal.<sup>5</sup> The rule applies to all redundant workers who had been working with enterprise at least

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<sup>3</sup> Swedish unemployment insurance system differs from the one of U.S. in one important aspect, there is no "experience rating" in Sweden, this could possibly raise incidence of temporary layoffs as suggested by Feldstein (1978). However, the later conclusion was questioned in a number of studies; see Holmlund (1998) for literature review.

<sup>4</sup> English translation of the law is available at ([www.sweden.gov.se](http://www.sweden.gov.se)).

<sup>5</sup> For people hired after 1 of January 1997, 9 months applies

12 months in the preceding 3 years. If several dismissed workers apply to the same job they are ranked according to their firm-specific seniority. Moreover, given equal years of seniority the priority should be given to older workers. It is important to mention that recall rules are not binding and may be changed by collective agreement.

The recent amendments to *LAS* diminished rights of the dismissed workers to get reemployment. In particular, part-time workers, who wish to increase working hours, have a priority over dismissed workers that want to return to their previous employer.

### **3. Data description**

The information on the length of unemployment spell is available from Händel database which covers all unemployed who enquire for assistance in finding a job to the state employment agency.<sup>6</sup> The dataset provides complete information on all unemployment periods, participation in active labor market programs and benefit entitlement. Moreover, there is detailed information on reasons of deregistration from employment office.

Unfortunately, the Händel dataset contains incomplete information on individual employment history prior to becoming unemployed and lacks description of the enterprise individual has transitioned to after a period of unemployment. To provide such information we combine the information available at the unemployment registry with the

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<sup>6</sup> The database is found to be representative for unemployed, about 96% of unemployed contact employment agency (Jansson, 1996)

employer-employee matched dataset which includes enterprise information available at Statistics Sweden's Business Register (RAMS).

The matched dataset gives detailed description on the type of work and enterprises individual was working at and transited to after a period of unemployment. Such information is available for approximately 200,000 individuals. The RAMS dataset covers incidence of employment with enterprise as of November each year.

To construct the length of unemployment spell, we use the information provided by the employment registry considering individual to be unemployed if he was openly unemployed and searching for job.<sup>7</sup>

Information on the previous place of employment is determined from business register. We assume that if individual is observed working with the enterprise in a given year, he continues to work at the same enterprise until the moment of registration with the employment office. Moreover, if the individual exits the employment office with employment we assume that he transited on recall if we can identify him working with the same enterprise in the subsequent year. The definition of the employer is important in our analysis. Large and medium size enterprises may consist of several divisions. In the analysis enterprise division is used as a definition of employer to avoiding unnecessary aggregation.

Finally, individual is considered to be permanently employed with a given enterprise if and only if the wage received from the given enterprise is his main source of labor income.

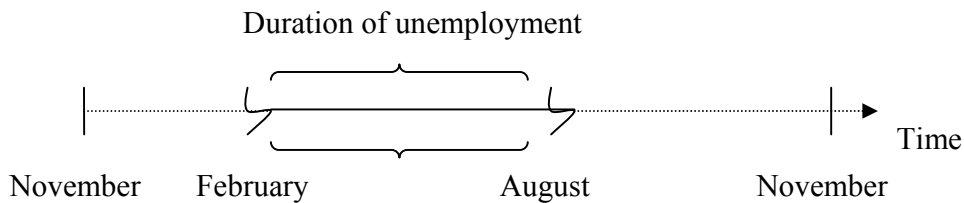
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<sup>7</sup> In calculation of the length of unemployment spell we followed the procedure similar to that of Carling (2001), see appendix of the working-paper version of the paper, <http://linda.nek.uu.se/1999wp20.pdf>.



The structure of the dataset may be represented in a simple figure. As illustrated in Figure 1 individual entered the employment office in February and remained unemployed until August, when he found a job. We can observe labor market status of individual in November when he was working. He became unemployed in February and stayed unemployed until August when he exited unemployment. Finally we again can observe individual working in November the following year. Dashed lines represent periods then individual attachment to the enterprise is not observable.<sup>8</sup>

**Figure 1.** Sample construction



To define destination of exit from unemployment we used information from unemployment registry on reasons of termination of registration with employment office. Thus, if individual transited to a job, as given by the information form employment registry, we try to identify him at the RAMS dataset. Individual is considered to be recalled if he transited to the same division within enterprise after a period of unemployment.

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<sup>8</sup> This creates two problems. On the one hand, the unemployment duration, which is going to be used in the later analysis, is not necessary the duration since the last employment by employer. On the other hand, exit from the employment office is not necessary done to the same employer. It may happen that the individual had different employer in the periods represented by the dash lines, but we can not to control for it.

Available dataset does not contain information on individual hours worked and whether the labor-contract is temporary or permanent. Furthermore, there is no information on individuals' subjective probability of recall.<sup>9</sup>

### **3.1 Sample selection**

Our sample consists of individuals registered with the employment office during the 12 month period from November 1997 to November 1998. We follow each person until the date of exit from unemployment or - if no exit is observed – until November 2000. Initially, we do not impose age restriction on our sample. Thus, all individuals from 18 to 64 are included in our analysis.

The dataset on unemployment benefit claimants was merged with the matched employee-employer dataset to determine individuals' previous place of employment. People never being employed cannot transit on recall and thus are excluded from the analysis. The resulting sample of unemployed includes 12,630 individuals.

Our analysis is restricted to unemployed with regular unemployment compensation and excludes disabled individuals. Moreover, the individuals who transit to unknown destination (405 cases) are excluded. Furthermore, 732 individuals who loose their jobs due to enterprise liquidation or restructuring are deleted.<sup>10</sup> Excluding the

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<sup>9</sup> Individuals' expectations of recall may influence their job search behavior (Katz and Meyer, 1990; Anderson (1992); Burgess and Stuart, 1998).

<sup>10</sup> Individual is considered to loose the job due to enterprise liquidation or restructuring if enterprise identification number disappears from the RAMS dataset in the year followed by unemployment. Although some individual dismissed from closing enterprises may still be eligible for recall we consider such possibility to be negligible.

individuals from the dataset is justifiable since their probability to return to the same enterprise equals to zero. Final sample used in the analysis includes 7,548 individuals.

#### 4. Descriptive statistics

In line with the previous results for Sweden (Jansson, 2002), we report that considerable number of individuals return to previous employer after a period of unemployment. The proportion of the individuals who transit to the Sprevious employer out of all who transit to a job equals to 47% (Table 1).<sup>11</sup> Splitting population into age groups reveals that older people are recalled more often.

**Table 1.** Share of recall among newly employed workers. The overall share and the share distributed according to age categories

		Recall	New job
Total		46.68	53.32
Age:	18-24	41.12	58.88
	25-44	46.63	53.37
	45-64	65.26	34.74
Number of observations		1751	2000

Furthermore, those who transit to recall exit unemployment faster comparing to individuals who transit to a new job (Table2). Young workers tend to exit unemployment, irrespective of destination, sooner comparing to older counterparts.

<sup>11</sup> Jansson (2002) reports 45% recall rate.

**Table 2.** Mean unemployment duration, in days

		Total		Recall		New job	
		Mean	Std.	Mean	Std.	Mean	Std.
Total		82.65	80.48	77.1	71.8	87.48	87.13
Age:	18-24	59.10	59.10	53.17	42.88	63.24	58.66
	25-44	84.20	84.20	77.61	67.94	89.9	87.56
	45-64	134.01	134.01	120.2	122.02	159.87	141.78

The distribution of recall shares and the unemployment duration is presented in Tables A1-A2 in Appendix. The share of the rehired individuals, generally, increases with tenure. The duration of the unemployment spell is also higher for the workers with long tenure.

#### 4.1 Sample statistics and empirical determinants of the probability of being recall

This section presents descriptive statistics and examines the determinants of the probability of recall by fitting binary logistic model. The dependent variable is dichotomized and takes the value of 1 if individual was recalled and 0 otherwise.

The important variable used in the analysis is tenure at the enterprise. Despite of considerable empirical research, the effect of tenure on employment security tends to be ambiguous. On the one hand, a number of empirical studies found that higher tenure associated positively with higher job security (Parson, 1972; Valletta, 1999, 2000, Arai and Vilhelmsson, 2004). On the other hand, long worker-firm attachment significantly reduces probability of finding a new job and prolongs time spent in unemployment (Katz and Meyer, 1990; Idson, and Valletta, 1996). Using business register, the enterprise and

the employer identity, we trace individuals back to 1990 and construct tenure variable as a dummy variable with maximum years of tenure equal to eight.<sup>12</sup>

To control for the size of the enterprise, the natural logarithm of the number of employees was included into the estimation. We expect that large firms rely on temporary internal labor reallocation, whereas small firms would be inclined to use temporary layoffs. The support of this hypothesis is found in Mavromaras and Helmut (1998). Authors also indicate that individuals laid off from large enterprises return to a previous employer at a much faster rate. Ownership and industry may influence probability of getting recalled and the duration of unemployment. We include in our estimation dummies for private ownership and industry.

Location and regional economic conditions may influence probability of being recalled and the time spent in unemployment. Two proxies were used in this paper: local unemployment rate and a dummy for residence in the big city.<sup>13</sup> Previous studies (Janasson, 2002) indicate that a high local unemployment rate increases chances and risk of exit unemployment on recall. However, high regional levels of unemployment prolongs unemployment spell when individuals exit unemployment to a new job. Residing in the big city is likely to produce negative impact on recall probability and decrease time spent in unemployment (Lazear, 2003). In the big cities, labor markets are likely to be thick and search cost is relatively low. Thus the individuals are more likely to find a new job which matches their skills.

To control for individual specific characteristics standard set of control variables such as age, gender, presence of children above 7 years old, education and country of

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<sup>12</sup> Auer and Cazes (2000) report that average tenure in Sweden was equal 11.9 years.

<sup>13</sup> Big cities are Stockholm, Gothenburg and Malmo.

origin were included. Finally, possible seasonal effects were captured by dummies for quarters of inflow into the unemployment.

Columns 1-3 (Table 3) present descriptive statistics according to destination of transition from unemployment. Column 4 provides the results of the estimation of logistic regression. The individuals who transit to a new job are on average four years younger comparing to those who return to a previous employer. However, the results of regression analysis indicate that age does not influence the probability to return to an old place of work. Approximately 60% of all transitions to recall are done by males and 23% of individuals have at least one child below 7. The presence of children does not affect probability of transition to recall and males are more likely to transit to recall. Unemployed who get rehired have on average nine extra month of work experience comparing to individuals who receive a new job. Regression confirms that tenure is a significant determinant of transition to recall. Individuals with low education tend to transit to recall. This result is confirmed when controlling for other characteristics. Immigrants are distributed evenly across destinations. Regression results indicate that being born outside Sweden does not influence the probability to be recalled. Recalls are concentrated in non-metropolitan areas and in areas with relatively high unemployment rate. These variables significantly affect the probability of being rehired. Among other enterprise characteristics individuals who had being employed in non-private companies or worked in constriction industry have higher incidence and probability of being rehired. Employment in the service sector decreases the probability of being recalled. Finally, the individuals registered with the employment office in winter have higher chances to transit to recall.

**Table 3.** Descriptive statistics according to destination of transition and results of binary logistic model

In this table we present mean values by destination of transition: New job; Recall and Other. Panel 4 presents results of estimation of binary logistic regression model. Dependent variable takes value 1 if individuals transit to the same employer after a period of unemployment and 0 if he transitioned to a new job.

Variables	Mean values			Logistic regression		
	New Job	Recall	Other	Coeff.	t-stat.	
	1	2	3	4		
Age	32.67	35.10	33.52			
18-24	0.18	0.14	0.17	-0.11	-1.22	
25-55	0.79	0.79	0.78			
55-65	0.03	0.07	0.06	0.10	0.85	
Male	0.54	0.59	0.45	0.21	3.24	
Child < 7	0.23	0.23	0.24	-0.05	-0.69	
Tenure	2.34	3.00	2.68			
Tenure<=1	0.51	0.36	0.46			
1<Tenure<=2	0.18	0.20	0.18	0.41	5.28	
2<Tenure<=3	0.10	0.12	0.11	0.43	4.68	
3<Tenure<=4	0.07	0.10	0.08	0.48	4.67	
4<Tenure<=5	0.03	0.04	0.03	0.49	3.34	
5<Tenure<=6	0.04	0.06	0.05	0.47	3.70	
6<Tenure<=7	0.01	0.02	0.01	0.58	2.59	
7<Tenure	0.05	0.09	0.08	0.38	3.51	
Education:	< Upper secondary, 2 years	0.15	0.25	0.21		
	Upper secondary, 2 years	0.39	0.41	0.41	-0.26	-3.45
	Upper secondary, 3 years	0.21	0.18	0.22	-0.31	-3.30
	University	0.25	0.16	0.17	-0.29	-3.07
Country of origin:	Sweden	0.94	0.93	0.92		
	Nordic	0.03	0.03	0.03	-0.14	-0.78
	Europe	0.01	0.02	0.02	0.18	0.83
	Other	0.03	0.03	0.04	-0.10	-0.56
Regional characteristic:	Regional unemployment rate	5.27	5.38	5.36	0.05	2.27
	Big city	0.17	0.12	0.16	-0.29	-3.27
Enterprise characteristics:	Private ownership	0.70	0.70	0.69	-0.16	-1.98
	Size	3.41	3.39	3.45	0.00	0.24
Industry:	Manufacturing	0.17	0.19	0.19	0.06	0.62
	Construction	0.12	0.20	0.06	0.78	7.99
	Service & finance	0.06	0.04	0.07	-0.31	-3.34
	Other					
Quarter of inflow:	Autumn	0.18	0.16	0.16	-0.27	-3.15
	Winter	0.28	0.32	0.22		
	Spring	0.20	0.19	0.18	-0.15	-1.85
	Summer	0.34	0.33	0.44	-0.32	-4.46
Constant				-1.31	-7.68	
Number of observations		2000	1751	3797	3751	
Log-likelihood value					-3918.59	

## 5. Empirical determinants of the duration of unemployment spell

This section presents results of estimation of the reduced form model of the duration of unemployment spell making distinction between exit to a new employer and exit on recall. Such approach is referred in the econometric modeling as an independent competing risk model (Lancaster, 1990; Narendranathan and Stewart, 1993; Jenkins, 2004). Competing risk model is required because of the possibility of different underlying process determining hazard to a new job and recall. In such a model observations which exit to an alternative destination are treated as censored. The cause specific hazard rate can be written:

$$\theta_{ij}(t) = \alpha_j(t) \{ \exp(x_i(t)' \beta_j) \},$$

where  $\alpha(t)$  is a baseline hazard rate,  $x_i$  is a vector of explanatory characteristics,  $\beta$  is a vector of unknown parameters to be estimated,  $i = 1, \dots, N$  and  $j = \text{recall}; \text{new job}$ . In our formulation we follow flexible base-line specification of hazard rate, allowing it to vary between monthly intervals, but restricting it to be constant inside each interval.<sup>14</sup> The model is assumed to be continuous and time is measured in weeks. Furthermore, we assume that all variables in the model are time-invariant and possible heterogeneity is captured by observed variables.

### 5.1 Results of Estimation

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<sup>14</sup> We allow hazard to vary between 18 monthly intervals, restricting hazard to be constant onwards.



This section focuses on the impact of enterprise and socio-economic characteristics on the risk of exit from unemployment. First, we treat exits to new a new job and on recall as a single destination. Next, we estimate competing risk model. The results of estimations are presented in Table 4. Same explanatory variables as in the analysis of the probability of being rehired were used.

The impact of age is similar across destinations. The hazard of exit form unemployment declines with age. Gender has an impact on the hazard rate from unemployment (Column 1). The results of competing risk model indicate that males have higher risk of transition than females only on recall. Having children below 7 years old does not affect the risk of transitions from unemployment. Important result concerns impact of tenure on the duration of unemployment spell. Similar to education, tenure has a mixed role in transition from unemployment. For low levels of tenure we find positive but not statistically significant relationships with the risk of transition from unemployment. Long tenure decreases hazard of transition from unemployment. The impact of tenure changes in competing risk model. Results indicate that the impact of tenure on the hazard rate varies depending on destination of transition from unemployment. Individuals who had acquired sufficiently long tenure are likely to be recalled by a previous employer; coefficients of tenure are positive and significant. The unemployed individuals who stayed long in the same job will face difficulties in finding a new job. The coefficients of tenure are negative and significant.<sup>15</sup>

In the previous section we found that the probability of being recalled declines with education. The results from duration modeling (Table 4) indicate that influence of

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<sup>15</sup> Documented relationship between tenure and the probability of finding a new job has been reported in several studies for the USA (Katz, 1986; Katz and Meyer, 1990; Idson and Valletta, 1996).

education on the hazard of exit from unemployment varies depending on destination of transition. Individuals with education above short upper secondary (Upper secondary, 2 years) tend to find a job faster when exits to new jobs and recall are not distinguished. However, competing risk model support this result only for exit to a new job. Opposite result is found for the risk of transition to recall. It appears that individuals with low level of education exit unemployment much faster when transit to recall. This relationship may imply that with every increase in educational level human capital becomes more transparent and unemployed depend less on the level of firm-specific skills. It is likely that single destination model underestimates the actual returns on education.<sup>16</sup> Competing explanation of a relatively high hazard of transition to recall for low educated workers comes from the fact that firms invest more in their training. If firms and workers share costs and profits from investment in on-the-job training rehiring should be a likely event (Becker, 1964, Hashimoto, 1981).

It appears that individuals from non-Nordic countries face difficulties in finding a new job. However, there is no significant difference between immigrants and natives in the speed of escape from unemployment on recall. This may indicate discriminatory behavior in the process of new hiring. Once foreigners reveal their true quality to the firm or establish strong labor-market attachment they face the same risk of transition to recall.

Among regional characteristics, in single destination model, both high local unemployment rate and residence in the big city prolong unemployment. Again this results contrast the findings of the competing risk model. High levels of unemployment reduce hazard to a new job, but have no effect on recall. Moreover, increase in the size of

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<sup>16</sup> Similar result was reported by Jansson (2002).

the labor market reduces hazard of transition to recall and is insignificant determinant of the hazard to a new job.

Individuals from private enterprise wait to be recalled longer and enterprise size has no effect on the hazard rate of exit to any destination. Private companies are likely to adopt more aggressive human-resource management strategies, trying to attract new workers rather relying on stagnant pool of workers marginally attached to enterprise.

The industry controls affect the hazard of transition to employment Table 4 (Column 1). The individuals previously employed in the construction industry have higher hazard of transition from unemployment irrespective of destination. Employment in manufacturing industry decreases the hazard of transition to a new job and does not affect the recall hazard. Opposite result is found for service sector. Employment in the service sector decreases hazard of transition to recall and does not have influence hazard of transition to a new job.<sup>17</sup>

We also identify important seasonal variation, individuals who became unemployed in autumn and spring stay unemployed longer if transit to recall, while no significant pattern exists if individuals transit to a new job.

In general our results suggest that the single destination model do not provide accurate picture of the impact of different covariates on the hazard rate from unemployment. Competing risk model with exits on recall and new job is preferred. Moreover, we test the appropriateness of competing risk model comparing it to a single

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<sup>17</sup> We also estimate the models excluding different industries. Results appeared to be sufficiently robust.

destination model (Narendranathan and Stewart, 1993).<sup>18</sup> The results reject the null hypothesis that both models are the same.

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<sup>18</sup> The test statistics is  $2[\ln(L_{CR}) - \ln(L_{SR}) - \sum_j n_j \ln(p_j)]$ , where  $\ln(L_{CR})$  is maximized log-likelihood value of competing risk model,  $\ln(L_{SR})$  is maximized log-likelihood value of single-risk model,  $n_j$  number of exists to state  $j$  ( $j = 2$ ) and  $p_j = n_j / \sum_j n_j$ . The test statistic is distributed Chi-squared with degrees of freedom equal to the number of restrictions. The value of the test is 328.9 which is highly significant.

**Table 4.** Estimated models of the hazard rate to a job

In this table we report models estimating the hazard rate of transition to a job. The sample consists of 7548 individuals and 108884 individual weeks. First panel, to the left, estimates hazard rate to a job without distinguishing new job and recall. Out of 3751 individuals who transit to a job, 2000 transit to a new job and 1751 transit to recall. Panel two and three report results of independent competing risk specification distinguishing between new job and recall. Coefficients indicate variables' effects on the hazard function, a positive coefficient increases the probability of exit, and thereby decreases expected duration. Estimated duration parameters can be found in Appendix (Table A3).

Variables		Employment		New job		Recall	
		1		2		3	
		Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat
Age:	18-24	0.34	6.97	0.44	6.82	0.22	2.86
	25-55						
	55-65	-0.65	-7.86	-0.99	-7.37	-0.40	-3.93
Male		0.08	2.20	0.06	1.27	0.10	1.88
Child<=7		0.01	0.35	0.03	0.46	0.00	0.05
Tenure:	Tenure <=1						
	1<Tenure<=2	0.04	0.94	-0.14	-2.43	0.29	4.28
	2<Tenure<=3	0.04	0.81	-0.20	-2.63	0.34	4.38
	3<Tenure<=4	-0.06	-1.02	-0.36	-4.18	0.28	3.28
	4<Tenure<=5	-0.08	-0.87	-0.41	-2.99	0.28	2.42
	5<Tenure<=6	-0.12	-1.63	-0.42	-3.62	0.22	2.24
	6<Tenure<=7	-0.01	-0.06	-0.29	-1.54	0.30	1.78
	7<Tenure	-0.31	-4.50	-0.71	-6.61	0.09	1.04
Education:	< Upper secondary, 2 years						
	Upper secondary, 2 years	0.07	1.51	0.31	4.49	-0.14	-2.38
	Upper secondary, 3 years	0.09	1.69	0.35	4.36	-0.14	-1.79
	University	0.22	4.23	0.61	8.16	-0.20	-2.62
Country of origin:	Sweden						
	Nordic	-0.13	-1.23	-0.08	-0.56	-0.19	-1.26
	Europe	-0.23	-1.66	-0.53	-2.32	0.05	0.29
	Other	-0.34	-3.43	-0.45	-3.22	-0.23	-1.49
Regional characteristic	Regional unemployment rate	-0.02	-1.78	-0.06	-3.75	0.03	1.48
	Big city	-0.12	-2.63	0.02	0.30	-0.32	-4.11
Enterprise characteristics	Private ownership	-0.09	-1.96	-0.02	-0.37	-0.17	-2.57
	Size	0.01	0.87	0.01	0.53	0.01	0.71
Industry:	Manufacturing	-0.10	-1.90	-0.15	-2.12	-0.04	-0.54
	Construction	0.41	7.74	0.18	2.24	0.63	8.45
	Service & finance	-0.18	-3.52	-0.09	-1.38	-0.30	-3.68
	Other						
Quarter of inflow:	Autumn	-0.12	-2.52	0.00	0.06	-0.25	-3.64
	Winter						
	Spring	-0.08	-1.59	-0.03	-0.41	-0.12	-1.79
	Summer	-0.04	-0.88	-0.02	-0.28	-0.05	-0.82
Constant		-4.28	-10.64	-4.65	-8.11	-5.40	-9.14
Log-likelihood value		-8313.13		-5547.68		-5196.82	

## 5.2 Age and tenure profile

There remains an open question “how does age relates to tenure and the risk of transition to recall?” It is expected that old workers would accumulate more tenure and more firm-specific human capital. Thus, such workers should be recalled more often. Theoretical and empirical work suggests that individuals with higher tenure are often paid above their marginal product of labor, creating incentives for firm to layoff workers with high tenure (Lazear, 1979, 1981). However, old-experienced worker are not dismissed since management of the firm faces reputation constraint and wants to create right incentives to junior workers.

In the previous sections we found that old workers are indeed recalled more often. Yet, it is not clear if old workers are given priority over young workers to return to the enterprise. Current legislation suggests that given equal years of experience older workers should have a priority to return to their enterprise.

We can test this proposition in the context of duration model by treating tenure as a continuous variable and assuming age to be in intervals as before. Results are presented in Table 5. High level of tenure reduces time spent in unemployment for young workers. However, interaction of tenure with oldest group of workers corresponds to an increase length of unemployment spell. It appears that given equal years of seniority older workers have lower hazard of exit on recall. It is likely that, firms tend to deviate from the basic norms of current legislation in favor of young individuals. A plausible explanation to this fact is that workers above 55 years are entitled to longer insured unemployment spell.

Firms may prefer to recall younger workers first expecting that these workers cannot wait too long.

**Table 5.** Effect of age and tenure on the hazard rate to recall

In this table we report model estimating the hazard rate of transition recall. Except tenure which is now continuous variable and it's interaction with age all other variables are the same as in the Table 4. Panel 2, for comparison replicates result of the previous table.

Variable	Hazard of exit to recall including interactions terms		Hazard of exit to recall no interactions terms	
	1		2	
	Coeff.	t-stat	Coeff.	t-stat
Age:				
18-24	0.06	0.49	0.22	2.86
25-55				
55-65	-0.17	-0.91	-0.40	-3.93
Age*tenure:				
(18-24)*tenure	0.08	1.92		
(55-65)*tenure	-0.06	-1.65		
Tenure	0.02	2.18		

### 5.3 Sensitivity analysis

Here we test if results are sensitive to exclusion of various groups of unemployed. According to current legislation a modified rule in calculation of seniority is applied to workers above 45 years. Section 3 §3 of Swedish Employment Protection Act states that: “The employee may include in the calculation one extra month of employment for each month of employment commenced after the age of 45. However the employee may, only be credited with a maximum of 60 such extra months.” To check if our results are sensitive to exclusion of this group of unemployed we restrict our sample to individuals from 18 to 44 in order to examine impact of tenure on this group of unemployed. Results of estimation are presented in Table 6.<sup>19</sup> Our results appear to be robust to exclusion of old individuals. In several cases significance of our estimates is alerted. However, our

<sup>19</sup> Here we estimate Cox proportional hazard model.

main conclusion about the impact of various covariates on the hazard rate remains unchanged.



**Table 6.** Cox model, excluding individuals above 44

In this table we perform sensitivity check by excluding all individuals older than 45. The sample consists of 6175 individuals and 77790 individual weeks. First panel, to the left, estimates hazard rate to a job without distinguishing new job and recall. Out of 3041 individuals who transit to a job, 1692 transit to a new job and 1349 transit to recall. Panel two and three report results of independent competing risk specification distinguishing between new job and recall. Coefficients indicate variables' effects on the hazard function, a positive coefficient increases the probability of exit, and thereby decreases expected duration. Baseline hazard parameters are not reported.

		Employment		New Job		Recall	
		1		2		3	
		Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat
Age:	18-24	0.18	4.12	0.21	3.52	0.15	2.14
	25-34						
	35-44	-0.12	-2.51	-0.22	-3.39	0.00	-0.01
Male		0.08	1.91	0.05	1.01	0.11	1.74
Child<=7		-0.01	-0.21	-0.02	-0.40	0.01	0.17
Tenure:	Tenure <=1						
	1<Tenure<=2	0.04	0.88	-0.14	-2.23	0.30	4.06
	2<Tenure<=3	0.07	1.28	-0.15	-1.86	0.37	4.23
	3<Tenure<=4	-0.01	-0.21	-0.27	-2.92	0.30	3.11
	4<Tenure<=5	-0.10	-0.96	-0.34	-2.28	0.21	1.53
	5<Tenure<=6	-0.11	-1.42	-0.41	-3.41	0.25	2.34
	6<Tenure<=7	-0.04	-0.24	-0.26	-1.10	0.23	1.05
7<Tenure	-0.20	-2.25	-0.52	-3.79	0.16	1.32	
Education:	< Upper secondary, 2 years						
	Upper secondary, 2 years	0.06	1.03	0.22	2.79	-0.11	-1.48
	Upper secondary, 3 years	0.17	2.71	0.35	3.99	-0.02	-0.18
	University	0.23	3.84	0.55	6.53	-0.16	-1.73
Country of origin:	Sweden						
	Nordic	-0.03	-0.24	0.08	0.51	-0.20	-1.00
	Europe	-0.43	-2.22	-0.75	-2.55	-0.11	-0.46
	Other	-0.34	-3.07	-0.44	-2.96	-0.22	-1.32
Regional characteristic	Regional unemployment rate	-0.01	-1.04	-0.05	-2.74	0.03	1.48
	Big city	-0.18	-3.41	-0.06	-0.84	-0.35	-4.04
Enterprise characteristics	Private ownership	-0.10	-2.08	-0.06	-0.87	-0.16	-2.18
	Size	0.02	1.57	0.00	0.32	0.03	1.99
Industry:	Manufacturing	-0.13	-2.17	-0.13	-1.69	-0.12	-1.36
	Construction	0.36	6.12	0.16	1.79	0.57	6.62
	Service & finance	-0.17	-3.05	-0.06	-0.87	-0.33	-3.67
	Other						
Quarter of inflow:	Autumn	-0.15	-2.79	-0.04	-0.51	-0.29	-3.5
	Winter						
	Spring	-0.06	-1.21	-0.06	-0.79	-0.06	-0.8
	Summer	-0.06	-1.34	-0.07	-1.16	-0.04	-0.6
Log-likelihood value		-24346.28		-13376.28		-10883.62	

## 5.4 Duration dependence

We examine the pattern of duration dependence using the specification reported in Table 4. Duration dependence, in the model is captured by 18 dummy variables up to 72 weeks, Table A3.

Several studies report that both hazards to recall and new employment increases prior to the point of benefit exhaustion (Katz, 1986; Katz and Meyer, 1990; Jurajda and Tannery, 2003;). Moreover, optimal firm's policy is to recall employees as they approach expiry of their benefits (Jurajda, 2004).

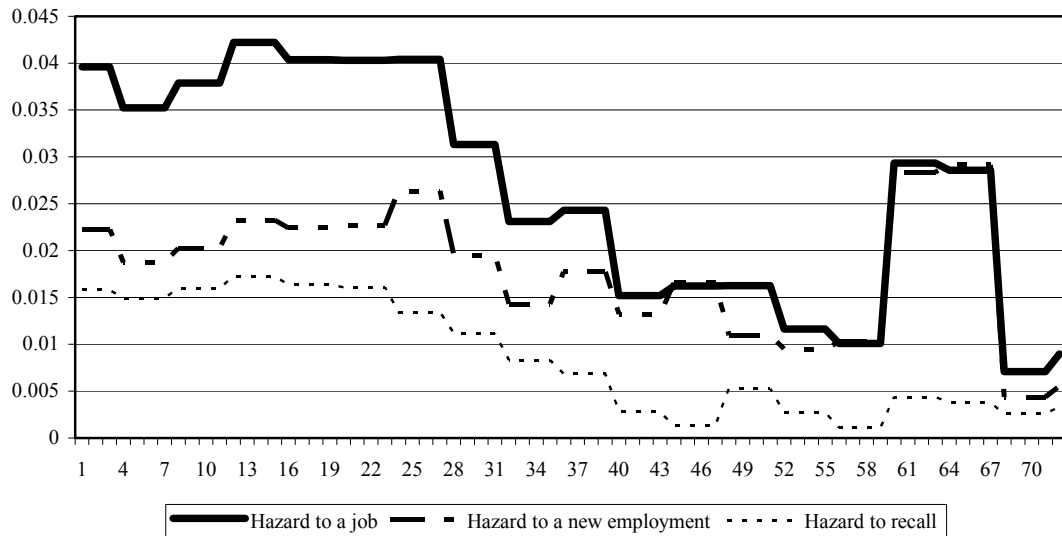
Previous research for Sweden (e.g. Carling et. al., 1996) finds negatively sloped hazards of transition to a job, which is interpreted as declining probability of finding a job as time passes. The authors, report a significant surge in job findings in the weeks just before benefits run out.

Figure 2 presents baseline hazards with all covariates set to zero. We observe initial increase in the hazard to a job, followed by a long-lasting decline from 28 to 60 week and a spike around week 64, which corresponds to a point of benefit exhaustion. Predicted hazard to a new job exhibits different trend. Hazard to a new job remains almost horizontal until the moment of benefit exhaustion and when it rises. At the same time baseline estimates for hazard on recall are not sensitive to benefits. Contrary to new job hazard, hazard on recall is non-monotonic and declines from week 28 and onwards. A small increase in the recall hazard around week 49 may correspond to the expiry of recall eligibility. As recall eligibility expires workers may inquire to the former employers for job directly or contact representative of the trade union.

Results of the duration dependence agree broadly with the previous findings for Sweden (Jansson, 2002). Similar to our results, the author finds close to horizontal hazard to a new job with strong effect of benefit exhaustion and declining hazard to recall with no clear benefit effect. Our results suggest that the hypothesis that firms recall individuals close to the benefit exhaustion may be rejected.

It is hard to identify effect of law governing rehires in Sweden. To make inference about effect of recall legislation on the risk of exit from unemployment we need to compare individuals eligible to be recalled with individuals who, according to the law, do not have a preferential right to return to a previous employer. In the institutional settings of Sweden every individual who has being employed for at least twelve month in the preceding three years has a right to be reemployed. Thus construction of the “statistical twin” group is impossible; individuals who are eligible to be recalled always have longer tenure. It is unlikely that rules governing the process of recall would restrict “firms will” to choose employees; after all, rules of recall are subject to change at the discretion of the firm. However, it is likely that eligibility to be recalled affect new job finding rates through increased expectation of being recalled.

Figure 2. Predicted hazards



## 6. Discussion and conclusion

In this paper we looked at the determinants of the individuals' unemployment duration distinguishing between transitions from unemployment to a new job and recall. The impact of covariates on the hazard rate from unemployment differs significantly between the alternative destinations. Furthermore, the duration dependency of the hazard rate of transition from unemployment and the impact of the unemployment benefits entitlement also vary depending on the transition destination.

We are the first to report the impact of individuals' tenure on the duration of unemployment spell in Sweden. The greater tenure tends to increase raises the hazard of transition to the recall state but lowers the hazard of transition to a new job. The impact of tenure on transition hazard is robust to exclusion of old workers specifically protected by the Swedish labor law. The private companies tend to rely on recalls less than the state

companies. The later result is in line with the evidence presented in Aggel and Lundborg (2003) who report that approximately 57% of companies in their sample of Swedish firms used flexible arrangements to reduce costs associated with permanent labor contracts. Controlling for the effect of industries on the hazard of transition from unemployment indicates that recalls seem to be more common in the construction.

The individuals' socio-demographic characteristics such as education, country of birth and geographical location tends to have different effects on the hazard rate to a new job and recall. More educated individuals are more likely to transit to a new job, while less educated workers are more likely to be recalled. This divide may imply that low educated workers are often trapped in unsecured jobs with the same employer. In line with the previous studies (e.g. Hansen, 2000) we report that individuals born outside Nordic countries have lower hazard of exit from unemployment. This conclusion, however, needs further elaboration. The negative impact of being born outside of Sweden is observed only for the hazard of transition to a new job. The risk of recall is not statistically different for immigrants and natives. Thus we inclined to rule out the hypothesis of discriminatory behavior in the process of recall. However, the possibility of immigrants' discrimination cannot be ruled out for process of new hiring. The residents of big cities in Sweden tend to have lower chances and lower hazard of transition on recall relative to all other individuals. High level of unemployment in an administrative region reduces the hazard to a new job, but increases the risk of recall.

The baseline hazard functions of transition to a new job and recall have different shapes. The hazard to a new job is sensitive to the duration of unemployment compensation entitlement which supports the predictions of the job-search theory. The

exit rate from unemployment increases sharply when the entitlement to benefits expires. In contrast, the hazard of recall is not sensitive to the duration of unemployment benefit entitlement. The later finding is consistent with the theory of implicit contracts (e.g. Feldstein, 1976). We find a further support to the implicit contract hypothesis for recalls is provided by the interaction term of tenure and age. Given an equal tenure, the hazard of recall for older workers is smaller than the hazard of recall for younger workers. A plausible explanation to this fact is that employers are aware of the fact that old workers (aged 55 and above) are entitled to longer insured unemployment spell relative to younger individuals. Nevertheless, our results should be interpreted with caution given our assumption of constant individual expectations of recall may be violated.

Overall we are able to illustrate that a large fraction of unemployed individuals return to a previous employer after a period of unemployment. More importantly, the determinants of transition to a new job and recall are different. Firms' characteristics and individuals' tenure are important factors. The impact of tenure varies from a positive one for the risk of recall to a negative one for the risk of transition to a new job. Unemployment benefits have strong impact on the hazard to a new job, but have only limited effect on transition on recall. We present evidence that companies in Sweden may deviate from the norms suggested by the Swedish labor law by first recalling young individuals. However, these deviations are generally allowed subject to the trade-union approval.

The main policy implication of our paper concerns the potential importance of accounting for recall in targeting the active labor market policies for the unemployed. As it stands now the government objective is to offer the participation in active labor market

programs at a relatively early stage of unemployment (Ackum Agell et al., 2002). To improve a relatively weak effect of early labor market interventions (Larsson and Carling, 2005) and avoid breaking valuable job matches it may be reasonable to condition participation in the programs on individual expectations of recall.

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## Appendix A

**Table A1.** Share of recall among employed workers by tenure

		Recall	New job
Tenure:	Tenure<=1	37.97	62.03
	1<Tenure<=2	48.82	51.18
	2<Tenure<=3	51.90	48.10
	3<Tenure<=4	55.52	44.48
	4<Tenure<=5	56.93	43.07
	5<Tenure<=6	56.68	43.32
	6<Tenure<=7	56.14	43.86
	7<Tenure	62.17	37.83

**Table A2.** Distribution of mean unemployment duration days by tenure

		Total		Recall		New Job	
		Mean	Std.	Mean	Std.	Mean	Std.
Tenure:	Tenure<=1	76.02	72.57	71.89	65.85	78.55	76.31
	1<Tenure<=2	82.46	79.34	74.23	66.21	90.31	89.49
	2<Tenure<=3	76.62	71.47	67.15	60.63	86.84	80.48
	3<Tenure<=4	85.37	81.62	73.74	67.07	99.88	95.05
	4<Tenure<=5	91.31	81.02	88.32	77.74	95.25	85.67
	5<Tenure<=6	95.82	79.23	95.17	73.01	96.67	87.15
	6<Tenure<=7	102.88	96.80	90.13	54.40	119.20	132.46
	7<Tenure	112.61	120.88	100.55	107.13	132.42	138.91

**Table A3.** Estimates of baseline hazard parameters

First panel presents baseline hazard parameters of a single destination model to a job. Panel two and three report baseline hazard parameters of independent competing risk specification distinguishing between transition to a new jobs and recall.

	Weeks	Employment		New Job		Recall	
		1		2		3	
		Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat
Duration parameters	1-4	1.11	2.85	0.89	1.60	1.32	2.30
	5-8	1.00	2.56	0.73	1.31	1.26	2.20
	9-12	1.08	2.77	0.82	1.46	1.34	2.33
	13-16	1.20	3.07	0.97	1.73	1.43	2.48
	17-20	1.17	2.98	0.95	1.68	1.38	2.40
	21-24	1.18	3.00	0.98	1.73	1.38	2.37
	25-28	1.20	3.02	1.14	2.01	1.20	2.06
	29-32	0.95	2.37	0.85	1.48	1.03	1.73
	33-36	0.66	1.61	0.56	0.95	0.74	1.23
	37-40	0.73	1.76	0.79	1.35	0.56	0.90
	41-44	0.27	0.62	0.51	0.85	-0.33	-0.46
	45-48	0.35	0.79	0.75	1.25	-1.08	-1.20
	49-52	0.37	0.80	0.36	0.55	0.33	0.48
	53-56	0.05	0.10	0.24	0.35	-0.33	-0.40
	57-60	-0.08	-0.14	0.34	0.49	-1.22	-1.06
	61-64	1.03	2.23	1.41	2.26	0.19	0.23
65-68	1.06	2.17	1.52	2.36	0.07	0.08	
69-72	-0.30	-0.38	-0.33	-0.29	-0.29	-0.25	

