

WORKER AND JOB REALLOCATION DURING THE TRANSITION TO A MARKET ECONOMY

Evidence from the Czech Republic

John Ham
Ohio State University

Stepan Jurajda
CERGE-EI and Princeton University

Katherine Terrell
University of Michigan



The National Council for Eurasian and East European Research
910 17th Street, N.W.
Suite 300
Washington, D.C. 20006

TITLE VIII PROGRAM

Project Information*

Sponsoring Institution: University of Michigan

Principal Investigator: Katherine Terrell

Council Contract Number: 814-13g

Date: October 5, 2000

Copyright Information

Individual researchers retain the copyright on their work products derived from research funded through a contract or grant from the National Council for Eurasian and East European Research (NCEEER). However, the NCEEER and the United States Government have the right to duplicate and disseminate, in written and electronic form, reports submitted to NCEEER to fulfill Contract or Grant Agreements either (a) for NCEEER's own internal use, or (b) for use by the United States Government, and as follows: (1) for further dissemination to domestic, international, and foreign governments, entities and/or individuals to serve official United States Government purposes or (2) for dissemination in accordance with the Freedom of Information Act or other law or policy of the United States Government granting the public access to documents held by the United States Government. Additionally, NCEEER may forward copies of papers to individuals in response to specific requests. Neither NCEEER nor the United States Government nor any recipient of this Report may use it for commercial sale.

* The work leading to this report was supported in part by contract or grant funds provided by the National Council for Eurasian and East European Research, funds which were made available by the U.S. Department of State under Title VIII (The Soviet-East European Research and Training Act of 1983, as amended). The analysis and interpretations contained herein are those of the author.

Executive summary

In this paper we seek to contribute to the debate about gradual vs. rapid economic reform in transition economies by shedding light on the pace and determinants of worker and job relocation in the early years of transition in the Czech Republic, a country some consider a successful rapid reformer while others question its success because of the low rate of Czech unemployment in the early transition years. Using results from analysis of new data in this paper we argue that the Czech rapid early transition was indeed successful in terms of moving workers and jobs from the old sector to the new sector. This reallocation has been gradual, balanced, and continued throughout the mid 1990s.

Section 1: Introduction

The optimal pace of worker and job reallocation in the transition economies is the source of great debate in the literature (see for ex., Aghion and Blanchard, 1994; Roland, 2000). Whereas, in theory, rapid reallocations of workers from the old (traditional, communist) sector to the new (*de novo* private) sector should enable workers to be at their highest value use and hence induce rapid economic growth, a high pace of reallocation usually involves considerable unemployment, with significant earnings losses for the impacted workers. It is typically assumed in the literature that the speed of the downsizing of state enterprises (and the resulting unemployment) was under the control of the government, both directly, through the reduction in state subsidies, and indirectly, by inducing workers to accept the restructuring plans by offering generous unemployment benefits. As a result of these combined measures, large inflows into unemployment would be expected. For example, Boeri (1999) points out that “unemployment could be considered as an indicator of the determinacy of government to push through reforms,” i.e., the speed of transition. However, significant and long-term unemployment only arises if jobs in the new (private) sector are not being created at the speed with which jobs in the old (state) sector are being destroyed. i.e., if the rate of growth of private sector jobs outstrips the rate of decline of public sector jobs, a rapid transition can allow for economic growth with little unemployment. A truly rapid transition need not generate high unemployment.

Boeri (1999) argues that the “stagnant pools” of unemployed were a supply side phenomenon, rather than demand driven (as argued for ex. by Ham, Svejnar and Terrell, 1998; Konings, Lehmann and Schaffer, 1996). He suggests that the direction of labor reallocation during early transition was driven by relatively high levels of non-employment benefits offered to the transition labor force. While the optimal speed of transition (OST) literature suggests that generous assistance be provided early on to sustain public support for reforms, the labor supply analysis of Boeri (1999) implies that generous non-employment benefits should be offered only later on, once the initial reallocation has taken place.

In this paper we seek to contribute to the debate about gradual vs. rapid economic reform in transition economics by shedding light on the pace and determinants of worker and job relocation in the early years of transition in the Czech Republic, a country some consider a successful rapid reformer while others question its success because of the low rate of Czech unemployment in the early transition years. Using results from analysis of new data in this paper (and relying on previous work, e.g. Ham et al, 1998 and 1999; and Terrell and Sorm, 2000), we argue that the Czech rapid early transition was indeed successful in terms of moving workers and jobs from the old sector to the new sector. This reallocation has been gradual, balanced, and continued throughout the mid 1990s.

To support this argument, we first provide estimates of the time evolution of worker and job reallocation and allow these measures to differ by ownership and size of firm. Next, we carry out a

multivariate duration analysis of job destruction to estimate the “pure” effect of ownership on job destruction and to quantify the extent to which workers were being “bought off” by generous non-employment benefits (see, e.g. Boeri, 1999). Finally, comparison of our results to those for other Central and East European (CEE) and Western countries will help us understand why the transition has been relatively smooth in the Czech Republic.

The puzzle of why unemployment was very low in the Czech Republic during the early 1990s while it reached double digits in other, otherwise comparable, Visegrad countries (Poland, Hungary, Slovakia), has been attacked from a number of angles (see, e.g., Boeri and Burda, 1996; Ham et al., 1999). This literature has not been fully successful in identifying the main culprit, which is likely caused by the severe paucity of comprehensive micro-level data covering the first years of transition (see Section 3). Yet, unemployment rates have diverged during 1991 and 1992.¹

Our analysis is based on newly available monthly data of labor market status of almost 5,000 workers in the Czech Republic between 1991 and 1996. These worker-level data are used to construct worker separation and hiring rates as well as measures of job destruction and creation in various ownership sectors. Next, we use the longitudinal dimension of these data to simultaneously quantify the importance of a number of factors determining job deaths (including the generosity of unemployment insurance and the industry-specific level of GDP). We distinguish jobs in the traditional *old sector* (state-owned enterprises, coops, enterprises in and after privatization), the *public sector* (public administration, health, education), and the *new sector* (*de novo* private and self-employment).² The ability to distinguish between specific types of ownership within these three main sectors allows us to come up with interesting comparisons. For example, comparing job failure in the privatized jobs to the entrepreneurial jobs sheds light on the success of privatization in transforming the economy.

Previous studies of job creation and destruction use firm-level data,³ which is preferable in terms of minimizing measurement error of gross rates of job reallocation (see Section 4.1). However, the firm-level data sets from transition countries are often rather small and/or cover only one sector of the economy (e.g., Bojnec and Konings, 1998; Konings, Lehmann and Schaffer, 1996). Furthermore, these data typically suffer from the so called “survival bias” as data is typically collected only after the initial shock of transition and therefore includes only surviving firms. Our data set, on the other hand, is large, based on well-defined random sampling, and provides a consistent coverage of virtually all sectors of the

¹ See, e.g., Ham et al. (1999) who provide the time evolution of Czech unemployment (and labor force participation) since the beginning of transition as well as a comparison to other CEE countries.

² Self-employment and much of the *de novo* employment result from the emergence of entrepreneurship, which was totally suppressed under central planning in Czechoslovakia. See, e.g., Earle and Sakova (1999).

³ The only exception is Haltiwanger and Vodopivec (1999). See the discussion in Section 3.

economy, including small firms and self-employed. Moreover, it is the only comprehensive micro data set covering the crucial early years of transition, 1991 and 1992, when Czech unemployment diverged from the rest of CEE countries.

In sum, this paper extends the existing literature by providing a detailed picture of worker and job reallocation and by quantifying the determinants of job exits early in the transition in the country that presents the most striking departure from the high-unemployment transition equilibrium observed elsewhere. We address the question of the optimal speed of reallocation raised in the OST literature and provide an empirical test of some of its premises. Further, we illustrate the use of worker-level data for job-level analysis and extend the typical descriptive analysis of job destruction to an appropriate multivariate framework allowing for time-changing covariates.

Section 2: Background

The Czech Republic has awed observers of transition economies since the government managed within the first three years (1990-1993) to liberalize nearly all prices, privatize much of the economy, decentralize wage setting, and open the country to world trade while maintaining a relatively balanced budget, low inflation, and low unemployment (below 4 percent until 1995).⁴

One of the most important discussions in the transition literature focuses on the impact of ownership and privatization. The Czech Republic's privatization scheme involved three major programs: 1) small-scale privatization; 2) first wave of large-scale privatization; and 3) second wave of large-scale privatization.⁵ Small-scale privatization, which applied to enterprises with less than 100 employees, began in 1990 and by the end of 1992 a total of 22,387 units had been sold at public auctions. (About two-thirds were sold in 1991, and almost 80 percent were privatized by March 1992.)

Large-scale privatization applied to most state-owned assets in the economy and was the most important part of all privatization in terms of the value of assets. Over half of the face values of these companies were distributed through the "voucher (coupon) privatization" scheme. This program came in two waves. The identity of firms participating in the first wave was announced shortly before the bidding process started in May 1992. The bidding ended in December 1992, but the shares were not distributed to

⁴ See Svejnar (1995, 1999) for details on the Czech transition and relevant research.

⁵ See Kotrba and Svejnar (1994) for more detail on these privatization programs. There was also a restitution program, which began in 1990 and ended for the most part at the end of 1991. Restitution legalized the return of buildings and some agricultural land to its previous owners.

new owners until May and June of 1993. For the second wave of large-scale privatization, the corresponding dates are April 1994 to February 1995.⁶

Little is known about job creation and destruction during the Czech transition. According to the Czech Labor Force Survey, there was an extensive restructuring of employment by industrial sector in medium and large enterprises in the mid to late 1990s (Terrell and Sorm, 2000). Between 1993 and 1998 the agricultural sector lost about 29 percent of its workforce and industry (i.e., manufacturing plus utilities) shed about 10 percent.⁷ Employment grew rapidly in construction, wholesale and retail trade, hotels and restaurants, and financial services. However, the Labor Force Survey does not contain information on firm ownership.

The data covering the changes in the employment structure during early transition years are even more limited (1990-1993). The Czech Statistical Office (CSO) has collected employment reports from enterprises with over 20 employees (the Firm Census) for several decades. However, during the first dramatic years of transition, the ability of this reporting scheme to capture changes in firm identity and ownership and to enforce accurate reporting was compromised. This was especially true for firms employing less than 100 employees, which one could expect to drive employment growth in transition. Even in the late 1990s, the CSO was virtually unable to capture the number of small firms and their total employment (see Jurajda, 2000).

While there is no empirical research on job reallocation in the Czech Republic, such analysis has recently been performed in a number of transition countries. Konings, Lehmann, and Schaffer (1996) analyze large firm-level data for Polish manufacturing and find most job destruction occurring in the state owned firms, while most new jobs are created in the private sector (including privatized firms). Bojniec and Konings (1998) study a sample of 100 Slovenian firms and reach similar conclusions, while Bilsen and Konings (1998) use a sample of 431 firms from Bulgaria, Hungary, and Romania to identify *de novo* (newly established) private firms as the driving force of job creation during transition. One potential problem with these studies is that they typically use data on continuing firms only and lack information on firm exit. This “survival bias” can lead to underestimation of the job destruction rates. Further, they either use small unrepresentative samples or they focus on one industry only.

Haltiwanger and Vodopivec (1999) use a retrospective questionnaire administered within the 1995 Estonian Labor Force Survey to provide descriptive evidence on the nature of worker and job reallocation during early transition in Estonia. They show a rapid increase in both worker and job

⁶ However, clearly determining the start and end of the privatization process for each individual firm would require detailed information on the structure of ownership and on the identity of the new owners. See, e.g., Hashi (1997) and Turnovec (1998).

⁷ By comparison, the net declines in the stock of jobs in these sectors over a similar period, 1994-97, were much smaller in Bulgaria, Estonia, Poland and Romania (Faggio and Konings, 1999).

reallocation in the early 1990s with the worker reallocation rate exceeding 35 percent by 1993. While at the beginning of transition, jobs were eliminated at a very high rate, by 1994 more jobs were being created than destroyed. We return to these results below in Section 5.

Section 3: Data

We use data from a survey of 3,157 randomly selected households throughout the 76 districts of the Czech Republic, administered in December 1996. For those individuals who were employed for at least two weeks during the 1991-1996 period, the questionnaire traces the characteristics of all the jobs held by the surveyed individuals between January 1991 and December 1996, as well as the characteristics of all non-employment spells. Since most of the jobs held in January 1991 began during communism, we have information on job spells that last from communism.⁸

As a result, we have continuous labor market histories, with exact records of the monthly durations of employment and non-employment spells of each individual during the 1991-96 period. In particular, for each job we have the start and end wage, occupation, employment status, industry, employer's ownership type at the end of the job, and size of firm. For those that exited their jobs, we also observe the reason for separation. The sample is representative of the 1996 population in terms of major demographic characteristics, such as the age structure, gender, region of residence and household size. We have usable data on employment histories of 4,786 individuals who experience 7926 spells of employment (jobs).

Note that no other Czech micro-level data set provides a comparable coverage of the early transition years and follows individuals through the most important years of transition. The quarterly Labor Force Survey (LFS) only started in 1993, once the Czech unemployment rate had already diverged from that of the other CEE countries. The Microcensus household survey obtains data for 1988, 1992 and 1996. However, it does not follow individuals over time and does not report the reason for employment separation. While the Czech Statistical Office collects a monthly Firm Census for all Czech firms with over 20 employees, only information on manufacturing firms has been available to researchers. Further,

⁸See Munich and Terrell (1997) for a description of the survey and sample design as well as the descriptive statistics of the sample relative to the Labor Force Survey data.

the ownership classification in these data may not be fully reliable and the Statistical Office experiences great difficulty tracking smaller firms (see Section 2).

Section 4: Estimation Strategy and Measurement Issues

Our goal is to first describe the ownership distribution of employment, and measure hiring and separation rates as well as job creation and job destruction rates. Next, we estimate hazard models of job destruction to analyze the determining factors of job failure. This section presents the measurement concepts and econometric models we use. We also use this section to discuss issues of timing ownership changes with our data.

4.1 Job and Worker Reallocation Rates

We measure the worker hiring and separation rates as follows:

- Hiring Rate equals the sum of $ne_t + ee_t$ divided by E_{t-1} ,
- Separation Rate equals the sum of $en_t + ee_t$ divided by E_{t-1} ,

where:

ne_t = a worker transitioned from non-employment to employment from $t-1$ to t ,

ee_t = a worker remained employed from $t-1$ to t with a different employer,

en_t = a worker transitioned from employment to non-employment from $t-1$ to t ,

E_{t-1} = total stock of employment at time $t-1$.

We calculate all rates both quarterly and annually.⁹

Next, we focus on job reallocation measures. Formally, job creation is the rate at which new jobs (i.e., new positions) are created and job destruction is the rate at which positions are eliminated. The rates of job creation and destruction are typically measured with establishment (or plant) and firm level data and they are defined as (Davis and Haltiwanger, 1999, pp. 2716-7):

- Gross job creation (JC) at time t equals employment gains summed over all business units that expand or start up between $t-1$ and t .
- Gross job destruction (JD) at time t equals employment losses summed over all business units that contract or shut down between $t-1$ and t .

Although job destruction and job creation rates are traditionally measured with firm or establishment level data, they can also be measured from worker flow data (as pointed out by Blanchard and Diamond, 1990, and recently implemented by Vodopivec and Haltiwanger, 1999, with Estonian data

⁹ Our annual rates reflect January to January changes, and therefore do not capture some temporary transitions occurring between those two points in time.

similar to ours). With this type of data, job creation can be defined as hires less quits that are replaced, while job destruction consists of layoffs and quits without replacement.

In our questionnaire, we have 13 answers for how someone separated from their job (see Table 1). We define as job destruction (JD) any separations where: 1) the firm was closed down (by the respondent or another employer) and 2) the separation was part of a mass-layoff.¹⁰ The JD rate is the total number of job destructions at a given time t , divided by the number of jobs in $t-1$. It is probably the case that some other separations correspond to job destruction as well. For example, it is possible that some reasons for voluntary separations, such as retirement, may have ended in (been induced by) job destruction; hence, our JD measure is likely a lower bound estimate.¹¹ However, in our data, respondents were allowed to provide more than one answer to the employment exit question, making retirement and layoff, for example, a valid answer. This possibility should minimize the underestimation of job destruction due to job destruction induced quits or out-of-labor-force transitions. In any case, given that total separation rate is an upper bound, we can gain some insight into the dynamics of job destruction by comparing the two.

The calculation of the rate of job creation (JC) uses the simple identity that net employment growth rate (NEGR) is the difference between the rate of job creation and job destruction. Hence, $JCR = NEGR + JDR$.¹² Again, this may be considered a lower bound estimate for JC because JD may be underestimated. Note, however, that firm-level studies, e.g. Bilsen and Konings (1998), often also provide only a lower bound estimate on the true job destruction rate due to focusing only on continuing firms.¹³

The use of worker-level data to examine a firm-level phenomenon introduces measurement error and results in a measure of job reallocation that is not directly comparable to those of the firm-level studies. However, worker-level data also offer important advantages. In particular, unlike data sets used in the empirical literature on job creation and destruction in transition, our data covers all sectors of the economy and provides a continuous coverage of the transition. Furthermore, in contrast to the Estonian retrospective worker-level data used by Haltiwanger and Vodopivec (1999), ours allow one to distinguish between privatized *and de novo* private employment.

¹⁰ In an alternative specification, we included all layoffs since the percentage of layoffs that were not mass-layoffs were very small. The results were not materially affected.

¹¹ It may also be the case that firms experiencing mass layoffs were simultaneously hiring, which would bias our job destruction estimates upward.

¹² This strategy of estimating job creation and job destruction rates relies on random sampling to the extent that when we observe a layoff with replacement (not mass layoff) within a given employment category, it is expected to be compensated by hiring of another worker within our sample into this employment category. Layoffs with replacement constitute only about 2% of all separations.

¹³ The nature of our retrospective data does not lead to any survival bias likely arising in cross-sections of firms taken late in transition.

Finally, our measure of job reallocation captures within-firm restructuring, which is not discernible with firm level data. Firm level data contain only the changes in total firm (plant) employment. If firms in a given sector maintain constant employment, but lay off and hire an equal number of workers, such restructuring would be ignored in a firm-level data set, but is captured in our data.

4.2 Job Hazards

Job destruction is an inherently dynamic process affected by time-changing covariates. To appropriately model this process, we estimate a hazard duration model of time to job destruction.¹⁴ In an attempt to shed light on the OST literature (see Section 1), we focus on ownership effects, distinguish the impact of demand conditions from that of the privatization process, and examine the impact of the unemployment benefit scheme.

Estimation of such job-specific models with data on employment spells requires that one observe the job since its beginning. In our data, we observe jobs since their start for *de novo* and self-employment jobs during early transition. Further, we could assume that left-censored jobs at the beginning of our sampling frame do in fact re-start from time 0 as of the “big bang” of January 1991. However, making such assumptions for employment spells starting later in transition is not convincing; hence, we need to assume no duration dependence.

We work in discrete time with a monthly hazard using the logit specification. Denote the hazard of job failure (the probability of job destruction at calendar time r) as:

$$\lambda(r) = (1 + \exp(-y(r)))^{-1} \quad (1)$$

where

$$y(r) = O(r)\gamma + X\delta + \alpha_1 Z(r) + \alpha_2 B(r) + \alpha_3 W(r) . \quad (2)$$

In equation (2), which encompasses all estimated specifications, the term $O(r)$ contains dummy variables capturing the job’s ownership type in month r , while the vector γ contains the corresponding set of parameters. The matrix X includes productivity-related job characteristics (firm size, schooling, years of experience of the job holder, and a dummy for Prague); $Z(r)$ captures demand conditions by conditioning on annual, industry-specific GDP per worker in hundreds of thousands of 1995 Czech crowns; $B(r)$ is the total amount of unemployment benefits the person could receive in a given year (or the time-changing level of welfare benefits); and $W(r)$ is the (endogenous) person-specific real monthly wage

¹⁴ One could build a model of firms’ job destruction decisions, similar in spirit to job search models, where firms evaluate the future stream of profits from a given job given the current realization of random determinants of the job-specific profit. Such a model would motivate the estimation of hazard models of job destruction much in the same way as job search models motivate the estimation of unemployment outflow hazards.

(which also varies over time). Note that our specification is essentially a competing risk hazard for job exit, where worker transitions other than job destruction are treated as censored.

4.3 Ownership type

Since our analysis focuses on the impact of privatization (as well as other factors) on job failure, it is necessary to know for each month of the job the firm ownership type. The data set indicates the following ownership types for the end of the job spell: 1) public sector, 2) a state-owned enterprise, 3) cooperative, 4) being privatized, 5) after privatization, 6) a new (*de novo*) private firm, 7) self-employed. Classification of each month of a spell for ownership types 1, 3, 6 and 7 presents no difficulties, as there are no changes in ownership over time. Similarly, coding of job spells into the three main ownership sectors (public, old, and new) involves no assumptions. However, choices need to be made regarding how to code categories 2, 4 and 5.

As indicated in Section 2, the Czech privatization scheme essentially consisted of two different programs, one for the small firms (under 100 employees) and one for large firms (over 100 employees). Hence, in order to determine firms' ownership at each point in time, we use one rule for small and another rule for large firms.

For small firms we use the following rule: If the respondent indicates that the job is "in privatization" or "after privatization" at the end of the job spell, that spell is coded as "in small-scale privatization" from the beginning of the job (or January 1991, whichever is later) until the end of 1992. At that moment it is coded "after privatization" since (almost) all small firms were privatized by that time. Note that it is impossible to use the information provided at the end of the spell to time the exact moment when ownership changed from "state" to "after privatization," and that we selectively observe "in privatization" jobs only employment spells which end during the privatization process.

Further, it is not clear what the meaning (respondents' interpretation) of the term "in privatization" as opposed to "after privatization" is in the months preceding and following the public auction at which a small state firm is sold. We do have information on the fraction of units privatized through the small-scale program at each point in time and use it in the calculation of the aggregate rates by distributing the "in small-scale privatization" jobs among "state" and "after privatization" categories accordingly.

For large firms, ideally, we would like to know whether we are observing jobs in firms that were included in the first or the second wave of privatization. Given such information, we would be able to time the transition from "state" to "voucher (coupon) privatization" and then to "after privatization". At

this time we are not able to assign all of the jobs in large firms to one of the two waves.¹⁵ Note that using the timing of the job end together with the information on the ownership type at that moment is not possible as we would be able to assign firms to each voucher wave only for those jobs where we observe a transition, resulting in a biased sample. Hence, the following rule was chosen: Any job spell that is indicated as “in privatization” or “after privatization” and which ends between the start of the first coupon wave (May 1992) and before the end of the second wave (February 1995) is coded as “in coupon privatization” during these months and “state” before May 1992. As of February 1995, when the vouchers for the second wave of privatization were distributed, all of these jobs are classified as “after privatization.” There is a negligible fraction of jobs located in large firms that seem to have already been privatized before the first coupon wave and these were coded as “early privatization” with the idea that some large firms were sold directly to foreign investors or may have had spinoffs that were privatized during this period.¹⁶

Section 5: Results

5.1 Employment Restructuring and Gross Flows from 1991-1996

In presenting the first results available for the Czech Republic on the ownership structure of entire employment since the early part of the transition, we begin with a simple picture of the transition of employment from the *old sector* (which is comprised of jobs in the state owned enterprises, cooperatives, and privatized firms) to the *new sector* (which includes all jobs in *de novo* private firms and the self-employed). Figure 1 (at the end of this paper) presents the shares of the working age population that are employed in these old and new sectors as well as the *public sector* (which includes public administration, education and health) and the share that is not working. The non-employment rate is relatively flat over time and the average share of non-employment in the working age population is about 20 percent.

Hence, there appears to be no early increase in the proportion of the population not working during the Czech transition, at least not following the big bang of January 1991. Given that the share of public employment remains constant as well, the remarkable fact is that the slopes for the old and new sector are mirror images, indicating that the new sector was absorbing workers at the same rate that workers were leaving the old sector. This transfer of labor from old to new jobs was gradual and balanced. Such lack of structural breaks is in full accord with the theoretical OST literature. The

¹⁵ We attempted to match the firms in our data with micro data providing the industry, size, and location of the firms that were in each wave of privatization. However, we were only able to match about 200 jobs this way. More time-consuming matching efforts will follow in near future.

¹⁶ The fact that there is only few of these jobs (see below) also allows us to code those jobs that end in “after privatization” after the second coupon wave was over as “state” before the first wave starts and as “in coupon privatization” between May 1992 and February 1995.

question naturally arises as to what extent the reallocation of jobs from the old to the new sectors was occurring in the small vs. large firms.¹⁷ In Figure 2 we see clearly that among small firms, the share of employment in the new sector overtook the share in the old sector already by the middle of 1992 and in 1996 there were three new-sector workers for every old-sector worker in small firms. On the other hand, among large firms the old sector still accounted for 60 percent of the jobs in 1996 and the new sector accounted for merely 10 percent of the jobs.

The employment distribution in terms of detailed ownership categories is provided in Figure 3, by firm size. The picture indicates that the driving force in creating jobs in the small-scale firms are the *de novo* firms, which grew from a share of 12 percent of small-scale jobs in early 1991 to 40 percent by 1996. The self-employed are next in importance, contributing to 20 percent of the jobs by the end of the period. On the other hand, the share of state sector jobs declined dramatically from 40 percent to less than 5 percent while the share of jobs in privatized firms rose dramatically until September 1992, when it fell as a proportion with the continued growth of *de novo* jobs.

Among the large firms, we see a dramatic decline in the state sector jobs with the advent of voucher (coupon) privatization in September 1992. The period of uncertainty regarding firms undergoing privatization is marked in the figure with the dashed line for “coupon privatization” from September 1992 until February 1995, after which they were clearly privatized (or “after privatization”). We note that a small percentage of jobs in large firms were privatized early (1991-92) and the proportion of jobs in large *de novo* firms was negligible for most of the period, rising to only 10 percent at the end of the period.

An overview of the hiring, separation, job destruction, and job creation rates is provided in Figure 4, with quarterly rates in the top panel and annual rates in the bottom.¹⁸ The plots of the total quarterly rates display several characteristics found in other studies, namely the existence of substantial volatility and a negative (but weak) correlation between the job destruction and job creating rates. A comparison of the levels of the annual separation and hiring rates indicates that they are somewhat lower in the Czech Republic, where they range between 15 and 20 percent over 1992-1996 compared to the peak of 20 to 30 percent in 1992-1994 for Estonia (Haltingwanger and Vodopivec, 1999).

Compared to Estonia, the pace of Czech job destruction is also lower: while during the most dramatic period of Estonian economic transition, 1992-1994, about 10% of jobs were destroyed every year, the comparable number for the Czech Republic never reaches 5%. Finally, the evolution of worker and job reallocation is also remarkably different between the two countries. While the Czech labor market appears to be redistributing workers and jobs at a steady pace since 1991, in Estonia, we see a

¹⁷ Small firms are defined as firms with less than 100 workers and large firms are those with 100 or more workers.

¹⁸ Recall that, following Haltiwanger and Vodopivec (1999), the annual rates are based on “snapshots” taken each January.

dramatic increase in the rate of worker and job turnover during transition. It is more difficult to directly compare our measures of job creation and destruction to those from other transition studies, and we return to this issue below.

We now turn to a more detailed examination of the components of the separation rates reported in Figure 4. In particular, Figure 5 provides the share of quits, layoffs and other transitions on total separations and indicates that, except for the initial transition period, Czech workers were more likely to quit their job than to get laid off. Table 1 provides the distribution of the answers to the question, “why did you leave your job?” which we use to code ‘layoff’ (first four answers), ‘quit’ (answers e. and f.) and ‘out-of-the labor force’ (answers k., l., and g. though i.). The remaining answers are left as ‘other.’

As seen in the second panel of Table 1, quits account for 40 percent of all separations over the period, and layoffs and leaving the labor force have similar shares: 23 and 28 percent, respectively.¹⁹ However as Figure 5 indicates, quits were not the dominant exit type at the outset of transition; their share of exits rose in 1992, remained stable until 1994 and then fell. The share of layoffs fell over the entire period, whereas the fraction of transitions resulting in departure from the labor force first fell and then rose substantially in the last part of the transition period.

Plots of the quarterly hiring and separation rates by firm size (Figure 6) clearly show that there is more turnover among small firms; whereas hiring rates are similar for small and large firms, the separation rates are far higher for small firms.

Plots of the quarterly hiring and separation rates by old and new sector (Figure 7) indicate that whereas the old sector was separating workers at a higher rate in the first year and a half, by September 1993 workers were leaving the new sector at a higher rate. Public administration and public services separated at a slightly lower level throughout the period. The hiring rates offer a dramatic picture. The public and old sectors are apparently hiring only to replace the separated workers, while hiring rates are very high since the outset of the transition in the new sector. About 15 to 20 percent of the new-sector employment in the first two years of transition comes from new hires. The new-sector hiring rate eventually decreases, but is still above the old-sector rate as of the end of our sampling frame, in late 1996.

This decline in hiring *rates* in the new sector is natural as the size of this sector is growing during transition. While there is a decline in the economy-wide hiring rate during the mid 1990s (see Figure 4), this is more likely caused by the nearing recession of 1997, rather than by a disproportionate slowdown of hiring in the new sector. Indeed, Figure 8 shows that since 1992 a steady 60% of all new hires in the economy occurred in the new sector.

¹⁹ As seen in panel 3 of Table 1, a much larger fraction of layoffs (25.4%) results in longer non-employment than is the case for quits.

The above findings (Figure 4) of low job destruction and high job creation in the Czech Republic are perhaps not surprising given its well-known low unemployment during early transition. Figures 9 and 10 therefore separate job creation by firm size and ownership sector. Figure 9 shows that virtually all job creation can be accounted for by small firms. Notice that the job creation measure for large firms takes on negative values. This is a consequence of the underestimation of job destruction.²⁰ While the job destruction rate is initially the same in large and small firms, a higher fraction of small-firm jobs are being destroyed shortly after the big bang of 1991, in accord with stylized facts of the job reallocation literature.²¹ However, the difference in terms of job destruction between small and large firms is much lower than the corresponding difference in job creation rates.

It is clear from Figure 10 that the new sector is responsible for almost all job creation with an impressive JC rate of about 15 percent during early transition. Again, the decline in the new-sector JC rate is natural, given its growing size. The new sector has the largest share on JC throughout the transition period. Hence, similar to Konings, Lehmann and Schaffer (1996), but much later in the transition process, we find evidence of vigorous job creation in the new sector, which does not appear to be driven by short-lived sectoral effects. (Blanchard et al., 1995, or Richter and Schaffer, 1996, expect that the newly established firms will enter under-represented industries and that once this ‘niche’ is filled, job creation in the new sector will slow down.)

Job destruction is initially highest in the old sector and remains comparable to the new-sector JD rate during most of transition, indicating a substantial amount of restructuring. While job destruction in the new sector becomes more likely over time, it stabilizes at about 1 percent during and after 1994. Apparently, jobs in the new sector are able to survive. However, this may be due to size or life-cycle effects, rather than to pure ownership effects and we explore this issue below in section 5.2.

A comparison of the average JC and JD for the transition economies and the more developed market economies is provided in Table 2. While it is dangerous to make comparisons of these measures across studies, which have different sample coverage and different business units, it is nevertheless useful to note some broad patterns.²² The most notable pattern is that, except for Estonia and Romania, the rates of job reallocation (creation and destruction) are much lower in the transition economies than they are in the mature market economies. These data indicate that the Czech reallocation rates are on the low end of

²⁰ Job creation equals the sum of net employment changes and job destruction. When employment decreases and our JD rate does not capture all corresponding job destruction, a negative JC rate results.

²¹ Since most job creation occurs in small firms, an interesting question arises about the ability of the small-firm jobs to survive during transition. We return to this issue in the hazard estimation below.

²² Davis and Haltiwanger (1999) note that these rates are higher for non-manufacturing than for manufacturing across all countries for which we have these measures.

the transition economies. However, as can be seen from the measures of net growth, the Czech Republic is one of the few transition economies where the job creation rate outweighs the job destruction rate.

One last piece of evidence on the extent of restructuring in the old sector is provided in Table A-1. Given our sampling design, we can observe the survival of worker-firm matches from communism following the big bang of 1991.²³ The first column of Table A-1 reports that we observe 3593 workers employed as of January 1989, ten months before the breakdown of communism in Czechoslovakia. About 63 percent of these workers are still employed in the same job as of January 1991 while less than a third of them still work in the same job as of the end of 1996. The second panel of Table A-1 shows that the bulk of these continuing employment relationships is not accounted for by the public sector, but can be attributed to the state (privatized) sector.

5.2 Hazard Analysis

This section presents the results of a multivariate duration analysis of job destruction. Table 3 attempts to isolate the ‘pure’ effect of the sector of ownership on job destructions. (Public sector is excluded and we only compare the old and new sectors.) In column (1), we include on the right hand side of the hazard function (Equation 2) only a constant and a dummy indicating the job is in the new sector. There appears to be on average somewhat more job destruction in the new sector compared to the state sector base case, but the difference is not statistically significant.

In column (2) we add the dummy variable differentiating between small and large firms. Once we condition for firm size, there is almost no difference between the two ownership sectors. Differences, or the lack of thereof, between job deaths in the two sectors may have to do with different productivity-related characteristics. In column (3) we therefore condition for the years of schooling and labor market experience of the worker, as well as for a Prague dummy and a variable indicating part-time jobs. Again, the new-sector coefficients remain insignificant and close to zero.

One could expect the new sector to selectively locate in industries where employment growth is high and job destruction rates are low. We therefore attempt to control for the impact of selection of new-sector jobs into growing industries by conditioning on the annual industry-specific level of GDP per worker in column (4) and on a set of eleven industry dummies in column (5). While both the GDP per capita coefficient and the joint set of industry dummies are statistically significant, there is no change in the new-sector coefficient. Finally, we separately estimate the richest specification from column (5) for large and small firms and present the estimates in the last two columns of Table 3. In neither size group can we detect a significant effect of ownership sector on job destruction. However, the large, but

²³ Conditional on the corresponding worker having at least two weeks of any employment since January 1991.

imprecisely estimated new-sector coefficient for large firms may suggest that jobs in new firms are less likely to die, but we do not have enough data to estimate the effect precisely.

One possible explanation for why there is no difference in JD rates between the old and new sector (either unconditional or conditional) is that the old sector is composed of heterogeneous groups of jobs. For example, one may hypothesize that restructuring (and job death) is more likely in firms undergoing privatization or in firms that have already been privatized. In Table 4, we therefore estimate a set of job death hazard specifications, conditioning for a set of detailed ownership indicators. Column (1) lists the ownership dummy coefficients, compared to the base case of state jobs, when no other explanatory variables are included. The estimates suggest that firms undergoing the coupon (voucher) large-scale privatization are much less likely to destroy jobs than state firms. Further, both self-employed jobs and jobs in firms after privatization are also less likely to be destroyed.

In column (2) of Table 4, we present a similar set of ownership dummy estimates controlling for the effect of firm size on JD. With the exception of coops and *de novo* firms, all other ownership categories now destroy jobs at a significantly lower rate. The picture changes little when job productivity characteristics and industry GDP level are taken into account. When we condition on the full set of industry dummies in column (5), firms of all ownership types are less likely than state firms to destroy jobs.

Finally, perhaps the most convincing specification with industry dummies is estimated separately for large and small firms in columns (6) and (7) respectively. Small state-owned firms are more likely to destroy jobs than any other form of ownership, possibly suggesting more restructuring, selection of better businesses for privatization (in ways which are not captured by industry category: see Gupta, Ham, and Svejnar, 2000), or better managerial ability in the non-state small firms. The results of column (6) suggest a different comparison for large firms. Only coupon-privatization and *de novo* firms destroy jobs less than state owned enterprises. One explanation for this finding is that firms undergoing the large-scale privatization program are inactive and delay restructuring. Jobs in large *de novo* firms may be more stable than state jobs due to a positive impact of ownership on business success.

However, the findings related to comparison of *de novo* and state firms may be related to firm-age lifecycle effects or to different stages of transition.²⁴ We explore this hypothesis in Table 5, where we interact the ownership dummies for categories which span the whole 6-year sampling frame with a dummy variable indicating a later transition stage, namely the years of 1994 to 1996. Column (1) lists parameter estimates based on the whole sample of jobs, whereas columns (2) and (3) present the specifications based on either small or large firms. The only significant interaction effect is that for large

²⁴ Given our assumption of no duration dependence, we may estimate a separate calendar time trend for each ownership time in our future work, in order to control for these differences.

coops in late transition. The results suggest that early on, state and coop employers destroyed jobs at a similar rate, but that later in the transition coop jobs became more stable. Apart from the case of large coops, we obtain a pattern of coefficients similar to that of last two columns of Table 4.

Finally, Table 6 explores the effect of various policy variables on job destruction. We estimate a JD hazard separately for each ownership category and enter policy variables one at a time to provide an empirical test of some of the arguments of the OST literature. (Each coefficient presented in Table 6 therefore comes from a different likelihood maximization.) The first two rows focus on the role of unemployment insurance (UI) in allowing firms (especially managers of state-owned enterprises) to destroy jobs. There was only one change in the level of UI support during the course of the Czech transition: replacement ratios were lowered and entitlement halved from twelve to six months at the end of 1991. It is therefore important (and difficult) to separately identify time trends in JD rates from the UI effect.²⁵

Hence, we include a cubic in monthly calendar time since January 1991 among the regressors in the UI specifications. The estimates suggest that destroying jobs is easier for small firms in privatization and for state firms when UI is more generous. This finding supports the notion that workers were “bought off” by the government in an attempt to promote restructuring.²⁶ Next, the third row asks a similar question with respect to the level of welfare benefits available. Here, we do not find any effect except for a puzzling large negative estimate for the privatized firms.

Finally, in the last two rows of coefficients in Table 6 we estimate the correlation between JD and local and industry-specific demand measures. We find that higher GDP levels are associated with less job destruction in the new sector and in privatized firms. Local unemployment appears unrelated to JD except, again, for a large positive impact for privatized firms.

Section 6: Conclusions

We have found that the economic transformation in the Czech Republic resulted in a steady and balanced transfer of workers from the old (traditional) firms to the newly established enterprises. There were no structural breaks in the reallocation of workers and jobs, and the transition proceeded at what appears to be an optimal rate since non-employment remained constant and the shares flowing to the new firms were similar to the flows out of the old sector. Future research is needed to identify the detailed features of this process and to further test the predictions of the optimal-speed-of-transition literature.

²⁵ In particular, we have no variation in UI separate of the wage level for coupon-privatization and after-privatization firms.

²⁶ Ham et al. (1998) find that the elasticity of unemployment duration with respect to benefits was quite small in the Czech Republic and conclude that the Czech unemployment compensations system was not impeding job reallocation, but may in fact have helped flows.

There is much less job destruction in the Czech Republic compared to Estonia while the overall extent of job creation in the two countries is comparable. Again, future research is needed to identify the determinants of cross-country differences in the extent and timing of job reallocation during transition from a market economy.

Small firms in the new sector (*de novo* firms and self-employed) are the driving force of job creation throughout the Czech economic transition. Collectives, state and privatized firms are hiring primarily to replace separating workers. Small firms also display a higher rate of job destruction than large firms, but the difference is not as dramatic. Further, the likelihood of job destruction in the new sector is not significantly different from that in the old sector, conditionally or unconditionally. New-sector jobs are therefore able to survive during the turmoil years of early transition.

Using a detailed classification of employer ownership types we find that among large firms, those undergoing the coupon privatization process are less likely to destroy jobs compared to state-owned enterprises (SOEs), suggesting a lower extent of restructuring before the transfer of ownership rights to new owners. New-sector large firms offer safer jobs compared to SOEs. Further, there appears to be no difference in job destruction in SOEs and in firms after privatization. Among small firms, SOEs face the highest chance of job destruction. We find little evidence of early/late transition differences in ownership effects on job destruction.

Finally, we find mild evidence that more generous unemployment insurance makes job destructions easier for SOEs, while firms after privatization and new sector firms are responsive to demand conditions. Both findings are in accord with the predictions of the theoretical models on optimal transition speed.

Bibliography

- Acquisti, Alessandro and Hartmut Lehmann (1999) "Job Creation and Job Destruction in Russia: Some Preliminary Evidence from Enterprise-level Data," *LICOS Centre for Transition Economics Discussion Paper No. 84*. Katholiek Universiteit Leuven.
- Aghion, Philippe and Olivier Blanchard (1994) "On the Speed of Transition in Central Europe," *NBER Macroeconomics Annual*, pp. 283-320.
- Basu, Swati, Saul Estrin and Jan Svejnar. (1999) "Employment and Wage Behavior of Enterprises in Transitional Economies," *William Davidson Institute Working Paper no. 114*, University of Michigan.
- Bilsen, Valentin and Jozef Konings (1998) "Job Creation, Job Destruction and Growth of Newly Established, Privatized and State-owned Enterprises in Transition Economies: Survey Evidence from Bulgaria, Hungary and Romania," *Journal of Comparative Economics*, Vol. 27, No. 1, March: 1-3.
- Blanchard, Olivier and Peter Diamond (1990) "The Cyclical Behavior of Gross Flows in the U.S.," *Brookings Papers on Economic Activity*, 1990: 2, 85-155
- Blanchard, Olivier, Simon Commander and Fabrizio Coricelli (1995) "Unemployment and Restructuring in Eastern Europe and Russia," in: Simon Commander and Fabrizio Coricelli, eds., *Unemployment, Restructuring and the Labour Market in Eastern Europe and Russia*. EDI, World Bank, Washington, D.C.
- Boeri, Tito (1999) "Transition with Labour Supply," *William Davidson Institute Working Paper Number 274*, December.
- Boeri, Tito and Christopher Flinn (1999) "Returns to Mobility in the Transition to a Market Economy," *Journal of Comparative Economics*, Vol. 27 No. 1: 4-32.
- Bojnec, Stefan and Josef Konings (1998) "Job Creation, Job Destruction and Labour Demand in Slovenia," *Leuven Institute for Central and East European Studies Working Paper 74/1998*.
- Davis, Steven J. and John C. Haltiwanger (2000) "Gross Job Flows," Chapter 41 in Orley Ashenfelter and David Card (eds.) *Handbook for Labor Economics*, Volumes 3B, Amsterdam: North Holland, pp. 2711-2808.
- Earle, John, S. and Zuzana Sakova (1999) "Entrepreneurship from Scratch: Lessons on the Entry Decision into Self-Employment from Transition Economies" *SITE Working Paper No. 145*.
- Faggio, Giulia and Josef Konings (1998) "Gross Job Flows in Transition Countries: Results from Company Accounts Data for Bulgaria, Estonia and Romania," *LICOS Discussion Paper 77*, Katholiek Universiteit Leuven.
- Gupta, Nandini, John C. Ham, and Jan Svejnar (2000) "Priorities and Sequencing in Privatization: Theory and Evidence from the Czech Republic," *William Davidson Institute Working Paper No. 323*, University of Michigan.

- Haltiwanger, John C. and Milan Vodopivec (1999) "Gross Worker and Job Flows in a Transition Economy: An Analysis of Estonia," *World Bank Policy Research Working Paper 2082*, March.
- Ham, John, Jan Svejnar and Katherine Terrell (1998) "Unemployment and the Social Safety Net During the Transition to a Market Economy: Evidence from Czech and Slovak Men," *American Economic Review*, Vol. 88, No. 5, December: 1117-42.
- _____ (1999) "Women's Unemployment During the Transition: Evidence from Czech and Slovak Micro Data," the *Economics of Transition*, Vol. 7, No. 1: 47-78.
- Hashi, I. (1997) "Mass Privatisation and Corporate Governance in the Czech Republic," *Working paper N97.4*, Staffordshire University, UK.
- Jurajda, Stepan (2000) "Gender Wage Gap and Segregation in Late Transition," *CERGE-EI Discussion Paper No. 36*.
- Konings, Josef, Hartmut Lehmann and Mark Shaffer (1996) "Job Creation and Job Destruction in a Transition Economy: Ownership, Firm Size and Gross Job Flows in Polish Manufacturing, 1988-1991," *Labour Economics*, 3: 299-317
- Kotrba, Josef and Jan Svejnar (1994) "Rapid and Multifaceted Privatization: the Experience of the Czech and Slovak Republics," *MOCT-MOST*, 4:147-185.
- Munich, Daniel, Jan Svejnar and Katherine Terrell, 1997. "Final Report to the Czech Ministry of Labor and Social Affairs on the Retrospective Questionnaire on Employment Histories," Unpublished, May.
- Richter, Andrea and Mark E. Shaffer (1996) "Growth, Investment, and Newly-established Firms in Russian Manufacturing," in: Simon Commander, Qimiao Fan and Mark E. Shaffer, eds., *Enterprise Restructuring and Economic Policy in Russia*. EDI, World Bank, Washington, D.C.
- Roland, Gerard (1999) *Politics, Markets and Firms: Transition and Economics*. Unpublished manuscript, ECARE, Belgium.
- Svejnar, Jan, ed. (1995) "The Czech Republic and Economic Transition in Eastern Europe," San Diego: Academic Press.
- Svejnar, Jan. (1999). "Labor Markets in the Transitional Central and East European Economies," Chapter 42 in Orley Ashenfelter and David Card (eds.) *Handbook of Labor Economics*, Vol. 3B. Amsterdam: North Holland, pp. 2809-2854.
- Terrell, Katherine and Vit Sorm (2000) "Sectoral Restructuring and Labor Mobility: A Comparative Look at the Czech Republic," *Journal of Comparative Economics*, forthcoming.
- Turnovec, Frantisek (1998) "Privatization, Ownership Structure, and Transparency: How to Measure a Real Involvement of the State?," CERGE Discussion Paper No. 6/98.

Figure 1: Share of Working Age Population by Employment Status and Old and New Sector

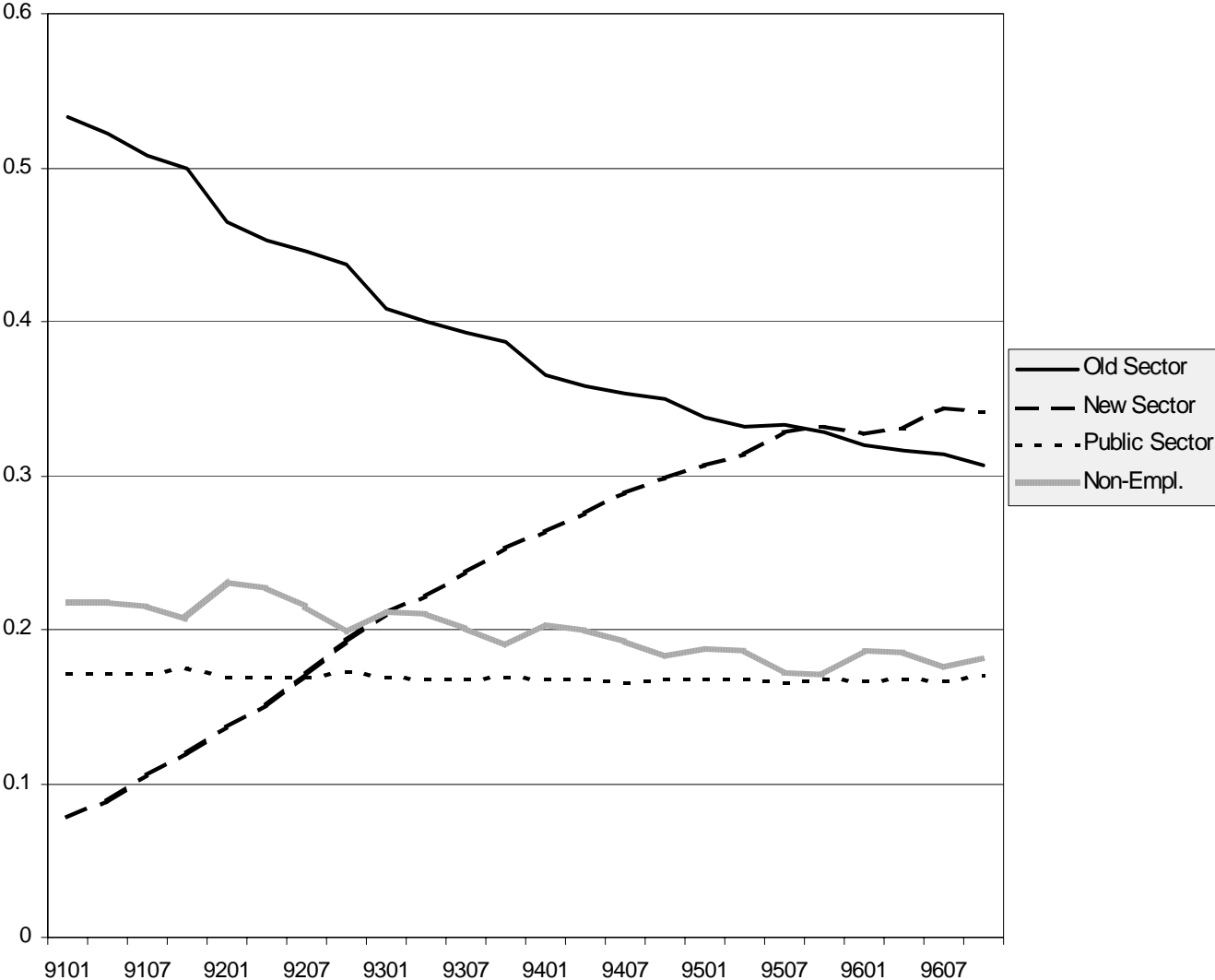


Figure 2: Share of Employment by Old and New Sector and Firm Size

Small

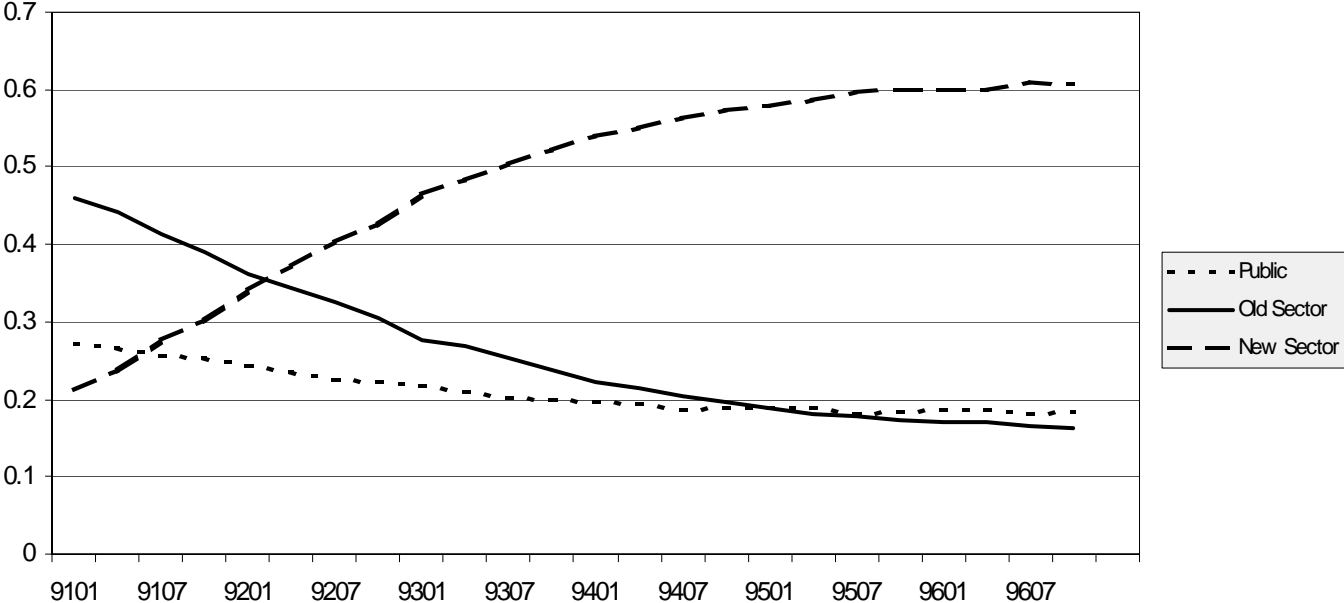
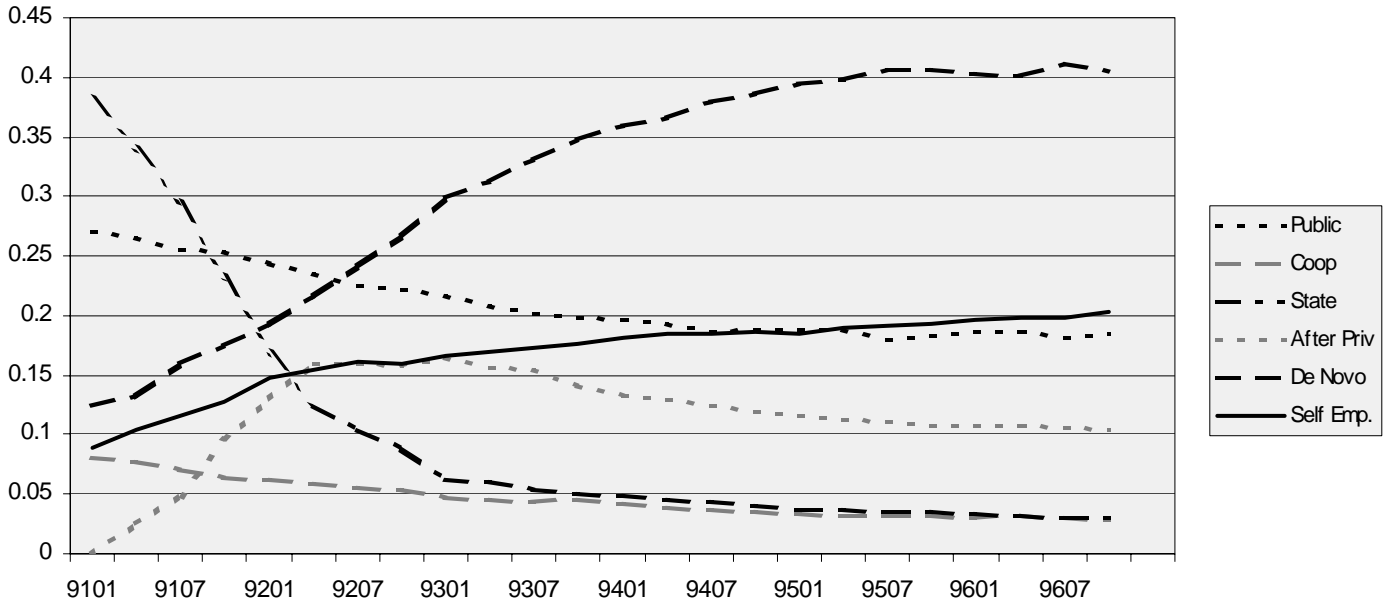


Figure 3: Share of Employment by Ownership Type and Firm Size

Small



Large

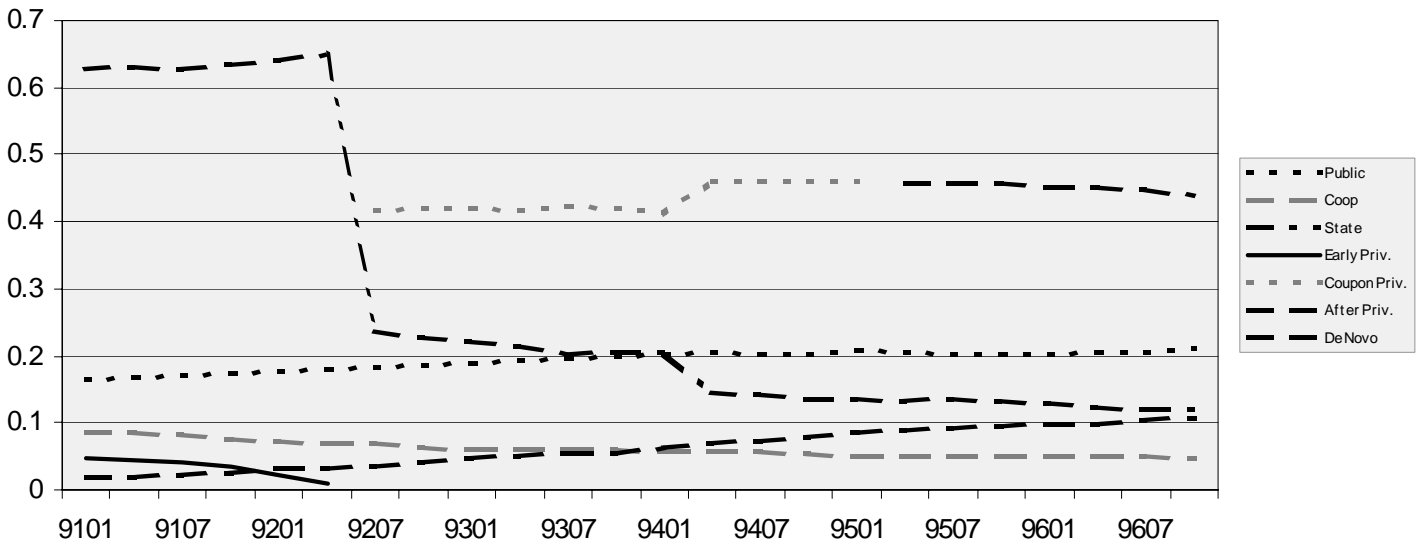
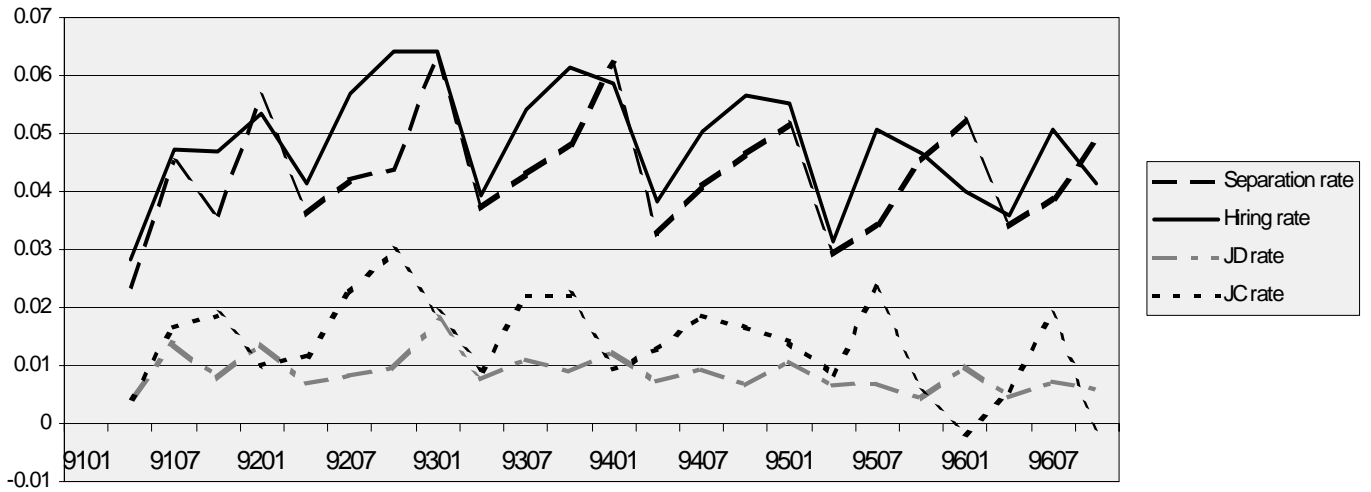


Figure 4: Quarterly and Annual Hiring, Separation, Job Destruction and Job Creation Rates

Quarterly



Annual Rates

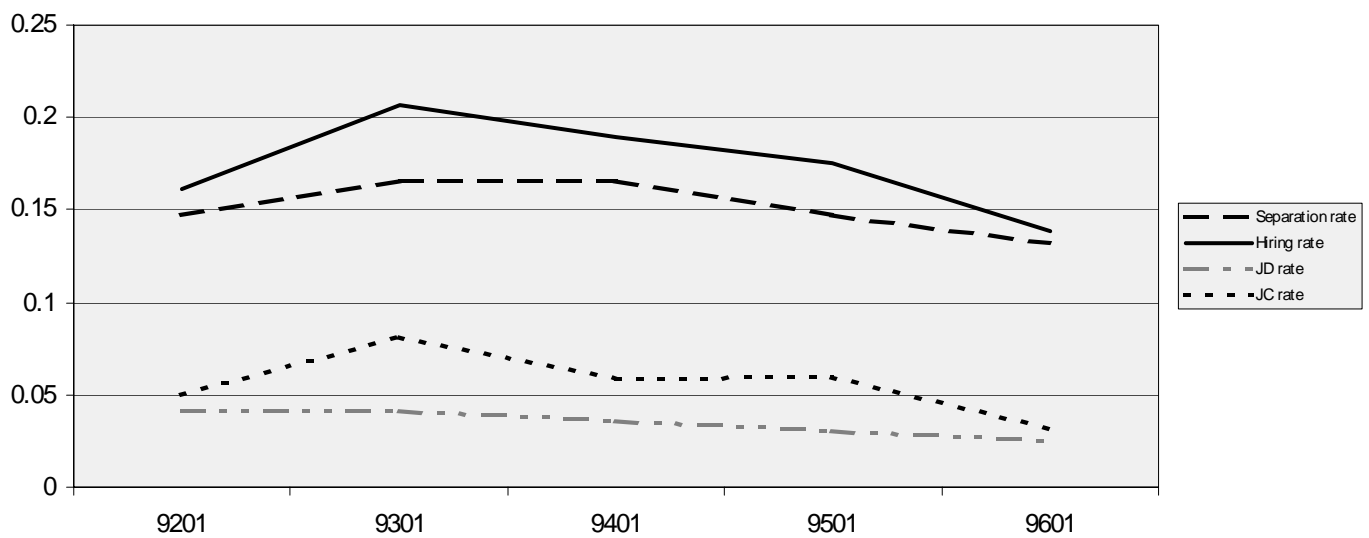
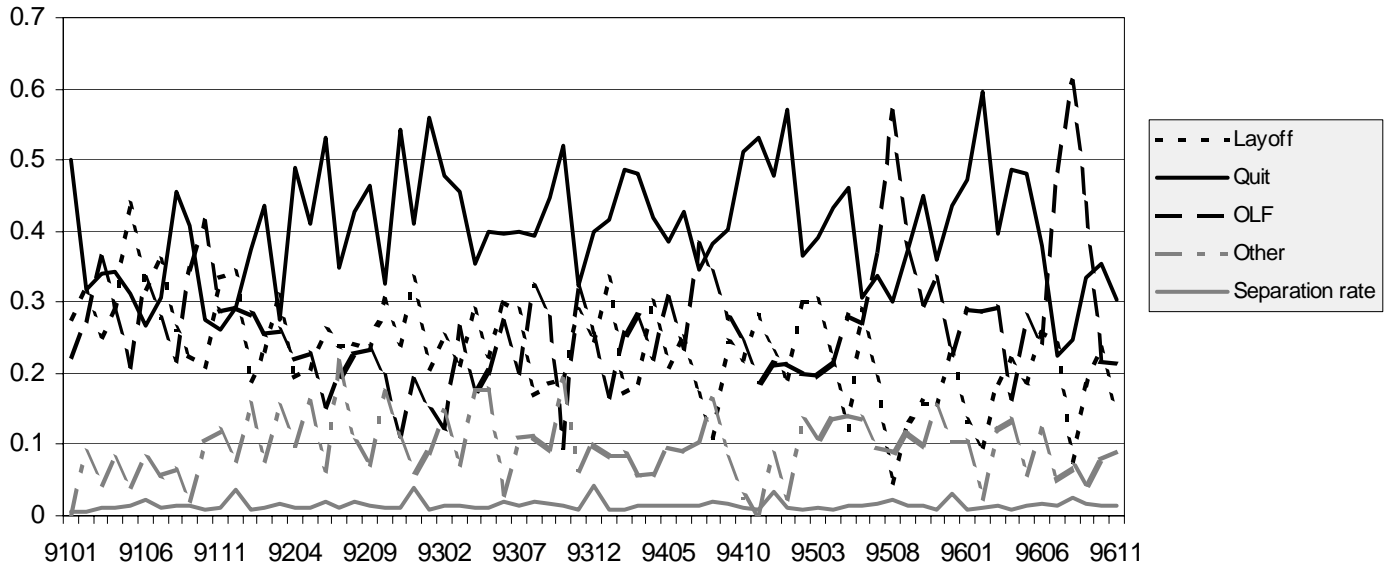


Figure 5: Types of Separation Rates (by months and years)

Monthly



Annual

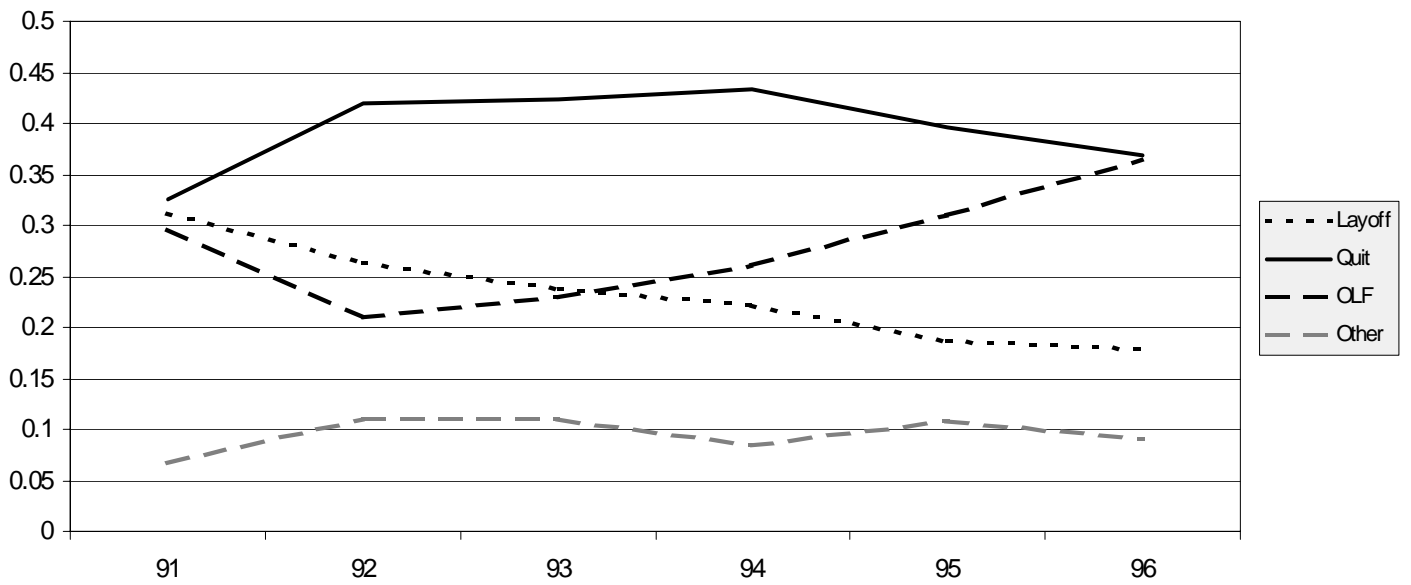
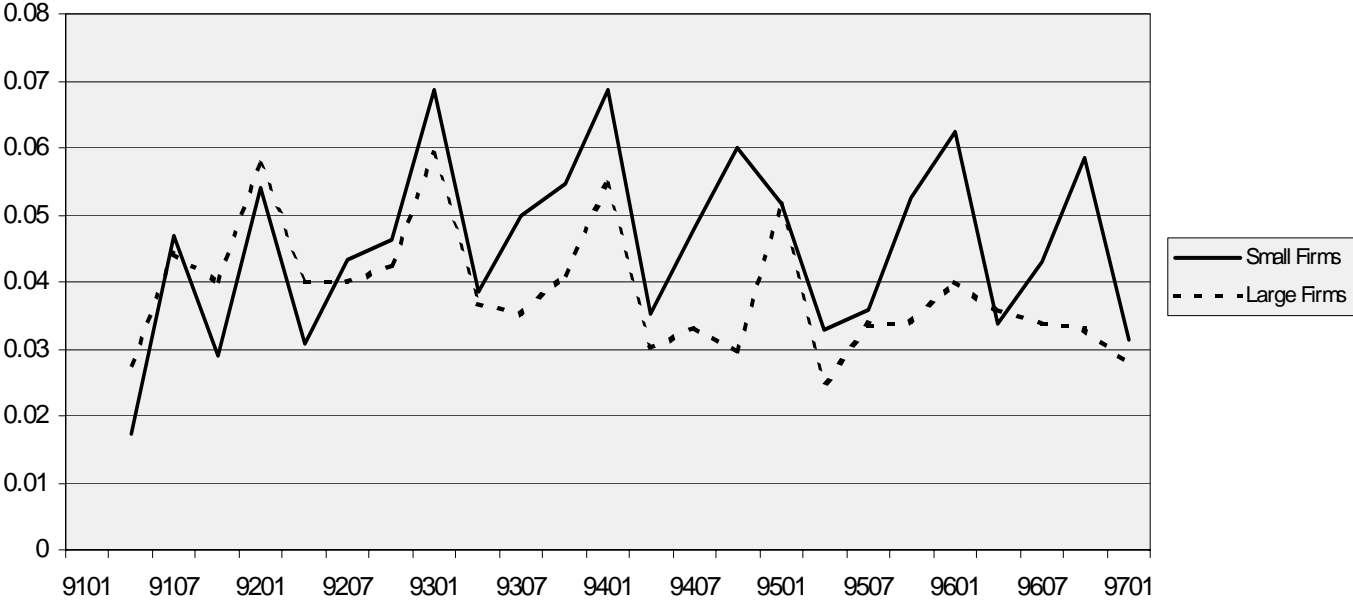


Figure 6: Quarterly Hiring and Separation Rates by Firm Size

Hiring Rates



Separation Rates

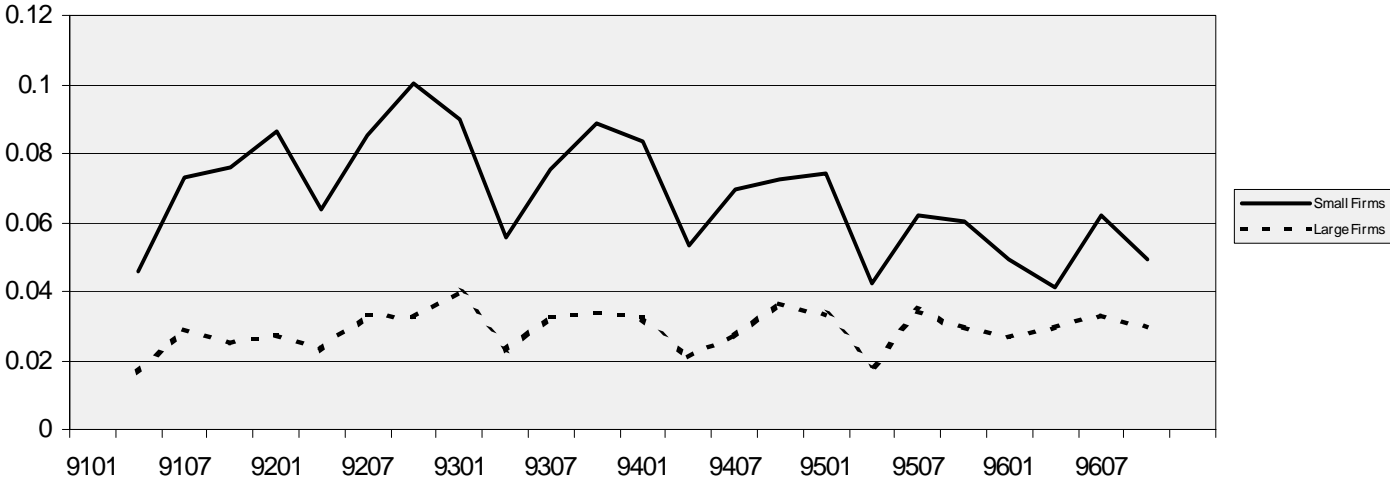
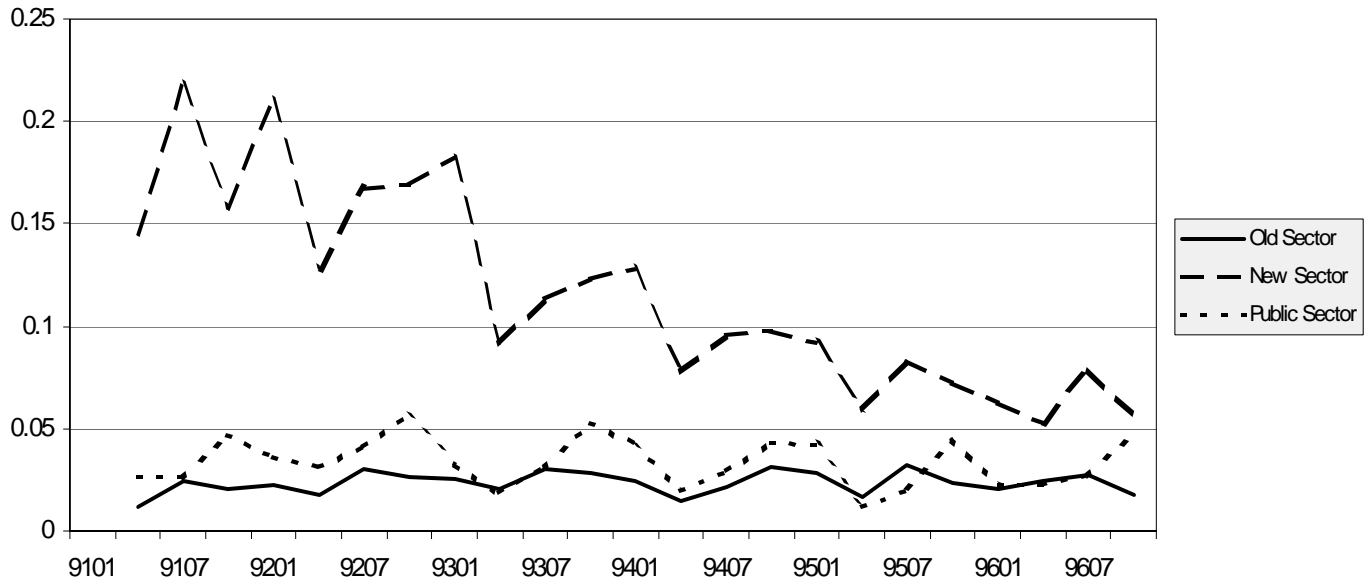


Figure 7: Quarterly and Annual Hiring and Separation Rates by Old and New Sector

Hiring Rates



Separation Rates

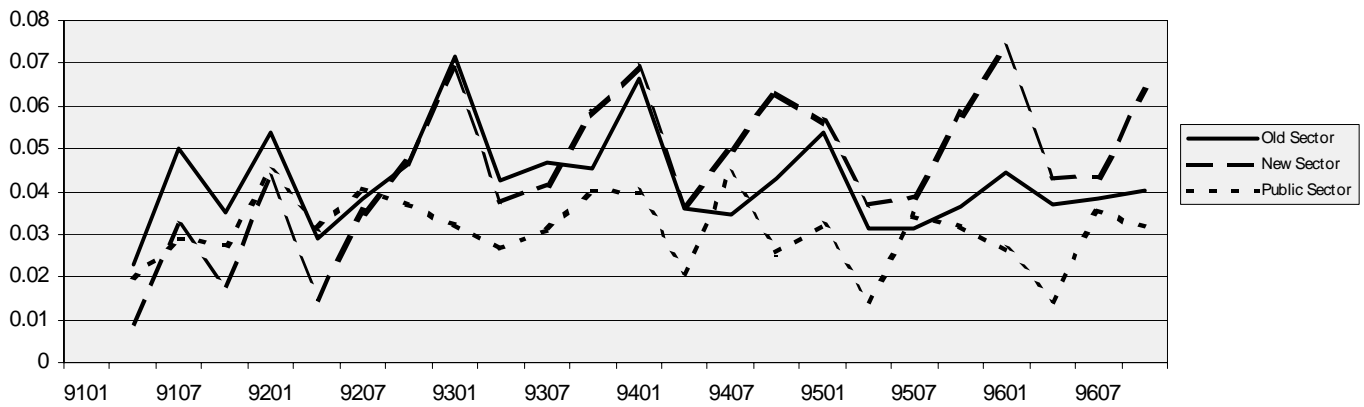


Figure 8: Quaterly Structure of Hiring by Sector

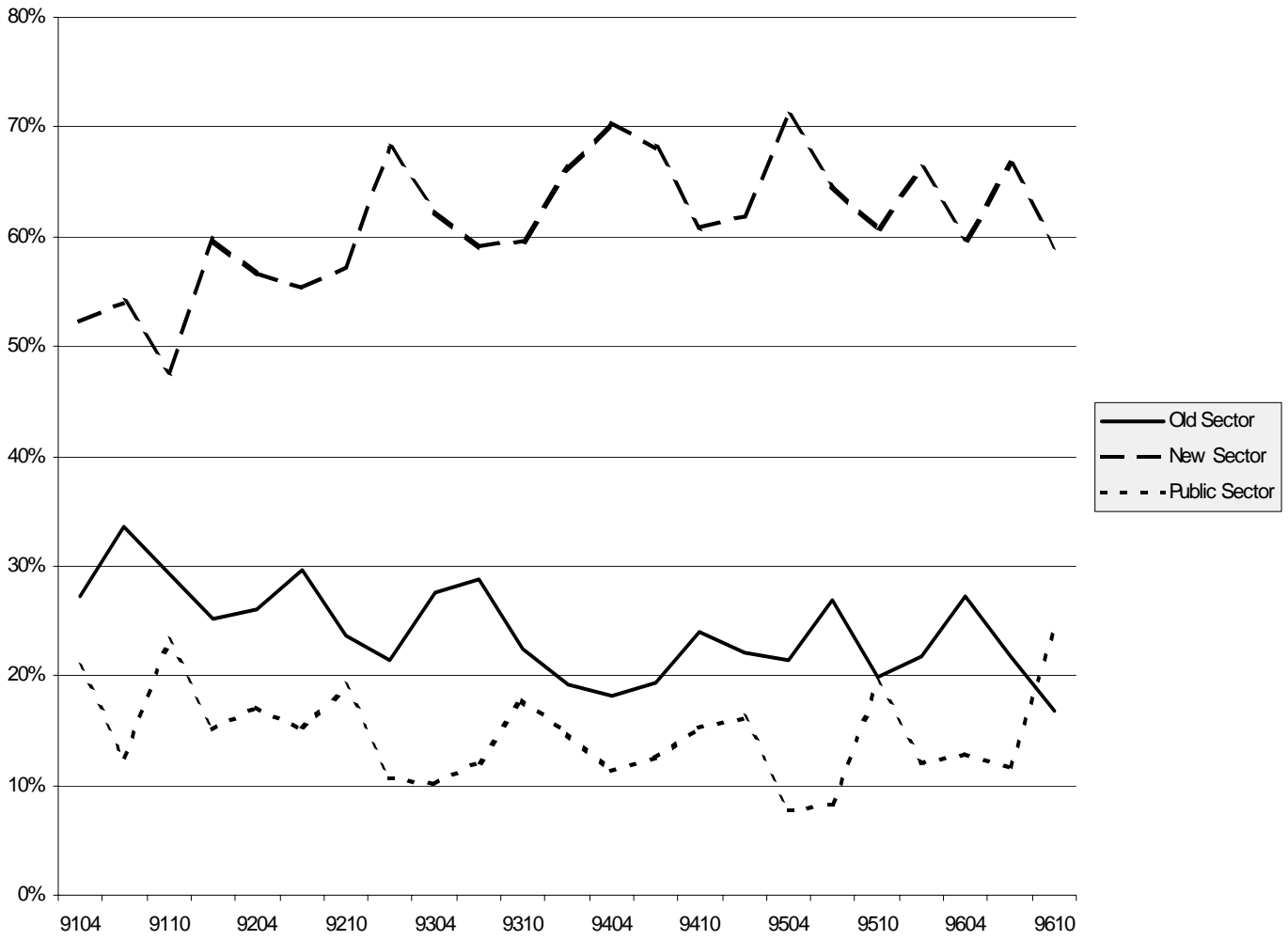
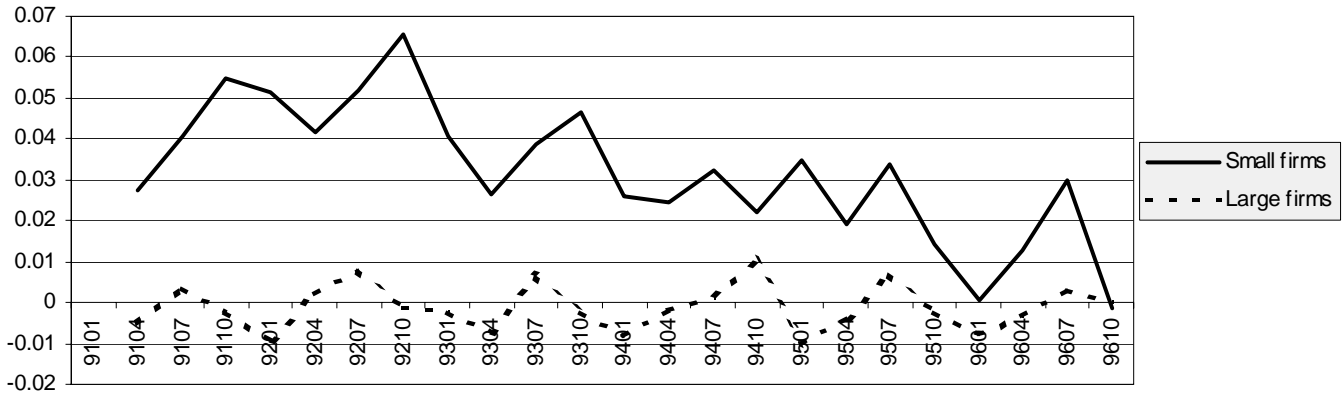


Figure 9: Quarterly Job Creation and Job Destruction by Size

Job Creation Rate



Job Destruction Rate

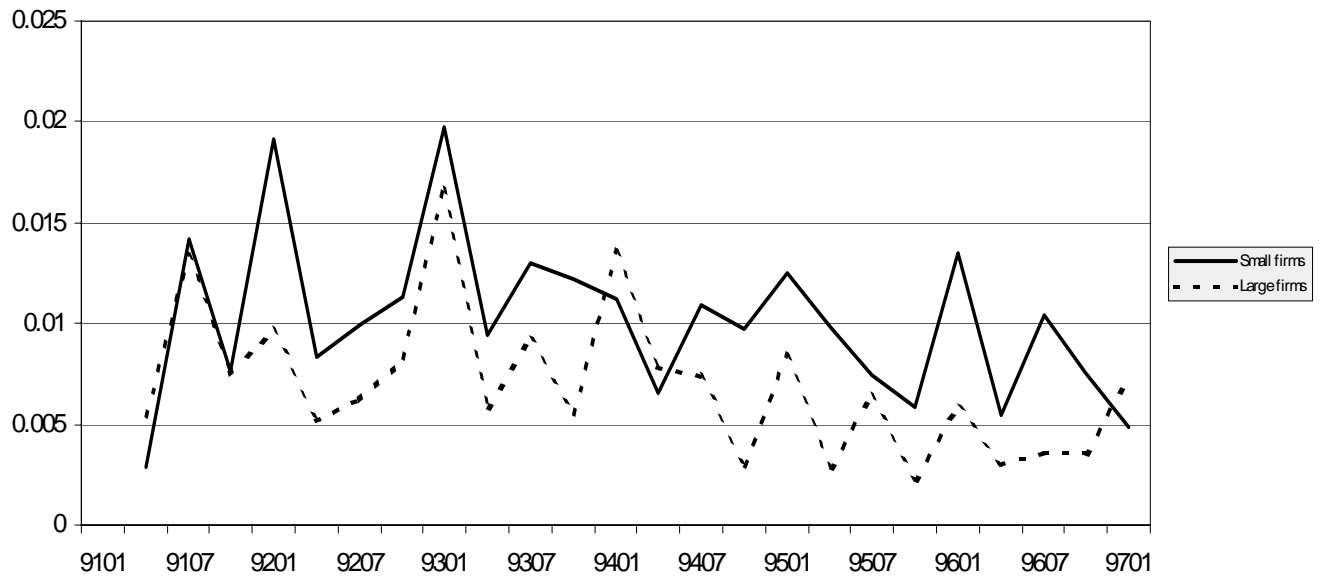
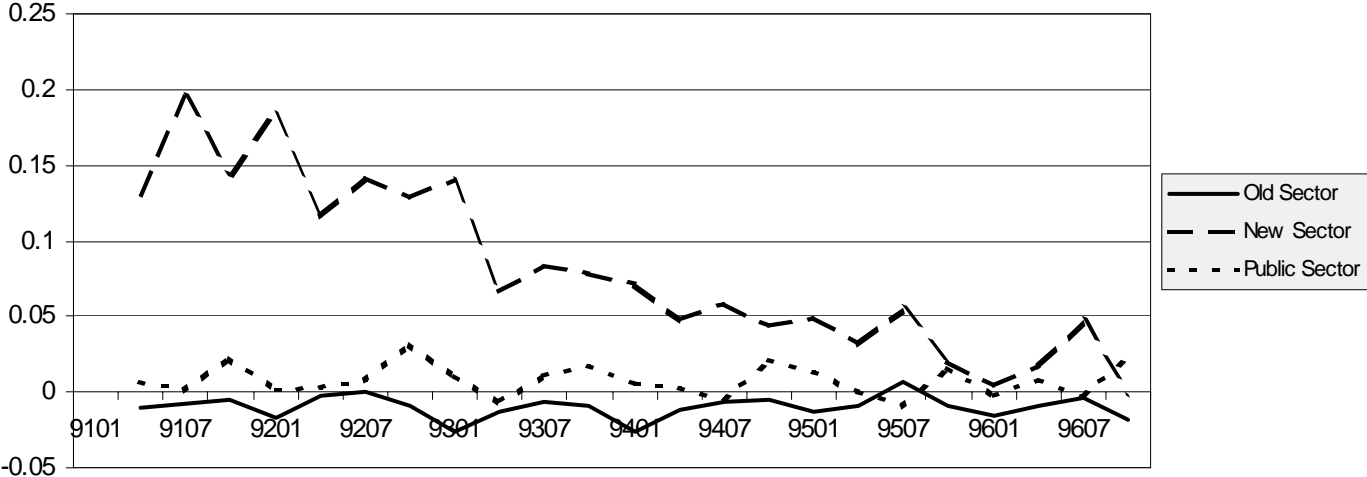


Figure 10: Monthly Job Creation and Job Destruction Rates by Old and New Sector

Job Creation Rate



Job Destruction Rate

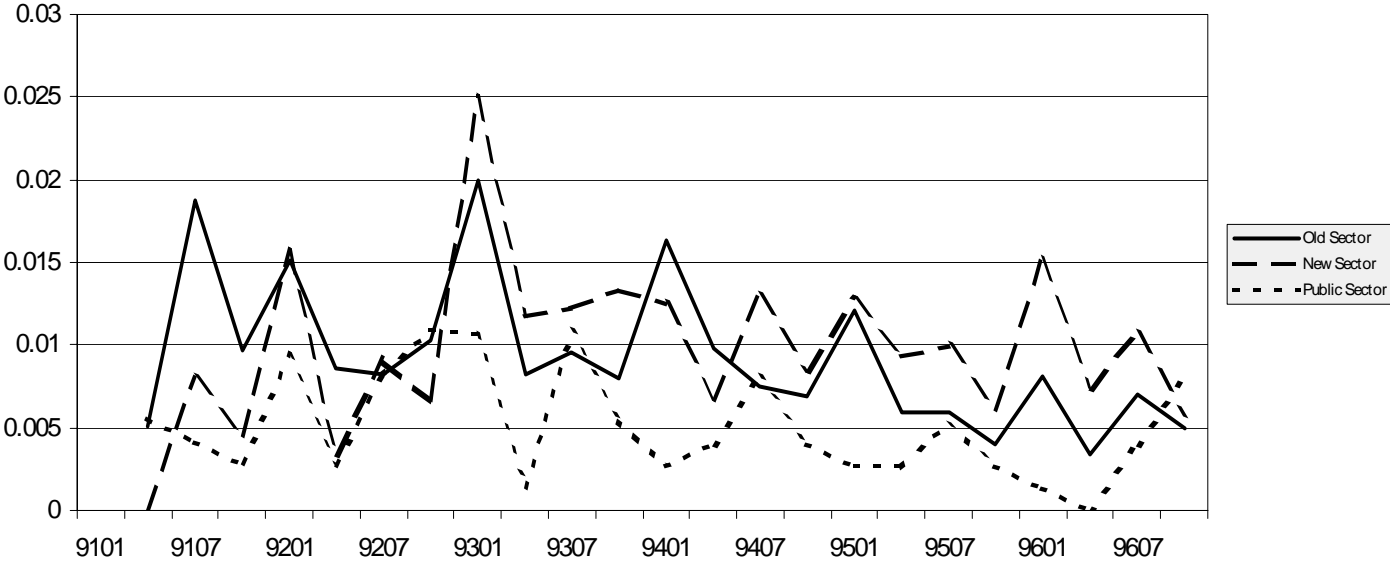


Table 1: Distribution of exits

<i>Sample counts</i>	
Number of workers	4786
Number of spells (jobs)	7924
Number of spells that ended within sampling frame	4010
Number of spells that ended with a job destruction	836
<i>Reported distribution of exits</i>	
a. I stopped my business	1.8%
b. My employer stopped his business	11.8%
c. Laid off due to reduction of workforce	7.4%
d. Laid off due to other reasons	2.4%
e. I was not satisfied with my job, or I found a better job	28.9%
f. I quit myself due to personal or family reasons	13.8%
g. I quit on health grounds	5.7%
h. School attendance, study, training	5.4%
i. Army service, civil service	2.0%
j. I moved	0.7%
k. Retirement	10.3%
l. Maternity leave	6.2%
m. Other reasons	10.0%
Total	106.5%
<i>A simpler distribution of exits</i>	
Layoff	23.1%
Quit	39.7%
Out of labor force	27.7%
Other	9.6%
Total	100.0%
<i>Fraction of transitions resulting in over 3 months of non-employment</i>	
Layoff	25.4%
Quit	7.4%
Out of labor force	23.4%
Other	17.0%
<i>Fraction of transitions resulting in over 1 month of non-employment</i>	
Layoff	32.9%
Quit	13.5%
Out of labor force	25.2%
Other	22.2%

Table 2: International comparison of annual gross job flow rates (annual averages as percentages of employment)

Country	Period	Coverage	Employer unit	Job creation	Job destruction	Net growth	Job re-allocation	Source
<i>Market Economies</i>								
Australia	1984-1985	Manufacturing	Establishments	16.1	13.2	2.9	29.3	Borland and Home (1994)
Canada	1974-1992	Manufacturing	Establishments	10.9	11.1	-0.2	22.0	Baldwin et al. (1998, Table 2)
Canada	1983-1991	All employees	Firms	14.5	11.9	2.6	26.4	OECD (1996, Table 2)
Denmark	1983-1989	Private Sector	Establishments	16.0	13.8	2.2	29.8	OECD (1996, Table 2)
Denmark	1981-1991	Manufacturing	Establishments	12.0	11.5	0.5	23.5	Albaek and Sorensen (1996, Table 2)
Finland	1986-1991	All employees	Establishments	10.4	12.0	-1.6	22.4	OECD (1996, Table 2)
France	1984-1992	Private Sector	Establishments	13.9	13.2	0.7	27.1	OECD (1996, Table 2)
France	1985-1991	Manufacturing	Firms	10.2	11.0	-0.8	21.2	Nocke (1994, Table 3)
France ^a	1985-1991	Non-manufacturing	Firms	14.3	11.8	2.5	26.1	Nocke (1994, Table 3)
Germany	1983-1990	All employees	Establishments	9.0	7.5	1.5	16.5	OECD (1996, Table 2)
Italy ^b	1984-1993	Private Sector	Firms	11.9	11.1	0.8	23.0	Contini et al. (1995, Table 3.1)
Netherlands	1979-1993	Manufacturing	Firms	7.3	8.3	-1.0	15.6	Gautier (1997, Table 3.3)
Norway	1976-1986	Manufacturing	Establishments	7.1	8.4	-1.3	15.5	Klette and Mathiassen (1996, Table 1)
Sweden	1985-1992	All employees	Establishments	14.5	14.6	-0.1	29.1	OECD (1996, Table 2)
USA	1973-1993	Manufacturing	Establishments	8.8	10.2	-1.4	19.0	Baldwin et al. (1998, Table 1)
USA ^c	1979-1983	Private Sector	Establishments	11.4	9.9	1.5	21.3	Anderson and Meyer (1994, Table 11)
United Kingdom	1985-1991	All employees	Firms	8.7	6.6	2.1	15.3	OECD (1996, Table 2)
<i>Transition Economies</i>								
Bulgaria	1993-1996	All Sectors	Firms	2.1	8.2	-6.1	10.3	Faggio and Konings (1998, Table 2a)
Czech Republic	1991-1996	All Sectors	Jobs	5.6	3.4	2.2	9.0	Author's own calculations
Estonia	1993-1996	All Sectors	Firms	7.2	9.2	-2.0	16.4	Faggio and Konings (1998, Table 2a)
Hungary	1994	Manuf.,trade, services	Firms	1.3	6.6	-5.3	7.9	Bilsen and Konings (1998, Table 2)
Romania	1995-1996	All Sectors	Firms	19.0	9.1	9.9	28.1	Faggio and Konings (1998, Table 2a)
Russia	1997	Manufacturing	Firms	2.7	12.7	-10.0	15.4	Acquisti and Lehman (1999, Table 1 & 3)
Slovenia	1991-1996	Manuf.,trade, services	Firms	1.3	5.4	-4.1	6.7	Bojnec and Konings (1998, Table 2a)
Estonia	1992-1994	All employees	Jobs	9.7	12.9	-3.2	22.6	Haltiwanger and Vodopivec (1997)

Data for market economies was taken from Davis and Haltiwanger (1999, Table 2, p. 2722).

^aNon-manufacturing includes commerce, transport and communications, services, insurance, banking and financial institutions.

^bContini and Paceli (1995, p. 33) report that efforts to purge the data of spurious births and deaths reduce the Italian gross job flow rates by about one-fifth.

^cSelected states. Based on data for employers covered by the Unemployment Insurance (UI) system. The UI system covers all private sector employment except self-employed persons, domestic workers, some railroad workers, and certain non-profit organizations.

Table 3: Job Destruction Hazard Estimates: Old/New Sector Comparison

	(1)		(2)		(3)		(4)		(5)		(6)		(7)	
New sector ^a	0.126	(0.079)	-0.076	(0.096)	-0.105	(0.098)	-0.086	(0.099)	-0.098	(0.102)	-0.235	(0.238)	-0.004	(0.116)
Small firm dummy ^b			0.336	(0.096)	0.301	(0.097)	0.300	(0.098)	0.195	(0.100)				
Years of schooling					-0.025	(0.018)	-0.015	(0.018)	-0.020	(0.018)	-0.003	(0.028)	-0.021	(0.024)
Labor market experience					-0.008	(0.003)	-0.007	(0.003)	-0.008	(0.003)	-0.006	(0.005)	-0.008	(0.005)
Prague dummy					0.068	(0.124)	0.111	(0.127)	0.126	(0.126)	0.545	(0.188)	-0.158	(0.172)
Part-time dummy					0.454	(0.098)	0.448	(0.099)	0.425	(0.099)	0.840	(0.154)	0.121	(0.134)
Annual industry GDP p.c. ^c							-0.252	(0.058)						
Agriculture ^d									0.876	(0.130)	0.829	(0.189)	0.865	(0.180)
Forestry									-0.240	(0.453)	-0.251	(0.715)	-0.284	(0.588)
Mining									0.320	(0.230)	0.354	(0.284)	0.374	(0.396)
Utilities									0.154	(0.297)	0.268	(0.346)	-0.048	(0.589)
Construction									0.428	(0.135)	0.637	(0.203)	0.221	(0.180)
Trade									0.286	(0.127)	0.678	(0.227)	0.065	(0.153)
Restaurants and Hotels									0.721	(0.190)	-0.665	(1.008)	0.695	(0.203)
Transportation									-0.172	(0.208)	-0.360	(0.317)	-0.093	(0.279)
Finance									-1.727	(0.711)			-1.285	(0.715)
Business services									0.303	(0.182)	0.547	(0.338)	0.151	(0.216)
Other services									0.432	(0.196)	0.957	(0.319)	0.126	(0.248)
Constant	-5.757	(0.051)	-5.861	(0.061)	-5.462	(0.243)	-4.977	(0.275)	-5.690	(0.251)	-6.083	(0.390)	-5.338	(0.332)
Sample	All firms		All firms		All firms		All firms		All firms		Large firms		Small firms	
Log likelihood	-4480.1		-4474.1		-4461.5		-4308.5		-4424.5		-1878.3		-2548.5	
Number of spells	5988		5988		5988		5988		5988		2508		3480	

^aThe new sector includes de novo and self-employment. The old sector (base case) includes state, privatized, in privatization, and cooperative employment.

^bSmall firms have less than 100 employees.

^cGDP in hundreds of thousands of 1995 CZK per worker in a given year and one of 8 major industrial sectors.

^dManufacturing is the comparison group.

Note: Bolded coefficients statistically significant at the 5% level. Standard errors in parentheses. Public employment (educ./health/publ.adm.) is excluded from the analysis.

Table 4: Job Destruction Hazard Estimates: Ownership Comparison

	(1)		(2)		(3)		(4)		(5)		(6)		(7)	
Coop ^a	0.159	(0.147)	0.069	(0.150)	0.044	(0.150)	-0.026	(0.152)	-0.475	(0.175)	-0.432	(0.254)	-0.678	(0.259)
Small scale privatization	-0.199	(0.218)	-0.467	(0.233)	-0.462	(0.233)	-0.486	(0.238)	-0.503	(0.234)			-0.689	(0.253)
Coupon privatization	-0.921	(0.181)	-0.858	(0.183)	-0.833	(0.183)	-0.783	(0.186)	-0.809	(0.183)	-0.701	(0.189)		
After privatization	-0.329	(0.130)	-0.406	(0.132)	-0.377	(0.132)	-0.345	(0.137)	-0.368	(0.133)	-0.047	(0.161)	-0.852	(0.229)
De Novo	0.025	(0.102)	-0.200	(0.124)	-0.219	(0.125)	-0.199	(0.127)	-0.294	(0.128)	-0.417	(0.247)	-0.413	(0.168)
Selfemployed	-0.345	(0.145)	-0.612	(0.166)	-0.632	(0.167)	-0.636	(0.171)	-0.741	(0.169)			-0.838	(0.196)
Small firm dummy ^b			0.333	(0.105)	0.304	(0.106)	0.320	(0.107)	0.237	(0.108)				
Years of schooling					-0.017	(0.018)	-0.009	(0.018)	-0.015	(0.018)	-0.0093	(0.029)	-0.011	(0.024)
Labor market experience					-0.006	(0.003)	-0.006	(0.003)	-0.007	(0.003)	-0.0059	(0.005)	-0.006	(0.005)
Prague dummy					0.062	(0.124)	0.101	(0.127)	0.100	(0.126)	0.515	(0.188)	-0.182	(0.172)
Part-time dummy					0.438	(0.098)	0.436	(0.100)	0.426	(0.100)	0.821	(0.154)	0.120	(0.134)
Annual industry GDP p.c. ^c							-0.218	(0.057)						
Constant	-5.556	(0.076)	-5.620	(0.079)	-5.349	(0.255)	-4.947	(0.284)	-5.495	(0.263)	-5.824	(0.401)	-4.988	(0.365)
Industry dummies	No		No		No		No		Yes		Yes		Yes	
Sample	All firms		All firms		All firms		All firms		All firms		Large firms		Small firms	
Log likelihood	- 4456.4		-4451.4		-4440.7		-4290.5		-4405.4		-1844.0		-2535.8	
Number of spells	5988		5988		5988		5988		5988		2508		3480	

^aThe state ownership is the comparison group. See Section 4.3 for the definition of the ownership dummies.

^bSmall firms have less than 100 employees.

^cGDP in hundreds of thousands of 1995 CZK per worker in a given year and one of 8 major industrial sectors.

Note: Bolded coefficients statistically significant at the 5% level. Standard errors in parentheses. Public employment is excluded from the analysis.

Table 5: Job Destruction Hazard Estimates: Ownership Comparison - Early/Late Transition

	(1)		(2)		(3)	
State * 94-96 ^a	-0.184	(0.186)	-0.217	(0.232)	-0.283	(0.321)
Coop	-0.299	(0.196)	-0.189	(0.272)	-0.653	(0.307)
Coop * 94-96	-0.626	(0.284)	-0.946	(0.423)	-0.308	(0.392)
Small scale privatization	-0.536	(0.239)			-0.791	(0.270)
Coupon privatization	-0.859	(0.187)	-0.743	(0.193)		
After privatization	-0.408	(0.140)	-0.088	(0.166)	-0.950	(0.248)
New Sector ^b	-0.332	(0.154)	-0.541	(0.423)	-0.501	(0.204)
New Sector * 94-96	-0.183	(0.124)	0.108	(0.489)	-0.209	(0.128)
Small firm dummy ^c	0.220	(0.110)				
Years of schooling	-0.024	(0.018)	-0.0104	(0.029)	-0.0246	(0.024)
Labor market experience	-0.007	(0.003)	-0.0056	(0.005)	-0.0076	(0.005)
Prague dummy	0.1132	(0.126)	0.521	(0.188)	-0.1646	(0.172)
Part-time dummy	0.406	(0.099)	0.82	(0.155)	0.0998	(0.134)
Constant	-5.314	(0.260)	-5.779	(0.400)	-4.669	(0.369)
Industry dummies	Yes		Yes		Yes	
Sample	All firms		Large firms		Small firms	
Log likelihood	-4406.2		-1840.8		-2538.1	
Number of spells	5988		2508		3480	

^aState ownership during 91-93 is the comparison group. See Section 4.3 for the definition of the ownership variables.

^bThe new sector includes de novo and self-employed.

^cSmall firms have less than 100 employees.

Note: Bolded coefficients statistically significant at the 5% level. Standard errors in parentheses. Public employment (education/health/publ.adm.) is excluded from the analysis.

Table 6: Job Destruction Hazard Estimates: Policy Variables by Ownership^a

	(1)		(2)		(3)		(4)		(5)	
<i>Ownership</i>	State		Small-scale priv.		Coupon priv.		After priv.		New sector	
Unemployment insurance at economy-wide level	0.014	(0.007)	0.057	(0.022)	n.a.		n.a.		-0.008	(0.010)
Unemployment insurance at personal level	0.102	(0.031)	0.113	(0.074)	n.a.		n.a.		0.034	(0.030)
Welfare for a single-headed household	0.005	(0.014)	0.027	(0.020)	-0.767	(0.685)	-3.362	(0.519)	-0.008	(0.019)
Monthly district unemployment rate	-0.648	(4.626)	11.642	(11.107)	-3.458	(9.639)	11.863	(5.792)	5.719	(3.600)
Annual industry GDP per capita ^b	-0.1803	(0.1074)	0.0363	(0.1118)	-0.0153	(0.2005)	-0.500	(0.2226)	-0.265	(0.092)
Number of spells beginning in a given ownership	1856		396		189		278		2843	
Number of spells entering while in progress	0		0		892		1242		0	
Number of spells ending censored ^c	264		0		0		961		1528	
Number of spells ending with job destruction	700		87		148		559		1315	

^aEach coefficient comes from a different likelihood estimation. All specifications are based on a combined sample of large and small firms within a given ownership category and include the standard set of regressors used in Table x.2. Further, the specifications with the unemployment insurance and welfare measures also include a cubic in calendar months elapsed since January 1991. Finally, the specification with personal level of unemployment insurance also includes person-specific monthly wages. No industry dummies are used in any of the specifications.

^bThe total sum of unemployment benefits available given wage, replacement ratio, and maximum entitlement.

^cGDP in hundreds of thousands of 1995 CZK per worker in a given year and one of 8 major industrial sectors.

^dCensoring includes transitions other than job deaths as well as end-of-sample censoring.

^eThere is no variation separately identifying unemployment insurance and wages during the period when a given ownership exits.

Note: Bolded coefficients are statistically significant at the 5% level. Standard errors in parentheses.

Table A1: Employment Spells from Communism (in progress as of Jan 1989)

	1989	1991	1996
Count	3593	2271	1026
	100.0%	63.2%	28.6%
<i>Ownership distribution</i>			
Coop		10.1%	7.3%
Public		24.8%	29.9%
State		64.9%	12.9%
After Privatization			49.4%
<i>Industrial distribution</i>			
Agriculture	9.4%	9.0%	6.6%
Mining	4.1%	4.5%	5.3%
Manufacturing	34.3%	35.0%	33.9%
Utilities	0.3%	0.5%	0.2%
Construction	7.5%	5.5%	4.4%
Trade	8.0%	7.5%	6.2%
Hotels	2.0%	1.9%	1.7%
Transport	7.1%	7.2%	9.1%
Finance	1.0%	0.9%	1.4%
Bus. Services	4.3%	3.7%	2.2%
Public Admin.	4.8%	5.4%	7.0%
Education	7.5%	9.0%	11.6%
Health	6.2%	7.0%	7.5%
Other Services	3.6%	2.9%	2.9%