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Job Creation and Job Destruction in Estonia: Labour Reallocation and Structural Changes

Jaan Masso
Raul Eamets
Kaia Philips

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Forschungsinstitut
zur Zukunft der Arbeit
Institute for the Study
of Labor

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Jaan Masso
University of Tartu

Raul Eamets
University of Tartu
and IZA Bonn

Kaia Philips
University of Tartu

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IZA

P.O. Box 7240
53072 Bonn
Germany

Phone: +49-228-3894-0
Fax: +49-228-3894-180
Email: iza@iza.org

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ABSTRACT

Job Creation and Job Destruction in Estonia: Labour Reallocation and Structural Changes*

This article documents and analyses gross job flows and their determinants in Estonia over the years 1995-2001, using a database containing the population of officially registered firms in Estonia (all in all 52,000). Our results show that job creation and job destruction rates have been rather high in Estonia and are comparable to the levels documented for the US. We find that the firm-specific component in job flows excess of employment change had relatively lower importance than in western studies due to the emergence of small and medium-sized enterprises and labour reallocation between the economic sectors. The high inter-sectoral mobility has helped maintain high levels of job flows, while both are high also due to a favourable institutional environment, especially due to low start-up costs and a large share of micro enterprises in Estonia. When investigating job creation and destruction at the firm level by estimating firms' growth equations, we detected a negative effect of their size and age on the growth of firms, especially of domestic firms. The job flows have not decreased recently, although worker flows have dropped. One explanation is provided by labour market institutional framework, while the other one relates to the concept of churning flows (the difference between worker and job flows).

JEL Classification: J6, P2, L11

Keywords: job creation, job destruction, worker flows, churning flows, Estonia

Corresponding author:

Jaan Masso
University of Tartu
Faculty of Economics and Business Administration
Narva Road 4
51009 Tartu
Estonia
Email: Jaan.Masso@ut.ee

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1 Introduction

Several studies have documented that individual firms behave in different ways: many firms enter and exit each year, among entering firms many are forced to leave the market after some time, and also the (employment) growth of individual firms differs remarkably. The developments are largely idiosyncratic in the sense that they do not necessarily reflect the general industry dynamics or economy cycles (Bartelsman et al. 2003): there are rapidly growing firms in contracting industries and contracting firms in expanding industries. Firm dynamics relates to the concept of micro-level labour market flexibility (see Eamets et al., 2003a), i.e. the process of job creation and job destruction. High labour market flexibility is needed at the micro level so that jobs could move between sectors and firms in order to ensure effective resource reallocation and productivity growth. Aggregate productivity growth occurs both due to within-firm productivity growth and the reallocation of production factors from low-productivity units to high-productivity units (see e.g. Ahn, 2001).

It appears to be an empirical regularity that job creation and job destruction are simultaneous and parallel processes, with a relatively modest net employment change (Davis et al., 1997). A high rate of job reallocation[2] (the sum of job creation and destruction) is positive for economic growth (Aghion and Howitt, 1994), channelling labour resources from old and contracting firms to new and expanding ones. This ensures efficient use of resources and increased labour productivity. However, Burgess et al. (2000) argue that the relationship between aggregate job and worker flows is nontrivial, as the behaviour of employers is complex: shrinking employers hire and growing enterprises fire workers. There can be differences between job flows and worker flows, called "churning flows". The latter may arise from workers quitting and being replaced by other workers (workers churning employers) and/or simultaneous hiring and firing activities of employers (employers churning workers).

These issues are particularly relevant for the transition countries characterised by highly distorted factor allocations and many inefficient firms. Therefore, a high degree of reallocation of labour resources is expected as many new firms (greenfield firms, spin-

[2] Definitions are presented in section 2.2.

offs, and foreign entrants) are entering the market, while many existing state-owned enterprises are forced to leave if they are unsuccessful in restructuring or downsizing. However, a high degree of job reallocation may also have negative effects, at least in the short run, in terms of worker displacement and loss of earnings, possible losses in human capital during the period of non-employment, etc. The size of potential costs of job loss obviously depends on labour market policies; in the transition countries these costs could be higher than in the western countries, since the criteria for social benefits are rather strict; payments are flat-rate and relatively low. Konings et al. (2002) argue that at the aggregate level and in the long run benefits are more likely to compensate for individual costs.

Caballero and Hammour (1996) assert that when an efficient economy enters a recession, job destruction is the first to increase, being closely followed by a rise in job creation. As the economy is pulling out of the recession, job creation and job destruction again fall synchronously. These tendencies appear also when worker flows are analysed. Haltiwanger and Vodopivec (2002), using the Estonian Labour Force Survey (ELFS) data, show a rapid increase in both worker and job reallocation in the early 1990s with the annual worker reallocation rate exceeding 35% by 1993. In Estonia, transition rates of workers between sectors and labour market states were very high in the early years of the transition, but since 2000 the labour market has become more stable and flow rates have declined (Eamets, 2003). According to Lehmann et al. (2002), also the displacement (job loss) in Estonia built up gradually during the initial period of the transition (up to 13% in 1992) and declined after that, being broadly comparable with the respective Western countries' indicators.

The purpose of this chapter is to analyse gross job flows in Estonia in the later period of the transition in order to find out whether the labour market has become more stagnant as suggested by other flexibility indicators (e.g. worker flows), and explore the empirical relationship between job and worker flows. As can be seen from Figures 1A and 2A in Appendix, workers' transition rates between the states of the labour market have declined. Also the probability of staying in the same state during a one-year period has increased and is relatively high[3]. As worker flows have declined in the course of the transition, one

[3] These are diagonal 'flows' in the flow matrix, like movement from unemployment to unemployment (denoted as UU in the matrix), inactivity to inactivity (OO) and employment to employment (EE). This means people have not changed their status during the year.

might expect job flows to have declined as well. The current article reviews and reassesses the results from previous analyses of job flows in Estonia. In addition to the calculation of the usual creation and destruction rates we perform various decompositions and investigate job creation and destruction at the firm level by estimating a firm's growth equation. We employ a novel database from the Estonian Business Registry that comprises almost all firms registered in Estonia over the period 1995-2001. Therefore, one major advantage of our study is the comprehensiveness of our data, which include the population of firms from all sectors, regions, ages and size classes. The Estonian Business Registry database allows us to document the gross job flows by different industries, whose net employment growth obviously varies. Our particular interest herein is to analyse whether it is job creation or job destruction that is the driving force behind this probably varying net employment growth. Analysing our data, we perceive no decline in job flows; so we will try to find the possible reasons for the very high job flow rate in Estonia.

The rest of the chapter is structured as follows. The next section describes the datasets used for analysis, providing a brief review of the definitions of job flow measures. The empirical results (aggregate job flows and job flows by employer characteristics) as well as the results from the decomposition of the excess job reallocation and the estimation of firm growth regressions are presented in the third section. The following section undertakes the analysis of the institutional factors that may have affected the job flows. The final section concludes.

2 Data and Measurement Procedure

2.1 Description of data

A job flow analysis assumes the availability of firm-level data. In Estonia, such data are gathered by the Statistical Office and the Business Registry. In addition, also the Estonian Tax Board has some information due to its activities. Performing the gross job flow analysis we use the database of the Estonian Business Registry that during the time of the study covered the years 1995-2001. This database includes all officially registered firms in Estonia. The total number of unique firm registry numbers in the database is almost 52,000; however, for each distinct year the number of firms is substantially smaller due to frequent entry and exit. In the Appendix, Figure A3 shows the evaluation of the total number of firms in the Registry. As we can see, the number of business entities increases

over time and over seven years the number has more than tripled. However, for 1995 and 1996 the coverage may be less perfect, which may have been created by spurious entry.

Gross job flows in Estonia have been estimated by several authors using different data sets (e.g. Faggio and Konings 2003, Haltiwanger and Vodopivec 2002, Eamets 2003, Venesaar 2003). Previous analyses, which used different enterprise data sets (AMADEUS, Statistical Office database, etc.), are likely to have underestimated the actual job flows, their data sets containing mainly larger enterprises and only a fairly limited number of smaller ones. However, in Estonia most enterprises are small and as Jurajda and Terrell (2002b) have observed, small start-up firms were the engines of job creation especially in the early transition. Our dataset is in several aspects more comprehensive than those used by previous studies.

First, it includes very small firms as well, there being no size threshold. Table A1 in Appendix presents the distribution of enterprises by the number of employees and their respective employment shares. By comparison, the database of the Estonian Statistical Office used by Eamets (2003) and Venesaar (2003) contained 7,800 firms, including all the enterprises owned by the state and local governments, and all the corporate enterprises employing at least 20 employees; from the rest of the enterprises owned by Estonian and foreign private entities a simple random sample was drawn and surveyed. The AMADEUS database of European firms, used, for instance, by Faggio and Konings (2003) to study job flows in the Central and Eastern European countries, was heavily censored, as it included only firms employing more than 100 employees, whose total assets were over 16 million or operating revenues over 8 million USD. Haltiwanger and Vodopivec (2002) and Vodopivec (2003) derived job flows indicators using the Estonian Labour Force Survey data, which was possible due to the survey's rather detailed information on the reasons for terminating the employment relationship.

Second, our data set includes all three economic sectors (agriculture, manufacturing and services) as well as information about industries (see Table A2 in Appendix about the distribution of firms across industries[4]). Frequently, researchers have access only to manufacturing firms' data, or the secondary sector data. Relying on the Business Registry

[4] As an industry classification, we use the OECD STAN classification (see e.g. Bartelsman and Barnes, 2001). It is based on NACE (Statistical Classification of Economic Activities in the European Community) like the Estonian EMTAK code (Classification of Economic Activities of Estonia), so the concordance between the two is straightforward.

data we can also analyse gross job flows by regions and by ownership type (Tables A3 and A4 in Appendix present the distribution of firms in Estonia respectively by regions[5] and ownership categories).

Third, the unique feature of our dataset is that it also provides information on transactions (mergers, acquisitions, divestitures, etc.). Although the presence of transactions in the data may be important for the results (even if there are just a few of them, but these few transactions concern large firms), it is often impossible to account for them in empirical studies. Table A5 in Appendix shows that the most frequent kind of transactions has been the change in the registry code due to transfer from the Enterprise Registry to the Business Registry. The transactions are more important when weighted by employment (e.g. mergers of large firms). We made the following corrections in the data. In case of "predecessor", the observations for old and new "ID numbers" were treated as one firm. For acquisitions, the employment of the acquired firm before the date of transaction was added to the employment of the acquiring firm. In other cases (mergers, spin-offs, break-ups) we considered the transactions as true entry and exit.

The average firm size (by number of employees) in Estonia is very close to the OECD average, however, the standard deviation is much smaller, for example, due to the smaller number of very large firms in Estonia (see Tables A6 and A7 in Appendix). The average firm size increased between 1995 and 1997 and decreased thereafter (that pattern is observable in agriculture, manufacturing, and services). The central variable in our analysis is the number of employees in a firm. In the available data we can observe only the increase or decrease in the given firm's total number of employees, but get no information about how many people were hired and fired during a year. Another drawback of our data is that employment data are missing in a rather considerable number of observations (e.g. in 29% of observations in the year 2000 and 22% of observations in 2001).

2.2 Definitions

The definitions of rates of gross and net job flows have by now become fairly standard in the literature on job dynamics (e.g. Davis and Haltiwanger, 1999). Gross job creation (*pos*) is defined as the sum of all employment gains in all expanding firms, while gross job destruction (*neg*) is the sum of all employment losses in all contracting firms in an

[5] For this analysis we used EU NUTS 3 (Nomenclature of Territorial Units for Statistics) classification.

economy, sector or region. Usually these gross job flows are expressed as rates by dividing them by the total amount of jobs available in an economy, sector or region. The job creation and destruction rates are given as

$$(1)\quad JC_t = \sum_i \Delta N_{it}^{+} \Big/ \left(0.5 \cdot \left(\sum_i N_{it} + \sum_i N_{it-1}\right)\right),\quad JD_t = \sum_i \Delta N_{it}^{-} \Big/ \left(0.5 \cdot \left(\sum_i N_{it} + \sum_i N_{it-1}\right)\right),$$

where N denotes employment at firm i in year t, the superscript '+' ('-') refers to a positive (negative) change in employment. The sum of jobs created or destroyed is divided by average employment in periods t and $t-1$. Such a definition has several technical advantages over the more conventional growth rate measures (see Davis et al. 1996)[6].

The sum of the gross job creation rate and the gross job destruction rate is the gross job reallocation rate (*gross,* $JR_t = JC_t + JD_t$), while the difference is the net aggregate employment growth rate (*net,* $NET_t = JC_t - JD_t$) that can be observed in aggregate statistics. A measure of reallocation of jobs, which is over and above the amount of job reallocation necessary to accommodate a given net aggregate employment growth rate is the excess job reallocation rate and is defined as the gross job reallocation rate minus the absolute value of the net aggregate employment growth rate (*excess,* $EJR_t = JR_t - \left|NET_t\right|$).

While most of these job flow measures have generally accepted interpretations also in transition contexts, one of them, namely, the excess job reallocation rate, is somewhat more controversial. While some authors understand it as a measure of deep restructuring, others interpret it more conventionally as a sign of heterogeneous firm behaviour within a given sector and of genuine labour reallocation within a sector (e.g. Konings et al., 2002).

We also look at the one-year and two-year persistence rates of job creation and job destruction. The one-year (and respectively two-year) persistence rate of job creation is the fraction of jobs created in year *t* that are still filled on the sampling date one year (two years) later. The one-year persistence rate of job destruction is the fraction of jobs that do not reappear on the sampling date a year later. These persistence rates indicate whether the

[6] For instance, that measure ranges from -2 to +2 (start-ups and shutdowns have growth rates of +2 and -2) and portrays expansions and contractions symmetrically.

observed job flows are of a temporary or more permanent nature, an issue of particular relevance in transitional contexts.

In order to study the effect of firm entry, exit, contractions and expansions on creation and destruction, we employed the decompositions developed by Contini et al. (1996). A total employment change can be written as $\Delta N_t = \Delta N_t^N - \Delta N_t^X + \Delta N_t^H - \Delta N_t^F$, where ΔN_t^N is the change in employment brought about by start-up firms, ΔN_{it}^X that due to firm exits, ΔN_{it}^H corresponds to the expansion of continuing firms, and ΔN_{it}^F to contractions of continuing firms. Let us denote also the number of entering, exiting, expanding and contracting firms as $n_t^N, n_t^X, n_t^H, n_t^F$ (the total number of firms is n_t). It can be then shown, that the rate of job creation due to entry ($JC_t^N = \Delta N_t^N / N_{t-1}$) and the rate of job destruction due to exit ($JC_t^X = \Delta N_t^X / N_{t-1}$) can be decomposed as follows:

(2) $JC_i^N = \pi_i^N \times \left(\theta_i^N / \theta_i\right)$ and $JC_i^X = \pi_i^X \times \left(\theta_i^X / \theta_i\right)$,

where π_t^N is the frequency of start-ups, $\pi_t^N = n_t^N / n_{t-1}$, π_t^X is the frequency of exits, $\pi_t^X = n_t^X / n_{t-1}$, θ_i is the average size of firms in the respective category. The rate of job creation due to expansions ($JC_t^H = \Delta N_t^H / N_{t-1}$) and the rate of job destruction due to contractions ($JC_t^F = \Delta N_t^F / N_{t-1}$) can be decomposed as follows:

(3) $JC_t^H = \pi_t^H \times \left(\theta_t^H \times \eta_t^H / \theta_{t-1}\right)$ and $JC_t^F = \pi_t^F \times \left(\theta_t^F \times \eta_t^F / \theta_{t-1}\right)$,

where $\eta_t^H = \Delta N_t^H / N_{t-1}^H$ is the rate of change in employment in expanding firms (conditional on the firms undergoing an expansion) and $\eta_t^F = \Delta N_t^F / N_{t-1}^F$ is the rate of change in employment in contracting firms (conditional on the firms undergoing a contraction).

Following the procedure of Davis and Haltiwanger (1992), we also investigate how the overall excess job reallocation decomposes into the ‘between’ and ‘within’ components. The former is measured by summing across sectors the deviation of net employment change for every sector from the absolute net employment change of the overall economy. The latter, the ‘within’ component, is measured as the sum over sectors of the excess job reallocation in each sector.

The formula for this decomposition (as derived by Davis and Haltiwanger, 1992) is as follows:

$$(4)\quad gross_t \cdot N_{t-1} - \left|net_t \cdot N_{t-1}\right| = \left(\sum_{s=1}^{S} \left|net_{s,t} \cdot N_{s,t-1}\right| - \left|net_t \cdot N_{t-1}\right| \right) + \sum_{s=1}^{S} excess_{s,t} \cdot N_{s,t-1},$$

where $N_{s,t}$ is the employment in sector *s* in time *t*; *S* is the total number of sectors; $gross_t$, net_t and $excess_t$ denote gross, net and excess reallocation rates, respectively. The left-hand side of the formula is the total job reallocation over the amount of net employment change (the excess job reallocation in the economy). The first term on the right-hand side shows the component of excess job reallocation due to the inter-sector employment shifts over the net employment change (calculated as the absolute value of employment changes in sectors summed over all sectors minus the net employment change in the total economy). The second term on the right-hand side is the component due to excess job reallocation within sectors.

2.3 Firm Growth Regressions

We complement the calculation of aggregate figures of job creation and destruction with studying the job creation and destruction at the enterprise level. An argument from Konings et al. (2002) is that the factors affecting firm level employment will most probably also shape the pattern of aggregate gross job flows. Our approach is as follows. First, let us use the lower-case letters to denote the logs of variables, i.e. $n_{it} = \log N_{it}$. Our dependent variable is the logarithmic employment growth, $\Delta n_{i,t} = \log N_{i,t} - \log N_{i,t-1}$. The model of firm growth following Jovanovic (1982) and Evans (1987) implies that a firm's growth at time t is a function of its size and age (A) at time $t-\tau$, i.e. $\Delta n_{i,t} = \ln F\left(A_{i,t-\tau}, N_{i,t-\tau}\right) + u_{it}$.

A well-known relation in the literature on firm growth, Gibrat's law (or proportionate effect hypothesis), states that the growth rates of firms are independent of their initial size, i.e. there is no tendency for small firms to grow faster than large firms; the empirics has usually shown that the relation does not hold for small and medium-size firms (see e.g. Evans 1987). We regress that variable on various firm characteristics (age, size, etc.) lagged by *two periods* (i.e. $\tau = 2$). As noted by Faggio and Konings (2003), this specification is more robust to possible measurement errors in the firm's size

(employment)[7]. Using a flexible translog functional form for the function $F(\ )$, the relation can be written as

(5) $\Delta n_{i,t} = \alpha_0 + \alpha_1 n_{i,t-2} + \alpha_2 n_{i,t-2}^2 + \alpha_3 A_{i,t-2} + \alpha_4 A_{i,t-2}^2 + \alpha_5 n_{i,t-2} A_{i,t-2}$.

By adding various other firm-level variables that are likely to affect the employment decision, we will thus estimate the following equation:

(6) $\Delta n_{it} = \alpha_0 + \alpha_1 n_{i,t-2} + \alpha_2 n_{i,t-2}^2 + \alpha_3 A_{i,t-2} + \alpha_4 A_{i,t-2}^2 + \alpha_5 foreign + \alpha_6 state + \\ + \alpha_9 PROD_{i,t-2} + \alpha_{10} CAPINT_{i,t-2} + + \beta X_{it} + u_{it}$

In the specification, *PROD* is the log of labour productivity calculated as the ratio of value added (sales minus intermediate inputs) to the number of workers[8], *CAPINT* is the measure of capital intensity (log of the ratio of fixed capital ratio to the number of employees) and vector $X_{it} = (I_i, T_t, R_i)$ includes dummies for 7 broad sectors (I_i), time effects (T_t) and 5 geographical regions (R_i). u_{it} is the error term.

Since entry and exit can be controlled, a 2-step selection model is also estimated in order to control for the selection bias resulting from the entry and exit[9]. That is motivated by the well recorded empirical fact that a firm's survival probability is not independent of characteristics such as its age. Thus an analysis of the growth rate based only on surviving firms would be biased. In the first step we estimated the survival model as

(7) $z^*_{it} = \gamma w_{it} + \eta_{it}$,

where γ is the vector of parameters, w_{it} is the vector of explanatory variables and η_{it} is the error term. Then, using the estimated parameters, the inverted Mill's ratio is calculated according to the formula $\hat{MR}_{it} = \phi(\hat{\gamma} w_{it} / \hat{\sigma}_\eta) / \Phi(\hat{\gamma} w_{it} / \hat{\sigma}_\eta)$, where ϕ is the standard normal probability density function and Φ is standard normal cumulative density function. . Mill's ratio was then added to the regression, including only the surviving firms (i.e. those observed both at time t and t-2; i.e. without entrants and exits), where Δn_{it} is observed only when $z^*_{it} > 0$:

[7] If the dependent variable is the growth rate measured as the difference between the current and initial size, and the independent variable is the initial size, then firms with a low initial size, due to the measurement errors, will grow on average faster than those characterised by a high initial size.

[8] Here this measure of labour productivity is more appropriate than the ratio of sales per employee, as there are firms from different economic sectors in this sample.

[9] For earlier estimations of this kind, see for example Heshmati (2001).

$$(8)\ \left(\Delta n_{it} \mid z^*_{it} > 0\right) = \alpha_0 + \alpha x'_{it} + \alpha_{MR} M\hat{R}_{it} + u_{it},$$

where x_{it} is the corresponding matrix of explanatory variables and β is the vector of unknown parameters to be estimated[10]. In the estimation we used the robust regression analysis in order to mitigate the impact of the large number of outliers to the results[11].

In addition to the firm growth regressions, we also estimated job reallocation regressions, where the dependent variable is the absolute value of the employment change divided by the average employment in the current and previous period:

$$(9)\ JR_{it} = \left|\Delta N_{it}\right| / 0.5 \cdot \left(N_{it} + N_{it-1}\right).$$

3 Patterns of job creation and destruction in Estonia

3.1 Job creation and destruction at the aggregate level

We start the review of the empirical results with the job flows (job creation and destruction) indicators. This strand of empirical research has gained importance since the paper by Davis and Haltiwanger (1992) was published and has produced a lot of evidence from the Western countries. By now several papers studying job flows in transition economies have been published (e.g. Konings et al. (1996) about Poland; Basu et al. (1997), and Estrin and Svejnar (1998) about the Czech Republic, Slovakia, and Poland; Brown and Earle (2002) about Russia, Rutkowski (2003) about Lithuania). The main findings of that literature, as summarised by Haltiwanger et al. (2003), are that (1) in early transition, job destruction dominates job creation, whereas at later stages job destruction and creation are roughly equal; (2) there was a large increase in worker flows[12] when the transition began, (3) small and new private firms contribute to job creation disproportionately, while most of the job destruction occurs among state-owned firms, (4) there is vast heterogeneity in job creation and destruction within narrowly defined

[10] The use of Mills ratio has been criticized, as it is sensitive to the specification of the missing value function and it introduces some arbitrariness, but it is still a popular method. See, for example, Johnston and DiNardo (1997).

[11] The robust regression begins by fitting the regression, calculating Cook's D statistic and excluding any observation with D larger than 1. Thereafter an iterative procedure is applied, by which case weights are calculated on the basis of absolute residuals and regression is run again using these weights; the procedure stops when the weights converge (StataCorp 2003). In the micro-level data the outliers need to be carefully considered in the regression analysis.

[12] Worker flows (flows between places of employment and employment status) are related to job flows as follows. The sum of job creation and job destruction induces the maximum amount of worker reallocation induced by the flow of jobs between firms, while larger job creation and destruction equal the minimum worker reallocation (Davis et al., 1997).

industries, but inter-industry reallocation is still more important than in western economies. Next, we will review and compare our results vis-à-vis the earlier literature.

Empirical literature has shown that the destruction (due to the exit of old firms or contraction of surviving firms) and creation of jobs (either due to the entry of new firms or the expansion of the existing ones) are largely simultaneous processes (Davis et al., 1997) with a relatively modest change in total employment, and that is what we can also see in our data (see Figure 1).

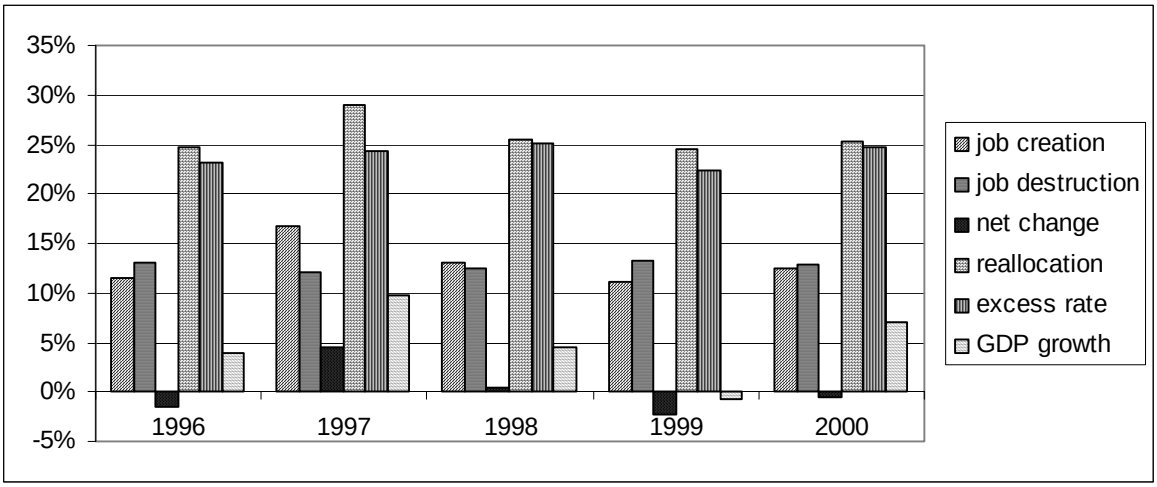

Figure 1. Indicators of job flows in Estonia, 1996-2000 (% of employment).

Source: Estonian Business Registry database, authors' calculations

Our estimates are higher than those from previous studies on Estonia (see Figure 2). This is an expected result as this dataset is more representative of the population of all firms. The excess rate remains higher even if small firms (less than 20 employees) are excluded from our calculations. According to Faggio and Konings (2003), the excess rate for 1996-1997 was 16%; our average for firms with more than 100 employees is quite close to that figure (18%).

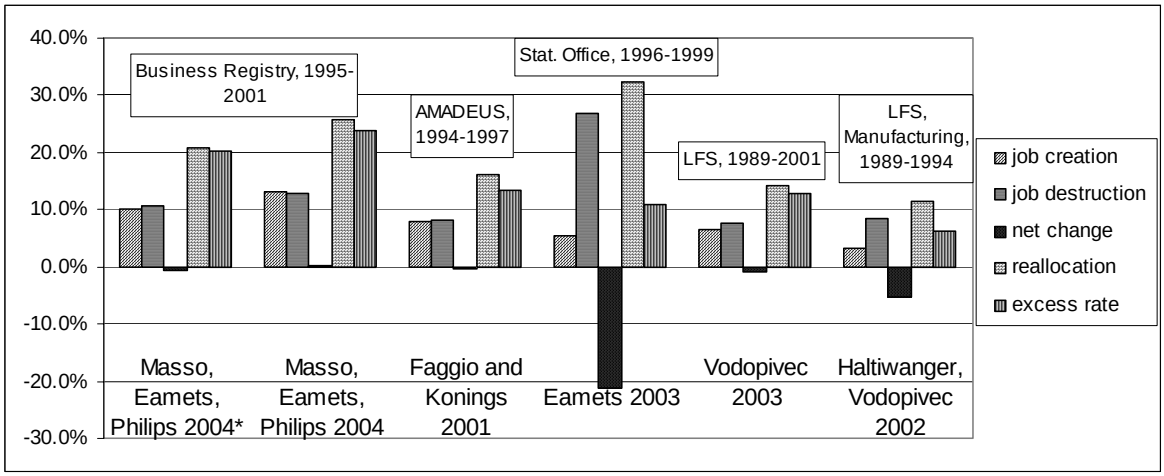

Figure 2. Job flows indicators in Estonia drawn from different studies (% of employment).

Note. LFS denotes Estonian Labour Force Survey; AMADEUS is an international database of firm-level data. "Masso, Eamets, Philips 2004*" denotes the results from the Estonian Business Registry database, using only firms having at least 20 employees.
Source: Authors' calculations; Eamets 2003; Vodopivec 2003; Haltiwanger and Vodopivec 2002.

By comparison with the earlier papers by Eamets (2003) and Venesaar (2003), our results are more reliable. Though the data from the Statistical Office included some extra useful indicators (e.g. firm's date of establishment), the observed negative employment change in the earlier findings cannot describe the economy as a whole and seems to have been caused by data problems. Our job flows estimates are rather stable over the years, while Faggio and Konings (2003) found that in Estonia the excess rate increased from 9% in 1994 to 18% in 1998. The estimates by Vodopivec (2003) based on the Estonian Labour Force Survey data declined from 18% in 1994 to 12% in 1999. An explanation to our results could be that while the worker flows might decline as the transition moves towards its end, the emergence and development of small and medium-size enterprises sector has helped maintain the overall high firm dynamics and flexibility.

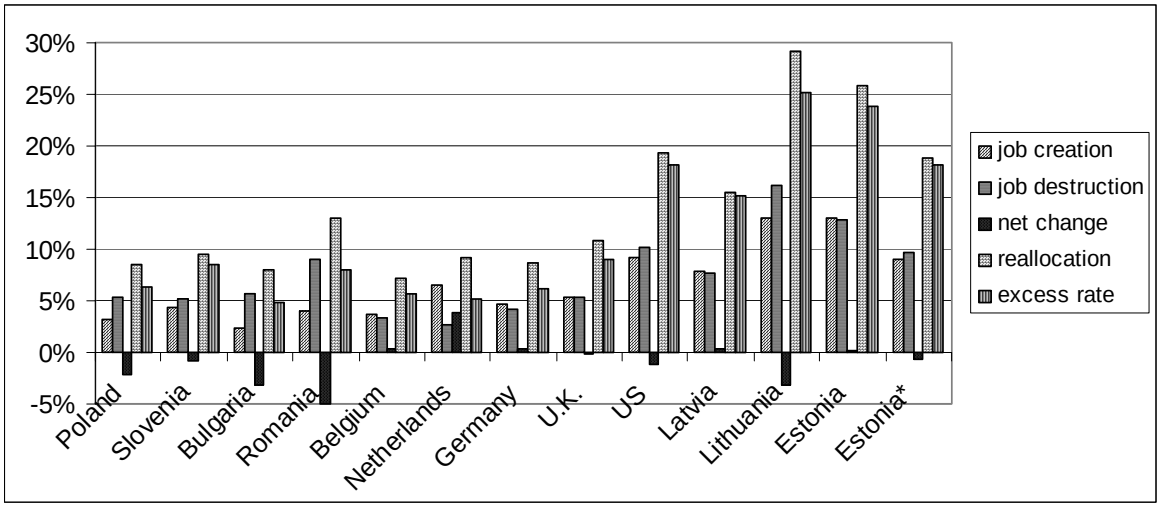

Figure 3. Indicators of job flows in Estonia in international comparison (% of employment).

Note. For Estonia, the data were from 1995-2001; for the USA from 1973-1988; for Belgium from 1989-1995; for the Netherlands and Germany from 1988-1995; for the UK from 1987-1995; for Romania from 1995-1997; for Poland, Slovenia and Bulgaria from 1994-1997; for Latvia from 2000-2001; for Lithuania from 1996-2000. Estonia* denotes the results from the Estonian Business Registry database using only firms with at least 100 employees.

Source: Estonia: authors' calculations; USA: Davis et al. 1997; Lithuania – Rutkowski et al. (2003); Latvia – Smarzynska and Spatareanu (2004); other countries: Faggio and Konings, 2003.

Our estimation of the gross job flows, 26%, is rather high in international comparison, and similar to the level of the United States. The most important job flow indicator, the excess rate, is 24%, indicating rather high labour market flexibility in Estonia compared to the CEE and Western European countries (see Figure 3). The excess rate is somewhat lower if we exclude small firms, but still almost equal to its US counterpart. A similarly high excess rate (25%) was found by Rutkowski (2003) for another Baltic State, Lithuania (1996-2000), and in late transition for Russia (24%). On the other hand, Smarzynska and Spatareanu (2004) report much lower rates for Latvia (excess rate 15 % only); though their sample included only large firms employing at least 50 persons, it is likely to indicate that the extent of ongoing restructuring is smaller in the Latvian economy than in Estonia or Lithuania.

This section is closed with the classification of job creation and destruction according to whether it is due, on the one hand, to a firm's entry and exit, or on the other to expansions and contractions among continuing firms (see Table 1 below). It can be noted that the declining entry rate has been compensated to some extent by the increasing size of entrants (relative to the average firm size). A peculiarity of Estonia (and possibly of other transition countries) is the much smaller size of entrants compared to exits (generally not observable

in the OECD countries, Italy being an exception; Contini et al. 1996). Similarly too, the contracting firms are larger than the expanding firms (in the Italian data of Contini, Gavosto, Revelli and Sestito the difference was much smaller than here), reflecting the necessary downsizing among the firms established in Soviet times. The rate of change of employment in expanding (contracting) firms has decreased (has been stable). The proportions of contracting and expanding firms are similar to those observed elsewhere (with expansions somewhat exceeding contractions).

Table 1 The decomposition of job destruction and creation rates

Year	1996	1997	1998	1999	2000
Job creation from entry	4.0%	6.3%	4.3%	4.0%	3.4%
Entry rate	21.0%	20.3%	17.9%	15.5%	12.5%
Size of entrants	3.1	5.1	3.5	3.3	3.4
Job destruction from exit	5.9%	3.2%	4.4%	2.9%	4.4%
Exit rate	10.8%	5.2%	6.1%	6.7%	9.0%
Size of exits	9.0	10.2	10.7	5.6	6.2
Job creation from growth	7.0%	9.6%	8.1%	7.0%	8.4%
Proportion of expanding firms	21.4%	21.8%	22.2%	19.6%	23.4%
Size of expanding firms	16.4	25.1	25.9	21.9	20.2
Job creation in expanding firms	32.7%	29.3%	20.8%	21.0%	22.4%
Job destruction from contraction	6.5%	8.3%	7.5%	10.2%	8.0%
Proportion of contracting firms	17.1%	23.6%	18.6%	20.3%	17.2%
Size of contracting firms	27.9	23.2	28.7	27.9	27.1
Job destruction in contracting firms	22.5%	25.0%	20.8%	23.1%	21.4%
Overall average firm size	16.4	16.6	14.8	12.9	12.5

Source: authors' calculations based on the Estonian Business Registry data

3.2 Job creation and destruction by employers' characteristics

Many shifts in employment across individual firms are idiosyncratic, that is with a relatively small proportion explained by shifts between industries, firm size, and so on. The common finding in the literature is that firm performance and job flows are very heterogeneous even within narrowly defined industries and determined by idiosyncratic factors. One reason for heterogeneity is uncertainty about the demand for new products which generates experimentation; the latter in turn will cause heterogeneity. The other reasons are inter-firm differences in their managerial and entrepreneurial ability, and slow diffusion of information about new technologies, marketing channels, and consumer tastes (Davis et al., 1997).

Next job flows by employers' characteristics in Estonia are analyzed (see Table 2). The negative relationship between job flows and firm size illustrates that in order to understand job flows in the whole economy, we need, besides data of large firms, those of

small and micro firms. However, this relationship is not linear; the excess rate diminishes rapidly from micro firms (less than 10 employees) to firms with 50-99 employees, but thereafter more gradually.

Table 2. Job flows by employers' characteristics

	pos	neg	net	gross	excess
Total average	0.13	0.128	0.002	0.258	0.239
Employer's size class					
1-9	0.29	0.20	0.09	0.49	0.40
10-19	0.17	0.14	0.03	0.30	0.28
20-49	0.13	0.13	0.00	0.25	0.25
50-99	0.10	0.12	-0.01	0.22	0.21
100-249	0.10	0.10	-0.01	0.20	0.19
250-499	0.10	0.09	0.00	0.19	0.19
More than 500	0.08	0.10	-0.01	0.18	0.17
Industry					
Agriculture	0.074	0.158	-0.085	0.232	0.147
Manufacturing	0.108	0.096	0.012	0.203	0.188
Construction	0.144	0.16	-0.016	0.304	0.273
Business services	0.172	0.144	0.028	0.316	0.288
Trade	0.127	0.119	0.008	0.246	0.189
Transport	0.163	0.147	0.016	0.309	0.289
Public services	0.164	0.111	0.053	0.274	0.221
Location of employer					
>500, 000: Tallinn	0.14	0.13	0.01	0.26	0.26
100, 000-500 ,000:Tartu	0.14	0.12	0.02	0.26	0.24
Large towns: 50, 000 – 99, 000	0.11	0.14	-0.03	0.25	0.23
Other: small towns and rural areas	0.12	0.13	-0.01	0.25	0.24
Region					
Northern Estonia	0.15	0.13	0.01	0.28	0.25
Central Estonia	0.10	0.12	-0.02	0.23	0.20
North-Eastern Estonia	0.11	0.13	-0.01	0.24	0.18
Western Estonia	0.12	0.13	-0.01	0.25	0.23
Southern Estonia	0.12	0.12	0.00	0.24	0.22
Ownership type					
State	0.11	0.14	-0.03	0.26	0.23
Municipal firms	0.02	0.13	-0.11	0.15	0.05
Domestic private firms	0.13	0.13	0.00	0.27	0.27
Foreign firms	0.15	0.08	0.07	0.23	0.16
Firm's age, years					
0-1	0.64	0.09	0.55	0.73	0.18
2-4	0.11	0.14	-0.03	0.25	0.22
More than 5	0.06	0.13	-0.06	0.19	0.13

Note. The rates in the table are annual average job flows. When using averages, job flow rate definitions need not hold exactly, i.e. the difference between job creation and job destruction need not exactly equal the net employment change.
Source: Estonian Business Registry database, authors' calculations.

The positive (negative) net employment growth among small (large) firms may reflect both the learning effect of small firms, i.e. a firm learns about its potential profitability

from the realised profits (passive learning, see Jovanovic (1982)), or actively explores the economic environment and invests to improve its ability to earn profits (active learning, see Ericson and Pakes (1995)). On the other hand, the negative growth of large firms may reflect downsizing due to changes in industrial structure and production technologies in the course of the transition processes. Table 3 discloses that small and medium-size firms (those with up-to 250 employees[13]) account for ca. 79% of job creation and 75% of job destruction.

Table 3. Job creation and destruction indicators by employer's size category

Firm's size class	Share of job creation	Share of job destruction	Employment share	Persistence of job creation		Persistence of job destruction	
				One-year	Two-year	One-year	Two-year
1-9	0.27	0.19	0.23	0.47	0.31	0.42	0.18
10-19	0.14	0.08	0.13	0.55	0.36	0.42	0.2
20-49	0.16	0.12	0.17	0.59	0.37	0.44	0.24
50-99	0.11	0.08	0.12	0.59	0.39	0.41	0.26
100-249	0.11	0.12	0.11	0.57	0.36	0.49	0.27
250-499	0.07	0.04	0.07	0.62	0.29	0.44	0.25
More than 500	0.14	0.21	0.15	0.73	0.56	0.47	0.26

Source: Estonian Business Registry database, authors' calculations.

Though small firms create more jobs, they seem to be less permanent. Compared to the classic study by Davis et al. (1997), our job creation persistence rates are low for small firms, but similar for large firms. Our job destruction persistence rates are much lower than in Davis et al. (1997), i.e. many destroyed jobs will be recovered after some time, which indicates rather high labour market flexibility.

Next, we analyze how job reallocation differs by sectors (industries) and what kind of changes have emerged over time with the maturing of the transition. Jurajda and Terrell (2002a) found that all Estonian industries have a higher level of job reallocation than do those in the Czech Republic, ascertaining that job destruction in 1989-1995 was especially high in Estonian agriculture, but also in trade, which at the same time also enjoyed a very high level of job creation. In the more mature transitional period, the highest job destruction in Estonia is still in agriculture. There are high job destruction rates also in construction, trade and business services, but in these industries job creation is also very high. The level of excess job reallocation has been highest in such sectors as business services, trade, and construction, but much lower in manufacturing and especially

[13] That is the definition for the small and medium-size enterprises applied by the European Union, when the number of employees is the criterion.

agriculture. These tendencies assure that transition leads to a convergence in the industrial structure of employment typical of mature market economies. In both the theoretical (Aghion and Howitt, 1994) and empirical (Faggio and Konings, 2003) literature it is argued that higher turbulence or flexibility correlates with growth. Indeed, across the 37 STAN0 industries[14], the Spearman correlation coefficient between the excess and net rates is 0.28[15]. This could reflect Schumpeter's creative destruction process in which old unproductive units are replaced by new productive ones leading to higher growth. Smarzynska and Spatareanu (2004) noted for Latvia a strong positive correlation between the employment growth and job creation at the sectoral level, but a small negative correlation between net change and job destruction. In our data the two correlations are respectively 0.65 and -0.24. According to Smarzynska and Spatareanu (2004), it implies that since some industries experience employment growth despite job losses, the government policies should focus on the creation of conditions that would be favourable to job creation rather than preventing job destruction.

Konings et al. (1996) analysed gross flows of jobs in Poland at the start of the transition and discovered high rates of gross job destruction concentrated in state-owned enterprises. They also found that new private firms contributed disproportionately to job growth in the economy. The same patterns apply to most other CEE countries as shown by Faggio and Konings (2003). There are striking differences in respect of gross job flows between state, municipal, domestic and foreign private firms in Estonia. As can be seen from Table 2, in the question of job creation, foreign firms are much more dynamic, leading to positive employment growth. Several researchers have shown that foreign direct investment (FDI) has played an important role in the development of the Estonian economy[16]. Mickiewicz et al. (2000), and Varblane and Mickiewicz (2001) have listed several factors characterising FDI influence on employment in the transition economies. They argue that

[14] See comment in footnote 6, page 6.

[15] We excluded four industries out of 41 with net employment change over 20%. These are aircraft and spacecraft, railroad equipment and transport equipment, public administration and defence, compulsory social services, and post and telecommunications (according to STAN0 classification). See also Table A7 in Appendix.

[16] According to Eamets et al. (2003b), Estonia has been successful in attracting foreign direct investment. The main state-owned large enterprises were sold by tenders in the form of large privatisation rounds, and a strong correlation exists between privatisation rounds and FDI inflow until 1996. Starting from that period, the structure of the FDI inflow changed. In 1997 and especially 1998, FDI inflows were in a larger part the result of the growth of reinvested earnings of foreign investors and acquisitions of Estonian privately owned firms and banks. During the Russian crisis in 1998 foreign investors, mainly Swedish and Finnish, used low share prices of firms reflecting difficulties in the Estonian economy and cheaply bought majorities in several

FDI operates like a buffer either by generating new or maintaining the existing employment. They also support the idea that FDI can contribute to the domestic generation of employment and recovery rather than the view that FDI can lead to growth or generate the bulk of manufacturing employment.

Eamets et al. (2003a) found that the foreign-owned sector of Estonian manufacturing was less affected by the Russian crisis, determining that in the period 1998-99 the foreign-owned firms actually created jobs, while in the domestic firms in total almost 11,000 jobs were destroyed. Our analysis shows that jobs are destroyed in particular by municipal firms, but also by state-owned ones. We also observe more heterogeneity in the employment behaviour of state and domestic private firms as shown by the high excess job reallocation rate. Studying workers' displacement in Estonia, Lehmann et al. (2002) found that the magnitudes and direction of displaced workers lend support to a model of labour reallocation from the state to the private sector. In 1992, 77% of all displaced workers came from the state sector and this percentage fell to 17% in 1998.

Two dimensions of job dynamics in the regions were analyzed: first, the size of settlement (large towns, small towns, rural areas), and then regional aspect (according to EU NUTS3 division Estonia has five geographical regions). There was not much variation in the first dimension, except that net change was positive in Tallinn and negative in large towns (including also North-East Estonia) and rural areas, reflecting the reallocation of labour to large centres. In the second dimension, the labour market flexibility is highest in Northern Estonia (excess reallocation of 25%) and lowest in North-Eastern Estonia (18%) – the former is the capital region, while the latter has the most difficult economic situation in Estonia due to both the hardships in adapting the large-scale heavy industry to market economy and the language problems of the non-Estonian population.

The last section of Table 2 analyses the job flows rates by the firms' age. The age measure here depicts the year when the firm was registered in the business registry. In case the year of entry (the year when the firm for the first time experienced positive sales or a positive number of employees) was different, we used this. According to theory (see e.g. Jovanovics, 1982) new firms face uncertainty about the cost of production and demand for products. Over time, as such information is accumulated, unprofitable plants exit and

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Estonian firms. Starting from 2000, an important component of FDI is also reinvested earning from the stock of FDI and further acquisition of domestic capital owned firms by foreign investors.

profitable plants survive and settle down to more stable employment levels. The net job creation rate declined with the firm's age. This could reflect replacement of old firms with new ones having technological and organisational advantages. The gross reallocation declines also with the firm's age, but not with the excess job reallocation rate (as indicated by Davis et al. 1997). This is due to the rapid employment growth among the newly established firms (by comparison with older firms), i.e. the volatility of employment growth becomes important only at the age of 2-4 years.

3.3 Decomposition of excess job reallocation

Next the possible reasons for the very high job flows in Estonia are considered. One explanation could be that Estonia has been a rapidly reforming economy, with a rapid labour reallocation (high worker flows) that has changed the employment structure within a comparatively short time (Eamets 2003). For example, if flows from unemployment to employment are taken, then the transition rate dropped from 44% in 1994 to 28% in 2000. Though this factor is still important, its importance has declined.

The numbers in Table 4 show that the fraction of excess job reallocation due to shifts between industries varies from 11% to 19%. It is a common finding in the literature that firms' performance and job flows are very heterogeneous even within narrowly defined industries, being determined by idiosyncratic factors.

Table 4. Fraction of excess job reallocation resulting from employment shifts between different groups

Group	1996	1997	1998	1999	2000	Average
Location	0.09	0.02	0.06	0.00	0.03	0.04
Regions, NUTS3	0.13	0.02	0.07	0.01	0.01	0.05
Industry, STAN0	0.13	0.11	0.27	0.18	0.19	0.18
Size class	0.11	0.12	0.14	0.06	0.11	0.11
Ownership type	0.02	0.02	0.09	0.07	0.08	0.06

Source: Estonian Business Registry database, authors' calculations

However, in this data the proportion of excess reallocation due to inter-industry shifts is still extremely high compared to the studies of western countries (Baldwin et al. 1998 report excess reallocation for Canada to equal 2.5% and for the USA 3.6%). Faggio and Konings (2003) report the Estonian average of 1994-97 to be even higher, 28%, which could be at least partly explained by the size threshold in their data and the smallness of their sample (only about 233 firms), so that there was only a limited number of firms in each group causing the between-group shifts to be relatively important. The shifts across

size classes are also relatively important in Estonia (11% of excess reallocation), while the shifts across ownership type are relatively low – 6% of excess reallocation. Decompositions for regions show that ca 5% of excess reallocation is due to shifts between regions. We conclude that changes in the structure of the economy have remarkably shaped the job destruction and creation process.

3.4 Firm Growth Regressions

The last sections showed that the rates of job creation and destruction varied with various characteristic firm motivations, but in many cases we suspected that various firm characteristics could be correlated, having an impact on the results. This motivates us to carry additionally trough a multivariate analysis of firm's employment decisions in order to disentangle the impact of different characteristics.

The results of the regression analysis are presented in Table 5. We can notice the negative effect of size and age on firms' growth (small and younger firms growing faster) that implies a departure from Gibrat's law (as often observed in the data). As noted by Faggio and Konings (2001), the effect of firm size controls also the initial restructuring (the downsizing necessary to eliminate labour hoarding). Foreign ownership has a positive impact on employment growth even if we control for other characteristics; the under-performance of state firms in terms of job growth may indicate the positive effect of restructuring on employment growth, but the dummy for state firms is still insignificant. After including the interaction terms of size and ownership dummies (the results are not reported herein to save space, but are available upon request), we found that belonging to the group of foreign firms reduces the negative effect of the initial size on the growth (the positive interaction term), i.e. the departure from Gibrat's law is smaller for foreign firms. On the other hand, belonging to foreign capital may circumvent the various size disadvantages of small firms (e.g. financial constraints). Another interpretation relates to the sunk costs and uncertainty. The negative relationship between growth and size may emerge because in the conditions of uncertainty about post-entry performance and some investments being sunk cost, a rational strategy for a firm could be to start in a small way and grow over time rapidly if successful. Then, this negative relationship may be less significant for foreign firms, because many of them are probably multi-plant firms diversified into a different geographical location, and the uncertainty raising from

launching a new establishment is probably less severe for a foreign firm that produces the same product.

Concerning location, although it is seen above that firms in Northern Estonia (incl. the capital area) outperform those in other regions (consistent with the better business environment in the region), that does not show up in our regression results; the additional regressions showed that dummies for regions other than Northern Estonia changed from negative to positive after the inclusion of productivity and capital intensity variables in the regression, which could mean that the positive effect of being located in Northern Estonia is related to the higher productivity there. Regarding economic sectors, manufacturing firms seem to outperform firms in other economic sectors in terms of employment growth. Besides the importance of scale economies, the difference could also be that manufacturing firms' growth is not limited by the size of domestic markets.

As a second step, the survival model and firm growth model controlling for selection due to entry and exit was estimated. It can be noted that the statistically significant variables are size (positive effect), age (negative effect), productivity (positive), and capital intensity (positive). Next to the dummy for foreign firms also the state firm dummy has become statistically significant. The Mills ratio added to the firm's growth regression is statistically significant, meaning that the employment growth patterns in the final sample differ systematically from the eliminated portion, and the differences must be considered to correct for selection bias. Still, most of the qualitative results remain fairly similar; the state firm dummy has become statistically significant.

Turning to the firm-level job reallocation regressions, we can notice the negative effect of age and positive effect of size on reallocation. While the latter is consistent with experimentation theories, the former could show that the observed negative effect of a firm's size on reallocation is to a large extent due to the correlation between the firm's size and age. The higher reallocation in Northern Estonia (capital area) and in construction, transport and business services confirms our previous results. Capital intensity having a positive effect on reallocation is different from the results of Davis et al. (1997) and in contrast with human capital theories (if human and physical capital are complementary in the production process, then more capital-intensive plants operate with more human capital, and are thus expected to have lower creation and destruction rates).

Table 5 Employment growth model parameter estimates

Dependent variable	Employment growth	Probit model for survival	Employment growth	Job reallocation
Method	Pooled data, robust regression	Maximum likelihood	Pooled data, 2-step Heckman selection model	Pooled data, robust regression
Size(-2)	-0.0213 (6.50)***	0.1502 (2.15)**	-0.0115 (2.75)***	0.0196 (6.50)***
Sizesq(-2)	-0.0001 (-0.17)	-0.0012 (-0.07)	-0.0013 (2.06)**	-0.0049 (9.42)***
Age(-2)	-0.0343 (5.18)***	-0.2244 (1.96)**	-0.0381 (5.67)***	-0.0312 (5.08)***
Agesq(-2)	0.0018 (0.62)	0.0707 (1.43)	0.0034 (1.15)	0.0001 (0.04)
Size(-2)*Age(-2)	0.0018 (1.08)	0.0826 (2.46)**	0.0026 (1.54)	0.0047 (3.00)***
Foreign firm	0.0153 (3.63)***	-0.0776 (-0.87)	0.0133 (3.15)***	-0.0028 (-0.70)
State firm	-0.0133 (-1.37)	-0.3076 (-1.43)	-0.0171 (1.76)*	-0.0139 (-1.51)
Labour prod. (-2)	0.0268 (20.86)***	0.1703 (8.51)***	0.0311 (17.01)***	-0.0075 (6.39)***
Capital intensity (-2)	0.003 (3.55)***	0.0278 (1.89)*	0.0034 (3.94)***	0.0048 (6.11)***
Central Estonia	0.0061 (1.43)	0.1711 (2.00)**	0.0103 (2.33)**	-0.0216 (5.44)***
North-East Estonia	0.0033 (0.55)	0.125 (-1.13)	0.0067 (1.09)	-0.0045 (-0.79)
Wester Estonia	0.0047 (1.36)	0.0469 (-0.77)	0.0062 (1.78)*	-0.0188 (5.83)***
South Estonia	0.0072 (2.63)***	0.1174 (2.31)**	0.0101 (3.52)***	-0.015 (5.87)***
1998	0.0089 (1.97)**	0.000 (0.00)	0.009 (1.98)**	-0.0268 (6.49)***
1999	-0.0272 (6.36)***	-0.0238 (-0.28)	-0.0279 (6.53)***	-0.0335 (8.59)***
2000	-0.0089 (2.11)**	-0.1731 (2.19)**	-0.0124 (2.85)***	-0.0362 (9.43)***
2001	-0.002 (-0.46)	-0.33 (4.34)***	-0.0095 (1.97)**	-0.0422 (10.89)***
Manufacturing	0.0601 (10.84)***	0.0271 (0.25)	0.0596 (10.78)***	0.005 (0.97)
Construction	0.0308 (4.99)***	-0.0492 (-0.42)	0.0286 (4.63)***	0.0234 (4.03)***
Trade	0.0287 (5.43)***	0.0025 (0.02)	0.0276 (5.23)***	0.0077 (1.55)
Transport	0.0303 (4.79)***	0.0883 (0.70)	0.0307 (4.86)***	0.0267 (4.52)***
Bus. Serv.	0.0157 (2.67)***	0.1179 (1.04)	0.0174 (2.96)***	0.0112 (2.04)**
Pub. Serv.	0.0361 (5.20)***	0.0617 (0.47)	0.0366 (5.30)***	-1.5299
Mills ratio			0.4151 (3.46)***	
Constant	-0.2703 (17.87)***	0.0101 (0.04)	-0.3436 (13.08)***	0.2229 (16.22)***
Observations	31391	36796	31391	33571
R-squared	0.05		0.05	0.02

Note: absolute values of t statistics are in parentheses.

* significant at 10%; ** significant at 5%; *** significant at 1%

Source: authors' calculations based on the Estonian Business Registry database.

4 Institutional framework and its impact on job and worker flows in Estonia

Because job and workers reallocation is important for growth, it is expedient to ask whether it is affected by government policies and institutions such as employment protection laws, bankruptcy and insolvency regulations, administrative burdens to start a new business, regulatory barriers to international trade and investment, etc. It seems that at least to some extent institutions and the business environment matter for firm-level dynamics and productivity growth. According to the concept of labour market flexibility used by Eamets et al. (2003b), institutional aspects of flexibility such as labour legislation,

labour policy, and trade unions affect the micro-level flexibility, which involves workers and job flows. Scarpetta et al. (2002) studied empirically the role of policies and institutional settings in the OECD countries, finding that stringent product market regulations have a negative effect on new firms' productivity and market access. In addition, strict employment protection regulations, too, by reducing employment turnover, may lead to lower productivity and discourage the entry of firms (mainly small and medium-size firms) to the market. Davis et al. (1997) discussed various policy implications, pointing out that high job destruction rates in all sectors underscore the importance of flexible workforce who is able to adapt to changes in location and skills requirements. These results have important implications for economic policy decisions, for example, those concerning employment protection laws, administrative costs of firm establishment, etc.

In general, one can expect that countries with less institutional intervention also have a more flexible labour market in terms of higher labour market mobility (both job and worker flows). A good example is the US labour market compared with the EU labour markets, for example, Portugal (see also Blanchard and Portugal, 2001). However, Addison and Teixeira (2001) report the surprising finding that the annual rates of job reallocation are often equally high in nations with stringent job protection and countries with weak regulations. There are several explanations to it. First, stricter employment protection legislation leads to a higher proportion of short-term jobs whose holders compete with unemployed persons, thereby reducing the latter's job-finding possibilities and job turnover. In less regulated markets there are higher unemployment flows and in more regulated markets more job-to-job flows. Second, if strict employment protection coincides with rigidities in wage setting, adjustment to adverse shocks occurs with employer-initiated job turnover. Third, the inter-country differences in quarterly data need not show up in annual data. Finally, job turnover could be counter-cyclical in unregulated labour markets while pro-cyclical in regulated labour markets (Garibaldi, 1998), which may impact on the cross-country relationship between strictness of labour laws and job flows. This verifies that at least to some extent institutions matter for firm-level dynamics. Gomez-Salvador et al. (2004) found for 13 European countries that job reallocation was negatively affected by employment protection, duration of unemployment benefits, the degree of wage-setting coordination, and tax wedge. Employment subsidies had a negative effect on destruction and a positive effect on creation.

Acquisti and Lehmann (2000) found evidence for Russia that new firms have disproportionately high job creation and destruction rates. They argue that the latter might be attributed to a relatively hostile environment for new businesses in Russia and the managers' lack of experience to operate in this environment. This motivates the question about whether the high firm dynamics in Estonia have been due to the favourable regulation of business activity in the country. Estonian legal environment is transparent and open to foreign investment. A number of laws governing the business environment were enacted very early in Estonia's transition (Bankruptcy Law 1992, Law on Competition 1993).

Table 6 summarises some of the available data on how easy it is to establish a firm and change employment in Estonia[17]. Starting a new business involves relatively small administrative burdens; the potential entrepreneur needs relatively few permits and little time to start a firm: to create firms is rather common. In fact, according to some indicators, Estonia ranks very high among the surveyed countries and the ease of starting a firm has significantly contributed to the overall high estimates of economic freedom[18].

For rational forward-looking agents, the decision to establish a firm is affected besides entry regulations also by regulations of exit. In Estonia the bankruptcy or insolvency regulation seems to make the exit of firms through bankruptcy relatively costly ─ the process is time-consuming (3 years, which is twice as long as in old EU countries on average) and the recovery rate is low (Doing Business 2004; authors' calculations).

[17] The business regulations in different countries and their economic importance are discussed in Doing Business… (2004).

[18] According to the National Heritage Foundation Index of Economic Freedom Estonia ranked 6th among the world nations covered by the survey in 2004 (http://www.heritage.org/research/features/index/countryFiles/English/2004Index.pdf)

Table 6. Administrative regulations affecting firms' entry and exit in Estonia and other countries

	Entry into local markets [a]		Administrative burden for a start-up [b]		Permits to start a firm		Days to start a firm		Employment protection regulations [c]		Bankruptcy regulation: recovery rate (cents per $)[d]	
	Value	Rank [e]	Value	Rank [e]	Value	Rank [e]	Value	Rank [e]	Value	Rank [f]	Value	Rank [g]
Estonia	5.6	12.0	5.8	5.0	3.0	5.0	30.0	34.0	2.1	14.0	40.0	39.0
EU15 average	5.5	23.6	4.8	27.3	4.8	26.8	41.4	38.2	2.5	15.9	70.2	18.7
OECD average	5.4	27.5	4.8	28.8	4.8	27.2	38.3	36.8	2.2	19.4	63.1	28.0
CEE average	5.3	30.7	4.2	43.8	4.7	31.9	33.2	36.7	2.6	14.5	35.7	67.5

Source: Global Competitiveness Report 2001-2002; Riboud et al. 2001; Doing Business (2004).

Notes: [a] - how often the entry of new competitors occurs in the local market, 1 to 7; [b] - from 1 (starting a new business is extremely difficult) to 7 (starting a new business is easy); [c] – Employment Protection Index (EPI) varies from 0 (unrestrictive) to 6 (restrictive); [d] - how many cents on the dollar claimants (creditors, tax authorities, and employees) recover from an insolvent firm; [e] - rank among 75 countries; [f] - Rank among 34 countries; [g] – rank among 145 countries.

The area where notable regulations exist is employment protection. From a formal point of view, the legal regulation of the labour market seems to be in place and workers are even better protected in Estonia than in the EU. But in practice it appears that the private sector does not always follow the government regulations.. In one of our earlier papers (see Eamets and Masso, 2005) we found ample evidence of violations of these regulations by Baltic enterprises. Workers' complaints to labour inspectors are rather frequent and in labour disputes employees' often lodge appeals, which may indicate that law enforcement is weak. But the problem is that appeals may represent only a small number of all breaches of law.

It is important for employment protection legislation strictness what proportion of the workforce is actually covered by the regulations. In the Baltic States, we found, the share of workers on unlimited contracts is close to the EU level, but temporary employment is more widespread (implying a higher level of flexibility). The positive correlation between the share of temporary employment and the strictness of the respective legislation in the Baltic countries may reflect their poor enforcement of legislation.

As regards policy suggestions, it can be argued that loosening of employment protection laws could be discussed; apart from increasing economic efficiency it should also be socially more acceptable from now on, because after the introduction of the

unemployment insurance system in Estonia (in 2002) protection against the risk of unemployment has increased.

5 Conclusions

Our results show that job creation and destruction rates in Estonia are very high in international comparison, higher than in almost any other European country and comparable to the levels documented for the United States. We estimate the amount of job flows over and above the amount needed to accommodate net employment changes to be about 23% per year – higher than has been found in any other European country so far (except Lithuania). Average excess rate of labour allocation was 18% in the US, 9% in the UK and only 6% in Germany. It suggests that the Estonian economic development is a good example of the success story of economic shock therapy, as a result of which relatively fast restructuring was accompanied by high labour reallocation. The high flexibility in terms of job flows can largely be ascribed to the small firms sector; the estimates of job flows in previous studies are biased downwards. By comparison with studies of the western countries, a very high proportion of labour reallocation is attributable to shifts between industries reflecting rapid changes in the economic structure.

To some extent, this phenomenon is typical of a transition process, but not only that. From changes in other labour market characteristics it seems that the restructuring of the labour market was over by 2001, as the worker flows between labour market states (employment, unemployment, inactivity) dropped significantly, but at the same time the aggregate job flows did not diminish. In the authors' opinion, there are basically four reasons for this.

Firstly, the inter-sectoral mobility has been relatively high: the shares of different sectors in employment have changed considerably and much of the excess job reallocation is due to shifts between the sectors. We found that a rather high fraction of excess job reallocation (18% on average for 1996-2000) can be explained by sectoral shifts.

Secondly, small firms seem to play a key role in labour reallocation. Firms with less than 20 employees give work to a quarter of the labour force. The net rate of labour allocation is positive, which means they create more jobs than they close. Also the excess rate seems to be particularly high in firms with less than 10 employees (36%).

Thirdly, the occupational mobility of the workforce in Estonia is high, but showing a decreasing rate as the transition matures. This issue was not analysed in our paper, but Campos and Dabušinskas (2003) documented that between 35 and 50% of all Estonian wage earners changed occupation in 1989-1995; however, most of these changes took place at the beginning of the transition, so the impact of occupational changes on job mobility may have declined by now. As the reallocation process affects certain industries and enterprises more than others, the role of personal characteristics in the incidence of displacement is insignificant. However, many people have changed their occupation over the transition period. In our understanding, this indicates Estonian human capital's rather good quality. In this respect, a possible problem is the low financing of active labour market programmes in Estonia.

Finally, the Estonian institutional environment has been rather favourable to firm dynamics: starting a new firm has been fairly inexpensive. The message of the paper in terms of policy implications could be that the flexible enterprise environment should be maintained in Estonia. This suggestion is supported by the theoretical and empirical evidence of the positive impact of higher flexibility and dynamics on growth.

We argued that institutional framework plays a crucial role in influencing worker and job flows, and in a more general way, labour market flexibility. The Estonian labour market is relatively well regulated, for instance, the employment protection index is comparable with the EU average. The business environment, at the same time, is characterised as very liberal and free. Estonia holds very high position (6^{th}) in the Economic Freedom Index (Heritage Foundation) ranking. This can also explain the differences between the two types of labour market flows.

Another explanation behind the differences in the job and worker flows dynamics is provided by the concept of churning flows (the worker flows over and above those necessary to achieve a desirable employment change). The two components of churning flows are the workers quitting and being replaced, and/or the simultaneous firing and hiring by enterprises. In another paper (Masso et al. 2005) we will show empirically that the churning flows in Estonia are fairly low compared with estimates from either developed or transition economies, and that churning flows have been declining in the course of time. Several potential explanations are provided (improving average job match

quality, improving working conditions, etc.), which still need some formal testing in the future.

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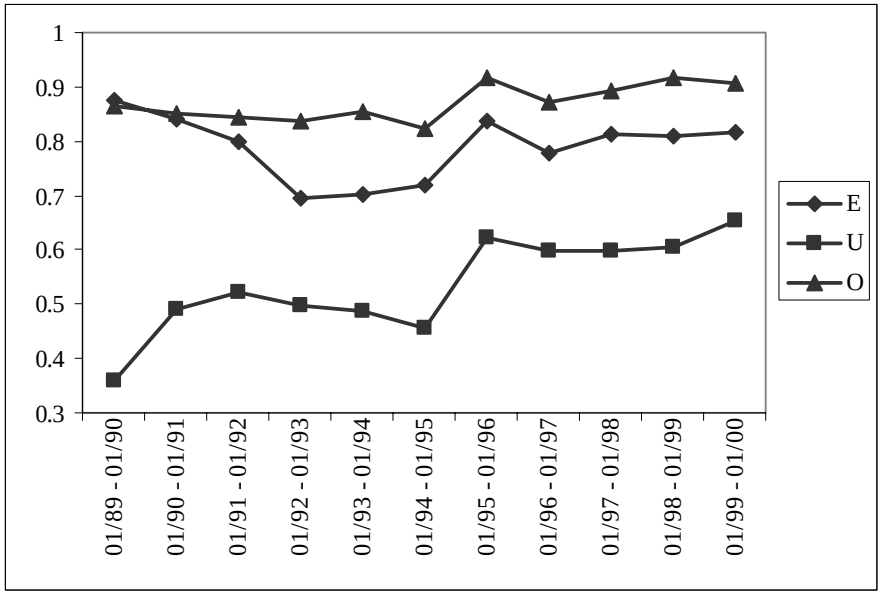

Figure A1. Worker flows dynamics: stable states .

Note. The letters E, U and O denote three labour market states, respectively employment, unemployment and inactivity.

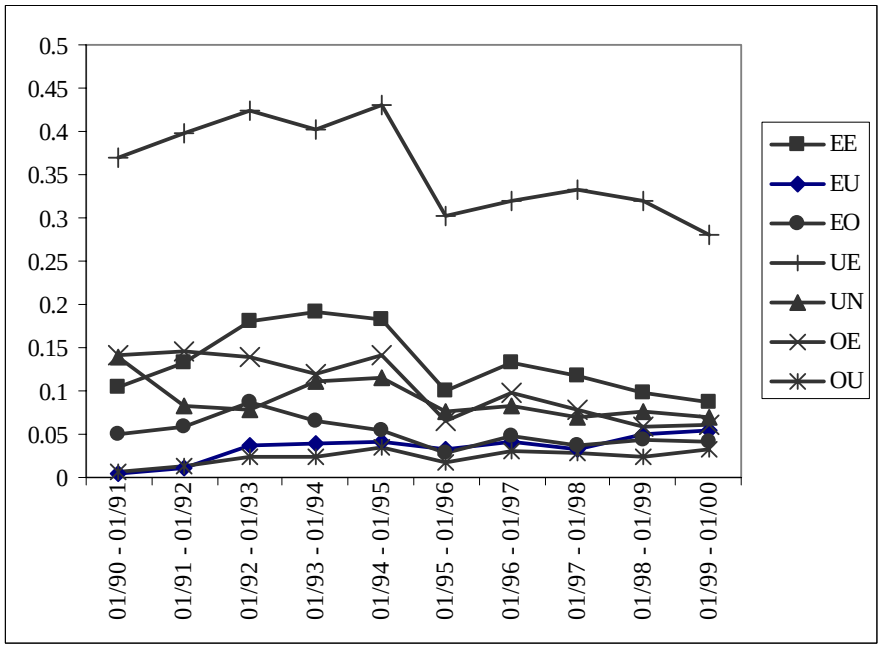

Figure A2. Worker flows dynamics: flows between labour market states.

Note. The letters E, U and O denote three labour market states, respectively employment, unemployment and inactivity. In the legend of the figure, the second letter denotes the worker's current labour market state and the first letter the labour market state one year before. Thus, EU denotes the flow from employment to unemployment.

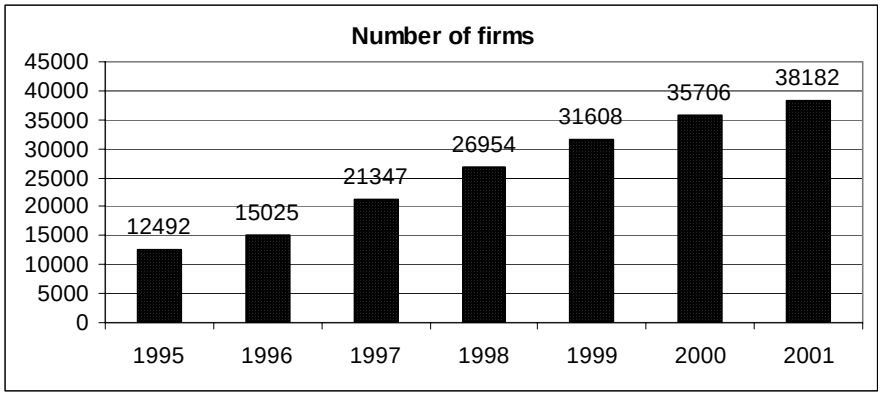

Figure A3. The evolution of the total number of firms in the Estonian Business Registry data
Source: Estonian Business Registry database, authors' calculations.

Table A1. Distribution of observations across employers' size classes (all years)

Size class	Number of employees	Frequency	Percentage	Cumulative percentage	Employ-ment share	Cumulative employment share
1	0	53,529	23.35	23.35	0.00	0.00
2	1-9	74,030	32.29	55.64	13.43	13.43
3	10-19	17,697	7.72	63.36	11.28	24.71
4	20-49	12,217	5.33	68.68	17.33	42.04
5	50-99	4,325	1.89	70.57	13.96	56.00
6	100-249	2,067	0.90	71.47	14.60	70.60
7	250-449	585	0.26	71.73	9.58	80.18
8	More than 500	316	0.14	71.86	19.82	100.00
9	Not available	64,506	28.14	100	0.00	100.00
	Total	229,272	100			

Source: Estonian Business Registry database, authors' calculations.

Table A2. Distribution of firms across industries

Industry	Frequency	Percent
Agriculture, hunting and forestry	2,586	4.98
Fishing	1	0
Mining and quarrying	130	0.25
Manufacturing	6,870	13.23
Electricity, gas and water supply	394	0.76
Construction	3,561	6.86
Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods	18,660	35.92
Hotels and restaurants	2,104	4.05
Transport, storage and communication	3,874	7.46
Financial intermediation	795	1.53
Real estate, renting and business activities	10,180	19.6
Public administration and defence; compulsory social security	4	0.01
Education	520	1
Health and social work	656	1.26
Other community, social and personal service activities	1,607	3.09
Private households with employed persons	1	0
Extra-territorial organisations and bodies	1	0
Total economy	51,944	100

Source: Estonian Business Registry database, authors' calculations.

Table A3. Distribution of observations across regions

Number	Region	The definition of region	Frequency	Percent
1	Northern Estonia	Tallinn and Harju county	114,663	50.0
2	Central Estonia	Järva, Lääne-Viru and Rapla counties	15,938	7.0
3	North-Eastern Estonia	Ida-Viru county	13,339	5.8
4	Western Estonia	Hiiu, Lääne, Pärnu and Saare counties	2,470	11.1
5	Southern Estonia	Jõgeva, Põlva, Tartu, Valga, Viljandi and Võru counties	59,854	26.1
6	Missing value		8	0.0
Total			229,272	100.0

Source: Estonian Business Registry database, authors' calculations.

Table A4. Distribution of observations by firm ownership groups and years (the number of firms and the relative frequency in a given year in %)

Ownership form	1995	1996	1997	1998	1999	2000	2001
State	198	145	107	82	53	52	49
	2.0%	1.0%	1.0%	0.0%	0.0%	0.0%	0.0%
Municipal firms	315	267	209	266	287	268	252
	3.0%	2.0%	1.0%	1.0%	1.0%	1.0%	1.0%
Domestic private firms	11 088	13 505	19 742	24 195	26 337	27 584	31 481
	89.0%	90.0%	92.0%	90.0%	85.0%	77.0%	82.0%
Foreign firms	835	1 030	1 079	1 907	1 940	2 347	2 575
	7.0%	7.0%	5.0%	7.0%	6.0%	7.0%	7.0%
Public institutions						2	1
						0.0%	0.0%
Other	41	30	20	1	3	1	1
	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Missing	15	48	189	503	2 448	5 452	3 823
	0.0%	0.0%	1.0%	2.0%	8.0%	15.0%	10.0%
Total	12 492	15 025	21 346	26 954	31 068	35 706	38 182

Source: Estonian Business Registry database, authors' calculations.

Table A5. The number of different kinds of transactions in the Business Registry data

Transaction	Description	Frequency	Percent	The average proportion of firms involved weighted by employment	The average proportion of firms involved
Predecessor	Change in firm id	24,418	97.53	0.695	0.493
Acquisition	2 or more firms merge, no new id	366	1.46	0.039	0.005
Merger	2 or more firms merge, old firms terminate and new firm is formed	191	0.76	0.022	0.002
Break up	A firm is divided in 2 or more pieces, old firm is terminated	17	0.07	0.001	0.000
Divestiture	2 or more units separate, old firm continues	39	0.16	0.010	0.001
Unofficial predecessor		5	0.02	0.000	0.000
No transaction		-	-	0.234	0.500
Total		25,036	100.00	100.00	100.00

Source: Estonian Business Registry database, authors' calculations.

Table A6. Firm size across industries and time

STAN	Year	Mean employment	Standard deviation of employment	Coefficient of variation	Share of industry employment in total employment
Manufacturing	1995	37.6	141.1	3.8	33%
	1996	42.0	139.9	3.3	33%
	1997	44.1	139.1	3.2	32%
	1998	40.0	121.7	3.0	31%
	1999	35.8	105.5	2.9	31%
	2000	34.5	107.9	3.1	32%
	2001	32.6	125.7	3.9	32%
Agriculture	1995	23.4	37.5	1.6	9%
	1996	30.5	74.7	2.5	10%
	1997	29.8	76.0	2.5	8%
	1998	26.0	72.9	2.8	7%
	1999	20.1	40.3	2.0	6%
	2000	16.8	36.8	2.2	5%
	2001	16.2	36.7	2.3	5%
Services	1995	13.3	66.9	5.0	44%
	1996	14.4	69.7	4.8	45%
	1997	15.1	94.2	6.3	43%
	1998	14.0	87.3	6.2	45%
	1999	12.9	77.4	6.0	47%
	2000	11.7	66.5	5.7	48%
	2001	10.8	59.4	5.5	49%
Total economy	1995	19.4	82.8	4.3	100%
	1996	21.0	84.7	4.0	100%
	1997	23.4	139.5	6.0	100%
	1998	21.1	130.9	6.2	100%
	1999	18.9	108.9	5.8	100%
	2000	16.9	89.8	5.3	100%
	2001	15.6	85.8	5.5	100%

Source: Estonian Business Registry database, authors' calculations.

Table A7. Average firm size in Estonia and in OECD countries

Industry: STAN code	Industry: description	Mean employment		Standard deviation of employment	
		Estonia	OECD average	Estonia	OECD average
1t5	Agriculture	23.3	5.5	53.6	67.26
10t4	Mining and quarrying	175.0	35.8	770.6	152.31
15t37	Total manufacturing	38.1	40.8	125.8	350.77
15a6	Food products	58.4	41.0	137.4	510.92
17t9	Textiles	49.4	33.5	140.9	160.06
20	Wood products	21.4	15.5	46.6	47.34
21a2	Pulp and paper	19.8	33.4	45.4	176.47
24	Chemicals	62.6	82.4	165.4	416.03
26	Other non-metallic mineral products	41.9	30.3	77.6	158.53
27t33	Basic metals and machinery	30.2	39.4	114.4	258.81
34a5	Transport equipment	80.9	228.4	208.7	1525.91
36a7	Furniture, recycling	44.1	20.3	144.4	105.25
40a1	Electricity, gas and water supply	51.0	97.1	275.4	1388.76
45	Construction	19.3	9.8	36.9	195.34
50t74	Business sector services	13.1	16.3	77.2	382.19
50t5	Wholesale and retail trade; hotels	10.6	14.5	25.8	280.92
60t4	Transport and communication	30.7	26.9	204.9	831.78
65t74	Financial intermediation	10.8	17.4	35.2	398.05
75t99	Public services	13.7	23.5	29.0	2184.7
TOT	Total economy	19.5	19.6	103.2	247.89

Source: Estonian Business Registry database, authors' calculations.