

# Gross Job and Workers Flows' Differences in Estonia

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This paper explores the links and analyses the differences in gross job flows and workers flows in Estonia over the period of 1995-2001. Job flows in Estonia have been rather high in international comparison and stable during the late transition period in Estonia, while workers flows have decreased considerably. Overall, the labour market in Estonia is relatively flexible. There are few effective constraints to employment adjustment, as witnessed by high rates of job creation and destruction. The high job destruction is associated with short average job tenure. Small firms hire the most workers (relative to their employment) and thus offer the best chances to find a new job. We find churning flows (the difference between worker and job flows) to be fairly low compared with estimates from other developed countries. We argue that there are several explanations behind the observed dynamics of churning: institutional background, improving firms' personnel policy, high workers mobility, etc.

**Keywords** : gross job flows, workers flows, churning flows, Estonia

**JEL classification**: J6, P2, L11

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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 relate closely to the concept of micro-level labour market flexibility (see Eamets et al., 2003a). High labour market flexibility is needed at the micro level so that jobs and workers could move between sectors and firms in order to ensure effective resource reallocation and productivity growth. 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 are entering the market, while many existing state-owned enterprises are forced to leave if they are unsuccessful in restructuring or downsizing.

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 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. (2000b) 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 could be difference between job flows and workers flows, called as “churning flows”. The latter could be arise from workers quitting and being replaced by other workers (workers churning employers) and/or simultaneous hiring and firing activities of employer (employers churning workers). Bartelsman, Haltiwanger, Scarpetta (2004) analysing of the process of creative destruction across 24 countries found large churning flows among firms: gross firm turnover involves 10-20 percent of all firms in industrial countries, and even more in transition and other emerging economies. Entering, but also exiting, firms tend to be small and thus firm flows affect only about 5-10 percent of total employment. This suggests that the entry of small firms is relatively easy, while larger-scale entry is more difficult, but survival among small

firms is also more difficult and many small newcomers fail before reaching the efficient scale of production.

Caballero and Hammour (1996) assert that when an efficient economy enters a recession, job destruction increases first, 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, while the labour market became more stable and flow rates declined as transition matured (Eamets, 2003).

The purpose of this empirical paper is to explore the empirical relationship between job and worker flows after the rapid economic reforms in Estonia in 1996-2000. Analysis shows that job flows in Estonia have been rather high and stable during the late transition period, while workers' flows have decreased considerably. We analyse churning flows (the difference between worker and job flows) and find them to be fairly low compared with estimates from other developed countries. We argue that there are several explanations behind the observed dynamics of churning: institutional background, firms' personnel policy, workers mobility, etc.

The rest of the paper is structured as follows. In Section 2 we discuss how the institutional background influences the job and workers flows and labour market flexibility. Section 3 describes the datasets used for analysis and provides a brief review of the definitions of job and worker flows as well as churning flow measures. The empirical results of the analysis of aggregate job and worker flows and churning flows are presented in Section 4. Section 5 explores the links between job and worker flows and presents possible explanations of their different development during the transition processes. The final section concludes.

## **2 Institutional background**

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 business environment matter for firm-level dynamics and productivity growth. According to the concept of labour market flexibility used by Eamets et al. (2003a), 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 regulation, too, by reducing employment turnover, may lead to lower productivity and discourage the entry of firms (mainly small and medium-sized 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, the administrative costs of firm establishment, etc.

In general, we 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 (see e.g. 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 and thereby reduce their 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 the 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, tax wedge; employment subsidies had negative effect on destruction and positive effect on creation.

Rutkowski (2003) argues that employment policies should first of all focus on creating favourable conditions for job creation rather than on preventing job destruction and protecting unviable jobs. Secondly, contrary to common perception, enterprise restructuring often results in employment gains, not losses, and thus should be encouraged rather than hampered. In other words, enterprise restructuring and associated job destruction are not detrimental to employment as long as business environment is conducive to job creation. Therefore high job creation, not low job destruction, is a key to employment growth. 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.

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 A1 (in Appendix) summarises some of the available data on how easy it is to establish a firm and change employment in Estonia<sup>2</sup>. In Estonia, starting a new business involves relatively small administrative burdens; the potential entrepreneur needs a relatively small number of permits and time to start a firm: creation of firms is rather common. In fact, according to some indicators, Estonia ranks at very high positions among the surveyed countries and the ease of starting a firm has significantly contributed to the overall high estimates of economic freedom<sup>3</sup>.

For rational forward looking agents the decision to create a job or establish a firm is affected aside to entry regulations also by the regulation 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, 2 times more than on average in old EU countries) and the recovery rate is lower (Doing Business... 2004; authors' calculations).

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<sup>2</sup> The business regulations in different countries and their economic importance are discussed in Doing Business... (2004).

<sup>3</sup> According National Heritage Foundation Index of Economic Freedom Estonia ranked at 6<sup>th</sup> position among word nations in 2004 (<http://www.heritage.org/research/features/index/countryFiles/English/2004Index.pdf>).

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 state regulations are not always followed in the private sector. In one of our earlier papers (see Eamets and Masso, 2003) we found ample evidence of violations of these regulations in 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 also important for employment protection legislation strictness what proportion of the workforce is actually covered by the regulations. In the Estonia, as well as in other 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.

In conclusion we can say that the Estonian institutional environment has been rather favourable for 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.

### **3 Data and definitions**

#### **3.1 Description of data**

Whereas several earlier papers have studied the differences between job and workers flows with matched employer-employee datasets that is no available for Estonia, nor do we know at the enterprise data the values of hiring and separations, thus we have to calculate the worker flow rates from the Estonian Labour Force Surveys (ELFS), and combine these numbers with the job flow figures calculated from the Estonian Business Registry database (see description of databases below). Though workers and jobs flows are calculated from two different sources, these should be still comparable, given that the Business Registry includes data on the population of enterprises and the appropriate surveying weights have been used in calculations of numbers from the ELFS data.

The Estonian Business Registry database comprises almost all firms that were registered in Estonia over the period 1995-2001. 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. Therefore, one major advantage of our study is the comprehensiveness of our data, as it includes 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.

According to the Business Registry database 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 Table A2 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).

For calculating workers flows, we use the Estonian Labour Force Surveys (ELFS) conducted by the Statistical Office of Estonia in 1995, 1997, 1998, 1999 and since 2000 quarterly. The target population of the surveys were all Estonian working-age (15-74 years old) residents. The surveys consisted of two major sections focusing on the retrospective and current situation of respondents respectively. The retrospective section aims to reconstruct major labour market flows in the preceding years of survey<sup>4</sup> and the reference week section of ELFSs gathers information about the respondents' activities in the labour market in the week preceding the interview.

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<sup>4</sup> The retrospective section of ELFS95 gathers the information of respondents' labour market behaviour over the years 1989-1994. Similar surveys were conducted in following years and in ELFS97 the retrospective part covered 1995-1996, full years; and in ELFS98, ELFS99 and ELFS00 the retrospective parts covered 1997, 1998 and 1999, full years respectively.

As different people were interviewed over these surveys we do not have panel data and caution must be exercised in trying to make comparisons between these surveys. Therefore, analysing the time series presented, one should consider the fact that this data originates from five sources and their comparability is reduced by some circumstances, which influenced the way the surveys were conducted. The circumstances to be considered are as follows:

- The sample size was different for different ELFSs<sup>5</sup>: Special care should be taken when comparing the results from ELFS97 with results of other data sets, as the sample size in 1997 was almost half of those in previous and later surveys.
- Starting from the year 2000, surveys are conducted all the year round and the results are for quarters. Since the 3<sup>rd</sup> quarter of 2000 retrospective data are not collected any more. In our calculations, we used the ELFS00 survey data from the two first quarters, which had retrospective parts. Therefore, the sample size is smaller again compared with the previous years.
- The sample frames for the surveys were different. For the ELFS95, the sample frame was the database of the 1989 population census, which in the view of the population changes in the meantime, was outdated and was thus one source of errors. Many persons had, for example, left Estonia or died. As the sample frame for ELFS97–00, the Population Register was used. Although it is more up-to-date than the database of the population census, it still contains some errors and lacks some of the necessary information (persons who have left Estonia, incomplete data about place of residence, etc.).
- The sample designs of the surveys are different. Stratified simple random sampling was used in the ELFS95, cluster sample in the ELFS97–00. With reference to sample, the results could be affected only by the errors of the sample frame described in previous paragraph, because regardless of the difference in sampling procedures, the inclusion probability for all persons was eventually the same.

Despite the fact that there are some comparability problems with the time series, these datasets are most useful as they reflect many different aspects of the labour market (more than 200 questions were asked from respondents during these surveys) over the years.

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<sup>5</sup> in ELFS95 the final sample size was 9608 persons (out of a total population of about 1.5 million), in ELFS97 – 5051, in ELFS98 – 13090, in ELFS99 – 12703 and in ELFS00 – 7400 persons were interviewed.



### 3.2 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 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

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

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

where  $N$  denotes employment at firm  $i$  in year  $t$ , the superscript ‘+’ (‘-’) refers to positive (negative) employment change. The sum of jobs created or destroyed is divided through the 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., 1997)<sup>6</sup>.

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*,  $EJR_t = JR_t - |NET_t|$ ).

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).

Analysing the workers flows, the risk of losing a job and the chance to find a new one are best depicted by the so called transition matrixes, which show estimated probabilities that

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<sup>6</sup> 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.

workers move across different labour force states, such as employment (E), unemployment (U) and inactivity/out-of-labour-force (O). The following analytical approach follows Marston (1976), Clark and Summers (1982), Bellmann et al. (1995) among others, in assuming that movements between states are governed by a Markov process. The main assumption underlying a Markov process is that the next state of the stochastic system depends only on the previous state. The application of the Markov process in labour market theory leads to the proposition that the probability of transition to another labour market state depends only on the state currently occupied (i.e. the number of individuals who are in one labour market state in time  $t-1$  and move to another state in time  $t$  or stay in the same state). The number of the individuals changing state, divided by the number of persons in the original state, can be interpreted as an estimate of transition probability between different states. The probability of transition from state  $x$  to state  $y$  is given by

$$P_{xy} = \frac{F_{xy}}{S_x} \quad x, y = E, U, O$$

where  $F_{xy}$  is the number of flows in state  $x$  at time  $t$  which moved to state  $y$  at time  $t+1$  and  $S_x$  is the total number of people at state  $x$  at time  $t$  (in the beginning of the selected year in our case).

Modelling the labour market by a Markov process seems appropriate especially for an economy in transition and in a state of structural shock. This can be explained by the fact that deep structural changes during the transition process depreciate previous working skills of the largest portion of the population. This leads to a situation where once unemployed; the probability of being employed again does not depend on the previous workplace. So, individual work histories are of less importance during transition than in a stable career based market economy.

Following Burgess et al. (1996), the churning flows are defined as follows. If  $E_{it}$  denotes employment at firm  $i$  at time  $t$ ,  $H_{it}$  is the number of hires and  $S_{it}$  the number of separations, then  $E_{it} = E_{it-1} + H_{it} - S_{it}$ . Job flows ( $JF_{it}$ ) is then change in employment,  $JF_{it} = E_{it} - E_{it-1} = H_{it} - S_{it}$ , and job reallocation ( $AJF$ ) is the absolute value of job flows,  $AJF = |JF|$ . Total worker flows are defined as the sum of hires and separations,  $WF_{it} = H_{it} + S_{it}$ . As the worker flows are often measured as the movements between three labour market states (employment (E), unemployment (U) and inactivity (O)), then total

hiring  $H = OE + UE + EE$  and total separations  $S = EO + EU + EE$ , where  $EE$  is job-to-job flow. The corresponding rates are calculated in respect to the employment in base year.

The worker flows can be written also as  $WF_{it} = AJF_{it} + CF_{it}$ , where the second term stands for churning flows, i.e. the worker flows over and above those necessary to achieve the desired employment change ( $CF_{it} = WF_{it} - AJF_{it}$ ). The two components of churning flows are the workers quitting and being replaced and/or the simultaneous firing and hiring by enterprises.

## 4 Patterns of gross job and workers flows in Estonia

### 4.1 Aggregate gross job flows and workers flows

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<sup>7</sup> 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) within narrowly defined industries there is vast heterogeneity in job creation and destruction, but inter-industry reallocation is still more important than in western economies.

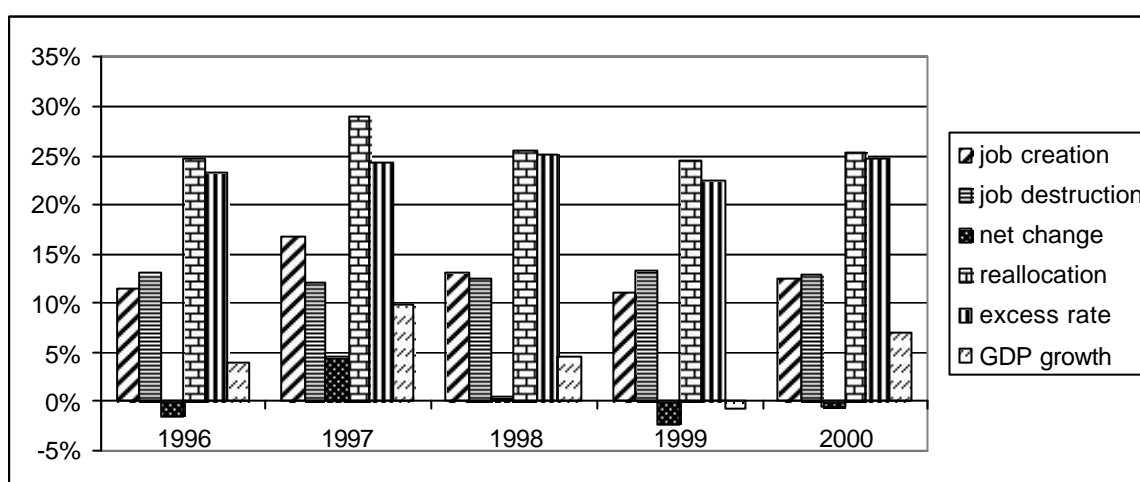
The empirical literature has shown that the destruction and creation of jobs are largely simultaneous processes and that is what we can also see in our data (see Figure 1)<sup>8</sup>. Our

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<sup>7</sup> Worker flows 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).

<sup>8</sup> More detailed analysis of job flows in Estonia is presented in Masso et al. (2004b) "Job Creation and Job Destruction in Estonia: Labour Reallocation and Structural Changes".

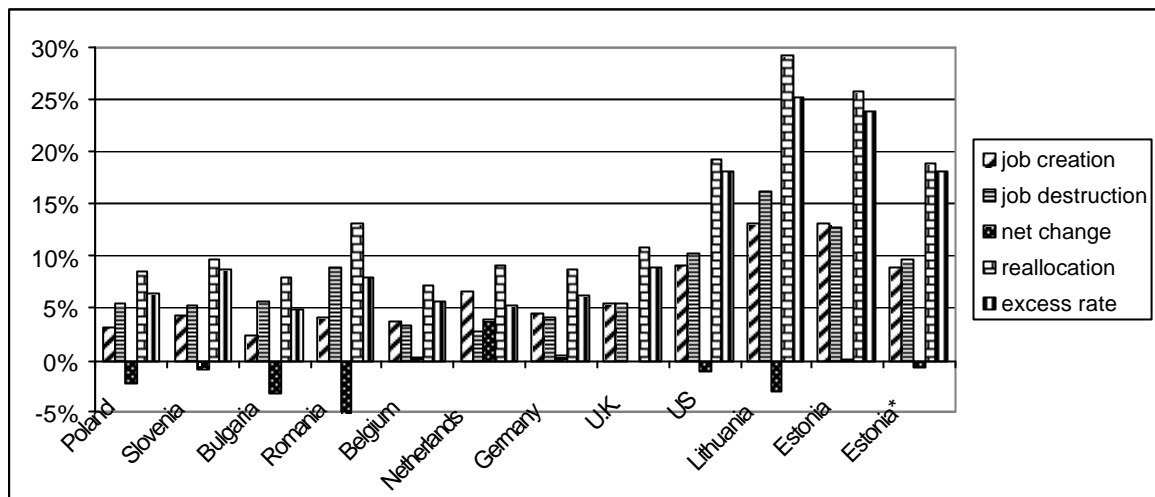
estimation of the gross job flows, 26%<sup>9</sup>, is rather high in international comparison, and similar to the level of the United States. The most important job flow indicator, the excess rate, is 24%, indicating about rather high labour market flexibility in Estonia compared to the CEE and Western European countries (see Figure 2). Average excess rate of labour allocation was 18% in the US, 9% in the UK and only 6% in Germany. The excess rate in Estonia is somewhat lower if we exclude small firms, but still almost equal to its US counterpart. Similarly high excess rate (25%) was found by Rutkowski (2003) for the other Baltic State, Lithuania (1996-2000), and in late transition for Russia (24%).



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

*Source: Estonian Business Registry database, authors' calculations*

<sup>9</sup> 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.



**Figure 2. 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 Lithuania 1996-2000. Estonia\* denotes the results from the Estonian Business Registry database using only firms having at least 100 employees.

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

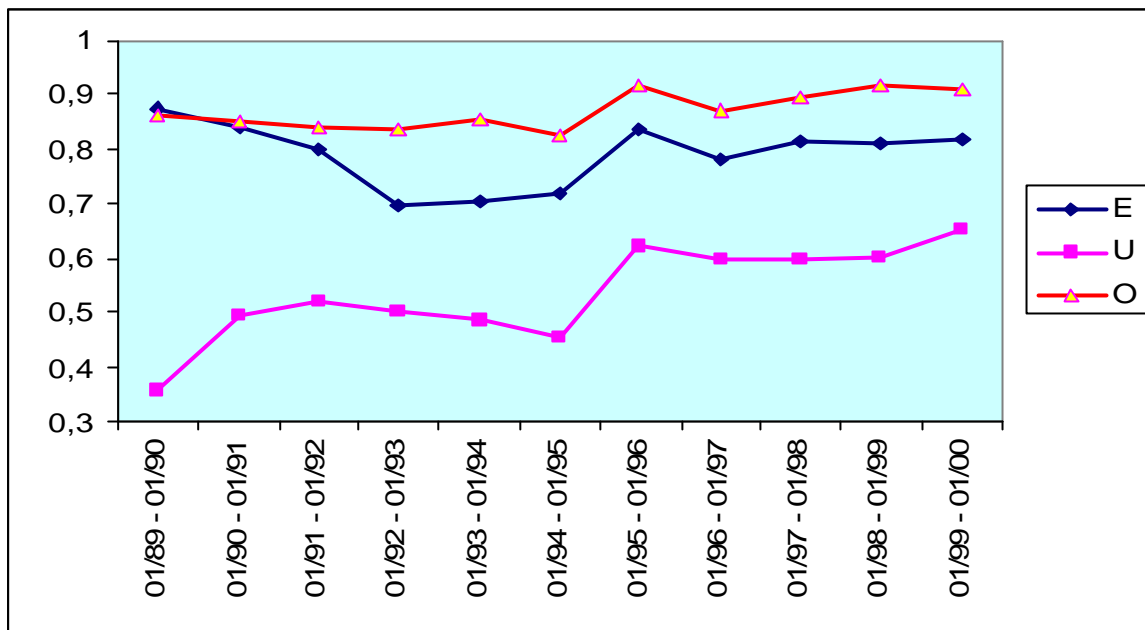
Analysing the overall job creation and destruction according to whether it is due to firm entry and exit on the one hand, or to expansions and contractions among continuing firms, on the other hand, we may note that the declining entry rate has been compensated to some extent by the increasing size of entrants. A peculiarity of Estonia (and possibly of other transition countries) is the much smaller size of entrants compared to exits (not observable generally in the OECD countries, except in Italy, see Contini et al. 1996); similarly also the contracting firms are larger than expanding firms (in data the difference was much smaller), reflecting the necessary downsizing among the firms established in Soviet time (see Table 1). The rate of change of employment in expanding (contracting) firms has decreased (been stable). The proportions of contracting and expanding firms are similar to those observed elsewhere (and expansions exceeding somewhat contractions).

**Table 1. The decomposition of job destruction and creation rates, 1996-2000**

Year	1996	1997	1998	1999	2000
Job creation from entry (%)	4	6	4	4	3
Entry rate (%)	20	20	17	15	10
Size of entrants	3.08	5.1	3.55	3.3	3.4
Job creation from exit (%)	6	3	4	3	4
Exit rate (%)	10	5	6	6	7
Size of exits	8.97	10.18	10.7	5.56	6.17
Job creation from growth (%)	7	10	8	7	8
Proportion of expanding firms (%)	21	21	21	19	19
Size of expanding firms	16.41	25.09	25.88	21.91	20.2
Job creation in expanding firms (%)	33	29	21	21	22
Job destruction from contraction (%)	7	8	8	10	8
Proportion of contracting firms (%)	17	23	18	20	14
Size of contracting firms	27.9	23.22	28.73	27.93	27.13
Job destruction in contracting firms (%)	22	25	21	23	21

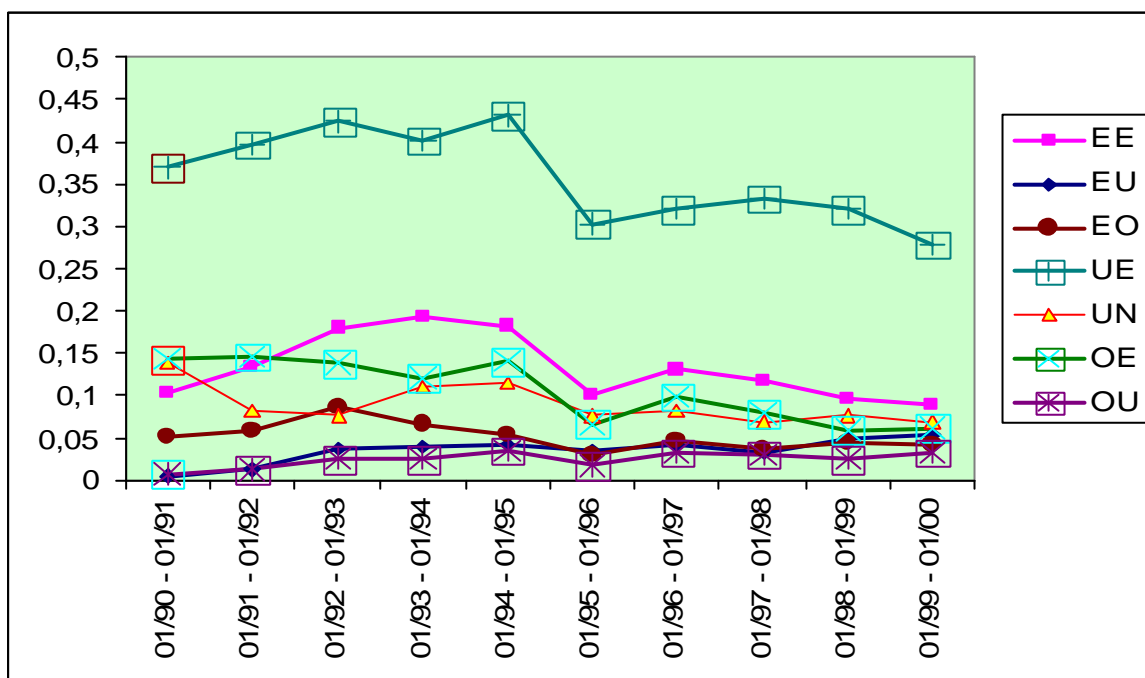
*Source: authors' calculations based on Estonian Business Registry data*

However, high job destruction does not necessarily imply a fall in employment, as high job creation does not necessarily mean employment growth. The changes in employment are determined by the joint impact of job creation and job destruction. Rutkowski (2003) argues that from the workers' perspective a labour market is efficient if it is easy to find a job paying a decent wage. This involves high probability of avoiding unemployment, short duration of job search, and wages that adequately reflect productivity differentials and human capital heterogeneity. As with other countries in transition, the pools of employed and out of labour force have been fairly stagnant at the beginning of transition in Estonia (see Figure 3 and 4). However, the movements between labour market states were increasing (the probability of staying in employment or inactivity was declining) during the transition. The probability of staying employed in 1990 was 0.88 and dropped to 0.72 in 1994 and then increased to 0.82 again in 1999. The same is true about staying out of the labour force. The probability of being out of labour force dropped from 0.86 in 1990 to 0.82 in 1994 and increased thereafter again to 0.91 in 1999.



**Figure 3. Worker flows dynamics: stable states**

Source: authors' calculations based on ELFS data



**Figure 4. Worker flows dynamics: flows between labour market states**

Source: authors' calculations based on ELFS data

At the same time the risk of losing a job has been relatively high. More than half of unemployment spells tend to be of long duration in Estonia. Poorly educated and low-

skilled workers find it particularly difficult to find employment. Outflow rates from unemployment to employment, which were relatively high in 1994 (0.45), dropped also to 0.28 in 1999. This supports the idea that at the beginning of the transition, the labour market was relatively flexible with high flow rates while later labour mobility between labour states decelerated. The low unemployment to employment flows in Estonia are consistent with the “stagnant pool” view of unemployment in East European transition economics and in Europe more generally. In most cases we see declining flow rates indicating that workers mobility between labour market states have declined drastically in the course of transition.

Over the three pairs of years studied, there was a decline in the rate at which workers shift across employers, from 0.12 in 1997-98 to 0.10 in 1998-99 and 0.09 in 1999-2000, although none of these rates are high by international standards. At the beginning of transition 1992-1994 job-to-job transitions were much higher. The decline in job-changing should therefore not be interpreted as reflecting greater employment stability, instead suggesting that workers wishing to change jobs have had a harder time doing so recently. The reduced rate of job-changing may also reflect the maturation of the sectoral composition of the Estonian economy.

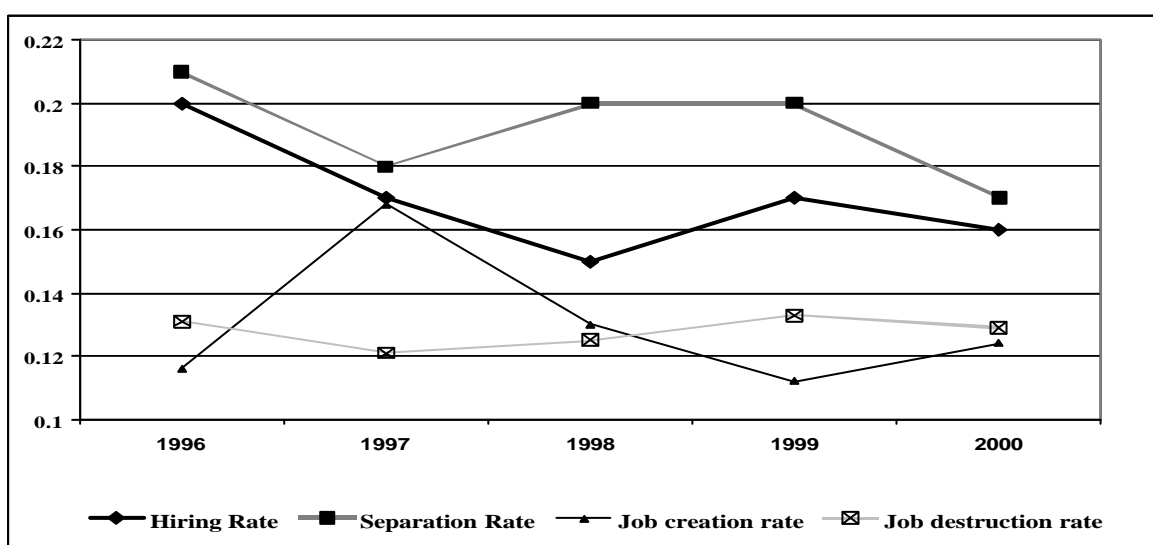
#### **4.2 Churning flows: explanation to differences in job and workers reallocation**

The previous discussion leaves unanswered the paradox, why have the job flows been rather high and stable during the late transition period in Estonia, while worker flows have decreased considerably. Here, we need to recall that although sometimes in theoretical models (e.g. the matching model of Mortensen and Pissarides, 1994) these two are assumed to be equal, in fact by no reason these should be. The available literature has provided a lot of facts about the component of workers flows due to the job creation and destruction, but relatively few papers have analyzed the worker flows that are over and above the job flows (the latter include Burgess et al., 1996, Burgess et al., 2000a). Burgess et al. (2000b) argue that the distinction between job flows and churning flows isolates the two fundamental processes underlying job and worker reallocation. These are (1) the re-evaluation by the employer of the number of jobs it wants and (2) the re-evaluation by both parties of the match of a particular job and particular worker. The available (scarce) empirical evidence points that churning flows are rather important, e.g. Burgess et al. (1996) found using US data that in manufacturing 38% of worker flows were not associated with any net change of firm size; in services the figure ranged from 46 to 64%.



Tattara and Valentini (2004) found from Italian data that churning flows accounted for 65% of all worker flows.

The resulting hiring, separation, creation and destruction rates on annual basis are depicted in Figure 5. The most striking features of Figure 5 are the declining overall workers flows and highly fluctuating job flows. These results differs remarkably of that Haltiwanger and Vodopivec (2002) found about in Estonia in the early transition period (1989-1994), when the overall workers flows were rising rapidly and the dominant role of job flows was accounting for the increasing worker flows, and the especially rapid rise of job destruction and worker separations n the 1992-94 period. These tendencies at the beginning of 1990s were due to opening up markets, relaxing market regulations and decentralising wage determination, which lead to increases in labour market flows and especially in rapid rise in worker separations due to job destruction. Dramatic changes, which took place in the period 1991-92, created a completely new environment for business activity and are viewed as the start of serious reforms and restructuring of the Estonian economy. This period in the development of country's economy was marked with relatively steady economic growth until the middle of 1998. Then a banking crisis came in Estonia, followed by the 1998 Russian crisis, which led to stagnant economic growth in 1998 and a recession in 1999. One by-product of the recession was the second wave of restructuring in the Estonian economy. Since the end on 1999, growth was restored.



**Figure 5. Annual rates of hiring, separation, job creation and job destruction**

*Source: authors' calculations based on ELFS and Estonian Business Registry data*

One useful way to summarise the worker and job flows in to consider the rates of worker and job reallocation. Figure 6 depicts the annual rates of worker and job reallocation over this period. We can see that the workers reallocation has declined over the observed period, while the job reallocation has been quite stable. In 1996, job reallocation accounted for about 56% of worker reallocation, which is similar to that observed in many western economies (see Davis and Haltiwanger, 1999). By 2000 more than two thirds of workers reallocation was accounted for by job reallocation.

Table 2 depicts the dynamics of jobs and worker flows in Estonia. We may say that the churning flows as a percentage of worker flows have decreased from 43% in 1996 to 25% in 2000. The latter percentages are fairly low compared with estimates either from developed economies (Burgess et al., 1996) or CEE transition economies. Cazes and Nesporova (2001) interpreted that as the sign of successful reallocation in Estonia compared to excessive workers mobility among low productivity and poorly remunerated old jobs for example in Bulgaria and Romania.



**Figure 6. Annual rates of worker and job reallocation**

*Source: authors' calculations based on ELFS and Estonian Business Registry data*

**Table 2 Jobs flows, workers flows and churning flows in Estonia, 1995-2002**

Year	WFR	Hiring rate	Separation rate	Job reallocation, AJFR	CFR/WFR	Quit rate	Quit rate, non-employed
1996	41%	20%	21%	23%	43%	14.4%	6.0%
1997	35%	17%	18%	27%	23%	12.9%	4.7%
1998	35%	15%	20%	24%	30%	13.2%	6.0%
1999	38%	17%	20%	24%	36%	11.6%	5.9%
2000	32%	16%	17%	24%	25%		5.7%
2001	34%	17%	17%				5.3%
2002	32%	16%	16%				4.9%

*Source: Worker flows – ELFS97-03, authors' calculations; Job reallocation – Estonian Business Registry database, authors' calculations.*

Note. The survey weights have been exploited in calculations using ELFS data. The quit rate could be calculated only till 1999, because since 2003d quarter the reason for the termination of employment relationship was given only for those non-employed during the time of survey, not for each termination of the employment relationship. Therefore, we have also calculated a ratio of currently non-unemployed quitting from the last place of employment to employment (the last column).

We now turn our attention to examining the differences in the flows by firm size and economic sector (see Table A3-A5). We can see that the hiring rate is higher in micro enterprises and the separation rate exceeds the hiring rate in enterprises with more than 20 employees. In tertiary sector the hiring rate is higher than the separation rate, while in agriculture and manufacturing the separation rates are still higher. Churning flows as a percentage of workers flows vary by different firm sizes, economic sector and years.

## **5 Explanations to discrepancy between job and worker flows**

### **5.1 Firms' personnel policy and job matching**

We argue that there are several explanations (that however call for formal testing) behind the observed dynamics of churning that are related either to decreasing churning of workers by firms (replacement of workers) or decreasing churning of firms by workers (quits). First of all, over the observed time period better match has been achieved between workers and jobs. Employers churning workers in order to improve either the quality of their workforce or to reconfigure their skill mix. In the following we show that the matching has improved over time and this might be the result of better personnel policy of firms. It is especially true about white-collar workers, because in the earlier period of transition firms had much less knowledge about personnel policy and main method was

learning-by-doing then today professional firms are hired to improve firms personnel policy. The managers' differing ability to select well-matched applicants was used as an explanation for the variation of churning flows also by Burgess et al. (2000b). Data about job matching about occupation and education are presented in Table A6. The share of those who answered that their job corresponds to their educational level has increased from 85.5% in 1996 to 88.7% in 2000 (up to 93.2% in 2003) among white-collar workers and from 79.6% to 81.3% over the observed years (up to 85.7% in 2003) among employees with higher levels of education (ISCED 1997 categories 8-10); the changes are marginal among blue-collar workers and workers with lower levels of education (ISCED 1997 categories 1-2).

We also ran the multinomial regressions to study the effect of job mismatch on the flows from employment (the reference level being the stay in the present job, other options job-to-job flow, flow to unemployment and flow to inactivity)<sup>10</sup>. The mismatch variable had (as expected) a positive impact on the probability to move from one job to the other and movement to unemployment, but negatively the movement to inactivity. We could run the regressions only for 2002 and 2003, for earlier years the job-education match was known only for the end (not for the beginning) of sample period.

Given the sorting of workers, we could also expect, that the average job match quality (productivity) increases with the time passed after entry into working relationship with the current employer. Anyhow we failed to see such a relationship (the results are available upon request). Another estimation strategy would be to run a wage equation (controlling for relevant individual characteristics) for new hires, to see, whether the dependence of wage on job tenure has changed; we however remain that for future work.

Another measure of the job match quality used in the literature is the length of job tenure at present job (Jovanovic, 1979). The argument is that due to the asymmetric information between employers and employees, the quality of job match becomes apparent only in the course of time; since bad matches are dissolved and good matches continue the job tenure can be thus used as a measure of match quality. Rutkowski (2003) argues that job tenure is also a popular measure of job stability. If workers tend to hold jobs for a long time this implies that the jobs are secure and labour turnover is limited. However, this usually comes

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<sup>10</sup> The control variables in the regressions were age, age squared, nation, sex, marital status, education level dummies, dummy for white-collared workers, 6 industry dummies, 4 dummies for firm size groups. Detailed results are available upon request.

at the cost of less hiring, which means less chances to find work for those who are jobless. In contrast, short average job tenure points to a flexible labour market, where jobs are less secure but at the same time there is more hiring and therefore it is easier to find a new job.

One would have expected that economic transition almost by definition is associated with widespread movements of labour across firms and industries, and thus with an increased job instability and thereby average employer tenure is shorter than in mature market economies. In our data (see Table A7) an inverse U-shaped pattern is observable; the tenure decreased 7.49 years in 1996 to 6.89 years in 1999, but thereafter started to increase again, but which are shorter than job tenure in mature market economies. In the early transition tenure decreased due to increasing labour market flows, but later has started to increase again due to the cooling-off, economic stabilization and the end of structural changes. The increasing of job tenure with firm size is consistent with the higher gross job flows rates among smaller firms. In the light of interpreting the lower tenure in small firms with weaker enforcement of employment protection (an interpretation due to Cazes and Nesporova, 2001), the increasing tenure among small firms may be due to improving law enforcement. The break-down by workers age shows the increasing tenure among young and middle-aged employees; one may ponder whether the modest increase of tenure among young employees could be associated with decreasing job shopping (experimentation with different jobs in the beginning of working life) among them.

Burgess et al. (2000a) also noted that excess churning could be in-optimal, as churning rates are associated with the lower probabilities of young firm survival (inability make good job match may exploit resources; or workers may quit from dying firms and are replaced). Particularly, we could test this explanation by looking at what proportion of new hires are dissolved during the probation period (or during some time after hiring). The caveat of that approach is that in Estonia probation period is actually used often by entrepreneurs to increase labour flexibility, rather than sort out appropriate workers. To account for that, we should analyze separately e.g. blue-collar and white-collar workers. According to the ELFS data during 1996-2003 the probability for the closure of new employment relationship with first six month declined among blue-collar workers from 11.6 % to 4.7 %, while for the white-collar workers the numbers are 6.8 % and 3.9 % (see also Figure A1). The numbers are consistent with the declining churning of workers.

## 5.2 Workers mobility, job satisfaction and on-the-job training

Next explanation would be the decreasing rate of restructuring progresses and technological changes. The reported job flows rates ( $\Delta N_{it}$ ) under-report the true ones. For instance, when a firm reconfigures its skill mix with keeping the total number of jobs the same, replacing jobs of one type with the other type, the actual job flows is above the net employment change. This unreported job flows is part of the churning flows. We may realistically assume that in the early transition such flows were more important than now, when the major restructuring processes are over.

In accordance to the end of transition process and fast restructuring of Estonian economy, we can see the ageing of firms. Although the average age of Estonian firms is rather low, because whole market economy is young, it is obvious from previous studies (Masso et al., 2004a) that firms' age is increasing (the rates of firm entry and exit are declining). From earlier studies we also know that with increase of firms age workers flows are declining (see Burgess et al., 2000a), the intuition being that as surviving firms get sorted out after entry, they identify their better workers or particular skill mix they require.

According to definitions declining rates of quits could explain differences between relatively stable job flows and declining worker flows over time, as well. Quits could decline because working conditions have improved, labour market became more rigid (i.e. smaller probability to find a new job after voluntary quits) or due to less job-shopping among young employees (for the latter, see e.g. Johnson, 1978). If we look empirical findings from ELFS data, we can see that the share of quits in the case of unemployed people has been relatively stable. During 1994-2000 the share of those who quitted from their previous job and then became unemployed has been between 17-29% from total unemployment (Philips, 2001). As far as job-to-job flows have declined we can expect that the total number of quits has declined as well; indeed during 1996-1999 the ratio of quits to employment declined from 14.4 to 11.6 % (see Table 2). Concerning the improving working conditions being an explanation to the declining quits, by the Working Life Barometer showed for 2002 compared to 1998 marginal improvement in job satisfaction (81 to 83 %), as well as decreasing work intensity, mental and physical stress (Antila and Ylöstalo, 2002). NORBALT surveys in 1994 and 1999 also record the increasing satisfaction with working hours (from 65 % to 80 %), physical and mental stress and satisfaction with salary.

Decreasing churning of workers by the firms could be related to the increasing on-the-job training. Generally in CEE countries the within-firm training is on lower levels than in EU15, the percentage of employees who had not undergone any training over the preceding 12 month was respectively 69% and 74%; in Estonia the respective figure is 66% (European Foundation... 2001). It could be regarded somewhat normal in the turbulent early transition period. As transition matures and labour market tightens, firms may choose to educate the necessary workforce within the firms instead of trying to find them on the external labour market. In the Working Life Barometer survey in 1999 the number of workers claiming the training possibilities have increased was 21% (and 15% were claiming a decrease) (Antila and Ylöstalo, 2002). On the other hand the ELFS data shows the percentage of workers having participated in training courses over the past four weeks are not increasing over the period of 1996-2003.

Finally, part of the job-to-job movements could be in fact the occupational mobility within the same enterprises. In the ELFS, the respondents are to report the changing occupation within the same enterprise as two different jobs. Considering, that the occupational mobility has decreased in Estonia over the time (Campos and Dabušinskas 2003)<sup>11</sup>, that could explain part of decreasing churning.

The different explanations carry rather different consequences. While the churning is decreasing due to the ending of transition is normal, but the decreasing labour flexibility could result in undesirable economic consequences (less efficient allocation of human resources). It is also the case that labour market has become a more rigid compared with the middle of 1990s in Estonia, employment protection laws are better implemented, workers knowledge about laws are increased, trade unions have become active. So, the rigid labour market means that unsuccessful matches are not dissolved anymore.

## 6 Conclusions

Our results show that job creation and destruction rates in Estonia are very high in international comparison, higher than in 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

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<sup>11</sup> 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.

year – higher than has been found in any other European country so far. It suggests that the Estonian economic development is a good example of the success story of economic shock therapy. As a result, relatively fast restructuring was accompanied by high labour reallocation. The high flexibility in terms of job flows can be largely ascribed to the small firms sector.

To some extent, this phenomenon is typical of a transition process, but not only. Although by the dynamics of the other labour market characteristics it seems that the restructuring of the labour market was over by 2001: the worker flows between labour market states dropped significantly, but at the same time the aggregate job flows did not diminished. We argued that there are several explanations behind the differences in job and workers flows dynamics. First of all, one explanation is provided by the concept of churning flows (the worker flows over and above those necessary to achieve the desired employment change). The two components of churning flows are the workers quitting and being replaced and/or the simultaneous firing and hiring by enterprises. We show empirically that churning flows have been declined in the course of time and provide several potential explanations, which need still some formal testing in the future.

Secondly, small firms seem to play a key role in labour reallocation. Small firms with less than 20 employees employ one fourth of the labour force. The net rate of labour allocation is positive, which means they create more jobs than 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 the decreasing rate as the transition matures. 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 rather good quality of human capital in Estonia. In this respect, a possible problem is the rather low financing of active labour market programmes in Estonia.

Finally, one can argue that institutional framework plays crucial role in influencing workers and jobs flows and in more general way in labour market flexibility in whole. Estonian labour market is relatively well regulated, for instance the employment protection index is comparable with EU average. Business environment is at the same time is



characterised as very liberal and free and this can also explain differences at two types of labour market flows.

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## APPENDIXES

**Table A1. Administrative regulations affecting firms' entry and exit in Estonia and other countries**

	Entry into local markets <sup>a</sup>		Administrative burden for a start-Up <sup>b</sup>		Permits to start a firm		Days to start a firm		Employment protection regulations <sup>c</sup>		Bankruptcy regulation: recovery rate (cents on the dollar) <sup>d</sup>	
	Value	Rank <sup>e</sup>	Value	Rank <sup>e</sup>	Value	Rank <sup>e</sup>	Value	Rank <sup>e</sup>	Value	Rank <sup>f</sup>	Value	Rank <sup>g</sup>
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: <sup>a</sup> - how often the entry of new competitors occurs in the local market, 1 to 7; <sup>b</sup> - from 1 (starting a new business is extremely difficult) to 7 (starting a new business is easy); <sup>c</sup> - Employment Protection Index (EPI) varies from 0 (unrestrictive) to 6 (restrictive); <sup>d</sup> - how many cents on the dollar claimants (creditors, tax authorities, and employees) recover from an insolvent firm; <sup>e</sup> - rank among 75 countries; <sup>f</sup> - rank among 49 countries; <sup>g</sup> - Rank among 34 countries; <sup>h</sup> - rank among 145 countries;

**Table A2. Distribution of observations across employers' size classes (all years)**

Size class	Number of employees	Frequency	Percentage	Cumulative percentage	Employment 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 A3. Churning flows by firm size and sector**

	WFR	Hiring rate	Separation rate	Job reallocation, AJFR	CFR/WFR	Quit rate	Quit rate, non-employed
<b>Firm size class</b>							
1-9	39.8%	20.8%	19.0%	49%	-23%	11.62%	4.39%
10-19	36.7%	19.0%	17.7%	30%	18%	11.06%	4.44%
20-49	33.3%	16.2%	17.2%	25%	25%	10.26%	4.64%
50-99	31.3%	15.5%	15.9%	22%	30%	10.30%	4.21%
100-250	32.4%	14.8%	17.6%	20%	38%	10.71%	5.16%
More than 500	25.9%	11.7%	14.2%	18%	31%	8.66%	3.86%
<b>Sector</b>							
Primary sector	28.5%	13.9%	14.6%	22.7%	20%	7.3%	3.9%
Secondary sector	36.9%	17.7%	19.1%	19.5%	47%	11.0%	5.1%
Tertiary sector	34.2%	17.4%	16.8%	28.5%	17%	10.6%	4.4%

Source: Worker flows – ELFS97-03, authors' calculations; Job reallocation – Estonian Business Registry database, authors' calculations.

**Table A4. Churning flows by economic sector and year**

Year	Sector	WFR	Hiring rate	Separation rate	Job reallocation, AJFR	CFR/WFR	Quit rate	Quit rate, non-employed
1996	Primary sector	24.0%	11.1%	12.9%	19.1%	20%	7%	4%
1997	Primary sector	29.0%	13.9%	15.1%	22.1%	24%	10%	3%
1998	Primary sector	28.5%	12.9%	15.6%	25.1%	12%	10%	5%
1999	Primary sector	38.1%	16.2%	22.0%	24.7%	35%	9%	7%
2000	Primary sector	22.7%	15.4%	7.4%	22.6%	1%	0%	0%
1996	Secondary sector	42.9%	20.6%	22.3%	16.6%	61%	14%	7%
1997	Secondary sector	39.3%	18.6%	20.7%	19.0%	52%	15%	5%
1998	Secondary sector	38.9%	15.5%	23.3%	21.1%	46%	14%	7%
1999	Secondary sector	38.3%	17.1%	21.3%	21.2%	45%	12%	7%
2000	Secondary sector	24.9%	16.8%	8.1%	19.6%	21%	0%	0%
1996	Tertiary sector	43.3%	22.1%	21.2%	28.5%	34%	16%	6%
1997	Tertiary sector	34.2%	16.9%	17.3%	32.8%	4%	12%	5%
1998	Tertiary sector	33.3%	15.3%	18.0%	27.4%	18%	13%	6%
1999	Tertiary sector	37.2%	17.5%	19.7%	26.4%	29%	12%	5%
2000	Tertiary sector	22.9%	14.9%	8.0%	27.3%	-19%	0%	0%

Source: Worker flows – ELFS97-03, authors' calculations; Job reallocation – Estonian Business Registry database, authors' calculations.

**Table A5. Churning flows by firm size and year**

Year	No of employees	WFR	Hiring rate	Separation rate	Job reallocation, AJFR	CFR/WFR	Quit rate	Quit rate, non-employed
1996	1-9	47.7%	24.9%	22.9%	51.6%	-8%	18%	7%
1997	1-9	44.3%	23.5%	20.8%	46.2%	-4%	14%	3%
1998	1-9	39.6%	18.9%	20.6%	43.6%	-10%	15%	6%
1999	1-9	39.8%	18.3%	21.5%	40.7%	-2%	12%	6%
2000	1-9	27.8%	18.4%	9.4%	41.6%	-50%	0%	0%
1996	10-19	46.2%	24.7%	21.5%	30.2%	35%	15%	5%
1997	10-19	42.6%	20.2%	22.4%	29.0%	32%	16%	6%
1998	10-19	34.6%	15.5%	19.0%	28.5%	18%	12%	6%
1999	10-19	32.3%	16.1%	16.1%	27.8%	14%	12%	5%
2000	10-19	27.6%	18.2%	9.5%	27.3%	1%	0%	0%
1996	20-49	40.4%	20.0%	20.4%	24.8%	39%	14%	6%
1997	20-49	33.6%	16.4%	17.2%	24.8%	26%	11%	4%
1998	20-49	38.3%	16.6%	21.7%	23.5%	39%	15%	6%
1999	20-49	33.7%	14.6%	19.1%	24.4%	28%	12%	6%
2000	20-49	20.6%	13.1%	7.5%	22.6%	-10%	0%	0%
1996	50-99	42.7%	21.8%	20.9%	22.4%	48%	16%	7%
1997	50-99	33.7%	15.9%	17.7%	19.9%	41%	14%	4%
1998	50-99	27.0%	12.1%	14.8%	23.2%	14%	10%	5%
1999	50-99	32.6%	13.7%	18.9%	19.9%	39%	12%	6%
2000	50-99	20.6%	13.7%	6.9%	20.2%	2%	0%	0%
1996	100-250	37.6%	17.6%	20.0%	13.6%	64%	13%	6%
1997	100-250	30.6%	14.2%	16.4%	21.0%	31%	12%	6%
1998	100-250	42.5%	16.0%	26.5%	17.5%	59%	17%	10%
1999	100-250	29.3%	11.5%	17.8%	21.9%	25%	12%	5%
2000	100-250	22.2%	14.9%	7.3%	19.5%	12%	0%	0%
1996	More than 500	34.6%	16.1%	18.5%	11.3%	67%	12%	5%
1997	More than 500	26.8%	12.0%	14.8%	25.8%	4%	11%	5%
1998	More than 500	25.6%	9.6%	16.0%	18.3%	29%	9%	5%
1999	More than 500	29.5%	12.1%	17.4%	12.8%	57%	12%	4%
2000	More than 500	13.2%	8.9%	4.3%	16.9%	-28%	0%	0%

Source: Worker flows – ELFS97-03, authors' calculations; Job reallocation – Estonian Business Registry database, authors' calculations.



**Table A6 Job matching by occupation and education**

<b>Job matching by occupation</b>									
	<b>Occupation</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>
Job corresponds to education level	Blue collar	78,2%	78,1%	79,1%	80,4%	78,2%	78,8%	79,7%	79,6%
	White collar	85,5%	85,6%	84,7%	89,0%	88,7%	91,5%	92,4%	93,2%
Job requires a more advanced level of education	Blue collar	3,0%	3,1%	19,5%	2,0%	2,7%	1,8%	1,7%	1,7%
	White collar	5,2%	5,1%	6,5%	7,0%	6,0%	4,1%	3,7%	3,3%
The respondent's level of education is higher	Blue collar	18,8%	18,8%	18,9%	17,6%	19,1%	19,5%	18,7%	18,6%
	White collar	9,3%	9,2%	8,7%	4,0%	5,3%	4,3%	3,9%	3,4%
<b>Job matching by education</b>									
	<b>Education level</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>
Job corresponds to education level	Education levels 1-2	90,1%	89,9%	93,1%	91,0%	88,7%	88,3%	89,4%	90,0%
	Education levels 3-7	80,8%	80,9%	81,5%	83,2%	82,7%	83,7%	84,8%	84,7%
	Education levels 8-10	79,6%	79,8%	77,0%	83,1%	81,3%	84,3%	85,3%	85,7%
Job requires a more advanced level of education	Education levels 1-2	5,2%	5,4%	3,9%	4,8%	4,3%	3,9%	3,7%	2,3%
	Education levels 3-7	3,6%	3,6%	4,8%	5,4%	4,8%	3,3%	3,4%	3,2%
	Education levels 8-10	1,1%	1,1%	2,5%	2,0%	3,0%	1,6%	0,8%	1,0%
The respondent's level of education is higher	Education levels 1-2	4,7%	4,7%	3,0%	4,2%	7,0%	7,9%	6,9%	7,7%
	Education levels 3-7	15,6%	15,6%	13,7%	11,3%	12,5%	13,0%	11,9%	12,1%
	Education levels 8-10	19,4%	19,2%	20,5%	15,0%	15,7%	14,2%	13,9%	13,3%

Source: authors' calculations based on ELFS data.

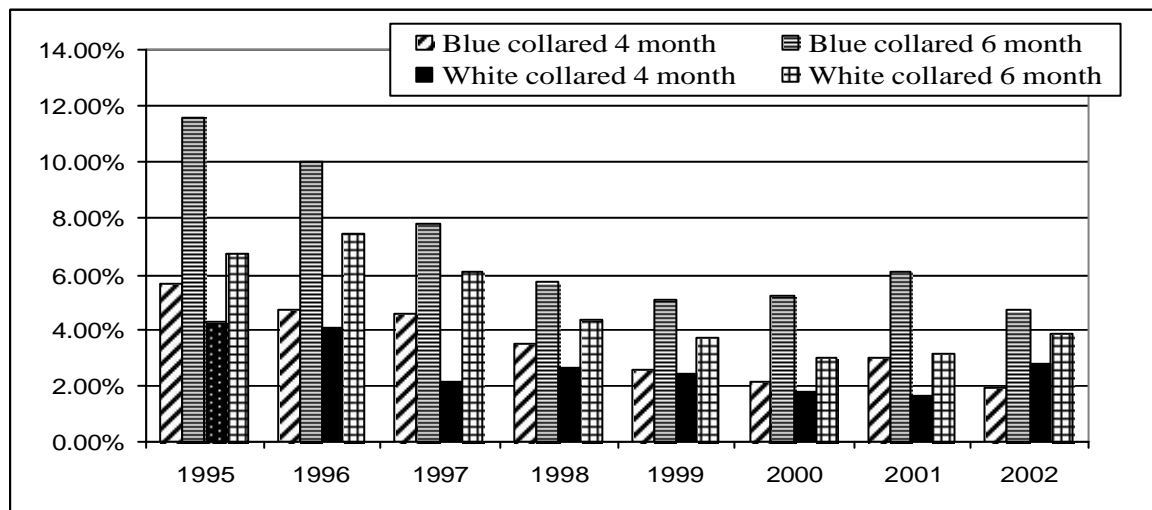
Note. The survey weights have been used in the calculations.

**Table A7. Average job tenure by job matching and enterprise size**

Year	1996	1997	1998	1999	2000	2001	2002	2003
<b>Total average</b>	7.49	7.24	6.92	6.89	7.31	7.32	7.47	7.53
<b>Job matching</b>								
Job corresponds to education level	7.89	7.64	7.31	7.18	7.74	7.7	7.82	7.87
Job requires a more advanced level of education	5.61	6	5.26	5.27	5.88	6.29	5.58	6.24
The respondent's level of education is higher	5.69	5.32	4.79	5.16	4.64	4.65	4.8	4.88
<b>Enterprise size</b>								
1-10	4.51	4.6	4.3	5.1	5.47	5.58	5.92	5.84
11-19	5.26	5.16	4.98	5.66	6.49	6.46	6.93	6.84
20-49	6.41	6.35	6.51	6.91	7.7	7.5	7.23	7.68
50-99	7.91	7.48	7.51	8.24	8.87	8.39	8.74	9.37
100-199	8.56	8.25	8.66	7.63	9.41	9.11	10.08	9.56
200-499	10.16	9.55	10.06	9.43	9.57	10.77	10.97	10.67
>500	11.34	10.98	10.52	10.78	9.97	12.03	10.14	10.15
<b>Age</b>								
15-29	2.15	2.10	2.41	2.62	2.59	2.63	2.70	2.50
30-44	5.85	5.58	5.27	5.54	5.71	6.05	5.92	6.07
45-74	11.52	11.11	10.24	9.68	10.29	9.97	10.27	10.61

Source: ELFS 1997-2003, authors' calculations

Note. The survey weights have been used in the calculations.



**Figure A1. Failure of new hires, 1996-2003**

Source: Estonian Labour Force Survey 1997-2003, authors' calculations