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Gross Worker and Job Flows in a Transition Economy

An Analysis of Estonia

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Estonia shows that intense restructuring after the opening of product and labor markets need not lead to massive increases in unemployment. The evidence suggests that flexibility in the labor market is vital in a transition's success, especially in a country undergoing rapid reform.

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Summary findings

With the transition in Estonia, worker flows increased greatly, driven by an increase in job flows. As the situation stabilized, the job and worker flows converged at rates similar to those observed in Western economies.

In 1989, job reallocation accounted for only a small fraction of overall worker reallocation, which was less than 15 percent. By 1993, the worker reallocation rate exceeded 35 percent, more than two-thirds of it attributable to job reallocation.

The dramatic increase in job flows was the result of increased separations, as jobs were eliminated. In 1992, early in the transition, the situation looked ominous but in only a couple of years new jobs and hires surged as well. By 1994, the hiring rate exceeded the separation rate, and jobs were being created faster than they were being eliminated.

Increased job and worker reallocations did not affect all sectors or types of employee the same way. More jobs were eliminated in large state manufacturing firms and more jobs were created by smaller, private service and trade-oriented employers. Virtually all of the new jobs came from the private sector (although many jobs were eliminated there, too).

The elimination of so many jobs accounted for about half the increase in direct job-to-job transitions (from less than 5 percent in 1989 to 15 percent in 1994).

Opening product and labor markets in Estonia led to a remarkable surge in worker and job flows. Early in the transition so many jobs were eliminated that things looked ominous, but within a couple years small private firms led the surge in new jobs and hiring.

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Gross Worker and Job Flows in a Transition Economy:
An Analysis of Estonia

by

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The results and conclusions of this analysis are those of the authors and do not necessarily reflect concurrence by the World Bank. We thank Debabrata Das for superb research assistance.

I. Introduction

Flexibility in the labor market is an important feature of well-functioning market-based economies. Davis and Haltiwanger (1998) report that in most western economies roughly 1 in 10 jobs are created and 1 in 10 jobs are destroyed every year. In addition to the high pace of job reallocation, market-based economies are characterized by substantially larger magnitudes of worker flows. The reallocation of employment opportunities across businesses accounts for a large fraction of the overall pace of worker reallocation (e.g., job reallocation accounts for roughly 30 to 50 percent of worker reallocation). The high pace of job and worker reallocation is often viewed as a mixed blessing of market-based economies. On the one hand, the flexibility permits the rapid reallocation of resources to their highest valued uses and thus is vital for economic growth.¹ On the other hand, the high pace of job reallocation involves significant worker displacement with associated significant earnings losses for the impacted workers.² Such adverse individual consequences of displacement along with the potential macro spillover effects underlie the justification for worker safety net policies throughout western economies. However, this discussion already hints at the dilemma inherent in worker safety net programs -- to the extent that such programs provide disincentives for efficient worker transitions, they may have adverse aggregate consequences on economic growth.

These fundamental issues loom particularly large for transition economies seeking to

¹ For example, recent studies indicate that about half of the productivity growth in U.S. manufacturing over the 1980s is accounted for by the reallocation of resources from less productive to more productive establishments. See Foster, Haltiwanger and Krizan (1998) for a recent survey of this evidence.

² See, e.g., Jacobson, Lalonde and Sullivan (1993).

move from planned to market-based economies. Getting all of the pieces for a well-functioning market-economy (i.e., competitive product markets with liberal trade policies, property rights and a well-functioning legal system, well functioning credit markets, labor market flexibility, sustainable and sound monetary and fiscal policies) into place is one of the major challenges facing such economies.³ Moreover, the substantial restructuring required in transition economies raises the question of whether rapid or gradual reform would be more advantageous. Advocates of gradual reform argue that the restructuring should be accomplished gradually due to factors such as large adjustment costs, negative externalities, macro spillover effects and slow institutional development.

While it well-beyond this paper to address all of these issues, we seek to provide some insight into the role of labor market flexibility for transition economies and indirectly contribute to the ongoing debate about gradual vs. rapid reform. We do this by studying one of the apparent success stories of one of the rapid reformers: Estonia. Estonia aggressively pursued transition by opening markets, decentralizing wage setting, and significant labor market reform. The bold reform lead initially to a dramatic decline in activity -- real output is estimated to have fallen a cumulative 25 percent in 1991 and 1992. However, after peaking at 8.9 percent in 1993, unemployment fell to 7.6 by 1995. This decline in unemployment has been accompanied by positive growth rates in real output in 1994 and 1995.

In this paper, we focus our attention on changes in the nature of labor market flexibility during this transition. Using a unique dataset on worker transitions, we are able to construct

³ Particularly since there is still considerable disagreement about the appropriate specific components of well-functioning market economies

measures of the hiring and separation rates as well as measures of gross job creation and gross job destruction. In addition, we are able to break out the components of these flows that involve spells of unemployment and those that involve direct job-to-job movements. We are thus able to characterize the overall rates of worker, job and unemployment flows for a country in transition.

The results that emerge from our study are striking. The top panel of Figure 1 presents annual rates of hiring, separation, job creation and job destruction. The hiring rate reflects the rate of worker transitions (as a fraction of employment) into jobs not occupied by the transiting worker in the prior period. Such transitions include movement from non-employment to employment and from job-to-job. The separation rate reflects the rate of worker transitions out of positions held by transiting workers in the prior period. Such transitions include movement from employment to non-employment as well as workers who experienced job-to-job movements. The job creation rate represents the rate at which new positions are created, while the job destruction rate represents the rate at which positions are eliminated. By construction, job creation is a subset of all hiring and job destruction is a subset of all separations. That is, worker reallocation in the form of hiring and separations stems from the sorting and resorting of workers across a given set of jobs and from the reallocation of jobs themselves. Job reallocation in the form of creation and destruction stems from the reallocation of employment positions across production sites.

The time series of hiring, separation, creation and destruction rates depicted in the top panel of Figure 1 are dramatic. From January 1989 to January 1990 (depicted as 1989 in the Figure 1), the hiring rate was around 10 percent, the separation rate was around 10 percent and

the implied worker reallocation rate (hiring plus separation rates less those transiting from job-to-job to avoid double counting) was about 14 percent. However, during the transition, the pace of worker transitions increased dramatically. From 1994 to 1995, the hiring rate was about 25 percent, the separation rate about 25 percent, and the pace of worker reallocation about 37 percent.

The large increase in worker flows is striking by itself. Even more striking is the fact that much of the increase was driven by a increase in the pace of job reallocation. Our estimates indicate that the rate of job creation and destruction were extremely low in 1989 to 1990. By 1994, the rate of job creation and destruction were both around 10 percent -- interestingly and remarkably close to the U.S. averages. Moreover, the path of job creation and destruction are quite interesting. Following the bold reforms in the early 1990s, job destruction rose more rapidly than job creation. Indeed, from 1992 to 1993, the rate of job destruction was about 15 percent and the rate of job creation was about 6 percent. However, after a couple of difficult years, the rates of job creation and destruction converged to the roughly 10 percent rate observed from 1994 to 1995. Interestingly, about two thirds of the increase in hiring and separation rates are accounted for by increases in job creation and destruction, respectively.

Our study investigates these dramatic patterns along a number of dimensions. As suggested above, we investigate the role of unemployment transitions in the increases in the pace of worker and job reallocation. Further, we investigate the characteristics of the businesses contributing to the worker and the job flows. In particular, we investigate differences in the magnitudes and the time series changes by industry, by employer size class, by enterprise type (private vs. state), ownership type (domestic vs. foreign owned), and by contract type. We focus

our attention on annual flows but also produce some evidence on the quarterly rates of worker and job flows.

The paper proceeds as follows. Section II provides a brief discussion of the institutional changes that occurred in Estonia over the period in question. Section III discusses the data and measurement issues. Section IV presents basic patterns of the annual and quarterly worker and job flows. Section V presents analysis of these patterns by employer characteristic. Section VI focuses attention on unemployment flows and section VII focuses on job-to-job flows. Section VIII presents some multivariate analysis of the determinants of the flows. Section IV provides some concluding remarks including some discussion of the role of labor market flexibility in the ongoing debate about gradual vs. rapid reform in transition economies.

II. Institutional Changes in Estonia

Being a former Soviet economy, Estonia faced a huge task of reallocating production resources as dictated by market forces and creating institutions attuned to democracies. To motivate the analysis of job and worker flows, this section briefly summarizes institutional details about the pre-reform period and the reform policies. A more extensive discussion can be found in Vodopivec (1997).

II. A. Pre-reform

We begin with an overview of the main features of the Estonian pre-transition labor market -- most of them produced by the rigidities of the Soviet regime, and hence shared by all FSU economies -- can be identified: job security and hidden unemployment; predominance of state sector employment; pay egalitarianism and distorted interindustry wage structure; high female labor force participation; good formal education of the labor force; and the presence of a

large non-Estonian population.

Job security and presence of hidden unemployment. Job security was perhaps the only aspect of the worker ideology of the Soviet regime where reality did not deviate from rhetorics. Except for disciplinary reasons, workers enjoyed virtually unlimited job security. In fact, because of the notorious "soft budget constraint" (Kornai, 1980), enterprises not only did not lay workers off, but they were always prepared to employ more workers, thus creating excess labor demand. That undoubtedly helped reduce open unemployment (which was officially not recognized in the Soviet times), but it contributed to considerable hidden unemployment (overstaffing). According to some estimates, the rate of hidden unemployment in socialist economies reached 30 percent.

Predominance of state sector employment. Under the Soviet regime, nearly all means of production were nationalized and the private sector was kept insignificant by legal limitations, discriminatory taxation and limited access to and unfavorable terms for credit. In 1989, over 80 percent of employment was generated by the state sector and the rest by cooperative sector, with private sector employing less than one percent of workers.

Egalitarian wage structure. Under the Soviet regime, workers' pay depended on a centrally determined wage matrix. Jobs were classified into different skill-exertion grades, to which economy-wide wage rates were assigned. Although the structure of wages was biased in favor of blue collar workers, the resulting distribution was very egalitarian. In 1986, for example, the ratio between the highest and the lowest basic wage rate was 4.3. Moreover, blue-collar workers earned more relative to white-collar workers than their counterparts in developed economies.

High female labor force participation. While the male labor force participation rate in Estonia was comparable to the rates in most OECD countries, the female participation rate was much higher. In 1989, the female participation rate in Estonia was 73 percent, similar to that in Scandinavia and the Central and East European socialist economies.

Well-educated labor force. Similar to other socialist economies, the Estonian labor force at the beginning of transition possessed a relatively high level of formal education. Of course, it is difficult to assess how functional the skills of the Estonian labor force were, particularly for meeting the needs of the transition to a market economy.

Large non-Estonian population. Of Estonia's 1.57 million population, only 61.3 percent (as of 1989) are Estonians. Most of the remainder are Russians (30.2 percent). As a result of the break-up of the Soviet Union, Estonia has experienced a continual outflow of Russians and inflow of Estonians, with the resulting net outflow of about 50,000 since 1989 (the estimate of the Ministry of Social Affairs). Most of these migrants were of working age.

II.B Reform policies

Estonia's transition to a market economy is one of the earliest and most successful among the FSU (former Soviet Union) economies. Reforms were started even before the declared independence from the Soviet Union in August 1991, and they were stepped up afterward. Estonia liberalized prices and, with a lag, brought inflation to manageable levels. It has opened up and reoriented its trade toward the West, initiated enterprise and banking reform, successfully privatized the majority of enterprises, overhauled labor market and social safety net programs, and revamped its legislation in many other areas. Below we highlight developments regarding price and trade policies, monetary and fiscal reforms, and privatization.

Price and foreign trade reforms. The increased economic autonomy in the late 1980s permitted Estonia to implement a comprehensive price reform in 1990 and 1991 that brought relative prices more into line with world prices. As a result, the price level more than doubled in 1991 and increased ninefold in 1992. The introduction of the Estonian kroon in June 1992 (under the currency board arrangement -- only issuing kroons against inflows of hard currency -- and pegging the kroon to the German mark) and consistent, tight fiscal policy since then succeeded in bringing inflation down substantially, to 23 percent in 1996. Stabilization efforts were also greatly eased by successful re-orientation of trade and advancement of privatization.

It should be emphasized that Estonia has an astonishingly open economy. Except for a few products, there are no import tariffs or other import restrictions. There is only an administrative fee on imports of 0.5 percent. In 1993, Estonia also removed the last export controls.

Privatization. After initial slow progress, privatization -- which follows the "Treuhand" approach of individual sales through evaluated biddings -- has gained momentum since 1993. While only 130 of the medium and large enterprises (out of a total of 500) were announced for sale as of November 1993, more than 380 enterprises have been sold two years later. Moreover, privatization of small enterprises has also been very successful. Over 90 percent of the estimated 1,600 small enterprises were privatized via auctions, the majority of them before 1993.

Labor market policies and programs, 1989-95

In line with the reforms in other areas, the Estonian government chose a radical and liberal approach also in the labor market. Above all, by allowing enterprises to discharge excess labor without imposing undue costs on them, it decisively ended the period of job security. In

addition, significant wage liberalization occurred. Separation costs, the taxation rate of wages, and minimum wage were set low as the government attempted to stimulate employers to create jobs. Below we describe the most important novelties regarding worker protection, wage setting, unemployment support, training, and public works in more detail.

To stimulate the reallocation of labor, The Law on Employment Contract was introduced in July of 1992. The law gives the employer the right to lay off a worker with two-month notification, and, in the case of bankruptcy, even with no prior notification. Depending on their job tenure, workers are entitled to a severance pay of two to four times their previous monthly earnings. The law also allows, under circumstances prescribed by it, for temporary employment, with no limitations on its renewal, but confining its cumulative duration to five years. Because the circumstances that justify temporary employment are notoriously difficult to disprove, that opens the possibility of wide use of temporary contracts.

Another important area of labor market reforms was the deregulation of wage determination. Since the beginning of 1990, the government determined only the minimum wage and the maximum wage, and from 1991 onward only the minimum wage, leaving the individual level of wages to be determined by enterprise management. The minimum wage regulation seems to have little effect on employment. The minimum wage has been set at a modest level: according to the 1995 labor force survey, in 1992 about 14 percent were paid at or below the minimum wage, while in subsequent years this percentage was less than 2 percent (Noorkoiv et al, 1997). This evidence also suggests that the enforcement of the minimum wage law seems to have been lax.

To cope with radical changes in the working of the labor market during the transition,

several new labor market programs have been introduced since 1990. Chief among them are training and public works as active measures, and unemployment insurance as an income support measure. Unemployed are offered free training for a duration of up to six months, as well as a training stipend (in addition to unemployment benefits). There are two types of training: vocational training and "labor market preparation" training of job search assistance type. Vocational training has to be approved by an employment office counselor, and is provided by a specialized training institutions, both public and private. Job search assistance consists of teaching the unemployed how to deal with psychological effects of unemployment and equipping them with skills necessary for effective job search. For non-Estonians with insufficient proficiency in Estonian, short language courses are also given as part of job search assistance.

There are two types of employment subsidies. One takes the form of a lump-sum payment of up to EEK 8,000 (about \$700), contingent on starting self-employment.⁴ To obtain this subsidy, the unemployed must obtain the approval of his or her business plan by a committee of experts. Second, employers obtain a subsidy for employing vulnerable groups. Employment office committees, deciding on the case by case basis, can grant a subsidy of up to EEK 450 for the first six months, and half of the original amount for another six months.

A public works program was introduced in March 1993. The main areas of activity are maintenance and repair of roads, cleaning of parks, and construction. An agreement must be made between the employer (any business entity) and the Employment Office. Participants

⁴ Since the introduction of the kroon (abbreviation EEK), the exchange rate has been EEK 8 for one German mark (about EEK 11 - EEK 12 for \$1).

continue to receive unemployment compensation in addition to earnings of no less than 13 EEK per day (paid by either the employer or the Employment Office if the employer is a local government). If asked, recipients of unemployment benefit are obliged to take part in public works for up to 10 days per month, and are eligible for extension of potential duration of the benefit (see below).

A system of unemployment insurance, introduced in April 1991, has functioned as a quasi-social assistance program. First, to permit coverage of seasonal workers, the program requires only a weak attachment to the labor force -- working of at least 180 days in the year preceding the registration at the employment office. The number of benefit recipients indeed exhibits a strong seasonal variation. Second, eligibility is extended also to some labor market entrants and reentrants (chief among them, recent school-leavers, and women reentering the labor force after having raised children). There is a waiting period of two months for quitters and school-leavers. To receive benefits, the candidate must report to the employment office several times during the waiting period.

Until February 1993, the maximum duration of the benefits was six months. Since that date, a person can receive a three month extension if he/she participates in public works, is within six months from reaching retirement, or has three children below the age of 18. Employment offices may, at their discretion, grant extensions also to other unemployed.

While conditions for obtaining the benefit allow the receipt of workers weak or even no previous attachment to the labor force, the level of the benefit is meager. It was set to EEK 180 (60 percent of the minimum wage) in October 1992, and despite substantial inflation, it was only increased to EEK 240 in July 1996. In 1995, it amounted to less than 10 percent of the average

wage -- extremely low when judged by both Western and Eastern European standards.⁵

Conditions to retain unemployment compensation have also been quite strict. First, the law requires reporting to the employment office three times a month. Second, there are strict rules about job refusals: a first refusal eliminates the receipt of the benefit for ten days, and the second one eliminates it completely. Since 1993 the job offered after six months of unemployment may even be below the skill that would fit the unemployed. Third, receiving unemployment compensation are denied the right to benefits if they refuse to participate in public works -- a condition that makes the program a form of "workfare." Fourth, even modest casual earnings disqualify the unemployed for the benefit (non-work income below the benefit level is allowed).

The insurance benefit is low, but there are other incentives for the unemployed to apply for it and to register at employment offices in general. Chief of these is the contingency of social welfare assistance on registration at employment offices, as well as on the receipt of unemployment compensation if eligible. And there is a fringe benefit that is attached to the unemployment benefit -- the period of the receipt of unemployment benefits is counted as an active contribution period to old-age insurance.

III. Data and Measurement Issues

The data used in this study are derived from the Estonian Labor Force Survey. In the 1995 Survey, a series of retrospective questions about labor market transitions over the 1989 to

⁵ For example, in 1992 the ratio of unemployment compensation to average wage was above 30 percent in Eastern European economies (Scarpetta, Boeri, and Reutersward, 1993), and between 40 and 90 percent in OECD economies (OECD, 1993).

1995 period were asked of respondents to the labor force survey. The respondents were asked about starting and ending dates of all labor market transitions (on a monthly basis), reasons for labor market transitions, characteristics of the employers and their employment relationship during spells of employment. From these responses, we can calculate labor market transitions involving changes across employment, unemployment and inactive labor market states. Table 1 provides a summary of the labor market transitions that we can measure. In measuring these transitions, we used point-in-time to point-in-time measures. That is, our annual rates reflect changes from one January to the next January. As such, our annual rates will (intentionally) miss some temporary transitions. To obtain perspective on this, we also calculated the labor market transitions on a quarterly frequency (i.e., point-in-time to point-in-time changes from January-April, April-July, July-October and October-January).

We measure the hiring and separation rates, respectively, as:

$$\text{Hiring Rate} = (UE_t + IE_t + EE_t)/E_{t-1}$$

$$\text{Separation Rate} = (EE_t + EI_t + EU_t)/E_{t-1}$$

In turn, we measure the worker reallocation rate (avoiding double counting of those workers who were both separated and hired) as:

$$\text{Worker Reallocation Rate} = (EE_t + EU_t + EI_t + UE_t + IE_t)/E_{t-1}$$

To measure job creation, job destruction, and job reallocation rates, we decompose the above flows into the components that reflect the reallocation of jobs and the components that

reflect the reallocation of workers across a given allocation of jobs. Our ability to do this is limited by the nature of the data but we nevertheless believe that we can obtain reliable lower bounds on the rate of job creation and destruction. Formally, job creation is the rate at which new jobs (literally new positions) are created and job destruction is the rate at which jobs (positions) are eliminated. Davis, Haltiwanger and Schuh (1996) measure these rates by following individual employers over time which provides measures of the between-plant rates of job creation and destruction. As Blanchard and Diamond (1989, 1990) point out, the rate of job creation and destruction can be measured from worker flow data of the type that we have available. Specifically, job destruction can be measured as layoffs plus quits that are not replaced. Analogously, job creation can be measured as hires less quits that are replaced.

In the present context, we have detailed information on the reasons that workers left their prior position. Specifically, workers leaving jobs are provided 21 categories (see Table 2) for reasons for leaving a job. To measure job destruction, we selected all separations induced by the first eight categories of Table 2. We believe that all eight of these categories reflect reasons for separation that correspond to job destruction. Unfortunately, it is probably the case that some of the other separations constitute job destruction as well. That is, some of the other reasons for voluntary departure (e.g., retirement) may have accompanied job destruction and it is unclear how such a worker would respond to the question. That is, how would a worker who lost their job from downsizing but voluntarily retired from the labor force answer the question: Why did you leave your job? Given these concerns, we must interpret our measure of job destruction as a lower bound on job destruction. Since the separation rate is an upper bound on job destruction, we can gain further insight into the dynamics of “true” job destruction by comparing and

contrasting the time series changes in our measure and the rate of separation.

To measure job creation, we take advantage of a simple identity linking net employment growth and job creation and destruction. That is, net employment growth is the difference between the rate of job creation and destruction. Accordingly, we can measure job creation as the sum of the net employment growth rate and the rate of job destruction. Given that our measure of job destruction is a lower bound, our measure of job creation will equivalently be a lower bound. However, they will, by construction, satisfy the identity that net employment growth which is properly measured is equal to the difference between creation and destruction. Finally, we measure the job reallocation rate as the sum of the rate of job creation and destruction.

This methodology for measuring hiring, separation, worker reallocation, job creation, job destruction and job reallocation rates is applied on an annual and quarterly basis. Further, we can identify components of these worker and job flows that involve spells of unemployment. Specifically, we examine the EU component of the separation rate and the EU component of the job destruction rate. We also examine the UE component of the hiring rate. Given that we derive job creation indirectly, we cannot measure the UE component of the job creation rate.

For all of the various flows we measure, we present rates by employer and employment relationship characteristics. In particular, we consider industry, size class, region, enterprise type (private, state vs. collective), ownership class (foreign vs. domestic vs. joint domestic/foreign owned), contract type (regular, verbal or temporary), and worker status (owner/employee, employee, or self-employed). For the most part, the measurement of these flows by these characteristics is straightforward. For separation, destruction and unemployment inflow rates,

the characteristics refer to the employer characteristic in period $t-1$. For hiring and unemployment outflow rates, the characteristics refer to the employer characteristic in period t . Given the manner in which we derive job creation rates, the tabulations of job creation by employer characteristic reflect a blend of the characteristics of employers in periods $t-1$ and t . That is, job destruction by employer type reflects type in $t-1$. The net employment growth rate by employer type reflects the change in the number of employees for a specific employer type between $t-1$ and t . As such, the net employment growth rate by type will appropriately incorporate entry and exit but also reclassification of continuing firms across types between $t-1$ and t . Given our method of measuring job creation, reclassification that induced measured net employment changes will also be reflected in measured changes in job creation. We do not believe this causes serious measurement difficulties except for measurement of job creation by enterprise type (since privatization led many to be reclassified from state to private). However, for enterprise type and ownership status, we can “fix” this problem since the survey questionnaire asked questions about changes in enterprise type and ownership type for workers remaining at the same employer. Thus, for these employer characteristics, we adjust job creation accordingly -- i.e., we do not count as job creation increases in employment simply due to reclassification.

Before proceeding to the analysis, one obvious concern in using retrospective data is recall bias. We believe that the nature of the survey questionnaire minimized this issue, but nevertheless it is a relevant concern. However, as will become clear in our analysis, there are several aspects of our results that indicate that this problem is not driving our results. In particular, we find that particular sectors, (i.e., particular size classes and particular enterprise

types) disproportionately account for the observed changes in worker and job flows. This suggests that the measurement error from recall bias would have to take a peculiar form -- e.g., workers from large firms were subject to greater recall bias than workers from small firms -- to account for our results.

IV. Basic Facts

We begin our analysis of the worker and job flows by examining the 10 components defined in Table 1. Figure 2 depicts the annual labor market transition rates for each of the 10 categories. For comparability, all are measured as fractions of prior period employment. There is a secular decline in the fraction of workers who remain with the same employer from one year to the next. There are secular increases in the job-to-job transitions, in the unemployment to employment transitions, in the inactivity to employment transitions, in the employment to unemployment transitions, and in the fraction of workers who remain unemployed from one year to the next and who remain inactive from one period to the next.

The resulting hiring, separation, creation and destruction rates on an annual basis are depicted in the top panel of Figure 1. The associated quarterly rates are depicted in the lower panel of Figure 1. The overall time series patterns are similar in the annual and the quarterly flows. There is a clear seasonal in the quarterly flows reflecting seasonal peaks of job destruction in the second quarter (from April to July) and of job creation in the third quarter (from July to October). It is especially interesting to compare the magnitudes of the quarterly and the annual series. After 1992, the average annual hiring rate is 23.3 percent while the average quarterly hiring rate is 6.8 percent suggesting that much of the quarterly hiring is cumulative and thus last for at least a year. Similarly, the average annual separation rate after

1992 is 25.2 percent and the average quarterly separation rate is 7.5 percent -- again suggesting that the separations are approximately cumulative. Similar cumulative patterns hold for job creation and destruction again indicating that we should view most of the quarterly labor market transitions as reflecting transitions that last for at least a year.

As emphasized in the introduction, the most striking features of Figure 1 are the rapidly rising overall worker flows, the dominant role of job flows in accounting for the increasing worker flows, and the especially rapid rise of job destruction and worker separations in the 1992-94 period that appears to be settling down by 1995. The message conveyed is that opening up markets, relaxing labor market regulations, and decentralizing wage determination leads to dramatic increases in labor market flows that are initially led by an especially rapid rise in worker separations associated with job destruction. The burst of separations and destruction are then followed in subsequent years by substantial increases in hires especially via job creation.

One useful way to summarize the worker and job flows is to consider the rates of worker and job reallocation. Figure 3 depicts the annual rates of worker and job reallocation over this period. The pace of worker reallocation accelerated dramatically over this period and it is clear that the primary driving force was the rapid increase in the pace of job reallocation. In 1989, job reallocation only accounted for about 13 percent of worker reallocation and worker reallocation was relatively modest as well. By 1993, the worker reallocation rate exceeded 35 percent and more than two thirds of this was accounted for by job reallocation. This dramatic role of job reallocation is especially remarkable given that our measure of job reallocation is a lower bound on the true measure. Interestingly, as job reallocation diminished somewhat, worker reallocation remained high. Thus, in 1994 job reallocation accounted for roughly 56 percent of worker

reallocation. This latter pattern is similar to that observed in many western economies (see, Davis and Haltiwanger (1998)).

V. Job and Worker Flows by Employer Characteristic

We now turn our attention to examining these flows by the characteristics of the employers and by the nature of the employment relationship. We examine the differences in the flows by industry, region, ownership status (domestic, foreign, or mixed), enterprise type (collective, state, private), employer size class, contract type (regular, temporary, informal), and employment status (owner/employee, employee or self-employed).

Table 3 presents annual employment shares and Table 4 presents net employment growth rates by employer characteristic and by the nature of the employment relationship. Regional growth rates have been similar so that shares have stayed relatively constant over the transition. State enterprises are the largest employer but experienced substantial net decline in growth and employment share over the period. Private enterprises share rise dramatically over the 1990-95 period.⁶ Some caution needs to be used in interpreting this increase since it partly reflects reclassification of employers from state to private firms. Most workers are employed in domestic owned firms but there is an increased share of workers at foreign and particularly joint domestic-foreign owned firms. Small firms have seen increases in their employment shares, particularly micro businesses (1-19 employees). Large businesses have experienced net declines in employment and sharply declining employment shares. Most workers are employees rather

⁶ This pattern of a large rise in the share of activity accounted for by private sector businesses is common in many transition economies (see, e.g., Aslund, Boone and Johnson (1996) -- see especially Table 8).

than business owners or self-employed but there has been substantial increases in the latter two categories. Most workers have regular, formal employment contracts but again there has been substantial increases in temporary or informal, verbal contracts.

Table 5 presents employment shares and growth rates by industry and Table 6 presents worker and job flows by a variety of employer and employee characteristics. Manufacturing and agriculture have seen significant net shrinkage while trade and services have expanded substantially. Virtually every sector exhibited a burst of separations driven primarily by job destruction between January 1992 and January 1993. In some sectors, primarily trade and services, hiring and creation rates jumped dramatically at the same time. However, for many other sectors, hiring and creation rates only increased with a substantial lag (e.g., manufacturing). The picture that emerges is that an enormous number of workers experienced separations driven by job destruction in the 1992-93 period. Early on a few sectors absorbed these workers but by the 1994-95 period many sectors exhibited substantial hiring and job creation.

We consider three regions of Estonia: the Capital (Tallinn) region which is heavily populated and industrialized, the Northeast region with a strong industrial base but formerly especially dependent on the Soviet states, and the remainder of the country which is more rural. As depicted in Table 6, the Capital region had the greatest magnitude of worker and job flows in all periods but each of the regions exhibited quite similar patterns. The Northeast had somewhat more anemic hiring and job creation rates in both the sense that the average rate is lower in the Northeast and this region did not experience as rapid a rise in hiring and job creation as the other regions.

Table 6 also depicts the worker and job flows by ownership status. Foreign, domestic

and mixed ownership employers all experienced increased worker and job flows over this period. A notable difference is the substantially more rapid rise in both job creation and job destruction for foreign owned employers. The speed of the transition at the individual employer level appears to be linked to the nature of the owners. However, caution must be applied in making too much of the differences by ownership status since the share of employment by foreign owned firms is so small.

Job and worker flows by enterprise type are presented in the next panel of Table 6. The striking finding that emerges is that virtually all of the job creation is accounted for by private enterprises. State and collectives are hiring over this period but primarily to replace separating workers. Job destruction rates for state and collectives are disproportionately high in the 1992 and 1993 periods but by 1994 they have settled down to rates comparable to those exhibited by private enterprises. In regards to the latter, it is important to emphasize that private enterprises have exhibited relatively high rates of separations and job destruction during the transition -- however, the remarkably high hiring and creation rates more than offset the separation and destruction.

There are also some striking differences in the flows by employer size. Many studies of job flows in western economies show that small businesses disproportionately create *and* destroy jobs. This pattern is ubiquitous and as discussed by Davis and Haltiwanger (1998) likely reflects the selection and learning effects associated with young, small businesses.⁷ The results in Table 6 present a very different picture. The two size classes for the smaller employers (1-19 and 20-

⁷ Models such as those of Jovanovic (1982) provide the theoretical underpinnings for these ideas.

99) disproportionately create jobs and disproportionately contribute to hiring over most of our sample. The largest (500+) and medium size businesses (100-499) disproportionately account for the rapid rise in separation and job destruction rates in 1993 and 1994. However, interestingly, by 1994 the smallest businesses have the highest hiring, creation, separation and destruction rates. The pattern that emerges is that the period of rapid transition in the 1992-93 period yielded considerable “cleansing” of larger businesses -- but after this period, some of the patterns observed for western market-based economies appear to be emerging.

We now turn our attention to characteristics of the employment relationship rather than the employer per se. One type of classification we examine is the contract type of the worker: regular contracts refer to workers with indefinite contracts with standard benefits, temporary contracts are for a specified period of time, and finally informal contracts refer to workers who are not on the regular payroll. Table 6 also presents worker and job flows by contract type. Early on in the transition, the increase in hiring and job creation rates were disproportionately accounted for by informal and temporary contracts. Over time, there has been a sustained increase in the hiring rate and creation rates of workers on regular contract but the rates are uniformly lower. Informal and temporary contracts disproportionately accounted for the increase in separation and job destruction rates as well. Nevertheless, there were large and sustained increases in the separation and destruction rates for regular contracts. For example, the job destruction rate for regular contracts rose from virtually zero to over 10 percent by 1994. Overall, the increase in job destruction dominated the increase in creation for regular contracts given the negative net employment growth and falling employment share for regular contracts.

We are also able to classify workers into whether they are an employee of a firm, the

owner of a firm with employees (referred to as an owner/employee), or self-employed (the owner of a sole proprietorship). The overall patterns for the Estonian job flows are generated by employees of firms since Table 3 indicates that the overwhelming majority of workers are employees. However, Table 6 shows that employee/owners and self-employed exhibit more volatile fluctuations in the worker and job flows. Early in the transition, hiring and job creation via owners and self-employed workers surged. Further, there was a surge of job destruction associated with owners transiting out of this status (presumably this meant the owner went out of business). Another interesting feature is the relatively low separation and job destruction rates for self-employed individuals. This pattern contrasts sharply with patterns observed in the U.S. where turnover among self-employed individuals is very rapid.

Having presented the basic patterns by employer characteristics, a useful way to summarize the contribution of job flows by employer characteristics is to consider the role of employment shifts between and within sectors defined by these characteristics. Following Davis, Haltiwanger and Schuh (1996), we decompose the job reallocation into a between sector and within sector shift. Formally, the decomposition considered in Table 7 is a decomposition of excess reallocation where the latter is defined as job reallocation less the absolute value of net growth. Excess reallocation is a useful summary measure of the job reallocation that occurs over and above that necessary to accommodate the net growth in the economy. The decomposition considered in Table 7 considers two components. The between sector contribution is measured by summing across sectors the deviation of the absolute employment change for the sector from the absolute change of the overall economy. This component reflects the contribution of the shifting of employment opportunities across sectors so defined. The component of excess job

reallocation due to within-sector shifts is measured as the sum across sectors of the excess job reallocation in each sector. This component reflects the contribution of the shifting of employment opportunities within the sectors so defined.

Reported in Table 7 is the fraction of overall excess job reallocation that is due to the between sector component. Shifts between industries accounts for a relatively modest ten percent of the overall excess job reallocation (although the fraction accounted for by inter-industry shifts is quite high by western economy standards -- see Davis and Haltiwanger (1998)).⁸ This finding implies that the vast majority of job reallocation occurred within each broad industrial sector. For the most part, the other classifications also yield modest between sector contributions. Two important exceptions are employer size and enterprise type. The massive restructuring away from large businesses to smaller businesses and away from state to private businesses yields a large contribution of between sector shifts measured on these dimensions.

To sum up the results by employer characteristic, probably the most striking findings by employer characteristics are by enterprise type and employer size. Large businesses exhibited disproportionate increases in separation and job destruction rates in the volatile 1992-93 period. However, by 1994-1995, the smallest businesses exhibited slightly higher separation and destruction rates than large businesses. Collective and state businesses suffered disproportionate increases in separation and destruction rates during the early phases of transition. However, in

⁸ Davis and Haltiwanger (1998) report the standard deviation of employment growth rates across one-digit industries for a variety of transition economies as well as the United States. On the basis of these calculations, Estonia appears to have exhibited somewhat less reallocation of employment across industries than many of the other transition economies.

spite of the large shift away from large, state businesses towards small, private sector businesses, it is important to emphasize the large job reallocation among businesses of the same type. This latter finding is highlighted, for example, by the large rates of job destruction exhibited by small and private sector businesses.

VI. The Role of Unemployment in Worker and Job Flows

The picture that has emerged thus far is that the Estonian labor market has become much more dynamic over the early 1990s. Worker and job flow rates have increased dramatically and it appears that by the mid-1990s the rates have settled into a range similar to that exhibited in western market economies. A key question is the role of unemployment in the reallocation and sorting process in the labor market.

In this section, we focus our attention on the components of the worker and job flows that involve transitions through unemployment. Specifically, for separation and job destruction, we examine the components of these flows that involve a worker transiting into unemployment. For hiring, we examine the component that is accounted for by workers transiting from unemployment to employment. Accordingly, the inflow rate to unemployment we focus on is the EU flow in Table 1. We convert this flow to a rate by dividing by employment in $t-1$ which makes this inflow rate comparable to our separation and destruction rates. We compute the inflow rate to unemployment due to job destruction as the components of the EU flow that correspond to workers leaving their jobs for the reasons we have associated with job destruction. The outflow rate we focus on is the UE flow -- again we divide this by employment in period $t-1$ to make the rates directly comparable to our hiring and creation rates. Our outflow rate thus corresponds to the component of the hiring rate that is associated with workers transiting from

unemployment.

It is important to emphasize that there are other components of unemployment inflows and outflows. In particular, workers flow into unemployment from inactive status and vice versa. We have not undertaken a systematic analysis here of whether unemployment and inactive status are distinct states so that the usual cautions about this distinction apply.

Figure 3 presents the annual unemployment inflow, the unemployment outflow and unemployment inflow due to job destruction so defined. Figure 4 presents the quarterly rates. Sharp increases in the inflow rates to unemployment are observed from 1991 to 1993 and most of this can be accounted for by job destruction. The outflow rate from unemployment to employment does not rise as rapidly but from 1994 to 1995 it has reached a rate close to that of the inflow rate from employment to unemployment. The lower panels of Figures 3 and 4 depict the fraction of the unemployment inflow rate accounted for by job destruction for the annual and quarterly flows, respectively. It is a large fraction throughout the period and for the annual flows peaks from 1993 to 1994 at approximately 70 percent.

Table 8 depicts the unemployment inflows and outflows by employer characteristic and characteristics of the employment relationship. For unemployment inflows, the characteristics reflect the prior job (i.e., the “E” characteristics for the EU flow), while for unemployment outflows the characteristics reflect the new position (i.e., the “E” characteristics for the UE flow). Several findings stand out. Industrial sectors exhibit similar patterns of inflows into unemployment and inflows due to job destruction and outflows clearly lag the burst of inflows that occur in the 1992 to 1993 period. Regions also exhibit similar patterns of unemployment inflows and outflows, but the Northeast contributes disproportionately to the increase in

unemployment inflows. However, the disproportionate role of the Northeast for unemployment inflows are for reasons other than job destruction. Foreign owned businesses yield very erratic contributions to unemployment inflows and outflows but this is likely the result of their very small employment share. Collective and state enterprises disproportionately contribute to unemployment inflows and unemployment inflows due to job destruction. Early on in the transition, private firms disproportionately contribute to unemployment outflows to employment but by January 1995 collective and state businesses contribute substantially to such unemployment outflows. Large and intermediate size businesses contribute disproportionately to the increases in unemployment inflows and those due to destruction over this period. Informal and temporary contracts contribute disproportionately to the changes in unemployment inflows but only a small share of workers are covered by such contracts. Interestingly, almost none of the inflows to unemployment are accounted for by self-employed or business owners. Apparently, business owners or self-employed who exit employment from that status do not transit through unemployment.

Overall, unemployment inflows from employment have risen dramatically over this period of transition. Starting from a rate of almost zero, about five percent of workers who were employed in one January find themselves unemployed the following January. Most of this increase is associated with workers whose jobs have been destroyed. However, the outflow rate from unemployment to employment has increased dramatically as well and from 1994 to 1995 essentially equals the inflow rate.

VII. Job-to-Job Flows

Although the increase in worker and job flows implied a substantial increase in

unemployment, many of the workers impacted by the flows transitioned directly from one job to another.⁹ Figure 5 shows that the rate of job-to-job transitions increased from around 5 percent in 1989 to around 15 percent in 1994. Strikingly, much of these job-to-job transitions were induced by job destruction. The job-to-job rate due to job destruction rose from around 1 percent in 1989 to as high as 6 percent in 1993. The quarterly job-to-job rates and the component due to job destruction also exhibit similar patterns. These job-to-job rates indicate that much of the success of Estonia is due to the fact that they have been able to accommodate the large increase in job flows common in market economies with a substantial fraction accounted for by direct job-to-job transitions.

Table 9 presents the job-to-job rates by employer characteristics and the characteristics of the employment relationship. The measured characteristics reflect the prior job in these tabulations. The trade sector as well as private sector businesses exhibited especially large increases in the job-to-job rates over this period of time. All size classes exhibited substantial increases but the micro businesses (1-19) exhibited earlier large increases in the job-to-job rates. Informal and temporary contract workers also exhibited disproportionately large increases in job-to-job rates. Interestingly, employer/owners exhibited an enormous increase in job-to-job movements in 1991-93 but then the rates dropped substantially (although they remained high

⁹ Some caution should be used in interpreting the annual job-to-job rates since they reflect workers who were employed in one January and also employed the next January but with a different employer. There may have been an intervening spell of unemployment which is intentionally not measured in this context. Note, however, that the patterns for quarterly and annual job-to-job rates look similar. Moreover, the annual rates are roughly the cumulative of the quarterly rates. These findings suggest that much of the job-to-job movements at the annual frequency reflect transitions that did not involve an unemployment spell lasting more than a quarter.

relative to pre-reform levels).

VIII. Multivariate Analysis of Separation, Destruction and Hiring Dynamics

The results in the prior sections suggest that the impact of the large surge in worker and job flows was unequal across employers of different characteristics and for alternative employment relationships. However, all of the analysis above is for one-way characteristics. In this section, we consider some simple multivariate specifications that permit us to control for several factors simultaneously including worker characteristics.

We consider a couple of alternative multinomial logit specifications for separations. The first specification considers four outcomes in terms of separations: (i) no separation; (ii) separation that yields a direct job-to-job movement; (iii) separation into unemployment; and (iv) separation into inactivity. For this specification, we consider all of the employer and employment relationships considered in prior sections simultaneously as well as include worker characteristics as controls. The latter include gender, nationality, age, education, work experience and tenure.

The results from this specification are reported in Table 10. The results are reported as differences from the baseline probabilities of each outcome. The baseline probabilities are for a male, Estonian, married, 30-40 year individual, with a secondary education, 5-10 years of tenure and 10-20 years of work experience, who works in the Capital region, for a state-owned, domestic firm with 500 or more employees in the manufacturing sector, is on a regular contract, is an employee, and is for 1992. We only include the 1992-94 separations since we are interested in focusing on the flows post-reform for this analysis. Demographic controls are included and year effects are included but not reported in the table. Differences in probabilities that are

statistically significant at the 10 percent level are highlighted in bold.

Workers in the North and Rural regions, workers affiliated with foreign-owned firms, employee-owners of firms, self-employed and workers in the transportation are much less likely to experience a direct job-to-job separation than the baseline worker. Workers in collective firms, workers who are employed as temporary workers, and workers in agriculture, construction, trade, and FIRE are much more likely to make such transitions. Workers who are with private firms and foreign firms, employee owners and self-employed as well as workers in transportation and services are less likely to experience a separation that involves a spell of unemployment. Workers who are in the rural region and temporary workers are more likely to experience such transitions. Workers who are with private firms, with very small firms, are employee-owners or self-employed and workers in the transportation sector are less likely than the baseline worker to experience a transition from employment to inactivity.

Another way to consider the separations is to consider whether the separations are induced by job destruction. To consider this perspective, we estimated an alternative multinomial logit with the following outcomes in terms of separations: (i) no separation; (ii) separation for reasons other than job destruction; (iii) separation induced by job destruction. The employer and worker characteristic controls for this specification are the same.

The results for this alternative specification are reported in Table 11. Workers in the North and Rural regions, workers with private firms, employee-owners or self-employed, workers associated with small firms, and workers in the transportation sector are much less likely to experience a separation induced by job destruction than the baseline worker. Alternatively, workers who are temporary, and work in agriculture, construction, trade or FIRE

are more likely to experience such transitions.

We also considered the flip side of the transitions -- the hiring side. For this we considered a simple specification with two outcomes for an employed worker in the current period: (i) the worker is incumbent with the firm (i.e., worked for the firm in the prior period); (ii) the worker is a new hire. Again, the worker characteristic and employer characteristics used are the same.

The results for this new hire specification are reported in Table 12. Workers in the Rural region, workers who are employee owners or self-employed or workers in agriculture are less likely to be new hires than the baseline worker. Workers who are with private or collective firms, work for small or medium firms, workers who are temporary, workers who are on an informal contract, and workers in transportation, trade, fire, services, and government are much more likely to be new hires. The differences in probabilities for private sector workers and for small firms are especially large. These results are consistent with those found in Table 6 regarding the surge in job creation and hiring for small and private sector employers. Apparently, those characteristics matter significantly (in both an economic and statistical sense) even after controlling for many other factors.

IX. Comparison of Worker and Job Flows in Estonia with Slovenia

The above analysis points to massive worker as well as job reallocations during Estonia's transition. Because Estonia pursued extremely liberal, radical reforms, it is of interest to compare its worker and job flows with those from less radical transition economies. In this section, we consider comparisons to Slovenia, a country which took sharply different labor market approach. Above all, Slovenia retained a considerable degree of employment protection and adopted much more generous income support policies.

The reforms which have importantly affected worker and job flows in the two countries are summarized in Table 13. As discussed above, Estonia followed a very liberal approach, with few barriers to labor market dislocations or new job creation, meager support of the unemployed, and no effective wage floor. In contrast, Slovenia adopted a much more cautious, interventionist approach, with significant barriers to job dislocation, generous support for unemployed workers and pensioners, and efforts to prevent reductions in real wages below a base level of consumption.

Along each of the areas represented in the table, Slovenia's policies stand out as either less conducive for reallocation of workers or directly opposing separation of workers. For example, Slovenian firms faced much higher separation costs, and in fact received subsidies not to layoff workers. Moreover, generous income support policies and lax enforcement of the provisions for continuation of unemployment benefits have resulted in relatively little incentive to exit unemployment in Slovenia (see Vodopivec 1995). In contrast, Estonia's low unemployment benefit and its short duration have encouraged reemployment. Wage setting mechanisms also differed profoundly between the two countries. In Estonia, few distortions in setting wages and a low tax wage stimulated generation of employment. In contrast, Slovenia's

minimum wages affected employment of the least skilled workers, and taxes and social security contributions were set a much higher rate than in Estonia.

Other reforms in Estonia were also geared toward stimulating labor and job reallocation. Estonian privatization, which emulated the East German Treuhand model, promptly produced concentrated private ownership and thus appropriate incentives for restructuring. The Slovenian approach has been very different – the majority of enterprises were turned to insiders who were much more opposed to reducing employment. Lastly, liberal trade policies, coupled by strong inflow of foreign capital, also contributed to generation of new jobs in Estonia. In this area, too, Slovenia's policies were much conservative and thus less conducive to generation of new jobs. Five years into the Slovenian transition, no sector had greater employment than before the transition began.

Did the profoundly different policies in the two countries generate different worker and job flows? Figure 7 shows that this is indeed the case. As described above, in Estonia both job destruction and, with a lag, job creation rates increased tremendously. Slovenian protectionist and generous policies resulted in much lower intensity of both job destruction and job creation. The most striking difference is on the job creation side, where the rates of Slovenia never even approach the order of magnitude of the Estonian rates. Except for 1994, job creation rates were at or below one percent per year, much lower than in Estonia. The only similarity between the countries was the declining job destruction rate as the transition progressed. But even at the height of restructuring, the Slovenian job destruction rate remained below 60 percent of the

maximum Estonian job destruction rate.¹⁰

Different adjustment paths of the two economies can be observed also from worker flows. Not surprisingly, both separation and accession rates of Estonia were higher than the ones of Slovenia (World Bank, 1998). Moreover, reflecting Slovenia's meager capacity to create jobs, Slovenian workers faced a much lower probability of direct transfers from one job to another (Figure 8).

X. Concluding Remarks

The main results of this analysis are summarized as follows:

1. **Explosion in Magnitude of Worker and Job Flows:** The transition in Estonia led to a massive increase in worker flows driven especially by an increase in job flows. Interestingly, as the situation stabilized, the job and worker flows converged to rates similar to that observed in western economies (although some caution should be used here since our measured job flows are lower bounds on true job flows).
2. **Increase in Job Reallocation Dominated Increase in Worker Reallocation:** In 1989, job reallocation accounted for only a small fraction of overall worker reallocation which was less than 15 percent. By 1993, the worker reallocation rate exceeded 35 percent and more than two thirds of this was accounted for by job reallocation.
2. **Destruction-induced Separations Surged First:** The dramatic increases in job flows were led by very large increases in separations due primarily to an increase in job destruction. Thus, early in the transition in 1992, the situation looked ominous with the separation rate exceeding

¹⁰ It is interesting to note that job flows rates for Estonia are also much higher than those reported for some other non-radical reformers: Bulgaria, Hungary, and Romania (see Bilsen and Konings, 1998).

25 percent and the destruction rate exceeding 10 percent with hires and job creation substantially lower. However, in just a couple of years, hires and job creation surged as well so that by 1994, the hiring rate exceeded the separation rate and the job creation rate exceeded the job destruction rate.

3. Unequal impact of Transition Across Employers: The dramatic increases in job and worker reallocation did not impact all sectors or all types of employers in the same manner. Large, state, manufacturing employers took the brunt of destruction-led separations. Smaller, private, service and trade oriented employers led the surge in hires and job creation. The role of the private sector is especially dramatic. Virtually all of the gross job creation came from private sector enterprises. State and collective enterprises exhibited substantial hiring rates but this primarily reflected replacing departing workers.

4. Large within-sector and between-sector reallocation: The dramatic increase in job reallocation during the transition was associated with large shifts of employment between and within sectors defined on a variety of employer characteristics. Most of the employment shifts were within broad industrial categories. Defining sectors by enterprise type (state vs. private) or by size class, Estonia exhibited substantial between-sector reallocation. Still, for all of the employer characteristics under consideration, large rates of job reallocation among businesses of the same type were observed. For example, even though small and private sector businesses dominated job creation, they also exhibited high rates of job destruction.

5. Unemployment vs. Job-to-Job Flows: The burst of destruction-led separations lead to a large increase in inflows to unemployment but it also led to a large increase in direct job-to-job transitions. For example, direct job-to-job transitions increased from less than 5 percent in 1989

to 15 percent in 1994. About half of this is accounted for by job-to-job movements induced by job destruction.

The picture that emerges from Estonia is clear. Opening up product and labor markets led to a remarkable surge of worker and job flows. Early on in the transition the surge in separations led by job destruction surely looked ominous. Large, state owned enterprises were shedding jobs at extremely high rates. However, within a couple of years, small, private sector enterprises led a surge in hiring and job creation. The restructuring away from large, state owned enterprises to small, private sector enterprises has been nothing short of dramatic. Interestingly, after this period of intense, enormous restructuring, patterns are beginning to look quite “normal” by western economy standards. Annual job creation and destruction rates are roughly around ten percent each, respectively. Moreover, smaller businesses which are inherently turbulent in western economies are beginning to exhibit rates of job creation and destruction that exceed larger businesses.

Even though there are substantial differences in the flows by employer characteristics, an important feature to emphasize is the role of within-sector reallocation. Even among small, private enterprises, there was large scale job reallocation as evidenced by the large rates of job destruction amongst such plants. Thus, one important conclusion is that it is not simply a matter of reallocating jobs away from one type of employer to another that is critical for success in this context.

Estonia is apparently a prime example of a successful and rapid transition brought about by the dramatic opening up of product and labor markets in transition with few barriers for hiring and firing. Estonia has shown that intense restructuring follows the rapid opening up of product

and labor markets but also shows that this can be accommodated without massive increases in unemployment. While it is beyond the scope of this paper to identify all of the circumstances that led to this successful transition episode, the combination of dramatic restructuring and successful transition surely make Estonia a case study worth further analysis.

To follow up on this last point and to conclude, it is useful to consider the case of Estonia relative to other transition economies. As Aslund, Boone and Johnson (1996) (hereafter ABJ) have pointed out, it appears that the rapid reformers have done relatively well (they count Estonia as a rapid reformer that has done quite well). They argue that the weight of the empirical evidence across countries does not favor the arguments that suggest that gradual reform should be preferred. The latter arguments are based on a variety of potential factors: adjustment costs, negative externalities, and/or inherently slow institutional development could conceivably make gradual reform dominate rapid reform on a variety of dimensions. Despite these theoretical arguments, ABJ find that the empirical evidence based upon macro statistics like output growth, inflation and unemployment does not support the view that gradual reformers have performed better. Our evidence on the micro dynamics of job creation, destruction and worker flows should be viewed as complementary with the macro evidence reported in ABJ. Specifically, our evidence points to the fact that a key part of the success of one of the rapid reformers is the dramatic surge in worker and job reallocation rates, without accompanying massive increases in unemployment. To our knowledge, there is not the type of detailed evidence of worker and job flows over a substantial period of time for transition economies like the rates we report for Estonia.¹¹ In light of the ongoing debate about gradual vs.

¹¹ Some limited evidence on worker and job flows for Poland are reported by Konings et. al. (1996). They find evidence of a surge in state-sector job destruction and also evidence of a

rapid reform and the factors that affect the relative success of each strategy, the evidence we have presented for Estonia suggests that it would be very useful to gather and obtain related evidence for other transition economies. The working conjecture suggested by the Estonian evidence is that labor market flexibility plays a vital role in successful transition -- particularly for a rapid reformer.

large pace of worker reallocation post-transition. In addition, there is the limited evidence we present in section IX on Slovenia.

REFERENCES

- Aslund, Anders, Peter Boone and Simon Johnson (1996) "How to Stabilize: Lessons from Post-Communist Countries," *Brookings Papers on Economic Activity: 1*, 1996, 217-313.
- Baily, Martin Neil, Charles Hulten and David Campbell. "Productivity Dynamics in Manufacturing Plants," *Brookings Papers on Economic Activity: Microeconomics*, 1992, 187-249.
- Baldwin, John R. "Turnover and Productivity Growth" in Baldwin, *The Dynamics of Industrial Competition*, Cambridge: Cambridge University Press, 1995, 208-38.
- Baldwin, John R., Tim Dunne and John Haltiwanger. "Plant Turnover in Canada and the United States," in Baldwin (ed.), *The Dynamics of Industrial Competition*, Cambridge: Cambridge University Press, 1995, 119-52.
- Bilsen, Valnetijn and Jozef Konings. "Job Creation, Job Destruction Growth of Newly Established, Privatized, and State-Owned Enterprises in Transition Economies: Survey Evidence from Bulgaria, Hungary, and Romania," *Journal of Comparative Economics*, 26, 429-445, 1998.
- Blanchard, Olivier and Peter Diamond. "The Beverage Curve," *Brookings Papers on Economic Activity*, 1989:1, 1-60.
- Blanchard, Olivier and Peter Diamond. "The Cyclical Behavior of Gross Flows in the U.S.," *Brookings Papers on Economic Activity*, 1990:2, 85-155.
- Bojnec, Stefan and Jozef Konings. "Job Creation, Job Destruction and Labour Demand in Slovenia," Katholieke Universiteit Leuven, Leuven Institute for Central and East European Studies, Working Paper 74/1998.
- Caballero, Ricardo, and Mohamad Hammour. "On the Timing and Efficiency of Creative Destruction," *Quarterly Journal of Economics*, 111(3), 1996, 805-852.
- Davis, Steven J., and John Haltiwanger. "Gross Job Flows," in Ashenfelter and Card (eds.), *Handbook of Labor Economics*, 1998, (forthcoming).
- Davis, Steven J., John C. Haltiwanger and Scott Schuh. *Job Creation and Destruction*, Cambridge: MIT Press, 1996.
- Foster, Lucia, John C. Haltiwanger, and C.J. Krizan, "Aggregate Productivity Growth: Lessons from Micro Evidence," mimeo, 1998.
- Hopenhyn, Hugo, and Richard Rogerson. "Job Turnover and Policy Evaluation: A General Equilibrium Approach," *Journal of Political Economy*, 101(5), 1993, 915-38.

- Jacobson, L.S., R.J. LaLonde, and D.G. Sullivan, "Earnings Losses of Displaced Workers," *American Economic Review*, 83(4), 1993, 685-709.
- Jovanovic, Boyan. "Selection and the Evolution of Industry," *Econometrica*, 50(3), 1982, 649-70.
- Konings, J. H. Lehmann, and M.E. Schaffer, "Job Creation and Destruction in a Transition Economy: Ownership, Firm Size, and Gross Job Flows in Polish Manufacturing," *Labour Economics*, 3(3), 1996, 299-317.
- Noorkoiv, Rivo, Peter F. Orazem, Allan Puur, and Milan Vodopivec, "Employment and Wage Dynamics in the Estonia Transition, 1989-95," 1997, working paper.
- Scarpetta, S., Boeri, T., and Reutersward, A., "Unemployment Benefit Systems and Active Labor Market Policies in Central and Eastern Europe," 1993, OECD-CCET working paper.
- Vodopivec, Milan, "Patterns of Labor Mobility During Estonia's Transition to Market," 1997, working paper.
- Vodopivec, Milan. "Unemployment Insurance and Duration of Unemployment: Evidence from Slovenia," PR Working Paper Series, No. 1552, The World Bank, December 1995, 38 pp.
- World Bank, "Slovenia: Labor Market Issues", Report No. 17741-SLO, 1998.

Table 1: Definitions Of Labor Market Transitions

ESE_t	=	Worker remained employed from $t-1$ to t with the same employer.
EE_t	=	Worker remained employed from $t-1$ to t with different employer.
EU_t	=	Worker transited from employment in period $t-1$ to unemployment in period t .
EI_t	=	Worker transited from employment in period $t-1$ to inactive in period t .
UE_t	=	Worker transited from unemployment in period $t-1$ to employment in period t .
UU_t	=	Worker remained unemployed from $t-1$ to t .
UI_t	=	Worker transited from unemployment in period $t-1$ to inactive in period t .
IE_t	=	Worker transited from inactive in period $t-1$ to employment in period t .
IU_t	=	Worker transited from inactive in period $t-1$ to unemployment in period t .
II_t	=	Worker remained inactive from $t-1$ to t .

Table 2: Reason Of Leaving Employment

1. Reason	In percent
2. Closing Of The Enterprize/Organisation	9.3
3. Reorganization Of The Enterprize/Organisation	10.0
4. Bankruptcy Of The Enterprize/Organisation	3.1
5. Privatization Of The Enterprize/Organisation	1.0
6. Dismissal Initiated By The Employer	3.0
7. Personnel Reduction	16.8
8. Expiration Of Employment Contract	3.6
9. Expiration Of The Trail Time	0.1
10.Military Service	0.7
11.Imprisonment	0.2
12. Illness/ Injury	4.0
13. Studies	1.2
14. Retirement	9.4
15. Marriage/Child Birth	4.3
16. Change Of Residence	1.8
17. Wanted/Was Proposed Higher Salary	13.6
18. Wanted/Was Proposed Better Working Condition	8.0
19. Wanted/Was Proposed More Interesting Work	5.0
20. Wanted To Start Own Business	2.6
21. Main Job Become Second Job	0.6

Table 3: Annual Growth Rates By Sectors (In Percent)

A: REGION			
Year	Capital	North-East	Rural
89	0.15	-2.43	-1.48
90	-0.74	-2.26	-0.64
91	-1.93	-0.69	-2.54
92	-5.82	-10.04	-8.07
93	-0.76	-5.06	-4.44
94	1.59	-1.37	1.12
B: Ownership			
Year	Domestic	Foreign	Joint
89	-0.88	12.50	14.47
90	-1.22	44.44	29.88
91	-2.67	69.23	31.85
92	-10.41	27.27	31.54
93	-5.06	39.28	36.22
94	0.24	51.28	23.59
C: Organization			
Year	Cooperative	Private	State
89	-1.03	63.80	-2.11
90	-3.52	85.71	-2.77
91	-9.00	104.80	-6.51
92	-21.58	77.47	-15.12
93	-21.65	47.78	-12.30
94	-13.05	27.44	-8.22
D: Size			
Year	1-19	20-99	100-499
89	10.02	3.07	-3.22
90	12.82	5.34	-2.96
91	26.52	4.65	-6.95
92	35.28	3.65	-17.67
93	21.84	11.70	-12.69
94	14.78	8.17	-5.99
E: Type of Contract			
Year	Regular	Temporary	Informal
89	-1.54	13.72	50.00
90	-1.94	19.82	44.44
91	-3.81	15.82	38.46
92	-10.15	18.63	19.44
93	-5.73	24.08	48.83
94	-1.29	20.67	34.37
F: Employment Status			
Year	Employee	Employer/Owner	Self-Employed
89	-1.20	10.00	42.42
90	-1.41	45.45	48.93
91	-3.20	58.33	64.28
92	-9.20	25.00	54.78
93	-4.26	52.63	7.30
94	0.13	22.06	8.37

Table 4: Employment Share At The Beginning Of The Year (In Percent)

A: Region				
Year	Capital	North-East	Rural	Missing
89	39.59	14.02	46.12	0.26
90	40.02	13.81	45.86	0.29
91	40.04	13.60	45.93	0.41
92	40.07	13.78	45.67	0.46
93	40.84	13.42	45.44	0.29
94	41.71	13.11	44.74	0.35
95	41.99	12.81	44.83	0.35
B: Ownership				
Year	Domestic	Foreign	Joint	Missing
89	70.02	0.12	1.17	28.66
90	70.05	0.14	1.36	28.43
91	69.75	0.20	1.78	28.25
92	69.27	0.35	2.39	27.97
93	67.16	0.48	3.41	28.93
94	65.65	0.70	4.79	28.77
95	65.21	1.05	5.87	27.85
C: Organization				
Year	Cooperative	Private	State	
89	20.92	1.45	77.61	
90	20.90	2.41	76.68	
91	20.33	4.51	75.15	
92	18.87	9.43	71.68	
93	16.01	18.12	65.85	
94	12.93	27.55	59.43	
95	11.14	34.79	54.05	
D: Size				
Year	1-19	20-99	100-499	500+
89	7.58	17.17	34.65	40.58
90	8.42	17.86	33.85	39.85
91	9.58	18.97	33.11	38.32
92	12.36	20.26	31.43	35.93
93	18.11	22.72	28.01	31.14
94	22.72	26.15	25.16	25.88
95	25.84	28.03	23.44	22.67
E: Type of Contract				
Year	Regular	Temporary	Informal	Missing
89	97.25	1.58	0.18	0.97
90	96.64	1.81	0.28	1.25
91	95.53	2.19	0.41	1.86
92	93.75	2.59	0.57	3.07
93	91.16	3.32	0.74	4.75
94	88.48	4.25	1.14	6.03
95	86.54	5.09	1.53	6.83
F: Employment Status				
Year	Employee	Employer/Owner	Self-Employed	
89	99.02	0.46	0.51	
90	98.74	0.51	0.73	
91	98.13	0.75	1.10	
92	96.92	1.22	1.85	
93	95.24	1.65	3.10	
94	93.89	2.60	3.43	
95	93.16	3.15	3.68	

Table 5: Employment Share And Employment Growth Rate By one-digit Industry (In Percent)

A: Share in the total Employment¹								
Year	Agriculture	Construction	F.I.R.E	Government	Manufacturing	Services	Trade	TransportComm &Util
89	20.10	7.61	4.62	3.97	27.48	18.58	7.58	10.02
90	20.07	7.68	4.52	3.91	27.30	18.61	7.75	10.11
91	19.55	8.12	4.46	3.86	26.69	18.75	8.01	10.49
92	18.53	8.11	4.36	4.04	26.49	18.92	9.03	10.45
93	16.35	7.65	4.84	4.81	24.52	20.28	10.47	11.01
94	13.31	7.22	5.37	5.15	23.17	21.37	12.71	11.55
95	11.97	7.20	5.67	5.37	22.74	21.64	13.61	11.67
B: Growth Rate of Employment								
Year	Agriculture	Construction	F.I.R.E	Government	Manufacturing	Services	Trade	TransportComm &Util
89	-1.08	0.00	-3.02	-2.34	-1.58	-0.75	1.22	0.00
90	-3.35	4.88	-2.07	-2.00	-3.03	-0.08	2.62	2.94
91	-7.10	-2.13	-4.24	2.44	-2.72	-1.09	10.43	-2.40
92	-18.50	-12.80	2.58	9.96	-14.46	-0.93	7.13	-2.61
93	-21.00	-8.42	7.55	4.34	-8.31	2.31	18.13	1.74
94	-9.17	0.70	6.68	5.22	-0.93	2.18	8.05	2.02

1. Shares are calculated at the beginning of the year.

Table 6: Annual Hiring Rate, Separation Rate, Job Creation Rate and Job Destruction Rate By Sectors: (as percent of employment)

By Industry:

	MANUFACTURING				AGRICULTURE				SERVICES			
Year	Hiring Rate	Separation Rate	Creation Rate	Destruction Rate	Hiring Rate	Separation Rate	Creation Rate	Destruction Rate	Hiring Rate	Separation Rate	Creation Rate	Destruction Rate
89	8.57	10.15	0.00	1.58	9.82	9.02	0.00	1.08	12.10	12.85	0.33	1.08
90	11.29	14.33	0.00	3.04	11.38	13.18	0.00	3.35	15.55	15.64	3.28	3.36
91	14.66	17.38	3.31	6.03	7.94	18.48	0.00	7.10	15.99	17.08	4.37	5.47
92	14.40	28.87	0.00	14.46	13.99	32.49	1.65	20.15	23.74	24.68	8.93	9.87
93	20.18	28.50	5.54	13.85	15.67	36.67	3.30	24.30	23.79	21.47	9.70	7.38
94	25.65	26.58	10.1	11.00	15.92	25.10	0.13	9.31	22.33	20.15	9.32	7.22
	TRADE				TRANSPORT/UTILITY/COMMERCE				CONSTRUCTION			
Year	Hiring Rate	Separation Rate	Creation Rate	Destruction Rate	Hiring Rate	Separation Rate	Creation Rate	Destruction Rate	Hiring Rate	Separation Rate	Creation Rate	Destruction Rate
89	10.42	9.20	2.04	0.81	9.28	9.28	0.77	0.77	11.81	11.81	□ 2.24	□ 2.24
90	17.77	15.15	5.45	2.82	12.38	9.44	5.88	2.94	21.38	16.49	9.57	4.68
91	30.90	20.47	17.52	7.08	14.13	16.54	3.45	5.86	18.64	20.77	6.01	8.15
92	40.64	33.51	25.66	18.53	17.72	20.33	7.39	10.01	22.22	35.11	4.76	17.65
93	49.58	31.44	34.27	16.13	22.46	20.72	9.65	7.91	28.01	36.44	8.65	17.08
94	42.25	34.22	22.39	14.64	23.63	21.61	10.57	8.55	27.86	27.11	10.94	10.19

By Region:

	CAPITAL				NORTH-EAST				RURAL			
Year	Hiring Rate	Separation Rate	Creation Rate	Destruction Rate	Hiring Rate	Separation Rate	Creation Rate	Destruction Rate	Hiring Rate	Separation Rate	Creation Rate	Destruction Rate
89	9.99	9.83	1.92	1.76	10.28	12.72	0.00	2.43	9.14	10.62	0.00	1.48
90	14.55	15.29	3.48	4.22	10.65	12.92	0.22	2.49	13.24	13.89	2.45	3.10
91	17.81	19.74	5.95	7.88	14.38	15.08	3.59	4.29	15.60	18.14	3.33	5.87
92	24.59	30.42	9.80	15.63	16.82	26.86	3.38	13.43	19.39	27.46	5.57	13.64
93	28.76	29.53	13.53	14.29	19.35	24.41	7.79	12.85	23.74	28.19	9.85	14.30
94	28.68	27.09	12.04	10.58	18.74	20.10	6.29	7.79	26.61	25.49	11.04	9.91

Table 6: Continued**By Ownership Type:**

	DOMESTIC				FOREIGN				JOINT			
Year	Hiring Rate	Separation Rate	Creation Rate	Destruction Rate	Hiring Rate	Separation Rate	Creation Rate	Destruction Rate	Hiring Rate	Separation Rate	Creation Rate	Destruction Rate
89	9.28	10.17	0.57	1.46	25.00	12.50	12.50	0.00	22.36	7.89	14.47	0.00
90	13.11	14.34	2.10	3.33	55.55	11.11	55.55	11.11	48.80	17.85	35.71	4.76
91	16.20	18.88	3.97	6.65	84.61	15.38	84.61	15.38	51.37	18.34	40.36	7.33
92	20.43	30.94	6.05	16.56	80.95	52.38	57.14	28.57	61.26	28.16	41.54	8.45
93	27.07	32.19	12.20	17.31	57.14	17.85	50.00	10.71	67.89	30.52	50.52	13.15
94	27.75	27.50	11.27	11.02	94.87	43.58	71.79	20.51	56.81	32.95	36.74	12.87

By Enterprise Type:

	COLLECTIVE				PRIVATE				STATE			
Year	Hiring Rate	Separation Rate	Creation Rate	Destruction Rate	Hiring Rate	Separation Rate	Creation Rate	Destruction Rate	Hiring Rate	Separation Rate	Creation Rate	Destruction Rate
89	9.89	10.93	0.37	1.41	70.21	6.38	64.89	1.06	8.60	10.72	0.00	2.12
90	12.49	16.09	0.38	3.98	104.54	18.83	93.50	7.79	11.17	13.99	0.45	3.26
91	12.30	21.88	0.00	9.57	126.05	20.42	113.73	8.09	11.59	18.32	0.00	6.73
92	13.21	36.42	0.00	23.21	104.77	27.30	89.42	11.94	13.06	28.91	0.00	15.84
93	15.06	37.59	0.00	22.53	76.51	28.68	59.96	12.12	14.63	27.74	0.44	13.56
94	17.07	30.44	0.00	13.37	59.77	32.33	38.98	11.53	14.06	22.77	0.54	9.25

Table 6: Continued
By Employment Size:

	1-19				20-99				100-499				500+			
Year	Hiring Rate	Sepa. Rate	Creation Rate	Destruc. Rate	Hiring Rate	Sepa. Rate	Creati. Rate	Destruc. Rate	Hiring Rate	Sepa. Rate	Creati. Rate	Destruc. Rate	Hiring Rate	Sepa. Rate	Creati. Rate	Destruc. Rate
89	23.72	13.70	10.83	0.81	14.09	11.02	4.60	1.53	7.78	11.01	0.00	3.22	6.91	9.63	0.00	2.71
90	32.15	19.33	18.95	6.13	19.63	14.28	9.20	3.85	11.51	14.47	0.83	3.79	8.56	13.16	0.00	4.59
91	49.42	22.89	35.25	8.73	23.87	19.21	10.89	6.23	11.15	18.11	0.00	6.95	9.06	17.17	0.00	8.11
92	58.59	23.30	46.22	10.93	32.51	28.85	15.02	11.36	13.37	31.04	0.00	17.67	8.65	28.55	0.00	19.90
93	48.70	26.85	33.39	11.54	36.19	24.46	21.62	9.89	18.60	31.30	5.04	17.73	9.68	29.04	0.00	19.36
94	43.99	29.22	26.22	11.53	32.80	24.63	16.54	8.44	19.53	25.51	4.70	10.83	11.50	23.17	0.00	11.58

By Contract Type:

	REGULAR CONTRACT				TEMPORARY CONTRACT				INFORMAL CONTRACT			
Year	Hiring Rate	Separation Rate	Creation Rate	Destruction Rate	Hiring Rate	Separation Rate	Creation Rate	Destruction Rate	Hiring Rate	Separation Rate	Creation Rate	Destruction Rate
89	9.23	10.78	0.00	1.54	21.56	7.84	14.70	0.98	50.00	0.00	50.00	0.00
90	12.36	14.30	1.42	3.37	37.93	18.10	29.31	9.48	61.11	16.66	50.00	5.55
91	14.68	18.50	2.59	6.41	29.49	13.66	22.30	6.47	76.92	38.46	61.53	23.07
92	18.76	28.91	4.39	14.55	55.28	36.64	40.37	21.73	63.88	44.44	41.66	22.22
93	22.75	28.48	8.73	14.47	60.20	36.12	39.79	15.70	95.34	46.51	67.44	18.60
94	24.03	25.33	8.33	9.71	58.22	37.55	41.77	21.09	76.56	42.18	50.00	15.62

By Employment Status:

	EMPLOYEE				EMPLOYER -OWNER				SELF EMPLOYED			
Year	Hiring Rate	Separation Rate	Creation Rate	Destruction Rate	Hiring Rate	Separation Rate	Creation Rate	Destruction Rate	Hiring Rate	Separation Rate	Creation Rate	Destruction Rate
89	9.51	10.71	0.26	1.47	13.33	3.33	10.00	0.00	48.48	6.06	42.42	0.00
90	12.97	14.38	2.07	3.48	51.51	6.06	48.48	3.03	61.70	12.76	51.06	2.12
91	15.28	18.48	3.28	6.48	81.25	22.91	70.83	12.50	74.28	10.00	67.14	2.85
92	20.00	29.21	5.58	14.78	43.42	18.42	36.84	11.84	66.08	11.30	57.39	2.60
93	24.63	28.89	10.28	14.54	65.26	12.63	58.94	6.31	23.59	16.29	11.79	4.49
94	26.22	26.09	10.36	10.30	34.48	12.41	27.58	5.51	28.27	19.89	13.61	5.2

Table 7: Fraction of Excess Job Reallocation Resulting From Employment Shifts Between Sectors: Means of Values, 1992 to 1994

Sectoral Classification	Number of Groups in Sector:	Fraction Resulting from Shifts Between Sector
Industry	9	0.10
Region	3	0.004
Ownership Type	3	0.05
Enterprise Type	3	0.41
Employer Size	4	0.29
Contract Type	3	0.05
Employment Status	3	0.10

Table 8: Annual Inflow, Inflow Due Job Destruction and Outflow Rate From Unemployment: (as percent of employment)

By Industry:

	MANUFACTURING			AGRICULTURE			SERVICES		
Year	Outflow	Inflow	Inflow (Destructi.)	Outflow	Inflow	Inflow (Destructi.)	Outflow	Inflow	Inflow (Destructi.)
89	0.33	0.22	0.16	0.23	0.15	0.00	0.50	0.50	0.16
90	0.28	0.51	0.34	0.15	0.31	0.23	0.25	0.58	0.25
91	0.47	1.30	0.82	0.08	1.37	0.72	0.58	1.01	0.67
92	0.72	4.31	3.46	0.17	4.77	3.99	0.59	2.72	2.04
93	2.77	5.33	4.12	1.49	6.82	5.75	2.40	2.31	1.71
94	3.56	4.65	3.02	3.23	4.31	2.29	3.61	2.68	1.93
	TRADE			TRANSP/UTIL/COMMERCE			CONSTRUCTION		
Year	Outflow	Inflow	Inflow (Destructi.)	Outflow	Inflow	Inflow (Destructi.)	Outflow	Inflow	Inflow (Destructi.)
89	0.40	0.00	0.00	0.30	0.00	0.00	0.20	0.00	0.00
90	0.00	0.60	0.40	0.15	0.30	0.00	0.40	0.61	0.40
91	0.78	1.57	0.98	0.30	1.65	1.20	0.19	1.16	0.77
92	1.96	4.99	3.20	1.07	3.23	2.15	0.99	6.34	4.16
93	5.32	5.15	3.66	2.37	2.84	2.21	2.27	4.55	2.73
94	6.35	5.08	3.53	3.57	5.90	3.73	3.48	5.97	3.73

By Region:

	CAPITAL			NORTH-EAST			RURAL		
Year	Outflow	Inflow	Inflow (Destructi.)	Outflow	Inflow	Inflow (Destructi.)	Outflow	Inflow	Inflow (Destructi.)
89	0.43	0.15	0.03	0.22	0.11	0.00	0.26	0.23	0.13
90	0.27	0.27	0.19	0.11	0.45	0.34	0.23	0.54	0.27
91	0.31	1.57	1.10	0.46	1.16	0.69	0.44	1.16	0.68
92	1.28	3.37	2.85	0.46	5.84	3.50	0.74	4.19	3.13
93	3.03	3.62	2.56	2.98	5.06	4.15	2.10	5.10	4.02
94	3.44	4.26	2.62	3.69	3.83	2.05	4.37	4.73	3.17

By Ownership type:

	DOMESTIC			FOREIGN			JOINT		
Year	Outflow	Inflow	Inflow (Destructi.)	Outflow	Inflow	Inflow (Destructi.)	Outflow	Inflow	Inflow (Destructi.)
89	0.33	0.17	0.08	0.00	0.00	0.00	1.31	0.00	0.00
90	0.22	0.44	0.26	0.00	0.00	0.00	1.14	0.00	0.00
91	0.38	1.42	0.85	0.00	0.00	0.00	2.65	1.76	0.88
92	0.90	4.60	3.53	4.54	13.63	9.09	1.34	2.01	1.34
93	2.80	5.37	4.23	0.00	0.00	0.00	7.65	4.08	3.57
94	3.99	4.89	3.28	30.76	15.38	7.69	7.11	4.11	2.62

Table 8: continued

By Enterprise Type:

	COLLECTIVE			PRIVATE			STATE		
Year	Outflow	Inflow	Inflow (Destructi.)	Outflow	Inflow	Inflow (Destructi.)	Outflow	Inflow	Inflow (Destructi.)
89	0.29	0.14	0.00	3.19	0.00	0.00	0.27	0.19	0.09
90	0.14	0.37	0.22	2.59	1.29	1.29	0.18	0.42	0.22
91	0.15	1.39	0.69	2.79	1.39	1.04	0.31	1.30	0.88
92	0.17	4.26	3.49	4.43	3.07	2.04	0.65	4.20	3.10
93	1.63	7.29	6.20	7.88	4.42	2.69	1.40	3.83	2.99
94	2.63	5.41	3.47	8.53	5.21	2.93	2.14	3.89	2.65

By Employment Size:

	1-19			20-99			100-499			500+		
Year	Outflow	Inflow w	Inflow (Destr)	Outflow w	Inflow	Inflow (Destr)	Outflow	Inflow	Inflow (Destr)	Outflow	Inflow w	Inflow (Destr)
89	1.02	0.40	0.00	0.45	0.18	0.09	0.22	0.17	0.04	0.22	0.15	0.11
90	0.55	0.74	0.55	0.43	0.70	0.35	0.09	0.23	0.13	0.19	0.43	0.23
91	0.98	1.64	1.15	0.83	1.58	0.83	0.14	1.09	0.66	0.24	1.31	0.94
92	2.73	2.60	1.95	1.27	4.21	2.38	0.51	4.76	3.84	0.44	3.98	3.18
93	4.33	4.71	3.36	4.37	3.83	2.83	1.61	4.85	3.92	1.23	4.53	3.52
94	6.40	4.34	2.84	4.94	3.84	2.40	2.99	4.63	2.78	1.80	4.99	3.33

By Contract Type:

	REGULAR CONTRACT			TEMPORARY CONTRACT			INFORMAL CONTRACT		
Year	Outflow	Inflow	Inflow (Destructi.)	Outflow	Inflow	Inflow (Destructi.)	Outflow	Inflow	Inflow (Destructi.)
89	0.30	0.19	0.07	0.98	0.00	0.00	0.00	0.00	0.00
90	0.21	0.42	0.22	0.00	0.86	0.86	5.55	5.55	5.55
91	0.38	1.32	0.85	0.71	2.15	1.43	3.84	3.84	0.00
92	0.84	4.12	3.07	2.48	8.07	6.21	2.77	5.55	5.55
93	2.35	4.55	3.46	7.32	6.80	6.28	16.27	6.97	6.97
94	3.57	4.44	2.80	9.28	6.75	5.06	20.31	10.93	9.37

By Employment Status:

	EMPLOYEE			EMPLOYER/OWNER			SELF EMPLOYED		
Year	Outflow	Inflow	Inflow (Destructi.)	Outflow	Inflow	Inflow (Destructi.)	Outflow	Inflow	Inflow (Destructi.)
89	0.31	0.18	0.07	3.33	0.00	0.00	0.00	0.00	0.00
90	0.22	0.44	0.25	0.00	0.00	0.00	2.12	0.00	0.00
91	0.40	1.35	0.86	0.00	0.00	0.00	0.00	0.00	0.00
92	0.89	4.23	3.17	1.31	0.00	0.00	1.73	0.00	0.00
93	2.63	4.64	3.58	3.15	1.05	1.05	1.68	1.68	0.56
94	4.03	4.62	2.98	1.37	1.37	1.37	4.18	2.09	0.00

**Table 9 : Annual flow of Job to Job and Job to Job due to Job Destruction By Sectors:
(as percent of employment)
By Industry:**

	MANUFACTURING		AGRICULTURE		SERVICES	
Year	Job-Job Rate	Due to Destruction	Job-Job Rate	Due to Destruction	Job-Job Rate	Due to Destruction
89	5.92	0.90	3.70	0.84	6.34	0.83
90	7.74	2.00	7.87	2.49	8.41	2.35
91	9.46	4.13	10.25	4.76	8.67	3.45
92	12.40	6.80	19.02	13.55	11.31	4.85
93	15.56	7.67	22.28	15.45	11.16	4.38
94	15.81	6.20	14.97	5.53	11.00	3.86
	TRADE		TRANSP/UTIL/COMMERCE		CONSTRUCTION	
Year	Job-Job Rate	Due to Destruction	Job-Job Rate	Due to Destruction	Job-Job Rate	Due to Destruction
89	2.86	0.20	5.26	0.77	7.94	2.03
90	6.46	1.61	5.72	2.01	11.81	3.46
91	11.02	4.92	10.22	3.60	15.92	6.60
92	18.36	12.29	10.78	5.85	21.62	10.51
93	19.80	9.98	13.29	4.74	23.23	12.52
94	22.88	8.89	10.73	3.73	16.91	5.72

By Region:

	CAPITAL		NORTH-EAST		RURAL	
Year	Job-Job Rate	Due to Destruction	Job-Job Rate	Due to Destruction	Job-Job Rate	Due to Destruction
89	5.68	1.29	7.74	1.32	4.94	0.87
90	10.05	3.09	6.46	1.36	7.23	2.28
91	12.45	5.40	8.00	3.24	9.75	4.02
92	17.56	9.44	12.03	8.17	13.15	7.68
93	19.03	9.38	12.85	7.27	15.68	8.40
94	17.39	6.28	10.41	4.24	14.53	5.41

By Ownership Type:

	DOMESTIC		FOREIGN		JOINT	
Year	Job-Job Rate	Due to Destruction	Job-Job Rate	Due to Destruction	Job-Job Rate	Due to Destruction
89	5.36	1.01	0.00	0.00	1.31	0.00
90	8.33	2.41	11.11	11.11	12.64	4.59
91	11.06	4.79	15.38	15.38	7.07	1.76
92	16.18	9.78	22.72	13.63	16.10	5.36
93	19.30	10.64	10.71	7.14	17.85	7.65
94	16.90	6.29	20.51	10.25	17.60	7.11

Table 9 : Continued
By Enterprise Type:

	COLLECTIVE		PRIVATE		STATE	
Year	Job-Job Rate	Due to Destruction	Job-Job Rate	Due to Destruction	Job-Job Rate	Due to Destruction
89	4.59	0.74	4.25	1.06	5.97	1.19
90	8.83	3.14	9.74	4.54	8.04	2.24
91	11.80	5.51	14.68	5.59	10.08	4.15
92	20.39	13.13	17.40	8.02	13.09	7.36
93	21.21	13.16	18.84	7.88	15.00	7.75
94	18.33	7.77	21.18	7.17	11.69	4.44

By Employment Size:

	1-19		20-99		100-499		500+	
Year	Job-Job Rate	Due to Destruction	Job-Job Rate	Due to Destruction	Job-Job Rate	Due to Destruction	Job-Job Rate	Due to Destruction
89	5.52	0.81	6.68	1.08	5.95	1.47	5.00	0.84
90	11.15	4.27	7.36	2.80	8.83	2.72	7.54	1.76
91	15.48	6.75	10.31	3.57	10.10	4.52	10.04	4.36
92	14.71	7.29	15.02	6.20	14.75	9.57	14.97	9.32
93	16.36	6.35	13.42	5.44	19.66	11.63	16.62	9.62
94	19.68	7.43	14.14	4.60	14.91	5.99	12.49	4.71

By Contract Type:

	REGULAR CONTRACT		TEMPORARY CONTRACT		INFORMAL CONTRACT	
Year	Job-Job Rate	Due to Destruction	Job-Job Rate	Due to Destruction	Job-Job Rate	Due to Destruction
89	5.72	1.13	3.92	0.00	0.00	0.00
90	8.27	2.47	8.62	4.31	11.11	0.00
91	10.60	4.42	7.19	3.59	19.23	15.38
92	14.92	8.58	18.01	10.55	22.22	11.11
93	16.69	8.91	23.03	8.90	25.58	9.30
94	14.98	5.42	20.67	11.81	21.87	6.25

By Employment Status:

	EMPLOYEE		EMPLOYER/OWNER		SELF-EMPLOYED	
Year	Job-Job Rate	Due to Destruction	Job-Job Rate	Due to Destruction	Job-Job Rate	Due to Destruction
89	5.68	1.11	3.33	0.00	3.03	0.00
90	8.29	2.50	3.03	0.00	6.38	2.12
91	10.56	4.45	20.83	12.50	10.00	2.85
92	15.05	8.65	14.47	9.21	6.08	0.86
93	16.98	8.91	8.42	4.21	12.35	2.80
94	15.32	5.72	9.65	3.44	15.18	4.71

Table 10: Probability of Transitions from Job (in percent *,)**

	Probability of staying on the same job ***	probability of moving one job to the another job	probability of moving from job to unemployment	probability of moving from job to inactivity
Baseline Probability ****	73.29	17.56	3.05	6.10
Difference in probability associated with Enterprise characteristics:				
A: Area				
North	5.79	-5.39	0.11	-0.51
Rural	2.80	-4.78	1.19	0.79
B. Organization				
Cooperative	-4.81	1.01	4.45	-0.65
Private	2.08	-0.39	-0.69	-1.00
C: Ownership				
Foreign	1.68	-3.48	-0.54	2.34
Joint	-1.60	-5.35	3.48	3.48
D: Size				
0-19	2.67	-0.92	-0.26	-1.49
20-99	3.25	-2.84	-0.44	0.03
100-499	-0.63	0.59	0.09	-0.05
E: Employment Status				
Employer/Owner	15.43	-10.59	-2.41	-2.43
Self-Employed	12.00	-6.71	-2.13	-3.16
F: Type of Contract				
Temporary	-4.25	2.55	1.00	0.70
Informal	-6.66	0.84	1.14	1.14
G: Industry Type				
Agriculture	-4.00	3.25	0.42	0.33
Transport	6.75	-4.13	-0.55	-2.07
Construction	-4.71	3.73	0.43	0.55
Trade	-5.57	4.89	0.51	0.17
F.I.R.E.	-2.73	2.72	-0.32	0.32
Service	2.12	-1.02	-0.73	-0.37
Government	-1.03	2.08	0.51	-1.56

* Probability associated with coefficients which are significant at 10% levels are reported in bold.

**Several worker characteristics are included in the multinomial regression but not reported here.

*** Probabilities associated with staying on the same job are calculated from other choices, so the significance levels are not reported.

**** Baseline probability applies for individuals with following characteristics: Estonian males, age 30 to 40, with secondary education, with 10 to 20 years of work experience, married, working regular in state sector, domestically owned manufacturing firm with more than 500 employee in the capital area.

Table 11: Probability of being Separated from Job (in percent *,)**

	Probability of staying on the same job***	Probability of being Separated from job for reason other than job destruction	Probability of being Separated from job due to job destruction
Baseline Probability ****	71.60	13.18	15.22
Difference in probability associated with Enterprise characteristics:			
A: Area			
North	5.81	-2.08	-3.73
Rural	2.82	-1.20	-1.62
B. Organization			
Cooperative	-1.57	0.57	0.99
Private	2.51	-0.12	-2.38
C: Ownership			
Foreign	2.15	-0.47	-1.68
Joint	-2.05	-0.11	2.17
D: Size			
0-19	2.65	-1.07	-1.58
20-99	3.49	0.10	-3.59
100-499	-0.76	-0.45	1.22
E: Employment Status			
Employer/Owner	15.98	-8.32	-7.66
Self-Employed	13.58	-3.07	-10.51
F: Type of Contract			
Temporary	-5.69	-1.03	6.72
Informal	-6.44	2.62	3.82
G: Industry Type			
Agriculture	-4.46	-2.01	6.48
Transport	7.18	-2.49	-4.70
Construction	-4.80	2.31	2.49
Trade	-5.99	-0.32	6.31
F.I.R.E.	-3.02	-0.17	3.19
Service	2.54	-1.11	-1.43
Government	-1.25	-2.22	3.47

* Probability associated with coefficients which are significant at 10% levels are reported in bold.

** Several worker characteristics are included in the multinomial regression but not reported here.

*** Probabilities associated with staying on the same job are calculated from other choices, so the significance levels are not reported.

**** Baseline probability applies for individuals with following characteristics: Estonian males, age 30 to 40, with secondary education, with 10 to 20 years of work experience, married, working regular in state sector, domestically owned manufacturing firm with more than 500 employee in the capital area.

Table 12: Probability of being hired (in percent *,)**

	Probability of being hired
Baseline Probability ***	6.61
Difference in probability associated with Enterprise characteristics:	
A: Area	
North	-0.54
Rural	-1.38
B. Organization	
Cooperative	4.31
Private	29.14
C: Ownership	
Foreign	0.80
Joint	1.46
D: Size	
0-19	8.36
20-99	7.12
100-499	3.67
E: Employment Status	
Employer/Owner	-2.87
Self-Employed	-3.64
F: Type of Contract	
Temporary	6.80
Informal	3.11
G: Industry Type	
Agriculture	-1.81
Transport	2.30
Construction	-0.87
Trade	1.08
F.I.R.E.	3.78
Service	3.39
Government	12.33

*Probability associated with coefficients which are significant at 10% levels are reported in bold.

** Several worker characteristics are included in the multinomial regression but not reported here.

*** Baseline probability applies for individuals with following characteristics: Estonian males, age 30 to 40, with secondary education, with 10 to 20 years of work experience, married, working regular in state sector, domestically owned manufacturing firm with more than 500 employee in the capital area.

Table 13: Comparison of Economic Policies in Transition: Estonia and Slovenia

	Estonia	Slovenia
	Change relative to pretransition	Change relative to pretransition
Employment protection legislation	Layoffs legally permitted Liberal dismissal policies No job preservation subsidies	Layoffs legally permitted Dismissal policies restrictive Sizable subsidies to preserve jobs
Unemployment benefits	Duration of 6 months, expandable to 9 months in limited cases Benefit less than 10% of the average wage	Maximum duration of 24 months Replacement rate equal 70 percent, and after 3 months, 60 percent
Wage policies	Low minimum wage Low tax wedge	High minimum wage High tax wedge
Collective agreements on wages	Eight percent of workers covered by collective agreements	All workers covered by collective agreements
Privatization	Individual sale methods--effects on corporate governance already noticeable	Mixed method--effects on corporate governance have been small
Foreign trade	No tariffs or quotas on imports	Up to 28 percent tariff rates on imports
Direct foreign investment 1989-96	Cumulative inflow per capita (1989-96): \$459	Cumulative inflow per capita (1989-96): \$366

Figure 1: Annual and Quarterly Rates

Figure 2: Annual Labor Market Transitions In Estonia (in percent)

These rates are calculated with the employment level at the beginning of the year as the base.

**Figure 3: Annual Rates of
Worker and Job Reallocation**

Figure 4: Annual Unemployment Outflow And Inflow Rate

Figure 5: Quarterly Unemployment Outflow And Inflow Rate

Figure 6: Job to Job Rate and Job to Job Due to Job Destruction

Figure 7: Job Creation and Job Destruction, Estonia and Slovenia

Source: for Estonia, own calculations; for Slovenia, Bojnec and Konings (1998).

Figure 8: Job-to-Job Transitions, Estonia and Slovenia

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