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***The Incidence and Cost of Job Loss in a Transition Economy:  
Displaced Workers in Estonia, 1989-1999***

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**THE INCIDENCE AND COST OF JOB LOSS IN A TRANSITION ECONOMY.  
DISPLACED WORKERS IN ESTONIA, 1989-1999**

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### **Abstract**

We examine the pattern and costs of worker displacement in one of the more reform-oriented transition countries, Estonia, as the transition process develops. Using Labour Force Survey data covering the period 1989-1999, we show that after the initial shock, displacement rates in Estonia have fallen back to levels observed in several western economies, as the economy picks up. The incidence of displacement is also similar to that in the West – concentrated on the less skilled and those with short job tenure. Roughly half of those displaced find re-employment within two months while the other half lingers on in the state of non-employment. There is less evidence however of a wage penalty to job loss, unlike in some Western countries, a fact one might attribute more to the nature of the transition process than to wage setting institutions in Estonia. The main cost of displacement is then the income loss due to non-employment, which is severe for a minority of workers who experience long-term non-employment.

**Key words:** Displaced workers, labour markets in transition

**JEL Classification No.:** J64, J65, P50.

## **The Incidence and Cost of Job Loss in a Transition Economy. Displaced Workers in Estonia, 1989-1999**

**Hartmut Lehmann, Kaia Phillips and Jonathan Wadsworth**

*“Toto, I’ve a feeling we are not in Kansas any more” – Dorothy in the ‘Wizard of Oz’*

### **1. Introduction**

Most transition economies go through deep recessions at the onset of the shift from planned to market economy. Estonia was no exception. This paper is concerned with identifying the workers displaced by the transition process and the costs associated with that upheaval. There is a large empirical Western literature on job displacement, summarised in Kletzer (1998) and Kuhn (2002), which has endeavoured to establish the extent, incidence and costs of displacement. As Jacobsen, LaLonde and Sullivan (1993a) point out, policy-makers need to be aware of the size of the losses borne by displaced workers when considering intervention, training or compensation. These features seem particularly pertinent for transition economies where institutional structures are often evolving as rapidly as large scale restructuring and reallocation in the labour market. Even if quits comprise the major share of separations from jobs in transition economies, the scale of the reallocation process is often such that large numbers of displaced workers result from the shock of transition.

The western literature on displacement focuses on seniority, firm-specific human capital premia and union wage premia as the main reasons why there could be substantial earnings losses for displaced workers. In mainland Europe, the cost of job loss appears to be lower than in the United States or in Britain, (see Kuhn (2002)) and this appears to be driven by institutional features in Europe, which cushion unemployment income, job finding and pay in return jobs. In many transition economies, institutional factors are less

likely to ameliorate the costs of job loss. Unions play a relatively minor role in the wage determination process, and welfare support systems are rather under-developed and ungenerous, (Boeri and Terrell (2002)). In contrast, it might be that the nature of a transition economy, with more rapid restructuring and labour reallocation than in the West, (Davis and Haltiwanger (1999)), could create a sufficiently dynamic environment where job moves occur quickly and productivity levels in the new and restructured sectors offer relatively high wage prospects. In this case, the welfare costs of job loss could be relatively low. As yet, little empirical evidence on displaced workers exists for transition economies, which can help distinguish between these possible outcomes.

In Estonia, employment protection legislation appears comparable to that in many western European countries, (see annex 2 and Kuhn (2002)). This would suggest, other things equal, that the incidence of job loss should also be broadly comparable. However the potential costs of job loss could be high since the criteria for unemployment benefit are rather strict, unemployment payments are flat-rate and very low, even by the standards set in other transition economies (see annex). While this makes it necessary for most individuals to try to return to work rapidly, the implied high search costs resulting from low benefits may compromise efficient matching and may increase the likelihood of wage penalties associated with displacement.

The other potential costs of job loss stem from differences in wages between old and new jobs. Wage-setting institutions help determine both the wages displaced workers have at the time of dismissal as well as their re-entry wages. In the early stages of Estonian transition, unions were virtually absent and wages were still tied to Soviet wage grids, which did have an in-built recognition of seniority, so that higher tenured workers

could expect to receive higher wages. If these workers lose their jobs, their skills gained under the old order may, however, not be in demand in a restructuring transition economy, as Lehmann and Wadsworth (2000) argue, and they then may suffer most from displacement. Haltiwanger and Vodopivec (2002) document large job creation rates in Estonia during the early stages of transition. This might indicate that Estonia was indeed sufficiently dynamic for many workers to obtain wages comparable or higher to those in the job from which displacement occurred.<sup>1</sup>

Hence, our intuition does not give us clear guidance as to the likely wage change following displacement and eventual reemployment in a transition economy and empirical evidence is required. If displaced workers can find new work relatively quickly and receive wages that exceed those in their former job then there may be less concern over job displacement than if long-term unemployment and a future of low paying jobs is the norm.

This study tries to establish the facts about worker displacement in Estonia in the years after transition. We analyse how the pattern of displacement has changed from the initial stages of transition to the present, more mature, stage of transition. We compare how the characteristics of displaced workers differ from other workers who experience joblessness and those workers who manage to avoid non-employment through transition and whether these characteristics have changed over time. We then estimate hazard rates from non-employment for displaced workers and for those who quit their jobs to see whether displaced workers experience longer or shorter non-employment spells and

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<sup>1</sup> If outside wage prospects are good, why do workers not quit their old job before displacement? In a transition economy workers might not do so because of uncertainty. While it might be generally true that workers who find employment in some industries in the private sector have higher wages and/or wage

whether there are systematic differences across the two groups. We also present difference-in-difference estimates of the earnings change associated with displacement in order to establish the extent of any pecuniary costs of job displacement. The next section outlines the data used in our study, while sections 3 and 4 discuss the incidence, duration and cost of job loss during transition respectively. Section 5 offers some conclusions on the overall cost of displacement.

## 2. Data

Our principal sources of information are the 1995, 1997 and 1999 Estonian Labour Force Surveys, (ELFS). Undertaken in the spring of each year, the ELFS sampled around 10000 and 12000 working age individuals in 1995 and 1999, while in 1997 only about 5000 were sampled. Each survey contains a retrospective labour market history section, which invites respondents to give details of changes in their labour market status and income between January 1989 and December 1994, in the case of the 1995 survey, between January 1995 and January 1997, in the case of the 1997 survey, and between January 1998 and January 1999, in the case of the 1999 survey. Our definition of a displaced worker mirrors that used in the western literature. Displaced workers are generally taken to be those separated involuntarily from their jobs by mass layoff or plant closure. Workers dismissed because of individual job performance are often excluded from this definition because of concerns whether such separations should be categorised as displacement. In the Estonian context, the survey questionnaire allows us to distinguish between job loss because of plant closure, personnel reductions, dismissal or

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growth than in the old state job, it is not clear in a transition environment that the worker will find re-employment rapidly, so the expected return to mobility could be negative.

privatisation. Since we cannot be sure that dismissal is individual or mass-based we retain these individuals in our definition of displacement.<sup>2</sup> We also identify those who left their jobs for other reasons – temporary workers, parental leave, retirements and those who quit their jobs in the hope of finding something better. In most of what follows we group these job leavers together.

All survey data that try to capture displacement are plagued to some degree by a selection bias. If workers have rational expectations about the economic viability of their firm then those workers with good prospects in the labour market might quit the firm before it is closed down or before mass layoffs occur, leaving those colleagues with “worse” characteristics behind. In restructuring firms that do not close down but initiate mass layoffs, “better quality” workers might, however, remain with the firm as post-restructuring productivity gains might imply high wage growth.<sup>3</sup> Whatever the selection mechanism, as long as this mechanism exists, displacement is not a purely exogenous event. It would be so if economic reality mimicked a social experiment, where from one day to the next a lottery would decide who is to be displaced and who is not. Seen in this way, displacement can never be purely exogenous.

Are selection problems related to mass layoffs and plant closure particularly strong in a transition economy? Potential failure or poor performance of firms might be to easier to perceive in a transition economy and good workers might then be more likely to leave the firm long before closure or large-scale labour shedding than in the West. On the other hand, good workers may have more reason to hold on to their old job in restructuring

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<sup>2</sup> The numbers of workers who say they are dismissed is very small in practice, no more than 3% of the total displaced stock. For a discussion of the advantages and disadvantages of survey data that try to capture displacement see Kuhn (2002).



firms because of higher future rewards after restructuring. Workers may also hold on to their jobs because of greater uncertainty in a rapidly changing transition labour market. This uncertainty is particularly strong in the early stages of transition, when most displacement occurs in Estonia, as we show below. Which of these scenarios prevails in a transition economy is not clear a priori. We allow for unobserved heterogeneity in the estimates of jobless duration and the cost of job loss which follow. When comparing those who quit with those who are displaced, a caveat of potential selection bias should be kept in mind.<sup>4</sup>

We have information on the year and month of any job change and the duration of any intervening non-employment spell. Respondents are also asked to give gross monthly wages received at certain periods covered by the survey. If a worker leaves or loses a job they are asked to give their final salary (gross monthly Eesti Kroons, (EEK)). If a worker starts a new job they are asked to give their starting salary. Those who stay in their job are asked to give their wages in October of each year between 1989 and 1995 and in each January in the years after that. We exclude all those who work abroad and outliers below 100EEK and above 10000 EEK. Because of concerns over the reliability of retrospective data in periods of hyper-inflation and when the Rouble was the national currency, we exclude the years before 1992 from our wage analysis<sup>5</sup>.

### **3. The Incidence of Displacement in Estonia, 1989-98**

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<sup>3</sup> For example Pfann (2001) finds that workers with higher expected productivity growth and large uncertainty of expected growth in productivity are “better quality” workers retained by the firm. Such workers might also want to stay in the restructuring firm.

<sup>4</sup> Some people might feel that the distinction between displaced workers and voluntary quitters is blurred in survey data. If there is, however, a data set that allows do distinguish between the two groups of workers, it is the Estonian one, arguably one of the most comprehensive Labour Force data sets in the world.

<sup>5</sup> The Eesti Kroon replaced the Rouble at a rate of 15EEK=1Rb in June 1992.

We begin with an outline of the basic facts about displacement in Estonia. Figure 1 and the last row of Table 1 outline the pattern of annual job displacement rates in Estonia in the years immediately before transition and the years after. It is apparent that displacement built up gradually during the initial transition period, from just 1 percent a year in 1989 to a peak of 13% in 1992, before falling back to around 6% in 1998. These later figures are broadly comparable with those from the Western literature (Kuhn 2002), whilst the incidence in the early nineties is clearly excessive by western standards. Annual worker separation rates in East Germany, where comparable survey data are available, show a similar pattern and rates over the transition, peaking at around 12% at the beginning of transition. Displacement rates in Estonia, therefore, seem to be as large as in the one transition economy thought to have the most severe employment contraction, following social and monetary union in 1990.<sup>6</sup>

As Figure 1 shows, redundancies rather than plant closures account for the majority of displacement. Plant closures reached a peak, at around a fifth of all displacements, in 1993. The incidence of quits is much larger than that of displacements, except in 1992 and 1993 when the majority of displacements occurred. Quits also grew through the early stage of transition and fell back at the end of the nineties. This seems to be because both retirements and voluntary quits have fallen back in recent years.

The magnitudes and direction of the flows of displaced workers in Estonia lend support to a model of labour reallocation from the state to the private sector, the latter of which is comprised of privatised and new private firms. In 1992, 73% of all workers were

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<sup>6</sup> In future work we will analyse displacement from a comparative perspective looking at Estonia and East Germany, both fast reformers but with very different labour market institutions. In this paper the German data are used only to highlight the large layoff rates in Estonia. East German displacement rates are available on request.

employed in the state sector. In 1998, 34% of all workers were employed in this sector. While in 1992 77% of all displaced workers came from the state sector, this percentage fell to 17% in 1998. Roughly half of the workers displaced from a state sector job in 1992 ended up holding a job in the private sector, while in 1998 this fraction rose to 75%.

Table 1 shows that men were more likely to experience displacement, but that this gender difference may have disappeared by the late nineties. Displacement rates are relatively uniform across age groups, but displacement does tend to fall disproportionately on the less skilled, (both manual and non-manual). The incidence of displacement by job tenure falls across all tenure groups from the early to the later stage of transition, but much more so for workers new to their jobs. While this group was most likely to lose their job during the initial transition phase, they are now least likely. Job loss is much lower in public administration throughout, while displacement in the nascent retail trade, hotel and finance sectors is high. Displacement in the state sector is higher in the early stages of transition, suggestive of substantial restructuring, but thereafter displacement rates are higher in the private sector, now comprising two thirds of the employment stock.

Are the displaced in Estonia different from other workers? In the face of a truly exogenous shock affecting all sectors equally there may be less reason to suspect that displaced workers would be very different from other workers. However, Table 1 suggests that displacement is non-random. This is reflected in the differences in worker characteristics shown in Table 2. Men account for a larger share of the displaced than of either quits or stayers, though this differential falls over time. Job losers are typically middle aged compared with job quitters, though their educational and occupational

backgrounds seem to be very similar. In the early nineties, agricultural and in the late nineties manufacturing sector workers are more likely to be displaced.

Low tenure workers are more likely to quit. However, during the initial transition period there was a high incidence of quits across the tenure distribution, in part brought on by a large volume of early retirements among those with the highest tenure category. Note that median tenure for job displacement was around 5 years in 1992 and has fallen below this in the late nineties. A similar reduction in median tenure amongst job quits can also be seen in Table 2, to a little over two years in 1998. Short job tenure is unlikely to be associated with much firm-specific capital. However in 1992, almost one third of those who lost their jobs had more than 5 years tenure, falling back to around 17% in 1998. For these workers firm-specific capital is likely to be more substantial.

Most of these patterns are confirmed, holding other characteristics constant, in the multinomial logit regressions given in Table 3 for the pooled samples of 1992/93, the early stage of transition in Estonia, and of 1995/98, when transition was in a more mature stage. Throughout the nineties, university graduates have a lower incidence of displacement and quits of between 4 to 5 percentage points than less educated workers. In the early stage of transition the probability of being displaced was roughly 6 percentage points higher in state-owned firms and 10 percentage points lower in foreign owned firms than in privatised or new private firms, a pattern that disappears in the later stages of transition.<sup>7</sup> It is also noteworthy that in the later nineties, Estonians had a lower probability of being displaced than non-Estonians (mainly Russians). Ethnicity did not play a role in the early years of transition, when firm attributes were generally more important than demographic characteristics as the magnitude and significance of the

marginal effects in the first column of table 3 demonstrate. When displacement was high by western standards, age, industry affiliation, ownership type of a worker's firm and firm size were the main factors behind closures and permanent layoffs.

#### **4. The Cost of Job Displacement in Estonia**

We next attempt to outline the possible costs of job loss in Estonia and whether these have changed over time. Job loss involves both a risk of non-employment and a possibility of lower wages for those workers who find new employment.

##### **Displacement and non-employment spells**

We begin, following Farber (1993), with a simple tabulation of the percentage of workers displaced in one year who were employed again in the spring of the following year. Table 4 shows that there is little evidence of any cyclical component in re-employment probabilities, indeed the chances of finding a job once displaced appear to fall steadily through the nineties. In 1990, more than 75% of those displaced could expect to be back in work the following Spring. By 1999, this re-employment rate had fallen to just 47%. The re-employment rate for job quits rises and then falls back over time and is far lower than the rate of displaced workers in the early phase of transition and roughly equal towards the end of the nineties.

These results are confirmed by multivariate regressions, not shown here.<sup>8</sup> We look at marginal effects from probit estimates of the re-employment probability, using a set of characteristics common to all the population of working age one year earlier and a set of

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<sup>7</sup> After 1995 there is no information on whether a firm is privatised or a new private start-up.

dummy variable interactions for displaced workers. The relative disadvantage of the average displaced worker, other things equal, finding a new job rises from 36 percentage points in 1993/94 to 55 percentage points in 1998/99. There are few variations around this average as virtually none of the interactions are statistically significant at conventional levels.

We next report the cumulative return rates to employment, conditional on non-employment duration, of displaced workers and compare these to return rates of quits for the years 1992, 1993, 1995 and 1998 in Table 5. These rates are based on the complement of Kaplan-Meier survivor functions in non-employment. Roughly 50% of the displaced return to full-time work during the first three months of non-employment, with around a third returning within one month of displacement. It is also interesting to note that at least half the people who return to work within six months do so during the first month. These rates are similar to figures in the volume by Kuhn, (2002), which suggest that two-thirds of US displaced workers are re-employed within six months. In Britain roughly half return within two months.

Outflows in Estonia taper off rapidly after the first three months, something we investigate more closely below. For the years before 1995, displaced workers have similar return rates over the first six months of any spell to those who quit. This suggests that the adverse selection problems one might encounter when analysing a pool of displaced workers in a transition economy may not be that serious for our sample of Estonian workers.

We next analyse hazard rates from non-employment. The Kaplan-Meier estimates of these rates over the sample period are given in Table 6 and Figure 2. In the early years

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<sup>8</sup> These regressions are available from the authors on request.

of the sample there are high hazard rates in the first two months, after that the hazard rates fall dramatically and stay uniformly low. In the later years, hazard rates fall precipitously after the first month. The hazard rates of displaced workers are generally not statistically different from those of quits at most spell lengths.

Summarising, roughly half the displaced workers each year find a new job rapidly, while the other half has great difficulties in flowing back into employment. Since unemployment benefits and related welfare payments are extremely low in Estonia, with an average replacement rate of around 10% (see Tables A5 and A6 in the annex)<sup>9</sup>, these findings have at least two implications. First, any incentive problems generated by the benefit system are less likely to be able to explain this flat hazard rate after two months. Rather, it seems that there are factors at work which absorb rapidly the half of the displaced worker flow with the “right” characteristics. Secondly, those unable to flow into employment fast, incur large income losses. Income losses would be greatly exaggerated however if people took up work in the informal sector. In Estonia, a small and socially tightly knit country, the informal sector is probably not as much developed as in many other transition countries and unemployed workers are likely to rely mainly on income transfers from family and friends (Eamets, 2001).

Which are the driving factors behind the hazard rates? For the early and later stages of transition (1992-93 and 1995-98 respectively) we pool the data and estimate parametric hazard functions for displaced workers and quits (Table 7), allowing for unobserved heterogeneity in the distributions of the hazard rates across the sample. We use a mixture distribution, integrating out the heterogeneity with an Inverse-Gaussian

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<sup>9</sup> An IMF report on Baltic and Bulgarian labour markets terms these benefit ratios “parsimonious” (see IMF, 2001).

parametric function. Figures A.1-A.4 in the appendix show that a Gompertz model that takes account of unobserved heterogeneity fits the data better than other parametric models, since the Cox-Snell residual plots are distributed like an exponential distribution with mean 1 when the parametric model fits well (Smith, 2002). As before, we exclude those who leave a job for retirement. Tables A.1 and A.2 show that a small fraction of this group eventually flow back into employment, but the results are not affected substantially by this exclusion.<sup>10</sup>

Table 7 shows that only in the more mature stage of transition do displaced workers find it harder to regain employment than quits. In contrast to the results in Table 3 concerning the incidence of job loss, we find that individual characteristics and not firm and job attributes of previous employment play the predominant role in the determination of the return to work hazard. There appears to be a positive age effect, although at a diminishing rate for both displaced workers and quits.<sup>11</sup> Female displaced workers and those with less education have substantially lower hazard rates throughout the decade<sup>12</sup>, while in both periods Estonians have rates that are substantially higher among displaced workers as well as among those who quit. While ethnicity is not a determinant factor when it comes to permanent layoffs, it is of great importance in flows back to employment. Regional location, working time, tenure and sector, on the other hand, play no role in the determination of the hazard for the displaced. The duration dependence parameters are all negative and significant, which in the context of the Gompertz

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<sup>10</sup> The results including retirees are available on request.

<sup>11</sup> The significance of the unobserved heterogeneity component in the estimates does not allow the conversion of the maximum likelihood coefficients into proportional changes in the hazard ratio.

<sup>12</sup> Table A3 shows regressions by gender. Pooling the data seems admissible, since a formal test does not reject the null hypothesis of equal slope coefficients across gender.



distribution suggests that there is a non-zero probability of remaining out of work at any infinitely large spell length.

### **Are there earnings losses for displaced workers?**

We now examine the earnings changes of those displaced workers who leave from and return to a full-time job. Table 8 contains estimates of changes of log wages for job movers, i.e. displaced workers and quitters who found again employment, pooled over the early period of transition (1992/1993) and over the later period (1995/98). Wages are observed immediately before and after the job change in the first period, but, because of a change in the survey questionnaire, up to one year apart in the second period, in the early period of transition (1992/1993). Few characteristics have any predictive power for the change in the log of wages.

There is little evidence that job tenure influences wage changes holding other factor constant. Those displaced from a job who avoid a period out of work between jobs appear to benefit in the early transition period, but this effect does not persist into the latter half of the period. Thereafter, the length of non-employment has no effect. Workers displaced from transport experience a wage change that is roughly 20% higher than the change experienced by workers displaced from agriculture. If industry-specific human capital is important for maintaining previous wage levels in new jobs (Neal, 1995), then changing industry should result in a wage penalty. This idea is not supported by the data. Finally, whether displaced workers find employment in a private or state-owned firm does not seem to affect the wage change that they experience. It seems pretty clear from the presented means, though, that quits have in their new jobs on average higher wages

than both stayers and displaced workers. For both displaced workers and quitters there is, however, a large premium for finding employment in a foreign firm.

The results of Table 8 point to the factors that drive wage changes for job movers, they do not, of course, tell us about the earnings loss due to displacement. In order to evaluate this earnings loss we need to compare the wage in the new job with its counterfactual, i.e. with the wage that would have prevailed if the worker had not been displaced and had remained in the original job until the date when the wage is next observed. We construct difference-in-differences estimators by estimating models with the dependent variable as the change in log wages of stayers, displaced workers and/or quitters and dummy variables for different subsets of displaced and a dummy variable for quitters. If the conditional expectation of the outcome variable (the wage) before the treatment (displacement) were the same for treated (displaced) and non-treated (stayers), the effect of displacement on earnings would be identified with this difference-in-differences estimator.

One of the problems of analysing earnings losses for the displaced is, however, that these workers might experience a deterioration of their pay before they are displaced, something observed by Jacobson, LaLonde and Sullivan (1993b) in the United States. Table A.4 gives real wage profiles over time (1992-95) for stayers, displaced workers and those who quit. For stayers we have information on real wages in each October for the years 1992-94 and in the Spring of 1995, while displaced workers and quits also provide information on their last wage in the old job and their starting wage in the new job. The end and start wages in the last four columns seem to indicate that there is more of an “inflation dip” than an “Ashenfelter dip”, as the mean real wage for both displaced

workers and quits falls between the October 1992 or October 1993 wage and the end wage. The period between 1992 and 1994 saw substantial double-digit inflation, subsiding to 5% in the last quarter of 1994, resulting in a declining real wage during this period. The earnings of those displaced in 1992 do not seem to recover by Spring 1995, whereas the earnings of those displaced in 1993 and 1994 seem to do so.

The observation that displaced workers are no worse affected by a declining real wage than quits, leads us to conjecture that stayers probably also experience this “inflation dip”, because of infrequent changes to nominal wages. While we cannot be sure that wage movements before displacement do not affect our difference-in-differences estimates, the evidence above suggests any such movements may be limited. In addition, if we take a subset of the displaced, displaced within a shorter period of time, and undertake difference-in-difference estimates across one and two year intervals then we do not find any significant differences on the displaced coefficients<sup>13</sup>. This also suggests that any wage dip effect may be limited.

The one, two or three year wage changes for displaced workers and voluntary movers is given by the difference in the October wage in the original job and the October wage in the subsequent job one year or two years later. These changes are compared to the wage changes over the same period of those who stayed in the same job.<sup>14</sup> We report in Table 9 estimates for all displaced and for sub-samples of displaced with varying spell lengths in non-employment. These suggest that there is a positive wage gain in all stages of transition for voluntary movers, although this gain declines over time. There is,

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<sup>13</sup> For example we take all those displaced in the first 9 months of 1993 and observe the wage change compared with stayers between October 1992 and 1993 and between October 1992 and 1994. Results are available on request.

<sup>14</sup> For the period 1996-98 we have wages not in October but in January of each year.

however, little evidence of any differential wage changes between the total sample of those who were displaced from a job and those who stayed. Only in 1996 is there a significant negative wage loss of 7.2 log points for displaced workers. In 1993 there is a wage gain for the average displaced worker who moves without a spell of non-employment that becomes negative for those of the displaced who have non-employment spells of more than 6 months. For the years 1992-93 and 1995-97 we find, however, wage penalties of roughly 2 log points per month of displacement. The estimates in Table 9 are also done with controls, for variables, industry, firm size and ownership that change over the period. Since these change variables are necessarily zero for stayers, they serve to disaggregate the displaced group more and the displacement effect, as a result, is less precisely measured. The upshot of these results is at any rate that the main cost of job loss in Estonia seems to be the income loss brought on by being out of work. For a majority of displaced Estonian workers this income loss is modest, however, given that the median duration of non-employment of displaced workers is less than three months. For a minority of those displaced workers who remain in non-employment for at least a year, i.e. for between 16 and 38 percent of the displaced workers in the nineties, the income loss is likely to be large and it is this group of displaced workers who may need to be helped with targeted policy intervention.

## **Conclusions**

Displacement rates in Estonia reached a peak of 13% in 1992, but were very small at the beginning of transition and, during the more mature phase of transition, roughly equal to rates in several western countries. Who are the workers who experience job loss? Men were more likely to experience displacement in the early years, but that distinction may

have been removed by the late nineties. Only workers over the age of 55 are relatively less likely to experience displacement, but displacement does tend to fall on the less skilled manual and non-manual. Job loss is generally higher in the production sector than in services, though displacement in the emerging retail trade and finance sectors is high. There is little evidence that these relative patterns have changed over time.

The cost of job displacement is mainly associated with the risk of non-employment and not with potentially lower wages in the newly acquired job. Estimates of the probability of re-employment for displaced and non-displaced workers, show that the relative disadvantage of the average displaced worker, other things equal, finding a new job rises over the period from 36 percentage points in 1993 to 55 points in 1999. When we analyse the hazard from non-employment for displaced workers and quitters we find that above all demographic characteristics have predictive power. Younger, female and less educated workers have substantially lower hazard rates throughout the nineties. It is particularly striking that, *ceteris paribus*, Estonians have substantially higher hazard rates than those of the non-Estonian (mainly Russian) minority. So, while ethnicity is not an important factor as far as layoffs are concerned, it is clearly important with regards to finding re-employment. Our hazard rate analysis also shows that it is crucial for displaced workers to leave non-employment soon after displacement as hazard rates are uniformly low for non-employment spell lengths greater than three months.

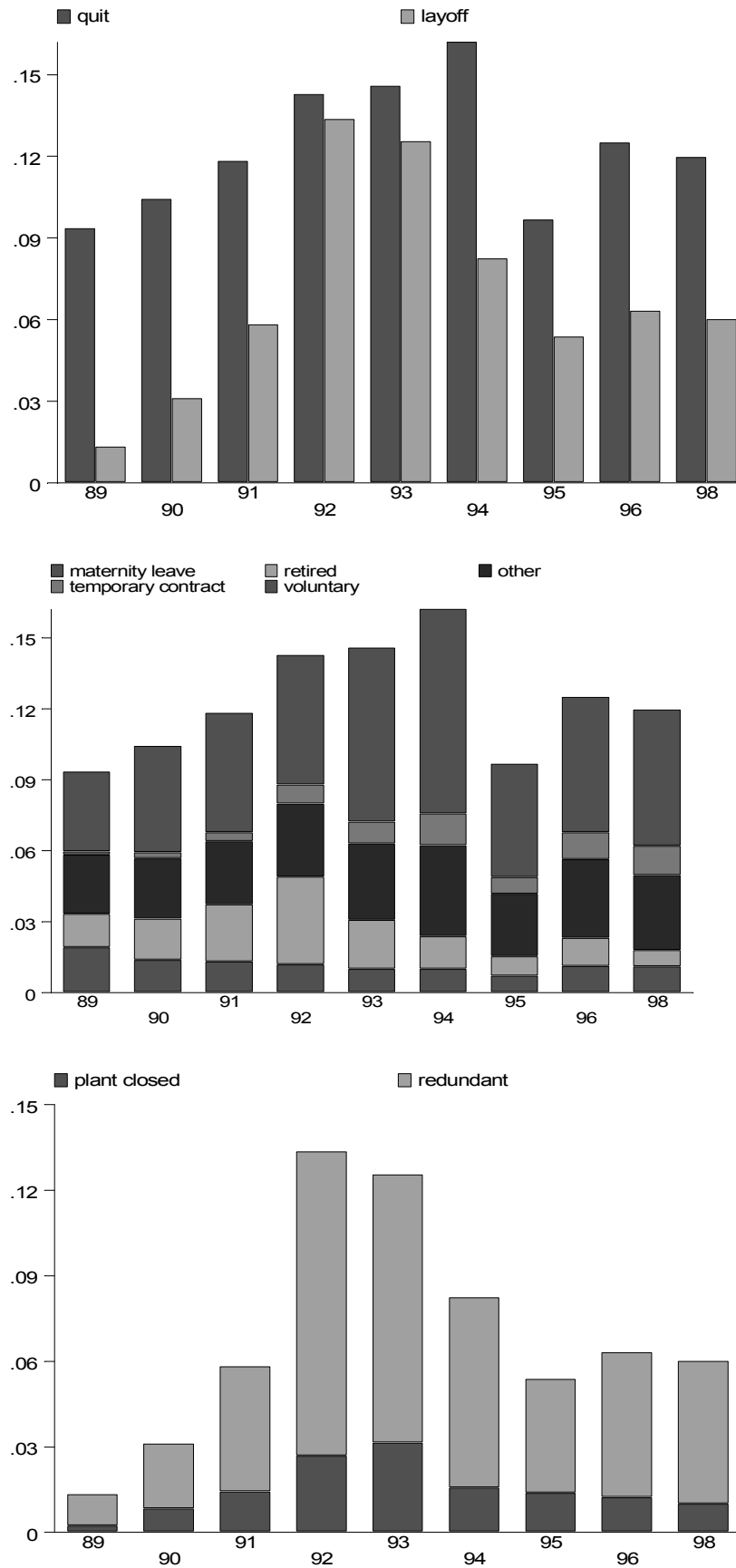
There is little evidence of any differential wage changes between the total sample of those who were displaced from a job and those who stayed. Only in one year is there a significant difference in the wage change between the total sample of the displaced and those who remained in their job. Those among the displaced who remain for long periods

in non-employment seem to incur, however, some wage penalties in several years. The main cost of job loss in Estonia seems at any rate to be the income loss brought on by being out of work. Given extremely low unemployment benefit payments and stringent eligibility criteria, this income loss is likely to be large for that minority of displaced workers who remain in long-term non-employment. Policies alleviating the plight of these workers should be a priority for Estonian policy makers.

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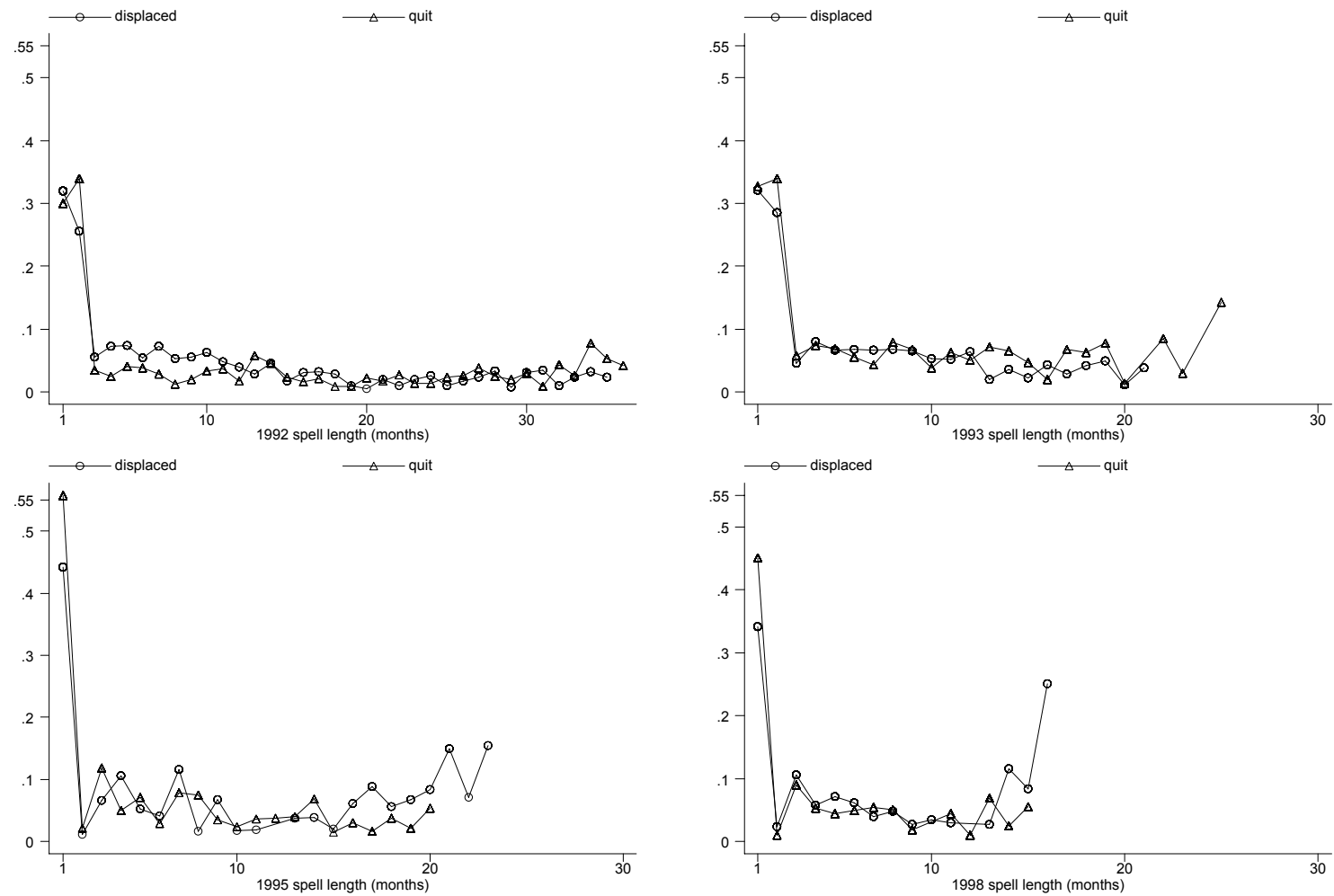
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**Figure 1. Worker Separation Rates by Year**





**Figure 2. Hazard Rates for Displaced Workers and Voluntary Quits in Estonia 1992-1998**



**Table 1. Job Displacement Rates (%), 1989-98**

	1989	1992	1994	1996	1998
<b>Demographic</b>					
Men	1.7	14.4	8.6	5.8	6.5
Women	1.0	12.2	7.8	5.9	6.6
Estonian	1.4	13.5	7.5	5.7	5.4
Non-Estonian	1.2	13.0	9.6	7.0	7.5
Age					
16-24	2.3	12.1	9.8	8.1	6.7
25-39	1.5	13.2	8.8	6.5	5.6
40-54	1.1	13.9	7.6	5.2	5.9
55-64	0.7	13.0	7.0	6.5	6.7
<b>Education</b>					
Primary and basic	1.6	14.3	8.5	8.9	7.8
Secondary	1.4	15.4	10.3	6.7	7.3
Vocational	1.2	13.2	8.1	6.2	5.5
University	1.2	9.7	5.4	3.6	4.1
<b>Job tenure</b>					
< 1 year	2.3	16.3	10.7	4.3	2.9
1 year	1.8	14.5	8.2	7.2	7.7
2-5 years	1.6	13.3	8.6	6.1	6.0
6-10 years	1.0	14.9	9.6	6.8	4.7
11 and more years	1.0	11.9	6.8	5.4	5.9
<b>Occupation</b>					
Professionals	1.3	11.5	7.1	4.2	4.1
Other non-manual	1.2	13.2	9.9	7.5	8.0
Skilled manual workers	1.3	14.1	7.2	7.1	5.4
Unskilled manual workers	1.6	15.2	9.8	7.5	8.0
<b>Industry</b>					
Agriculture	1.1	18.7	8.3	3.8	4.4
Manufacturing and electricity	1.1	12.4	8.5	7.3	7.8
Construction	2.1	16.8	6.9	9.9	7.5
Trade and hotels	1.5	16.9	13.8	9.0	8.4
Transport	0.8	9.8	6.8	5.7	6.5
Finance	4.1	11.8	8.3	5.7	7.6
Public	1.0	7.9	5.1	3.5	2.2
<b>Sector</b>					
State	1.4	14.4	7.9	5.3	3.5
Private	0.3	9.8	8.5	6.1	8.1
<b>Total</b>	1.3	13.2	8.1	5.8	6.4

**Table 2. Characteristics of Job Losers, Leavers and Stayers, 1989-98**

	1989			1992			1994			1998		
	Lost	Quit	Stay	Lost	Quit	Stay	Lost	Quit	Stay	Lost	Quit	Stay
Men	61.4	42.6	49.4	55.6	51.9	50.7	54.3	57	50.5	49.6	55.1	50.8
Estonian	38.5	65.8	64.6	44.4	67.5	64.4	45.7	71.8	65.9	50.4	78.6	74.3
Age 15-24	18.1	26.7	8.4	9.2	20.6	8.4	12.7	20.6	8.3	10.3	19	7.7
Age 25-39	44.6	38.5	40.5	37.8	35	38.7	40.2	41.7	36.5	34.8	41.3	37.1
Age 40-54	30.1	17.1	37.5	39.1	20.6	40.5	36.1	25.9	41.9	38.8	27.3	40.8
Age 55+	7.2	17.6	13.6	13.8	23.7	12.4	10.9	11.8	13.3	16.0	12.4	14.4
<i>Education</i>												
Basic	24.1	20	19.8	18.1	20.3	16.0	14.3	13.8	13.7	17.3	15.4	12.7
Secondary	24.1	23.3	22.6	28.5	26.3	23.5	32.7	31.1	24.3	27.8	23	22.3
Technical	36.1	40.1	40.7	40.9	39	41.9	40.7	39.1	42.0	42.9	49.4	46.5
Graduate	15.7	16.6	16.9	12.5	14.2	18.6	12.3	16	20.0	12.0	12.1	18.5
<i>Occupation</i>												
Professional	33.7	33	36.1	30.7	30.8	37.4	32.0	29.6	39.0	24.1	24.3	37.8
Other Non-Manual	12.0	16.8	13.0	13.6	13.6	13.7	19.7	19	15.2	21.0	19.4	14.9
Skilled Manual	25.3	28	26.1	28.3	30.2	25.9	21.7	28.7	24.2	20.8	27.1	22.8
Unskilled Manual	28.9	22.2	24.8	27.5	25.5	23.1	26.5	22.6	21.6	34.1	29.3	24.5
<i>Industry</i>												
Agriculture	16.9	17.3	20.6	26.1	15.9	17.7	13.4	12.9	13.4	9.0	10.8	12.6
Manufacturing	25.3	27.7	29.9	26.9	29.9	29.1	27.0	24.3	26.2	34.8	26.3	26.2
Construction	12.0	7.7	7.6	10.6	11.1	7.5	6.1	9	7.1	8.8	10	6.5
Trade	10.8	9.9	9.9	14.6	14.5	10.3	26.1	19.1	13.6	21.8	20.2	14.4
Transport	4.8	7.7	7.9	5.9	5.3	9.0	7.0	7.8	8.9	8.8	6.8	8.1
Finance	14.5	4.5	4.6	3.8	4.2	4.4	5.4	6.7	5.1	8.0	7.6	6.0
Public	15.7	25.2	19.6	12.0	19.2	22.0	14.8	20.2	25.7	8.8	18.4	26.3
<i>Job Tenure</i>												
<1 year	7.2	5	4.0	2.5	3.8	1.7	3.9	6.1	2.2	2.3	7.8	4.3
1-2 years	16.9	22.1	11.4	17.7	23.3	14.7	25.7	39.2	22.7	27.6	35.4	18.8
2-5 years	31.3	35.6	24.0	27.8	32.6	27.0	33.9	31.6	32.2	38.6	37.6	38.9
5-10 years	14.5	16.6	20.0	18.6	12.5	17.1	13.6	7.7	12.3	12.0	10.1	16.5
10 years+	30.1	20.7	40.5	33.3	27.8	39.6	22.9	15.4	30.6	19.5	9.1	21.5

**Table 3. Who is Displaced? Multinomial Logit Estimates (Marginal Effects) – 1992/93 & 1995/98**

	1992/93		1995/98	
	Displaced	Quit	Displaced	Quit
Female	-.020 (.012)	.007 (.013)	.003 (.005)	.007 (.008)
Estonian	-.016 (.013)	.059** (.014)	-.017** (.005)	.011 (.008)
Age	.011** (.003)	-.057** (.003)	-.006 (.001)	-.020** (.002)
Age <sup>2</sup>	-.0001** (.00004)	.0007** (.00004)	.00001 (.00001)	.0002** (.00004)
- University	-.052** (.022)	-.056** (.023)	-.036** (.010)	-.053** (.014)
- Vocational	-.018 (.019)	-.026 (.019)	-.018** (.007)	-.006 (.010)
- Secondary	.017 (.019)	-.032 (.020)	-.011 (.008)	-.016 (.011)
<b>Job Tenure</b>				
<1 year	-.188** (.026)	.001 (.024)	-.041** (.009)	.085** (.014)
1-2 years	.060** (.019)	.143** (.021)	.002 (.008)	.125** (.013)
2-5 years	.045** (.019)	.113** (.020)	.001 (.008)	.098** (.013)
5-10 years	.036** (.015)	.061** (.019)	-.020** (.008)	.026 (.014)
<b>Ownership</b>				
State owned	.064** (.021)	.004 (.021)	.009 (.007)	-.023** (.011)
Privatised	-.019 (.026)	-.214** (.028)	N/a	N/a
Foreign owned	-.104** (.028)	.025 (.026)	-.014 (.010)	-.037** (.014)
<b>Industry</b>				
Manufacturing	-.118** (.017)	.045** (.020)	.029** (.009)	-.008 (.013)
Construction	-.075** (.022)	.121** (.026)	.034** (.011)	.029 (.016)
Retail	-.027 (.021)	.088** (.024)	.043** (.010)	.012 (.014)
Transport	-.200** (.025)	-.007 (.029)	.008 (.012)	.007 (.017)
Financial sector	-.089** (.030)	.036 (.034)	.020 (.013)	-.005 (.018)
Public Services	-.251** (.021)	-.020 (.023)	-.050** (.012)	-.011 (.016)
<b>Firm Size</b>				
20-99	.076** (.031)	.015 (.029)	.009 (.006)	.008 (.009)
100-499	.018 (.030)	.021 (.029)	.004 (.007)	.028** (.010)
500+	.092** (.029)	.014 (.028)	.005 (.009)	-.009 (.015)
N	6536		10495	
Pseudo R <sup>2</sup>	.112		.055	
Sample Mean	.246	.306	.079	.168

Notes: Coefficients are marginal effects. Standard errors in brackets with \*\* significant at 5% level.

**Table 4. Probability of Being in Employment  
by Displacement Status One Year Earlier**

In work in year	Employed	Non-employed
1990		
Displaced	75.9	24.1
Quit	50.5	49.5
Stay	98.4	1.6
1993		
Displaced	62.0	38.0
Quit	48.8	51.2
Stay	86.5	13.5
1995		
Displaced	60.2	39.8
Quit	62.8	37.2
Stay	89.9	10.1
1997		
Displaced	57.5	42.5
Quit	55.7	44.3
Stay	90.6	9.4
1998		
Displaced	46.9	53.1
Quit	49.8	50.1
Stay	89.5	10.5

**Table 5. Cumulative Return Rates for Job Movers in Estonia**

	1992		1993		1995		1998	
	Displaced	Quit	Displaced	Quit	Displaced	Quit	Displaced	Quit
% returning <1 month	32.0	30.0	32.1	33.8	44.2	55.8	34.1	45.0
% returning <3 months	52.2	55.3	53.7	58.2	48.5	61.9	42.5	50.4
% returning <6 months	61.1	58.2	63.0	63.9	58.2	66.3	52.8	57.4
N	889	797	810	937	165	312	454	908

Note: Fractions based on one minus the Kaplan-Meier survivor function. Retirements are excluded from quits.

**Table 6. Kaplan-Meier Hazard Rates for Job Movers**

Duration (months)	1992		1993		1995		1998	
	Hazard	s.e	Hazard	s.e	Hazard	s.e	Hazard	s.e
<b>Displaced</b>								
0-1	0.32	0.02	0.33	0.02	0.44	0.06	0.34	0.03
1-2	0.26	0.02	0.29	0.03	0.01	0.01	0.02	0.01
2-3	0.06	0.01	0.05	0.01	0.07	0.02	0.11	0.02
3-4	0.07	0.01	0.08	0.02	0.11	0.04	0.06	0.02
4-5	0.07	0.01	0.07	0.01	0.05	0.03	0.07	0.02
5-6	0.05	0.01	0.07	0.01	0.04	0.02	0.06	0.02
11-12	0.04	0.01	0.06	0.02	0.04	0.03	0.03	0.02
% censored	17.5		20.4		18.2		42.1	
<b>Quit</b>								
0-1	0.30	0.02	0.33	0.02	0.56	0.05	0.45	0.03
1-2	0.34	0.02	0.34	0.02	0.02	0.01	0.01	0.01
2-3	0.04	0.01	0.06	0.01	0.12	0.03	0.09	0.01
3-4	0.03	0.01	0.07	0.01	0.05	0.02	0.05	0.01
4-5	0.04	0.01	0.07	0.01	0.07	0.02	0.05	0.01
5-6	0.04	0.01	0.06	0.01	0.03	0.01	0.05	0.01
11-12	0.02	0.01	0.05	0.01	0.04	0.02	0.07	0.02
% censored	20.7		16.3		18.9		37.7	

Note: The censoring cut-off points vary over the sample period

**Table 7. Gompertz Proportional Hazard Estimates of Jobless Spell Excluding Movements into Retirement, (Pooled Samples).**

Variable	1992/93			1995/98		
	Total	Displaced	Quit	Total	Displaced	Quit
Displaced	0.044 (0.047)			-0.125 (0.061)*		
<b>Individual</b>						
Age	0.125 (0.013)**	0.071 (0.019)**	0.161 (0.018)**	0.078 (0.017)**	0.017 (0.033)	0.104 (0.020)**
Age2	-0.002 (0.000)**	-0.001 (0.000)**	-0.002 (0.000)**	-0.001 (0.000)**	-0.000 (0.000)	-0.001 (0.000)**
Female	-0.534 (0.048)**	-0.346 (0.066)**	-0.708 (0.068)**	-0.381 (0.061)**	-0.240 (0.115)*	-0.449 (0.070)**
Primary	-0.609 (0.087)**	-0.598 (0.120)**	-0.608 (0.126)**	-0.733 (0.115)**	-0.851 (0.212)**	-0.639 (0.133)**
Technical	-0.285 (0.073)**	-0.315 (0.106)**	-0.264 (0.099)**	-0.551 (0.096)**	-0.578 (0.184)**	-0.523 (0.109)**
Secondary	-0.241 (0.068)**	-0.231 (0.099)*	-0.280 (0.093)**	-0.456 (0.089)**	-0.649 (0.172)**	-0.343 (0.100)**
Estonian	0.305 (0.051)**	0.308 (0.073)**	0.311 (0.071)**	0.338 (0.066)**	0.314 (0.121)**	0.318 (0.076)**
Capital	0.191 (0.051)**	0.131 (0.076)	0.231 (0.068)**	0.240 (0.064)**	0.035 (0.127)	0.305 (0.072)**
<b>Job</b>						
Part-time	0.127 (0.123)	-0.004 (0.207)	0.217 (0.152)	-0.231 (0.119)	-0.416 (0.272)	-0.138 (0.127)
Tenure	0.017 (0.010)	0.013 (0.013)	0.035 (0.016)*	0.037 (0.013)**	0.043 (0.024)	0.036 (0.016)*
Tenure2	-0.000 (0.000)	-0.000 (0.000)	-0.001 (0.001)*	-0.001 (0.000)*	-0.001 (0.001)	-0.001 (0.001)
Firm Size						
20-99	0.024 (0.107)	-0.136 (0.182)	0.142 (0.131)	-0.075 (0.067)	-0.121 (0.129)	-0.042 (0.075)
100-499	-0.037 (0.104)	-0.139 (0.176)	0.028 (0.127)	-0.027 (0.097)	-0.132 (0.187)	0.015 (0.110)
500+	0.033 (0.101)	0.087 (0.169)	-0.016 (0.127)	0.003 (0.139)	-0.186 (0.258)	0.092 (0.159)
<b>Industry</b>						
Manufacturing	-0.085 (0.071)	-0.087 (0.095)	-0.069 (0.107)	-0.055 (0.104)	-0.128 (0.204)	-0.023 (0.115)
Construction	0.017 (0.087)	0.102 (0.121)	-0.044 (0.125)	-0.098 (0.127)	-0.008 (0.256)	-0.131 (0.141)
Retail	-0.023 (0.082)	0.134 (0.112)	-0.144 (0.121)	-0.014 (0.109)	-0.102 (0.218)	0.050 (0.120)
Transport	0.167 (0.102)	-0.008 (0.145)	0.302 (0.144)*	0.077 (0.129)	-0.181 (0.262)	0.177 (0.140)

Finance	0.010 (0.117)	0.041 (0.163)	0.007 (0.167)	0.109 (0.140)	0.236 (0.270)	0.099 (0.157)
Public service	-0.098 (0.085)	0.039 (0.125)	-0.183 (0.120)	0.021 (0.128)	-0.203 (0.269)	0.136 (0.141)
State owned	-0.128 (0.072)	-0.239 (0.114)*	-0.041 (0.093)	-0.115 (0.086)	0.095 (0.155)	-0.239 (0.101)*
Foreign owned	-0.191 (0.103)	-0.057 (0.173)	-0.274 (0.128)*	-0.079 (0.112)	0.265 (0.208)	-0.171 (0.130)
Privatised	0.094 (0.097)	0.059 (0.137)	-0.019 (0.145)			
1993 dummy	0.107 (0.045)*	-0.003 (0.063)	0.209 (0.064)**			
1996 dummy				-0.099 (0.079)	0.271 (0.155)	-0.235 (0.088)**
1998 dummy				-0.361 (0.075)**	-0.240 (0.146)	-0.421 (0.083)**
Duration dependence.	-.079 (.006)**	-.084 (.009)**	-.074 (.007)**	-.161 (.013)**	-.079 (.020)**	-.218 (.018)**
Unobserved Heterogeneity	0.322 (.072)**	0.251 (.101)**	0.310 (.095)**	0.255 (.105)**	0.668 (.261)**	0.017 (.091)**
Log L	-5639	-2695	-2910	-3685	-1199	-2450
Observations	3415	1624	1791	2449	794	1655

Note: Standard errors in brackets. \*\* significant at 5%



**Table 8 . Wage Changes for Job Movers (log gross monthly wage)**

	1992/93		1995/98	
	Displaced	Quit	Displaced	Quit
<b>Individual</b>				
Female	-0.024 (0.035)	0.024 (0.033)	-0.083 (0.050)	-0.074 (0.039)
Estonian	-0.008 (0.035)	0.036 (0.034)	0.049 (0.049)	0.011 (0.047)
Age	0.008 (0.011)	0.007 (0.009)	0.035 (0.016)**	-0.006 (0.012)
Age <sup>2</sup>	-0.000 (0.000)	-0.000 (0.000)	-0.001 (0.0004)**	0.000 (0.000)
University	0.037 (0.061)	0.016 (0.064)	-0.038 (0.079)	0.093 (0.074)
Technical	-0.021 (0.048)	-0.013 (0.052)	-0.118 (0.074)	0.032 (0.070)
Secondary	-0.001 (0.050)	0.001 (0.054)	-0.060 (0.093)	0.148 (0.079)
Capital	-0.083 (0.037)**	-0.015 (0.033)	-0.116 (0.053)**	-0.110 (0.039)**
<b>Job</b>				
Privatised	0.147 (0.065)**	0.011 (0.072)		
State owned	0.055 (0.055)	0.082 (0.043)	0.080 (0.063)	0.057 (0.060)
Foreign owned	0.039 (0.090)	0.026 (0.067)	0.003 (0.079)	-0.163 (0.084)
State (new)	0.022 (0.036)	0.030 (0.038)	-0.053 (0.064)	0.006 (0.051)
Foreign (new)	-0.094 (0.064)	0.154 (0.052)**	0.210 (0.074)**	0.138 (0.059)**
<b>Tenure</b>				
Tenure < 1 yr	0.037 (0.071)	-0.088 (0.058)	-0.014 (0.102)	-0.091 (0.085)
Tenure 1-2 year	-0.056 (0.054)	0.029 (0.051)	-0.076 (0.068)	-0.053 (0.064)
Tenure 2-5 yrs	-0.052 (0.050)	-0.002 (0.053)	-0.022 (0.065)	-0.051 (0.062)
Tenure 5-10yrs	0.009 (0.044)	0.022 (0.052)	-0.022 (0.067)	-0.076 (0.068)
<b>Industry</b>				
Manufacturing	0.101 (0.053)	0.081 (0.070)	-0.044 (0.104)	0.043 (0.095)
Construction	0.267 (0.070)**	0.185 (0.076)**	-0.032 (0.111)	-0.123 (0.109)

Retail	0.077 (0.057)	0.045 (0.069)	0.124 (0.111)	0.020 (0.097)
Transport	0.234 (0.071)**	0.059 (0.088)	-0.054 (0.114)	0.079 (0.101)
Finance	0.106 (0.084)	0.133 (0.088)	0.043 (0.124)	0.023 (0.118)
Public Service	0.061 (0.063)	0.047 (0.072)	0.096 (0.120)	0.059 (0.105)
Change indust. 1 digit	-0.036 (0.035)	0.022 (0.030)	0.023 (0.046)	-0.020 (0.036)
Firm size20-99	-0.031 (0.099)	0.018 (0.061)	-0.024 (0.056)	-0.069 (0.043)
size:100-499	-0.027 (0.097)	-0.050 (0.061)	-0.027 (0.063)	-0.026 (0.053)
size: 500+	-0.030 (0.092)	-0.039 (0.062)	-0.007 (0.093)	-0.067 (0.081)
<b>Time Out</b>				
Job-to-job	0.208 (0.089)**	0.095 (0.106)	0.157 (0.101)	0.176 (0.071)**
Out <=3 months	-0.049 (0.038)	-0.059 (0.036)	0.002 (0.219)	0.264 (0.178)
Out 4 months+	0.094 (0.092)	-0.127 (0.107)	0.056 (0.106)	0.044 (0.086)
Constant	-0.279 (0.248)	-0.170 (0.197)	-0.669 (0.348)	0.200 (0.259)
Observations	894	925	324	573
R-squared	0.07	0.09	0.13	0.10

Note: Full-time workers only. Wage change is log of difference between last monthly wage in old job and first monthly wage in new job. job changes combined across years indicated. Model contains year dummies. Robust standard errors in brackets. \*\* significant at 5%;

**Table 9. Wage Costs of Displacement – Full-Time workers**

	Displaced	Displaced* Time out	Quit	Constant	Controls	N	R <sup>2</sup>
1992-93	-0.012 (0.024)			0.052** (0.007)	No	3037	0.01
1992-93	-0.075 (0.071)			0.063 (0.047)	Yes	3037	0.03
1992-93	0.040 (0.033)	-0.019** (0.008)		0.052** (0.007)	No	3037	0.01
1992-93	-0.012 (0.024)		0.131** (0.026)	0.052** (0.007)	No	3037	0.02
1993-94	0.043 (0.048)			-0.044** (0.005)	No	3556	0.01
1993-94	0.146 (0.125)			0.035 (0.095)	Yes	3556	0.08
1993-94	0.155** (0.063)	-0.030** (0.013)		-0.044** (0.005)	No	3556	0.01
1993-94	0.043 (0.048)		0.161** (0.033)	-0.044** (0.005)	No	3556	0.01
1992-94	0.036 (0.023)			0.004 (0.009)	No	3079	0.01
1992-94	0.040 (0.100)			0.056 (0.074)	Yes	3079	0.02
1992-94	0.058** (0.029)	-0.006 (0.005)		0.004 (0.009)	No	3079	0.02
1992-94	0.036 (0.023)		0.071** (0.024)	0.004 (0.009)	No	3079	0.01
1996-95	-0.072** (0.023)			0.080** (0.005)	No	2251	0.01
1996-95	-0.075 (0.043)			0.080 (0.005)	Yes	2251	0.01
1996-95	-0.063 (0.035)	-0.008 (0.018)		0.080** (0.005)	No	2251	0.01
1996-95	-0.072 (0.023)		0.036** (0.020)	0.080** (0.005)	No	2605	0.01
1997-95	0.017 (0.035)			-0.025** (0.007)	No	1940	0.01
1997-95	-0.046 (0.066)			-0.025** (0.007)	Yes	1940	0.01
1997-95	0.066 (0.042)	-0.016** (0.006)		-0.025** (0.007)	No	1940	0.01

1997-95	0.017 (0.035)		0.150** (0.040)	-0.025** (0.0007)	No	2240	0.02
1999-98	-0.011 (0.033)			0.034** (0.003)	No	4270	0.01
1999-98	-0.042 (0.069)			0.034** (0.003)	Yes	4270	0.01
1999-98	-0.040 (0.051)	0.016 (0.022)		0.034** (0.003)	No	4270	0.01
1999-98	-0.011 (0.033)		0.143** (0.030)	0.034** (0.007)	No	4581	0.02

Note: based on regression of change in log real net monthly wage over the period on dummy variables for displacement between first and second period. Default group are those who remain in the same job. Controls include change in firm size, ownership from state to private and 1 digit industry. White adjusted standard errors in brackets.

## ANNEX

**Table A1. Destination of Job Movers by Next Labour Market State**

	1992/93		1995/96/98	
	Displaced	Quit	Displaced	Quit
Job-to-Job	61.7	56.4	48.4	50.1
Unemployed	20.2	7.6	40.3	20.4
Inactive- retired	5.4	18.7	4.3	8.2
Inactive - Other	12.6	17.4	7.0	21.3

Source: Estonian LFS.

**Table A2. Re-Entry Rates of Job Movers by Next Labour Market State**

	1992/93		1995/96/98	
	Displaced	Quit	Displaced	Quit
Job-to-Job	100	100	100	100
Unemployed	75.4	74.4	46.8	50.3
Inactive- retired	14.7	8.8	8.1	7.8
Inactive - Other	59.4	51.7	34.7	20.0

Source: Estonian LFS.

**Table A3. Gompertz Proportional Hazard Estimates of Jobless Spell Excluding Movements into Retirement by Gender.**

	1992/93		1995/98	
	Male	Female	Male	Female
Age	0.096 (0.024)**	0.155 (0.032)**	0.037 (0.037)	0.137 (0.055)**
Age2	-0.001 (0.000)**	-0.002 (0.000)**	-0.000 (0.000)	-0.002 (0.001)**
Primary	-0.537 (0.151)**	-0.614 (0.189)**	-0.621 (0.294)**	-1.165 (0.318)**
Technical	-0.350 (0.145)*	-0.253 (0.146)	-0.549 (0.283)	-0.713 (0.240)**
Secondary	-0.210 (0.133)	-0.246 (0.138)	-0.290 (0.257)	-1.121 (0.235)**
Estonian	0.126 (0.093)	0.480 (0.113)**	0.348 (0.153)**	0.416 (0.186)**
Capital	0.182 (0.100)	0.108 (0.109)	0.087 (0.160)	-0.041 (0.193)
<b>Job</b>				
Part-time	-0.085 (0.299)	-0.042 (0.262)	-0.768 (0.382)*	0.261 (0.368)
Tenure	0.032 (0.017)	-0.018 (0.018)	0.050 (0.029)	0.032 (0.030)
Tenure2	-0.001 (0.000)	0.001 (0.001)	-0.002 (0.001)	-0.001 (0.001)
Firm Size				
20-99	-0.361 (0.246)	0.131 (0.255)	-0.055 (0.158)	-0.334 (0.201)
100-499	-0.284 (0.241)	0.092 (0.242)	0.022 (0.229)	-0.604 (0.291)**
500+	-0.004 (0.230)	0.227 (0.232)	-0.032 (0.310)	-0.620 (0.424)
<b>Industry</b>				
Manufacturing	-0.172 (0.119)	0.067 (0.147)	0.190 (0.255)	-0.588 (0.323)
Construction	0.081 (0.135)	0.075 (0.248)	0.226 (0.294)	-0.256 (0.527)
Retail	0.103 (0.159)	0.223 (0.157)	0.174 (0.287)	-0.777 (0.327)**
Transport	-0.119 (0.164)	0.108 (0.272)	0.008 (0.313)	-0.401 (0.436)
Finance	0.087 (0.207)	0.131 (0.249)	0.612 (0.338)	-0.352 (0.439)
Public service	0.064 (0.178)	0.092 (0.170)	0.546 (0.374)	-1.102 (0.387)**
State owned	-0.259	-0.211	0.152	0.127

	(0.149)	(0.171)	(0.199)	(0.230)
Foreign owned	-0.177	0.049	0.360	0.247
	(0.225)	(0.254)	(0.248)	(0.344)
Privatised	0.142	-0.014		
	(0.175)	(0.211)		
1993 dummy	0.060	-0.111		
	(0.080)	(0.095)		
1996 dummy			-0.020	0.519
			(0.192)	(0.247)**
1998 dummy			-0.320	-0.341
			(0.178)	(0.232)
Duration dependence.	-.093	-.086	-.135	-.034
	(.011)	(.016)	(.032)	(.027)
Unobserved Heterogeneity	.172	.139	.288	.797
	(.108)	(.226)	(.288)	(.476)
Log L	-1546.9	-1213.7	-653.6	-556.0
Observations	943	756	439	392

Note: log likelihoods for sample pooled across gender are -2789.5 and -1230.9 respectively.

Likelihood ratio tests: 1992/93 – Chi square (25)= 57.8; 1995/98 – Chi square (26)= 42.6.

**Table A4. Mean Real Monthly Wage by Displacement Status**

	Stay	Disp 92	Quit 92	Disp 93	Quit 93	Disp 94	Quit 94
October 92	1651 (1135)	1609 (1006)	1816 (1416)	1560 (1137)	1718 (1362)	1678 (1209)	1742 (1204)
End wage				1324 (1079)	1473 (1024)		
Start wage				1623 (1119)	2282 (1851)		
October 93	1802 (1270)	1642 (1099)	2191 (1710)	1778 (1260)	2416 (1861)	1724 (1172)	1729 (1216)
End wage						1466 (1453)	1460 (1040)
Start wage						1699 (1329)	2000 (1366)
October 94	1772 (1347)	1557 (1032)	2415 (2658)	1749 (1377)	2194 (1664)	1754 (1314)	2055 (1343)
Spring 95	1762 (1241)	1563 (1029)	2286 (2148)	1759 (1425)	2225 (1851)	1689 (1243)	2061 (1390)

Note: Estonian crowns, spring 95 prices. Standard errors in brackets. Full-time workers.



## **ANNEX: Labour Market Legislation and Institutions Affecting Displacement and the Cost of Displacement**

### **Employment protection legislation in the private sector**

In Estonia, individuals work under an employment contract, under a "work undertaking contract"<sup>15</sup> or in the civil service, where the Public Service Act regulates employment.

#### **Employment Contract (law entered into force in July 1, 1992)**

An employment contract can be terminated: (a) by mutual agreement of parties - the employment contract may be terminated at any time the opposite party gives written consent; (b) upon expiry of the contract; (c) on the initiative of the employee; (d) on the initiative of the employer; (e) at the request of third parties - e.g. if the work endangers the health, morality or education of a teenager, the employment contract may be terminated on the request of third parties (parent, guardian or labour inspector); or (f) in circumstances which are independent of the parties.

#### **The termination of a contract on the initiative of the employer**

There are several reasons for an employer to terminate the employment contract – liquidation of the enterprise, bankruptcy, unsuitability of an employee due to inappropriate professional skills or for reasons of health, unsatisfactory results of a probationary period, (see Table A7 for a detailed description of reasons and legal bases for termination of employment contract).

The advance notification period varies from two weeks (in case of long-term incapacity) to four months (when laying off workers who have continuously worked for the employer more than ten years). Severance pay varies from one monthly average wage (unsuitability of the worker) to four months of the individual worker's average wage (when laying off workers who have continuously worked for the employer more than ten years). Failure to adhere to the terms of notification results in the employer having to pay the employee's average daily wage for each of the working days short of the advance notice. More extensive information on severance pay and notification stipulations is given in Table A8.

The employer is can not terminate the employment contracts of temporarily ill employees, of employees on holiday or on strike, of pregnant women and women raising children younger than three years of age. Minors' contracts cannot be terminated because of unsatisfactory performance during the probation period. Termination of the working contract with a workers' representative (Labour Contract Law) on the employer's initiative during the period of performance of representative functions and within one year after the end of this period is permitted only with the consent of the Labour Inspectorate. In the case of liquidation or bankruptcy of the enterprise, or in the case of long-term illness, incapacitating the workers' representative, s/he may be dismissed without this consent. The Labour Inspectorate has to give written justification for this decision and has to consult the employees' union before deciding. Dismissal of a representative due to actions in protection of workers' interests is illegal. Notification periods and stipulated levels of severance pay do not apply to secondary jobs.

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<sup>15</sup> "Work Undertaking Contract" is a civil law contract under which the "work undertaker" (contractor) is obligated to do the work (prescribed by the costumer) on its own risk. The main difference between a work undertaking contract and an employment contract is that the first type of contract regulates the outcome of the work, while the second type regulates the process of work. A work undertaking contract assumes two equal parties at the same time, whilst an employment contract establishes subordinate relations. Thus, when working under a work undertaking contract, the guarantees prescribed in labour law do not apply to the "work undertaker" (contractor).

***Release of workers from the Civil Service under the Public Service Act ( 1996)***

The main difference in the layoff regulations relates to the levels of severance pay. They are as follows:  
For employment in the Civil Service of less than 3 years - salary of two months;  
3-5 years - salary of three months;  
5-10 years - salary of six months;  
10 and more years - one annual salary.

Unemployed civil servants have during the first six months of unemployment a right to be listed in the reserve list of officials. The reserve list is meant to assist former Civil Servants to find more easily a new job. If there is a vacant position, it is filled in the first instance with an official from the reserve list (if s/he has the requested skills and experience). The period on the reserve list is considered as service when the years of service are counted. Persons on the reserve list must undergo in-service training, re-training or evaluation, refusal to participate will result in the removal from the reserve.

**Sources of Income Support for the unemployed**

The Law on Social Protection of the Unemployed came into effect on 1 January 1995. Government decrees regulated unemployment issues before 1995. The major changes made in the 1995 law were that the interval between going to the employment office and registration as an unemployed person was reduced from 30 days to 10 working days, and that labour market concepts were codified in the text taking suggestions made by the ILO on board.

Eligibility for status of unemployed and for unemployment benefit

The right to labour market services and state unemployment benefit is enjoyed, as a rule, by permanent residents of Estonia. According to the Law on Social Protection of the Unemployed, a person is registered as being unemployed within 10 working days after going to the state employment office if he/she satisfies the following conditions:

he/she is between 16 years old and the retirement age;  
he/she has no working occupation or equivalent activity;  
he/she is looking for a job;  
he/she has been employed for at least 180 days during the 12 months preceding appearance at the state employment office; no previous employment is required of those who have been looking after a disabled child or a child under 7 years of age, persons undergoing hospital treatment, persons nursing a sick, disabled or elderly person, disabled persons or those under arrest or serving a prison sentence;

An extended waiting period of 60 days is required before benefit is received for those who have:  
studied at an educational institution as a full-time student before registering as unemployed;  
quit their last job voluntarily, and done so not because of illness or disability, nor in order to nurse a sick or disabled person, nor to enter the national defence forces; been dismissed due to violation of a labour contract, breach of trust or an undignified act.

The unemployed are required to actively search for work by appearing at the unemployment office at 15 day intervals. Failure to do so can result in the suspension of benefit payments for that period. After repeated "no shows" an unemployed person may be deprived of status and the right to unemployment benefits. However, a person who has lost unemployed status is entitled to re-register as a job-seeker.<sup>16</sup>

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<sup>16</sup> At the start of 2001 the new acts of "Labour Market Services" and "Social Protection of the Unemployed" came into force. The new "Social Protection of the Unemployed Act" redefines the definition of unemployment, abolishing the requirement of previous employment. This requirement is applied only in the case of unemployment benefits. Those laid-off, get the right to apply for labour market services. So, more persons, including long-term unemployed, can now register as unemployed and become eligible for labour market services. Also the time limit for registering as unemployed was abolished. Only the payment of unemployment benefits is now, in general, limited to 270 days.

Unemployment benefits

Originally the level of unemployment benefit was pegged to the minimum wage: in October 1992 the rate was fixed at 180 Kroons, which at that time made up 60% of the minimum wage. The rate was not changed until July 1996, when it was raised to 240 Kroons. The difference between the minimum wage and the unemployment benefit has increased steadily - with unemployment benefit falling to 32% of the minimum wage in 1999 (see Table A1.). The level of unemployment benefit is insufficient to cover expenditures on the minimum food basket (573 EEK in 1999), and far below the minimum means of subsistence (the average in 1999 was 1170 EEK).

**TABLE A5. UNEMPLOYMENT BENEFIT LEVELS**

Effective date for unemployment benefits	Unemployment benefits (EEK)	The ratio of unemployment benefit to minimum wage (%)
01.10.1992	180	60
01.07.1996	240	35.3
01.03.1998	300	27.3
01.01.1999	400	32.0

Unemployment benefit is paid every 15 days for every day of unemployment until the individual is no longer unemployed, but for not more than 180 calendar days in succession. A decree of the Labour Market Board, dated March 1993, extended the payment of benefits to those who had forfeited the social status of being unemployed, if they had registered as a job-seeker<sup>17</sup> and not found a job within 30 days. If the employment office is unable to send a job-seeker to a training measure, the job-seeker may apply for unemployment benefits three times during the subsequent 180 calendar days, but for no more than 30 days at a time. Following the exhaustion of unemployment benefits six months into unemployment, workers become eligible for Social Welfare Benefits. These are subject to registration at the employment office, are means tested, but open-ended.

Social Welfare Benefits

Social welfare in Estonia is regulated by the Social Welfare Act (passed in 1995<sup>18</sup>). The main social benefit of the state is subsistence benefit, which is paid to persons whose monthly income is below the subsistence level. Since April 1994, this benefit is granted and paid on a monthly basis by rural municipality or city governments from funds in the state budget prescribed for this purpose. During 1994 - 1996 a second benefit was paid in the form of a housing allowance. This allowance, coming from the state budget, covered those housing costs that within the standard allotted living space<sup>19</sup> exceeded one third of the family's income. From 1997, persons whose income is below the subsistence level established by the Government of the Republic receive a single subsistence benefit instead of the former two benefits. The basis for applying for subsistence benefits is the monthly income of a person (family) after expenses<sup>20</sup> connected with housing within the allotted living space have been subtracted.

<sup>17</sup> A job-seeker in Estonia is person, who voluntarily registers at the state employment office and wants a full-time job immediately, is willing to undergo labour market training and appears at the employment office at least once every 10 working days.

<sup>18</sup> The basis for financing welfare changed in 1999, becoming increasingly focused on individual needs.

<sup>19</sup> 18 square meters of total area a family member and a supplementary 15 square meters is considered standard allotted living space. As an exception, the total area of an apartment in the case of a two-room apartment, and not more than 51 square meters in the case of an apartment with a larger number of rooms, may be deemed to be the standard allotted living space of a pensioner who lives alone.

<sup>20</sup> In some local governments electricity, gas and firewood expenses may be partially compensated from the subsistence benefit funds of the state budget.

The subsistence level is as follows:

1.04.1994 – 280 EEK,

1.10.1994 – 320 EEK,

1.02.1996 – 390 EEK,

1.01.1997 – 460 EEK,

1.11.1997 – 500 EEK.

Subsistence benefit is paid to single persons on the basis of the said amounts and are taken as a basis for finding the subsistence level for the first family member. Consumption coefficients are used for each subsequent family member. The consumption coefficient for children under 14 years of age on April 1, 1994 was 0.5, raised to 0.7 on July 1, 1994 and to 0.8 on January 1, 1999.

### **Wage Setting Institutions**

#### Wage legislation

Before the 1994 Wage Law came into effect, wage setting was regulated by government decrees. Wages were set according to nominal salary grades, which were changed very often in the early 1990s because of persistent high inflation.

#### Wages under the Employment Contract

The law establishes minimum wages and rates for overtime, night-time and holiday work, while actual wages are subject to individual and collective bargaining. The additional compensation paid for an hour of overtime work must be at least 50% of the usual wage. The additional compensation for an hour of work in the evening time (6 PM - 10PM) must be at least 10% of the usual wage. Work at night (10 PM - 6 AM) has to be remunerated with a 20% additional wage payment. The usual wage rate has to be doubled if the worker is required to work on holidays.

#### Unions and their role in wage setting

The Trade Unions Act has been in force since 1989 and establishes the definition and tasks of trade unions and prohibits dissolving and restricting their operations. It stipulates that employees can be represented by a union in any enterprise or organisation that has three or more employees. All employees are entitled to unionise, including the police and civil servants.

Wages are bargained over individually or collectively. Collective bargaining over wages takes place directly between representatives of the trade unions and of employer organisations. Union density is, however, quite low in Estonia (between 12% and 18% across sectors in 1999) and not many collective bargaining agreements are concluded.

Much wage regulation is done through state level labour legislation. In this area, trade unions are important as they negotiate over laws concerning labour regulations. Tripartite agreements have gained more importance from year to year. These concentrate mainly on income issues, in particular the minimum wage, tax-free income and unemployment benefit. Despite this, the minimum wage, the minimum wage is still low in comparison with the average wage as Table A6 shows.

Table A6. Minimum and average wage per month

Effective date of the minimum wage	Minimum wage per month (EEK)	Growth (previous min. wage=100)	Average nominal monthly wage before taxes (EEK)	Share (%)
01.10.1992	300			
01.09.1994	450	150%	1734	26.0
01.01.1996	680	151%	2985	22.8
01.02.1997	845	124%	3573	23.6
01.01.1998	1100	130%	4125	26.7

Source: Statistical Office of Estonia

Table A7. Minimum wage, minimum subsistence level and tax free income in EEK

	1992	1993	1994	1995	1996	1997	1998
Minimum wage	300	300	300	450	680	845	1100
Minimum subsistence level		280	280	320	390	460	500
Tax-free income					500	500	500

Source: Statistical Office of Estonia

One objective of the Association of Estonian Trade Unions (EAKL) is to equalise the minimum wage and tax-free income<sup>21</sup>. EAKL has also the objective to raise unemployment benefits to at least 50% of minimum wage. Negotiations over unemployment benefits have, however, been even less successful than negotiations over the minimum wage.

<sup>21</sup> EAKL negotiates over the levels of minimum wage or minimum living standard TALO negotiates over the wage fund. Thus, wage levels for workers are not the issues of collective bargaining at state level.

**TABLE A8. LEGAL PROVISIONS OF EMPLOYMENT PROTECTION IN ESTONIA<sup>22</sup>**

The reason of dismissal	Notice period <sup>23</sup>	Redundancy pay	Procedural obligations	Exemptions
Liquidation of enterprise	Not less than 2 months	Compensation to employees who have been employed continuously: up to 5 years - 2 months' average wage, 5-10 years - 3 months' average wage, 10 and more years - 4 months' average wage	Employer is required to offer another position to the employee if possible. If employer has vacant positions he is obligated to re-employ the released worker upon his demand within six month. The information regarding the number, occupation, age and sex of the released employees has to be submitted to the local employment office. Written notice of the reason of termination of contract and the measures taken to provide work to employee has to be sent to the organisation or person representing employees.	The termination of contract with pregnant woman or woman raising under three years old child is allowed only with the consent of local labour inspector.
Bankruptcy of the employer	Not less than two weeks, if the enterprise continues to operate after the bankruptcy is announced. No advance notice required if enterprise is not operating after announcement of bankruptcy	Compensation to employees who have been employed continuously: up to 5 years - 2 months' average wage, 5-10 years - 3 months' average wage, 10 and more years - 4 months' average wage. If an employer lacks the means to pay compensation, the state shall pay compensation to the employees. Compensation is up to employees two months' average wage but not more than two months' wage of the state's average (since 1998 three months' average wage is paid).	The termination of contract is allowed after the bankruptcy order is issued. The information regarding the number, occupation, age and sex of the released employees has to be submitted to the local employment office.	The termination of contract with pregnant woman or woman raising under three years old child is allowed only with the consent of local labour inspector.
Lay-off <sup>24</sup>	Notice period to employees who have been employed continuously:	Compensation to employees who have been employed continuously: up to 5 years - 2 months' average wage, 5-10 years - 3 months' average wage,	An employer has the right to terminate employment contracts upon a decrease in work volume, reorganisation of production or work, reinstatement of an employee in a	The termination of contract with pregnant woman and woman raising under three years old child is not allowed.

<sup>22</sup> These provisions only apply to primary jobs.

<sup>23</sup> Upon failure to adhere to the terms, an employer is required to pay compensation to the employee in the amount of the employee's average daily wages for each working day short of advance notice of termination of the employment contract

<sup>24</sup> If the number of laid-off during the three month is 10-20 and their reemployment is not guaranteed the person or organization representing workers may stop the termination of contract up to one month. If the number is more than 20 the termination may be stopped up to three month.

<b>The reason of dismissal</b>	<b>Notice period<sup>23</sup></b>	<b>Redundancy pay</b>	<b>Procedural obligations</b>	<b>Exemptions</b>
	up to 5 years not less than 2 months, 5-10 years not less than 3 months, 10 and more years not less than 4 months	10 and more years - 4 months' average wage	previous position and in other cases which require termination of the work. Prior to termination of an employment contract, the employer is required to offer another position to the employee if possible. An employer is required to re-employ an employee who has been released due to a lay-off within six months if the employee so desires, if the employer has vacant positions The information regarding the number, occupation, age and sex of the released employees has to be submitted to the local employment office. Written notice of the reason of termination of contract and the measures taken to provide work to employee has to be sent to the organisation or person representing employees.	The contract of minors is allowed to terminate only with the consent of labour inspector. Notice period to workers' representative person has to be one month longer. In the first place representatives of employees have preferential right to stay employed, followed by the employees who work for such employer as their principal job. Of the persons who are employed in a principal job, preference is given to those who have better performance results.
Unsuitability of an employee due to professional skills or for reasons of health	Not less than one month	One month's average wage	The termination is allowed if it is not possible to offer another position or if employee refused an offered position. Written notice of the reason of termination of contract and the measures taken to provide work to employee has to be sent to the organisation or person representing employees.	The termination of contract with pregnant woman or woman raising under three years old child is not allowed. The contract of minors is allowed to terminate only with the consent of labour inspector. Notice period to workers' representative person has to be one month longer.
Unsatisfactory results of a probationary period <sup>25</sup>	No advance notice required	No compensation is paid	The employment contract might be terminated within the probation period included the last day of probation period.	The termination of contract with pregnant woman or woman raising under three years old child is allowed only with the consent of local labour inspector. The termination of contract with minors is not allowed.

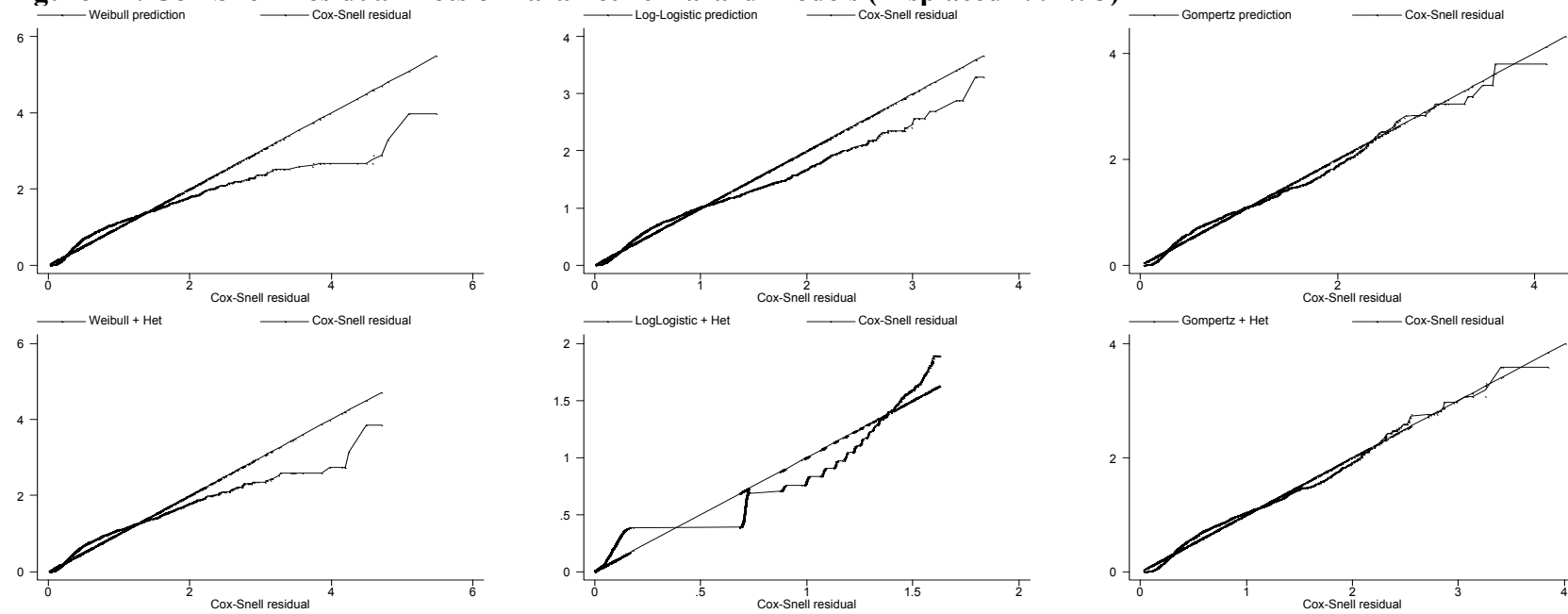
<sup>25</sup> A probationary period cannot exceed four months

<b>The reason of dismissal</b>	<b>Notice period<sup>23</sup></b>	<b>Redundancy pay</b>	<b>Procedural obligations</b>	<b>Exemptions</b>
The long-term incapacity for work of an employee	Not less than two weeks	No compensation is paid		The termination of contract with pregnant woman and woman raising under three years old child is not allowed.
The age of an employee (if person is 65 years old and has right to full old-age pension)	If the employee has been continuously employed: less than 10 years – 2 months; more than 10 years – 3 months	Compensation to employees who have been employed continuously: up to 5 years - 2 months' average wage, 5-10 years - 3 months' average wage, 10 and more years - 4 months' average wage		
Breach of duties an employee Loss of trust in an employee An incident act by an employee	No advance notice required	No compensation is paid	An employer is required to adhere to the procedure prescribed by law for imposing disciplinary punishments for terminating the contract. The disciplinary punishment is allowed to impose within six months after the date the offence is committed, but not later than one month after becoming aware of the offence. If the offence is proved by findings of an inventory, review, audit, etc., the punishment may be imposed within a year after the offence is committed.	The termination of contract with pregnant woman or woman raising under three years old child is allowed only with the consent of local labour inspector.

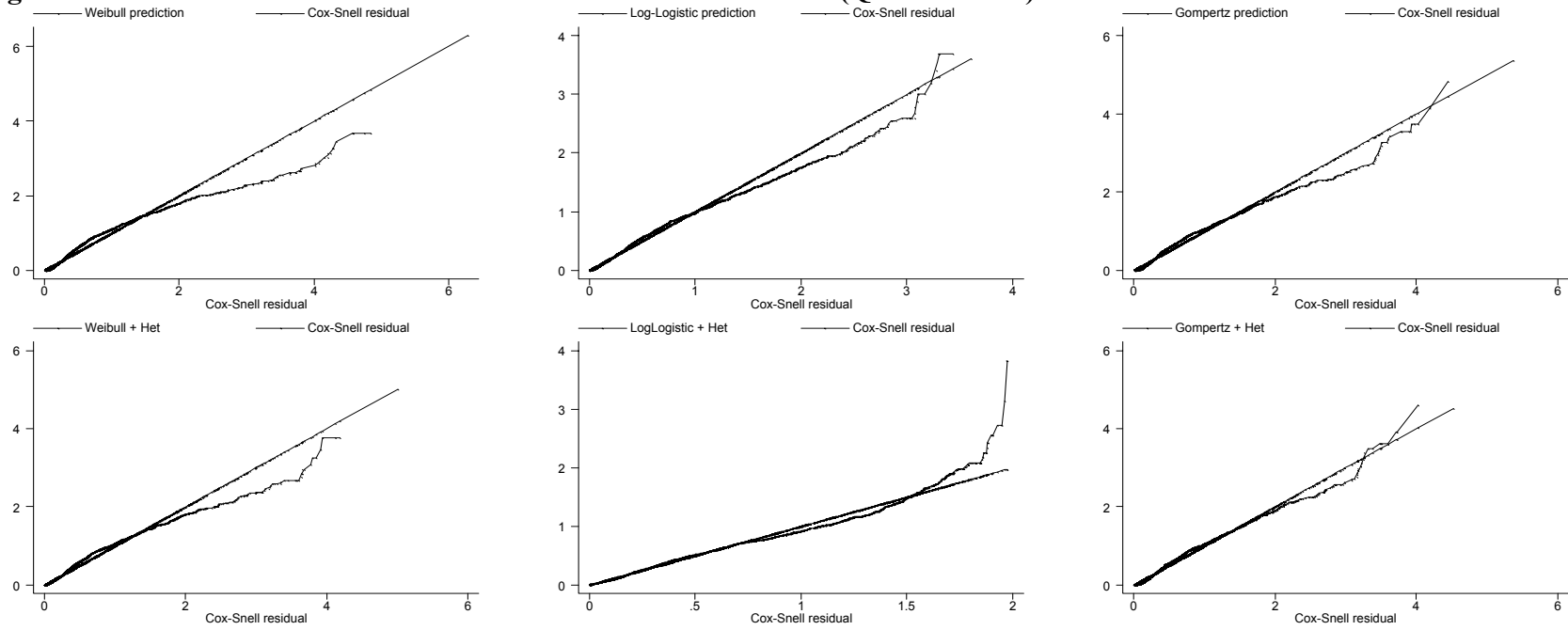
Sources: RT...



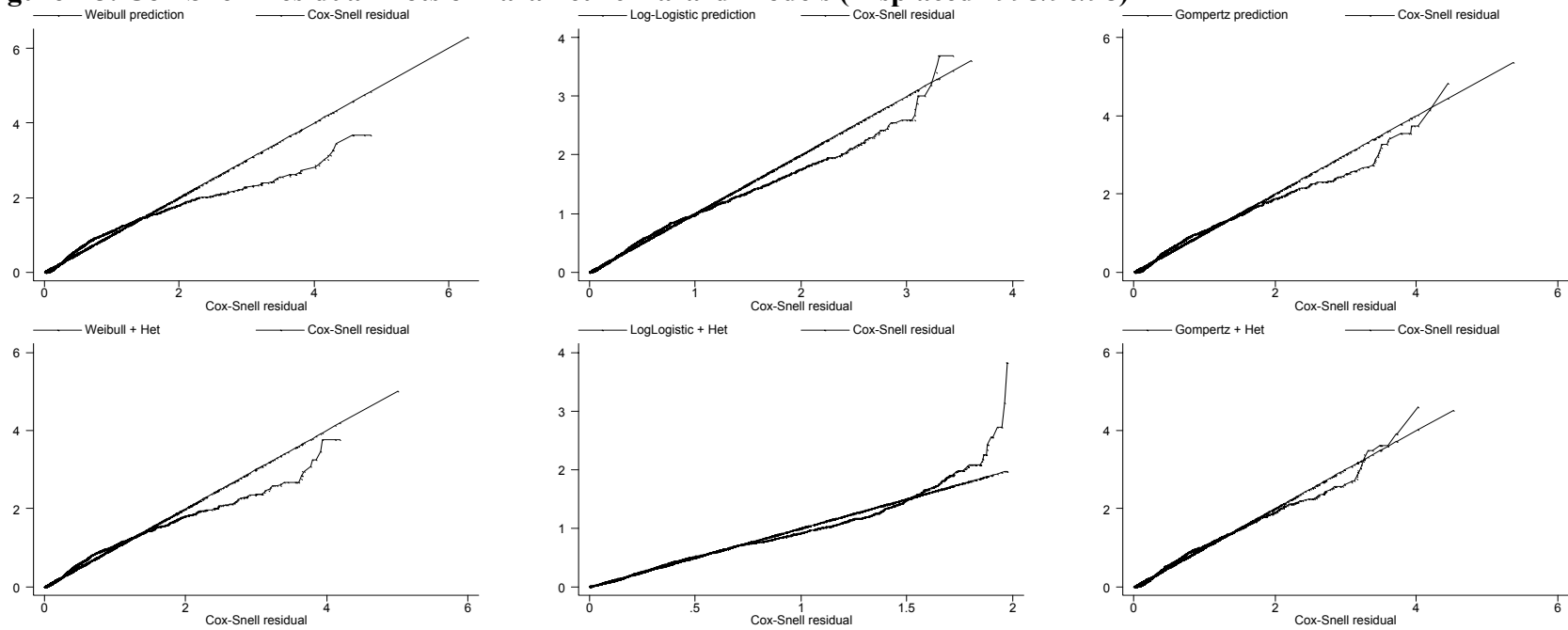
**Figure A1. Cox-Snell Residual Plots of Parametric Hazard Models (Displaced 1992/93)**



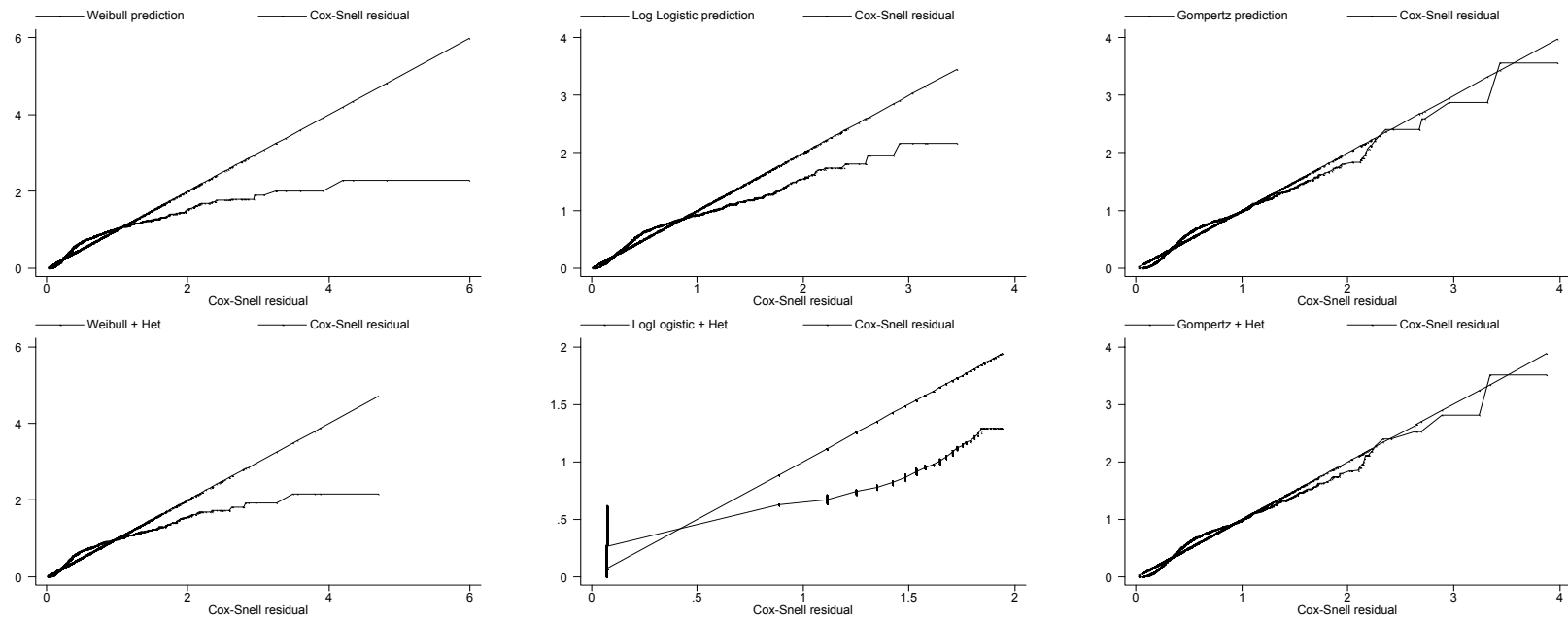
**Figure A2. Cox-Snell Residual Plots of Parametric Hazard Models (Quits 1992/93)**



**Figure A3. Cox-Snell Residual Plots of Parametric Hazard Models (Displaced 1995/96/98)**



**Figure A4. Cox-Snell Residual Plots of Parametric Hazard Models (Quits 1995/96/98)**



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