

# Job growth in early transition: Comparing two paths\*

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## Abstract

Small start-up firms are the engine of job creation in early transition. We ask about differences in their growth across two different transition economies: Estonia, which experienced rapid destruction of pre-existing firms, and the Czech Republic, which reduced the old sector gradually. We find that the majority of job growth corresponds to within-industry reallocation. The within-industry growth of small start-up firms is similar in the two countries, in line with the convergence to Western industry firm-size distributions. We also find similar patterns in the evolution of wage differentials between start-ups and old firms and small differences in the extent of low-wage employment in start-ups across the two transition paths.

JEL Classifications: J2, J3, J4, L1, O1, P2.

Keywords: Start-ups, job creation, job destruction, transition, firm-size distribution.

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## 1. Introduction

'Transition' of the productive structure in the countries of Central and Eastern Europe (CEE) and the former Soviet Union is a process aimed at achieving efficiency through (1) restructuring of enterprises that were created during central planning (e.g., by privatization), and (2) reallocating capital and labour from these post-communist firms to new start-up private ones.<sup>1</sup> Much research within the transition literature has analysed the process of privatization and whether it has resulted in efficiency-inducing restructuring (for surveys see Roland, 2000; Svejnar, 1999). On the other hand, relatively little work has focused on newly created firms, even though early in transition at least one important author, Kornai (1990), viewed the rise of the new sector as more important for the success of transition than the restructuring of the old state-owned firms. While there is extensive research on the reallocation of labour across industrial branches (see Boeri and Terrell, 2002, for a summary), as well as work focusing on patterns of private employment, for the most part this literature uses data that do not differentiate between privatized and *de novo* private firms. This is crucial to the extent that privatized firms did not effectively restructure, which is especially likely in the Czech Republic (see, e.g., Roland, 2000). Furthermore, an empirical literature emerged recently that stresses the importance of the new start-up firms as the engine of growth in these economies (see, e.g., Berkowitz and DeJong, 2003, and World Bank, 2002). Nevertheless, little remains known about the evolution and characteristics of this new sector.

In this paper we address this gap in the empirical literature. First, we use unique worker-level data to characterize job creation in newly started enterprises during the early transition period in the Czech Republic. Second, we rely on similar data from Estonia to approximate the growth of the new sector in a country, whose path of transition has been very different from that of the Czech Republic. While early transition in Estonia was characterized by massive job destruction of the post-communist firms in the absence of an effective social security net, Czech reallocation proceeded at a more gradual pace, involved relatively generous social support, and featured extensive voluntary moves from the old firms to the new sector. Our earlier research (Jurajda and Terrell, 2001) demonstrates that, despite the different policy background, newly started and small firms were an impressive sole engine of job creation in both countries at the start of transition. In less than five years since the start of transition, more jobs were provided by these firms than by the enterprises inherited (and potentially transformed) from communism.

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<sup>1</sup> For a similar view on adjustment in developing countries see Caballero and Hammour (1996).

In our previous work, we interpreted the aggregate Czech and Estonian job reallocation patterns in terms of macroeconomic theories. In the present analysis we focus on microeconomic aspects of the early-transition job growth. Our goal is to learn about the characteristics of this growth by contrasting the transition paths of our two sample countries. Unfortunately, we do not have complete information distinguishing privatized and start-up employment in Estonia. Given that most start-up firms are small (about 90 percent of employment in start-ups is found in firms employing less than 100 workers in the Czech Republic), we use firm-size information to approximate the extent of the start-up sector in Estonia. We also directly compare the evolution of the small-firm sector across the two transition countries.

Using the distinction between old- and new-sector jobs, this paper asks to what extent newly created jobs are shaping the economies into more mature market economies in terms of both industrial and firm-size structure. Further, our previous macroeconomic comparison of the gradual Czech and rapid Estonian transition paths found similar levels of aggregate job creation on the background of dramatically different levels of job destruction, unemployment, and social safety nets. The second line of questioning in this paper therefore asks if these paths led to the creation of different types of jobs. First, since much of the Czech old-to-new reallocation occurred as a result of voluntary worker moves from old to new firms in an environment of low unemployment, while more of the Estonian reallocation resulted from layoffs than from voluntary quits, we expect higher new-old wage differentials in the Czech Republic than in Estonia. Similarly, the demographic composition of the new sector may be expected to differ under the more voluntary reallocation, with a larger fraction of young workers who can better reap benefits from investing into new skills required in start-up enterprises. Second, the share of low-wage jobs in all newly created jobs may be higher in an environment with a high incidence of unemployment and low benefits than in an environment of low unemployment and adequate benefits. Hence, it is interesting to ask to what degree the new sector served as a depository for the unemployed, especially in Estonia.

The relative lack of research on new firms is probably caused by the fact that micro datasets on the early transition evolution of employment by the new/old firm distinction are scarce. Our findings are based on labour market histories from retrospective household survey data. In the Czech data we directly distinguish between new and old jobs, while the Estonian data allow us to approximate this distinction. An important advantage is that the data are representative samples of the populations in both countries, and hence cover employment in all industries (not just manufacturing) and firm sizes.

We proceed in Section 2 with some background on the transition experience of these two economies and the empirical literature on job reallocation in transition. In Section 3 we introduce our data and empirical strategy. The findings are presented in Section 4 and the conclusions in Section 5.

## 2. Background

### *2.1 Policies in transition in the Czech Republic and Estonia*

A decade after the start of transition, the Czech Republic and Estonia are two of the most market-oriented economies in the region. The Czech Republic became free of Soviet rule at the end of 1989 and undertook its first macroeconomic and institutional reforms in 1991, whereas Estonia gained independence from the Soviet Union in 1991 and enacted a reform package, similar to the Czech one, in 1992.<sup>2</sup>

Estonia experienced a deeper and longer recession than did the Czech Republic.<sup>3</sup> Whereas the unemployment rate in the Czech Republic peaked at 4.1 percent during the first year of the transition (1991) and then stabilized at around 3 percent for the following five years, the unemployment rate in Estonia followed an upward trend throughout the entire period, reaching almost 10 percent in 1996. The Estonians also faced far higher levels of inflation throughout the entire period, but especially in its year of price liberalization when the country suffered rouble hyperinflation of 1,076 percent. The government responded to runaway inflation by aggressively implementing a tight monetary and fiscal policy and introducing a currency board for the newly established Estonian currency (crown) in July 1992 (Eamets, 2001). Finally, real wages declined more in Estonia than in the Czech Republic during the hyperinflation year, but followed a very similar pattern once the new Estonian currency was introduced.

The privatization process proceeded somewhat more rapidly in Estonia than in the Czech Republic (Kotrba and Svejnar, 1994; Eamets and Philips, 1998). There is extensive evidence on the Czech privatization experience that suggests little success in restructuring (see, e.g., the survey in Roland, 2000). However, little information is available for either country on the experience of the new private sector and policies to promote start-up firms. For example, there are no official statistics on the amount of bank credit going to small new firms in either country, yet the national statistics do indicate that there was more overall credit available in the Czech Republic than in Estonia. Our calculations indicate that total credit available as a percentage of GDP was about 66–69 percent in the Czech Republic (1991–94) whereas it was only 14–17 percent in Estonia (1994–95). More importantly, new credit was about 10–12 percent of GDP in the Czech Republic (1993–94) whereas it was only 2 percent in Estonia (1994–95). Survey evidence from Central European countries suggests that their credit markets have provided *de novo* private firms with large amounts of financing from the early stages of firm existence and that credit for newly established firms has been more available in the Czech Republic

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<sup>2</sup> For more detail, see Dyba and Svejnar (1995) and Eamets (2001).

<sup>3</sup> The comparison of Estonia and the Czech Republic is essentially a comparison of the former Soviet Union with the CEE in all the above respects (except for the low level of the unemployment rate in the Czech Republic).

than elsewhere (Bratkowski *et al.*, 1999). We also know that the relative share of GDP allocated to active labour market policies, another source of financing for start-up firms, was lower in Estonia than in the Czech Republic (0.19 percent vs. 0.08 percent during the 1990s, see Riboud *et al.*, 2001).

Finally, we note that in spite of the deeper recession in Estonia, its social safety net was substantially less generous than that of the Czech Republic. In the first year of transition, unemployed Czechs were offered 12 months of unemployment benefits entitlement and benefits as high as 90 percent of the previous wage. As the transition proceeded the Czechs tightened their unemployment benefit system, reducing the entitlement period to six months and lowering the replacement rate to between 50–60 percent of the previous wage. Whereas an Estonian unemployed worker also received benefits for six months, the replacement rate was only 7–10 percent. Finally, after six months of unemployment benefits, all low-income Czech households have always been entitled to welfare benefits indefinitely, whereas only the poor Estonian families with three or more children have been entitled to welfare assistance and for only up to three months.

## 2.2 Empirical literature

The firm-based analysis of job creation and destruction in transition pointed out the dominant role of new firms in job creation and old firms in job destruction (e.g., Konings *et al.*, 1996; Bilsen and Konings, 1998; Johnson *et al.*, 2000). However, this research had to rely on small samples of firm survey data or was limited to the manufacturing sector.<sup>4</sup> The data scarcity is reflected in the few detailed analyses performed to-date about the growth of the *de novo* sector, its determinants and the impact of this sector on the economy.

The available evidence suggests that entrepreneurial activity is a critical source of growth in post-socialist countries. Berkowitz and DeJong (2003) find that the number of start-up firms across Russian regions exhibits a strong and enduring relationship with GDP growth rates. McMillan and Woodruff (2001) review studies of China, Poland, Russia and Vietnam and conclude that the robust economic growth enjoyed by Poland and China is attributable in large part to substantial entrepreneurial development they have enjoyed, while the economic stagnation Russia has endured during its transition is largely due to sluggish entrepreneurial development.

In this paper we use worker-level data to analyse job reallocation. Haltiwanger and Vodopivec (1999) use the same data we use to provide an extensive analysis of Estonian job creation and destruction in the public and private sectors, where the latter combines jobs in the privatized sector with those in *de novo* firms. They show a rapid increase in both worker and job reallocation during the early 1990s so that the annual worker reallocation rate exceeded 35 percent by 1993. Our analysis

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<sup>4</sup> There are representative studies of self-employment, however. See for example, Earle and Sakova (2000).

differs in that we use a different categorization of Estonian jobs in order to approximate the extent of start-up employment (new sector).

Finally, since we also examine wage differentials between old and new sector jobs in this paper, we point out that there is a small literature that focuses on wage gains of individuals who change jobs in transition economies.<sup>5</sup> This research sheds light on the nature of job reallocation to the extent that wage gains reflect productivity gains. Munich *et al.* (2002a) use the same Czech data that we use to examine wage gains associated with the emerging new private sector, taking into account the decision of workers to quit or stay and to move to firms in the new versus old sector of the economy. Their findings suggest that those who quit an old-sector job for a new-sector one had the highest wage gains, and those who were laid off and went to another old sector had the lowest gains. Lehmann *et al.* (2002) study the extent and consequences of worker displacement in Estonia using the same data we use. They find little difference in the wage evolution of displaced workers compared to that of workers who stayed employed. The main cost of job displacement is apparently associated with the risk of long-term non-employment.

### 3. Data and measurement issues

Measuring the dynamics of worker and job reallocation into the *de novo* private sector at the beginning of the transition from communism to capitalism is not easy. First, most of the start-ups are small firms (Jurajda and Terrell, 2001) and in the early part of transition the statistical offices did not include firms with fewer than 20 workers in their firm surveys. The offices were also unable to locate many of the newly established firms with more than 20 employees. Second, household labour force surveys started to be implemented in these countries only in the mid-1990s, leaving the first crucial years of transition undocumented. Third, most of the existing household survey data does not differentiate between new private and privatized firms and few samples cover information on the size of the employer.

Hence, the only way to gather representative information on the entire population of firms during the early period of transition is to collect retrospective data from households, asking individuals about employer attributes.<sup>6</sup> In this section we briefly describe these data and show how measures of job reallocation, which are complementary to those based on firm-level data, can be constructed with individual data.<sup>7</sup>

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<sup>5</sup> See, e.g., Boeri and Flinn (1999), Burda and Mertens (2001), Hunt (1998), Noorkõiv *et al.* (1997) and Sabirianova (2002).

<sup>6</sup> One could also collect firm-level surveys today with retrospective questions about employment, but such sampling would not cover new firms started in early transition that went out of business, which would lead to underestimating the size of the new sector.

<sup>7</sup> We refer the reader to Jurajda and Terrell (2001) for a detailed description of these measures.

### 3.1 Data

Our analysis uses data from two similar retrospective surveys. The Czech survey was administered in December 1996 to 3,157 randomly selected households throughout the Czech Republic using the sample frame of the official Labor Force Survey. We have the employment histories of 4,786 individuals, who experience 7,926 main jobs during the 1991–96 period.<sup>8</sup> The Estonian survey was administered in the first quarter of 1995 to one percent of the population between the ages of 16 and 75 in 1995 using the Census for the sampling frame. In Estonia, we have usable data on 7,928 individuals who experience 14,465 main jobs during 1989–95. The number of jobs per person in the data is therefore quite low at 1.82 in Estonia and 1.65 in the Czech Republic.<sup>9</sup>

For each job there is information on the industry of employment, type of employment and a number of employer attributes. For those that exited their employment, we also observe the reason for separation. Whereas in both countries there is information on the respondent's wage at the beginning and end of each job, in Estonia respondents were also asked to report their earnings in October of each year. However, a drawback of the Estonian data is that the wage information from the hyperinflation years of 1990–91 is not usable.<sup>10</sup>

The classification of firms into the new and old sectors is a crucial aspect of our analysis. First of all, we set aside jobs in the public sector (education, health, and public administration). Next, we want to contrast the evolution of the newly created firms to that of the pre-existing old firms. The Czech data is unique in that it provides this distinction.<sup>11</sup> Therefore, we pool state and privatized jobs into the old sector and distinguish the *de novo* private enterprises (new sector) from the privatized

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<sup>8</sup> We have compared the means and distributions of the major demographic characteristics (i.e., age structure, gender, region of residence and household size) of our sample in 1996 with those from the national Labor Force Survey and we find that our sample is representative in terms of these characteristics. See Munich, Svejnar and Terrell (1997) for a description of the survey and sample design as well as the descriptive statistics of the sample relative to the Labor Force Survey data.

<sup>9</sup> Retrospective data is often criticized for 'recall bias.' Yet, research indicates that individuals recall traumatic events more readily and we believe that changes in the labour market status (rare at 1.7 to 1.8 jobs per person during six years) are likely to have been particularly memorable in an economy transiting from a system with many years of steady employment. For Estonia, Noorkõiv *et al.* (1998) compared the responses on economic activity in 1989 in the 1995 survey with the responses in the 1989 census and found that 'the recall data corresponded quite well. The majority of the discrepancies are attributable to changes in labor force definitions.'

<sup>10</sup> To form complete monthly labour market histories, we interpolate wages from the available information.

<sup>11</sup> Respondents are asked about the ownership type of their employer at the end of their employment spell. The choices are, e.g., 'newly established private firm', 'firm after privatization', 'firm in privatization'. This is not a perfect measure of ownership. In particular, it is unclear how respondents consider spin-offs from privatized or state-owned firms. However, the number of workers employed in spun-off enterprises is unlikely to be large in the Czech Republic. Lízal *et al.* (2001) analyse the process of breakup of old firms in Czech manufacturing and suggest that employment in spin-offs amounts to approximately 5 percent of all employment.

firms. In the Estonian questionnaire, however, firm ownership is categorized as state, private, or cooperative/collective. We can distinguish whether a given job is in the new or old sector for employment spells that started before 1992, the year of privatization. If a worker reports being employed in a private firm before privatization began in Estonia, the firm is likely to be newly started. It is clear that employment spells starting in state-owned firms belong to the old sector and that we should keep on-going jobs in firms that are privatized in the old sector. However, for employment spells starting in private firms after 1992, the data do not distinguish jobs in *de novo* private firms from those starting in privatized enterprises. We categorize such spells as being in the new or old sector depending on the size of the firm in which hiring occurs because the Czech evidence on startup size composition indicates that 90 percent of all new-firm employment is in firms of less than 100 employees. Therefore, we categorize Estonian employment spells starting in small firms as being in the new sector and assign those employment spells starting in large firms to the old sector. This is the best approximation available to us, although there are two, potentially offsetting sources of measurement error: (i) some of the large private firms that hire workers in Estonia may be newly created private firms, and (ii) some of the hiring in small private firms occurs in privatized firms.<sup>12</sup> Following this strategy, the observed growth of the new sector is not due to reclassification of on-going jobs.

In the end, we therefore distinguish between three main employment sectors: the *old sector* (comprised of jobs in the state-owned enterprises, cooperatives, and privatized firms), the *new sector* (including all jobs in *de novo* private firms and the self-employed as well as jobs of new hires into Estonian privatized firms), and the *public sector* (public administration, health and education).

Our coding choices maximize comparability across the two countries given the structure of the data and allow us to focus on the under-researched phenomenon of start-up employment growth. An alternative approach would be to rely on the private/state coding and to reclassify jobs in privatized firms as new (private) at the moment of privatization. Haltiwanger and Vodopivec (1999) use such coding for their analysis of the Estonian data. We are not able to compare the two transition paths using the private/state distinction because the Czech data do not provide the timing of privatization and we cannot reclassify on-going jobs from state to private status accurately. We do, however, examine employment in firms of more or fewer than 100 employees (large vs. small), irrespective of ownership, which is strictly comparable in Estonia and the Czech Republic. Such cross-country comparison is free of measurement error and speaks about changes in firm-size distribution across different transition paths. As we argue below, the growth of the new sector appears closely linked to the firm-size structure of transition economies.

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<sup>12</sup> Appendix Figure A1 shows the amount of hiring into private Estonian firms by firm size.

### 3.2 Measurement of job and worker reallocation rates

Although job destruction and job creation are traditionally measured with firm data, they can also be measured from worker flow data using information on the type of employment separation.<sup>13</sup> In the Czech (Estonian) questionnaire, we have 13 (21) answers for how someone separated from their job. We define job destruction (*JD*) as any separations where: 1) the firm was closed down (by the respondent or another employer) and 2) the separation was part of a mass layoff.<sup>14</sup> The *JD* rate is the total number of job destructions at a given time  $t$ , divided by the number of jobs in  $t - 1$ . Clearly some separations not included in these two types (e.g., retirement or quit without replacement) also correspond to job destruction; hence, our *JD* measure is likely to be a lower bound estimate.

To measure job creation (*JC*), we follow the existing literature and use the simple identity that net employment growth is the difference between job creation and job destruction. This implies that  $JC_{tk} = \Delta E_{tk} + JD_{tk}$ , where  $\Delta E_{tk}$  denotes the time change in employment in sector  $k$  (i.e., new or old), and where  $JC_{tk}$  and  $JD_{tk}$  are job creation and job destruction counts in sector  $k$  in time  $t$  respectively.<sup>15</sup> Again, this may be considered as a lower bound estimate for *JC* because *JD* may be underestimated. In particular, when the estimated  $JC_{tk}$  measure is negative, it informs us that the minimum number of quits not replaced is  $-JC_{tk}$ . Hence, whenever the initial  $JC_{tk}$  estimate based on layoffs without replacement is negative we add the negative of  $JC_{tk}$  to our  $JD_{tk}$  measure and set  $JC_{tk}$  at zero.<sup>16</sup>

Our measure produces the same net job creation as that based on firm data but it results in a measure of gross job flows that is not identical to that of the firm-level studies. Nevertheless, our worker-level data offer important advantages. In particular, unlike datasets used in the empirical literature on job creation and destruction in transition, our data are based on well-defined random sampling, cover all economic activities and all firm sizes in the economy, and provide a continuous coverage of transition. Many studies on transition countries use small unrepresentative samples of firms or focus on one industry only. Furthermore,

<sup>13</sup> See Davis and Haltiwanger (2000, pp. 2716–7) for the standard definitions of job creation and job destruction using firm-level data. See Blanchard and Diamond (1990) for the development of comparable measures using worker-level data.

<sup>14</sup> In addition to exits due to business closures, workers indicated if they exited a job due to a ‘reduction in workforce’ in the Czech Republic or as part of a ‘reorganization, privatization or bankruptcy of the enterprise’ or ‘personnel reduction’ in Estonia. See appendix tables in Jurajda and Terrell (2001) for more detail.

<sup>15</sup> This strategy of estimating job creation and job destruction rates relies on random sampling. When we observe a layoff with replacement within a given employment category, it is expected to be compensated by hiring another worker within our sample into this employment category. Layoffs with replacement constitute only about 2 percent (3–6.7 percent) of all Czech (Estonian) separations.

<sup>16</sup> In our final empirical work, we perform this correction at a more detailed level, checking for  $JC_{tks} < 0$  where  $s$  denotes one-digit industry and summing up the corrected  $JD_{tks}$  across industries within employment sectors  $k$  to obtain our final estimate of  $JD_{tk}$ . This additional level of detail changes the corrected *JD* measure only in the old sector, which comes as no surprise.

these data often suffer from 'survival bias' as the firm samples are typically collected only during mid-transition and therefore include only surviving firms.<sup>17</sup>

Perhaps most important is the fact that the firm-level approach is not available for medium and large firms during the early years of transition when Czech unemployment diverged from the rest of the CEE countries, and little firm-level information exists for small firms in all years. Thus relying on firm data alone would ignore potentially important evidence that one can find using our approach. Our data also allow us to simultaneously consider worker and job flows, and our measure of job reallocation captures within-firm restructuring, which is not discernible with firm-level data. Firm-level data contain only the changes in total firm (plant) employment. If firms in a given sector maintain constant employment, but lay off and hire an equal number of workers (into different positions), such restructuring would be ignored in a firm-level dataset, but is captured in our data.

## 4. Results

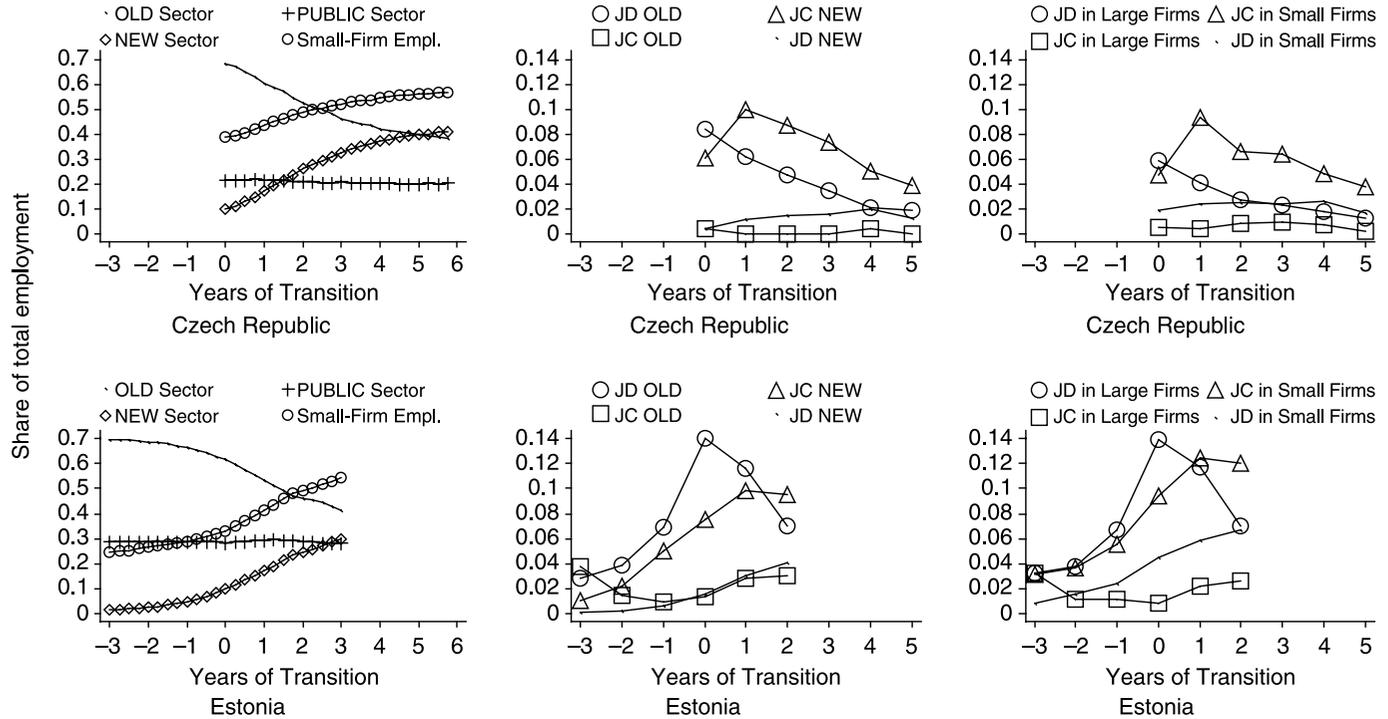
Figure 1 sets the aggregate stage for our inquiry about the nature of job creation in early Czech and Estonian transition. Its two left graphs summarize changes in employment structure in each country, while the remaining graphs show the evolution of job creation and destruction. We recast time in terms of the start of the reforms; year 0 corresponds to 1991 for the Czech Republic and 1992 for Estonia.

Beginning with the Czech Republic, the upper left graph implies a striking growth of the new sector during the early reform period in the Czech Republic. The start-up firms provide more jobs than the old firms only five years into the transition process. It is also clear that the rise of the new sector closely corresponds to the growth of small firms, defined as firms employing less than 100 workers (irrespective of firm ownership). This is natural because start-up firms are typically small. In fact, about 90 percent of Czech new-sector employment occurs in such small firms. The public sector holds on to a stable fraction of total employment and is omitted from the subsequent analysis. The next graph shows the evolution of job reallocation in the Czech old and new sectors. It implies that the old sector is responsible for almost all of early-transition job destruction while almost all of job creation occurs in new firms. The new/old categorization allows one to separate job creation from job destruction during early reforms. Finally, the last graph in the upper row of Figure 1 confirms that one can think of the new sector and its vigorous job creation as corresponding to the rise of small firms.

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<sup>17</sup> Survival bias can lead to the underestimation of job destruction rates. It may not only affect state-owned enterprises, but can come from the closure of newly established private businesses during (chaotic) early transition.

**Figure 1. Employment structure and job reallocation during transition**



JC: Job Creation. JD: Job Destruction. Small: less than 100 workers.

The bottom row of Figure 1 presents Estonian results based on our approximation of the new sector there. As we explain in Section 3.1, we cannot distinguish privatized (old) from start-up (new) jobs for Estonian employment spells starting after 1992 so we categorize employment spells starting in small firms as being in the new sector and assign those spells starting in large firms to the old sector. Using this approximation, the rate of the new sector growth in Estonia is similar to that in the Czech Republic. A comparison of the upper and lower graph shows that three years into transition, the old sector in both countries still provides a larger share of total employment (about 10 percentage points more) than the new sector does.<sup>18</sup> However, as the next graph shows, the employment reallocation in Estonia occurs on the background of drastic job destruction in the old sector. Job creation in the new sector rises quickly, but surpasses job destruction one year later into transition compared to the Czech results. The last graph of Figure 1 then offers a comparison to the Czech findings that is not affected by measurement error. Using the small/large firm distinction we again find the job reallocation rates to be much higher in early Estonian transition than in early Czech transition.<sup>19</sup> In both countries, early-transition job creation occurs almost solely in small firms. The firm-size patterns of job reallocation imply swift changes in economy-wide firm-size distributions during the early reform period.

Below, we explore the characteristics of this new-sector growth. There are some characteristics we would expect in all transition economies as they become market-oriented. Specifically, we would expect that the new sector creates relatively more jobs in industries (economic activities) that represent greater employment and output shares of market economies compared to planned economies (e.g., trade, restaurants and hotels, financial and other services). Given the scarcity of small firms under central planning, we expect the new job creation process to lead to convergence in firm size structures to that of the more mature market economies.

In addition to these patterns for transition countries in general, we also expect differences in the evolution of the new sector and its characteristics in Estonia and the Czech Republic because of their different patterns of job destruction and relative levels of unemployment and social safety nets. First, given the higher level of unemployment in Estonia, and given that a larger share of the Czech old-to-new reallocation occurs as voluntary moves while mass layoffs are more important in Estonia (Jurajda and Terrell, 2001),<sup>20</sup> we expect positive self-selection based on benefits from moving to the new sector to play a larger role in the Czech Republic

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<sup>18</sup> If we assign all hiring in private firms in Estonia to the new sector, it provides as many jobs as the old sector at the start of the third year of transition.

<sup>19</sup> Job destruction in small firms is higher compared to that in new firms because of the scrapping of jobs in old small firms. Given that job creation equals the sum of job destruction and net employment change, this also pushes up job creation rates in small firms.

<sup>20</sup> In Jurajda and Terrell (2001), four job exits are considered: voluntary quits, layoffs, out-of-the-labour-force and other moves. See Lehmann *et al.* (2002) for an analysis of displaced Estonian workers using the same data, but a different categorization of job exits.

(Roy, 1951). This would suggest a higher wage differential between the new and the old sector in the Czech Republic.<sup>21</sup> For the same reason, one may expect the workers in the Czech new sector to be younger than the workers in the Czech old sector, whereas in Estonia there may be less of a difference in the demographic characteristics of workers in the new and old sectors.<sup>22</sup> Second, given that displaced Estonian workers are unlikely to live on an unemployment benefit equal to 10 percent of their previous wage, job search theory suggests that they may be more likely to accept jobs of poorer quality so that the new sector in Estonia may partly represent a repository for the unemployed.<sup>23</sup> In the following five sections, we gather evidence on each of these expectations.

#### 4.1 Industrial reallocation

This section provides new evidence on the industrial distribution of job reallocation in early transition.<sup>24</sup> We start in Figure 2 with estimates of the annual industry-specific job creation and job destruction rates (as a fraction of industry employment) for eight industrial branches.<sup>25</sup> We find in all industries that there is a higher level of job reallocation ( $JC + JD$ ) in Estonia than in the Czech Republic. Taking an average across industries and time periods, the Estonian level of job reallocation is approximately twice the level of the Czech reallocation. This is because of both higher  $JC$  and higher  $JD$  in Estonia ( $JD$  being especially high in Estonian agriculture, but also in trade or finance, which enjoy a very high  $JC$ ). The time pattern of  $JC$  is different across the two economies in some of the industries. Whereas  $JC$  was already declining in most branches of the Czech economy by transition year two,  $JC$  was on a rapid rise in Estonian manufacturing, construction and service industries. Overall, the patterns of  $JC$  and  $JD$  are very different across industries and across the two countries for a given industry, indicating very different processes.

What is the result of these industry job flows in terms of sectoral reallocation of employment? Each graph of Figure 3a shows the evolution of two indicators for

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<sup>21</sup> The same prediction is delivered by the macroeconomic model of transition of Castanheira and Roland (2000), in which slow job destruction in the old sector makes new firms offer higher wages in order to pull workers from the old firms.

<sup>22</sup> This prediction is based on the assumption that selection on observed worker characteristics is stronger in a worker reallocation process driven by voluntary quits than in one driven by mass layoffs. Younger workers are expected to be more likely to voluntarily move to the new sector because they have a longer time horizon to reap benefits from investing into skills required in the new sector. On the other hand, we expect less of a selection on age in the mass layoff process.

<sup>23</sup> Workers with lower unemployment benefits would be more likely to accept low-paying jobs if they are liquidity constrained and cannot self-insure. Given that the Estonian hyperinflation reduced the value of savings and family income in general, we find these assumptions likely to hold.

<sup>24</sup> Here our individual-data analysis complements the firm-level work of Faggio and Konings (2001) based on medium and large firms. Our evidence is also complementary to the extensive research on worker reallocation across industrial branches (see Boeri and Terrell, 2002, for a summary).

<sup>25</sup> The public sector (education, health, and public administration) is excluded from the analysis.

Figure 2. Job creation (JC) and destruction (JD) by industry

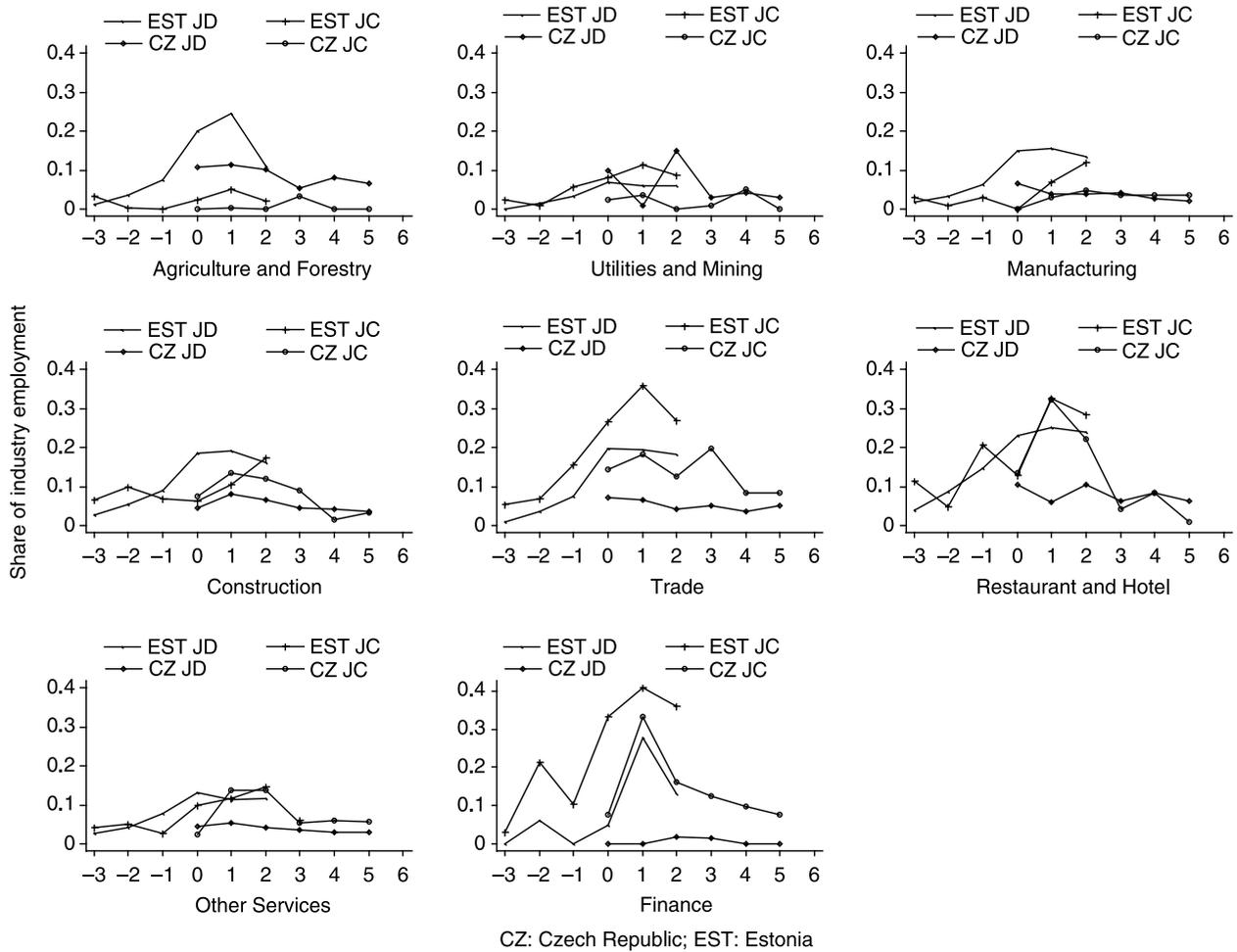
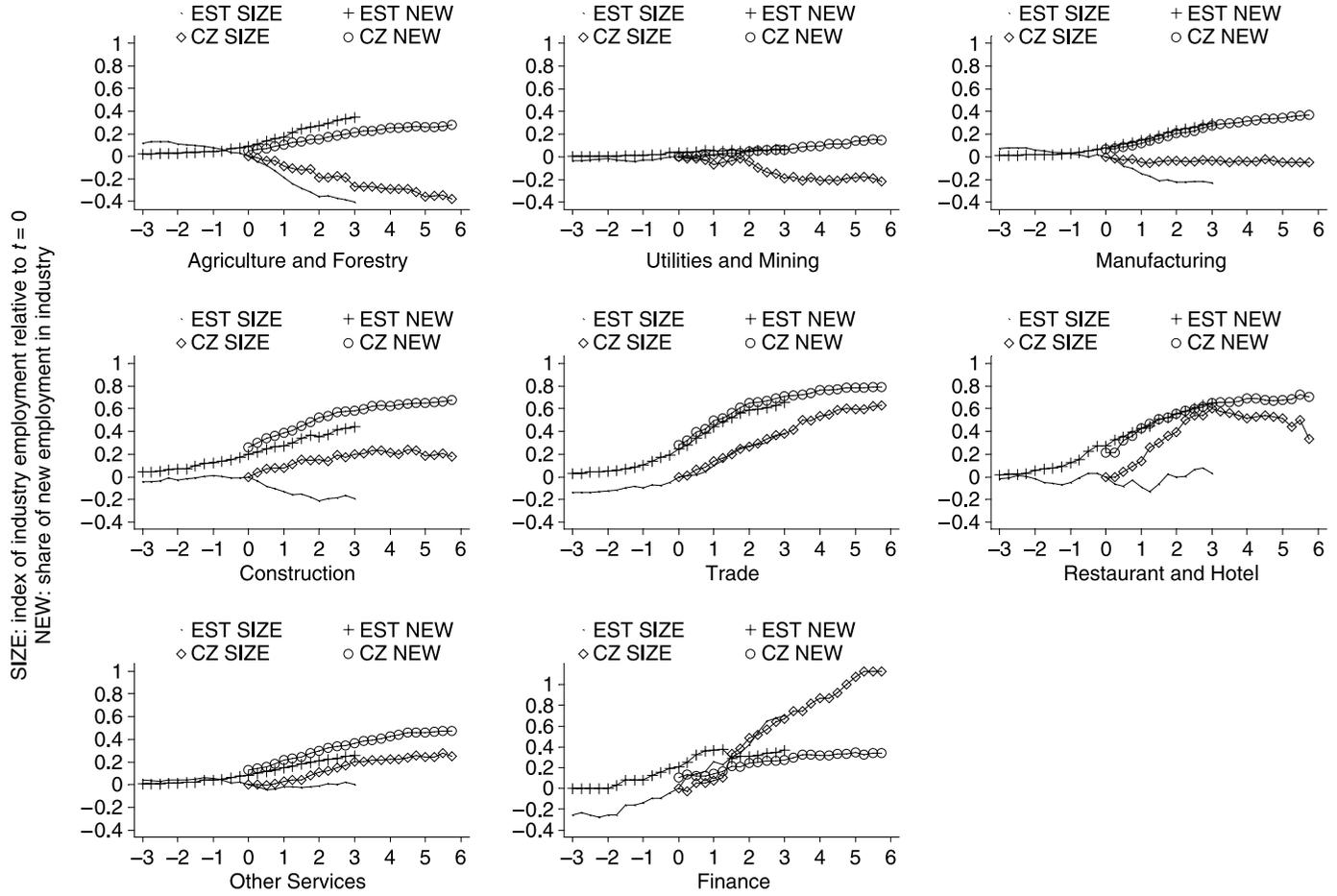


Figure 3a. Industry employment and fraction new



CZ: Czech Republic; EST: Estonia

each of our grouped industrial branches in the Czech Republic and Estonia. We plot the total employment in each industry as an index of its level at the start of transition ( $SIZE^{26}$ ) to highlight growing and declining industries and juxtapose to this the share of start-up employment in all jobs within the industry ( $NEW$ ) to see where new-sector employment is growing most rapidly.

The patterns of industry employment ( $SIZE$ ) during transition are well known and it is not surprising to see agricultural employment as well as employment in manufacturing decline, while employment of trade and finance industry grows. The largest decline within each country occurs in agriculture, where employment fell almost 40 percent from the start of transition in each country, while wholesale and retail trade showed the largest gains in both countries. On the other hand, there are also sizeable cross-country differences in industry employment evolution. For example construction and services industries grow in the Czech Republic, but their employment stagnates in Estonia.

We expect new firms to contribute to the convergence of the industrial structure of transition economies to that typical for mature market economies. Indeed we find in Figure 3a that they constitute a large share of the growing new economic activities ( $NEW$ ). Only three years into transition, over 60 percent of employment in trade and over 40 percent in the construction industries is in start-up firms in both countries. However, Figure 3a indicates that start-ups grow in importance not only in expanding, but also in declining industries. After three years of reform, new firms provide approximately a third of all jobs *within* manufacturing and the service industries in each country, despite the misallocation *across* those two industry groups at the outset of transition. While manufacturing was over-staffed under central planning and shrank during transition, the number of new manufacturing jobs is comparable to the number of new jobs in the rapidly expanding trade industry in both the Czech Republic and Estonia.

This finding leads us to compare quantitatively new job growth across industries with new job growth within industries. How can we distinguish if new jobs emerge from reallocation across as opposed to within industry? In industries that are shrinking, all of new sector growth is due to within-industry job reallocation. (Reduction of employment in a given industry could have been achieved by scrapping of old jobs alone without any growth of new firms.) In growing industries, within-sector reallocation amounts to that part of new-sector job growth that replaces disappearing old-sector jobs. The remaining part of the new sector's growth in growing industries is then attributable to across-industry reallocation. We compare the start of transition ( $t = 0$ ) with transition year 3 in both countries and calculate the size of both 'within' and 'across' job growth using our main industry groups. In the Czech Republic (Estonia) the sum of within-industry

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<sup>26</sup> The index is calculated as current industry employment divided by industry employment at the start of transition, minus 1.

new-sector job growth amounts to 18 percent (16 percent) of the total employment at the start of transition. In contrast, the across-industry new-sector job growth is 11 percent for the Czech Republic and 5 percent for Estonia. In both countries, within-industry start-up job growth is quantitatively more important than increases in employment in new firms across industries.<sup>27</sup>

Finally, Figure 3a is surprising not only because of the large growth of new jobs within declining industries, but also because of the similarity in the share of new employment across countries. Even though Estonian and Czech transition followed a different policy path, reflected by a different pattern of job creation and destruction and a different evolution of total employment, the share of new jobs within industries in Figure 3a is quite analogous. However, our Estonian new-sector measure is only approximate. In Figure 3b we therefore offer a cross-country comparison of within-industry employment structure that is free of measurement error concerns. We find that the shares of small-firm employment within industries evolve in close tandem in most branches of the Czech and Estonian economy.<sup>28</sup> This pattern is discussed in the next section.

## 4.2 Firm-size reallocation

Why is it that new jobs are created not only in the niches left open by central planning (e.g., in services) but within all branches of the economy? And why is it that the share of new jobs in each industry's employment is similar across two different macroeconomic scenarios? It is a well-known fact that one of the main distortions of central planning was to do away with small firms. Given that almost all new job creation occurs in small firms, one natural interpretation of these reallocation patterns is that they are driven by convergence to 'normal' industry-specific firm-size distribution.

While different open economies specialize in different industries given their comparative advantage, it is more natural to expect the firm-size distribution within an industry to be similar across countries. For example, Kumar *et al.* (1999) analyse European data on average firm size by country and industry, and find that 63 percent of variation in firm size is attributable to industry identity and only 2.5 percent to country identity. This finding is confirmed in the three top panels of Table 1, which provides a summary of the firm-size distribution over broad groups of industries from Austria in 1998 and East and West Germany in

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<sup>27</sup> The total across-industry job destruction of old jobs over this 3-year period, which equals the sum of job losses in old firms in declining industries, is 18 percent in Estonia and only 5 percent in the Czech Republic.

<sup>28</sup> Figure 3b also indicates that in the Czech Republic, the share of new-sector employment and small-firm employment typically move in close tandem, especially in agriculture and utilities and mining industries. In all of the other sectors, the new sector apparently grows somewhat faster as a share of industry employment than the small-firm employment, suggesting that small start-up firms grow to cross the 100-worker threshold, which we use for distinguishing between small and large firms.

Figure 3b. Industry fraction new and fraction small

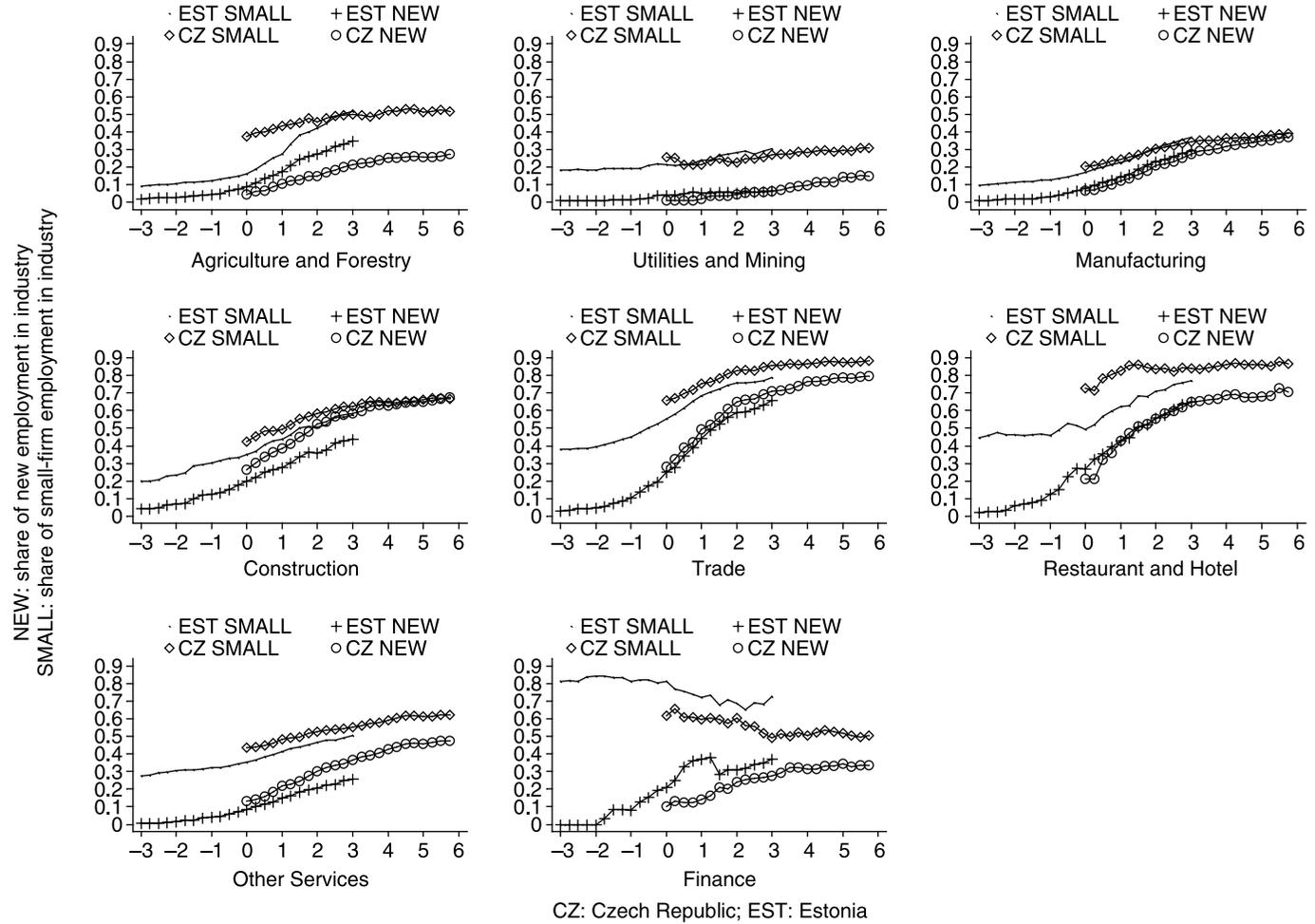


Table 1. Industry firm-size distribution

Firm size	Agriculture and forestry	Mining and utilities	Manufacturing	Construction	Wholesale and retail trade	Hotel and restaurant	Other private services	Banking and insurance
<b>Austria, 1998</b>								
<20	65	8	22	35	42	67	55	11
20–100	29	18	25	38	28	23	21	25
101–500	6	28	32	22	20	9	18	33
>500	0	46	22	5	9	2	7	31
<b>West Germany, 1995</b>								
<50	85	21	24	66	58	53		22
50–99	8	9	9	13	13	14		12
100–499	6	24	27	17	21	22		31
>500	1	46	40	4	9	11		35
<b>East Germany, 1995</b>								
<50	50	23	47	61	67	50		29
50–99	21	9	14	17	14	12		16
100–499	18	16	27	22	17	22		40
>500	11	51	12	0	3	17		14
<b>Czech Republic, January 1991</b>								
<25	9	4	7	23	44	56	25	7
25–100	29	20	14	20	21	19	21	51
101–500	49	26	34	35	25	14	29	23
>500	13	50	45	22	10	10	25	19
<b>Czech Republic, December 1996</b>								
<25	23	12	18	43	67	67	42	22
25–100	31	17	21	24	19	16	21	26
101–500	43	23	29	25	10	11	19	33
>500	3	48	32	8	3	6	18	19
<b>Estonia, January 1991</b>								
<20	6	4	4	10	20	20	14	0
20–100	6	15	9	21	26	27	20	100
101–500	50	21	28	39	30	32	34	0
>500	37	60	59	30	25	22	32	0
<b>Estonia, March 1995</b>								
<20	33	9	15	21	54	48	28	13
20–100	19	21	22	37	25	29	25	73
101–500	26	19	26	28	15	17	24	7
>500	22	50	37	13	6	6	23	7

1995. Indeed, comparing the fraction of workers employed in firms in the upper two firm-size categories (the lower two are not always strictly comparable) suggests a striking similarity of firm-size distribution in Austria and West Germany.<sup>29</sup> These distributions provide one possible benchmark against which one can measure transition reallocation.

The bottom four panels of Table 1 contain industry firm-size distributions in the Czech Republic and Estonia at the start of transition and then again in mid-transition. The initial distortion towards large firms is clear, especially in manufacturing, construction, and services. It is also equally clear that there was a substantial shift toward Western distributions and this shift roughly 'explains' the growth of the share of the new-sector employment within each industry. We find in the Czech Republic, where we have a direct measure of the new sector, that there is a 0.93 correlation between the share of the new sector employment in each of the eight industries and the corresponding employment share of firms with less than 100 workers in December 1996.

### *4.3 Demographic reallocation*

Given the differences in the transition paths of our two countries, it is natural to ask whether there are differences in the demographic composition of the sectoral reallocation. In Figure 4 we plot the share that each demographic group (in terms of gender, age, and education) represents out of total employment (*%TOT*) and out of new-sector employment (*%NEW*). The graphs indicate that in both countries, males and younger workers are more likely to participate in the start-up firms. Furthermore, the extent to which these workers are more likely to be employed by new firms is similar in the Czech Republic and Estonia. Finally, there appears to be a relationship between education and new-sector participation in that secondary-educated workers are somewhat more likely to work in start-up firms. Overall, the data imply little difference in the demographic pattern of the old-to-new reallocation in these two countries, despite their different job destruction policies and unemployment levels.

### *4.4 Reallocation and wages*

As we discuss above, the difference in the transition paths of our two economies suggests an important role for new-old wage differentials. Our data contain representative information not only on the distribution of jobs but also on the corresponding wages (starting in late 1992 in Estonia). Comparing the relative

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<sup>29</sup> The statistics are based on representative samples of social security records excluding the public sector. See Bender *et al.* (2000) and Stiglbauer *et al.* (2002) for descriptions of the German and Austrian data.

**Figure 4. Demographic composition of employment**

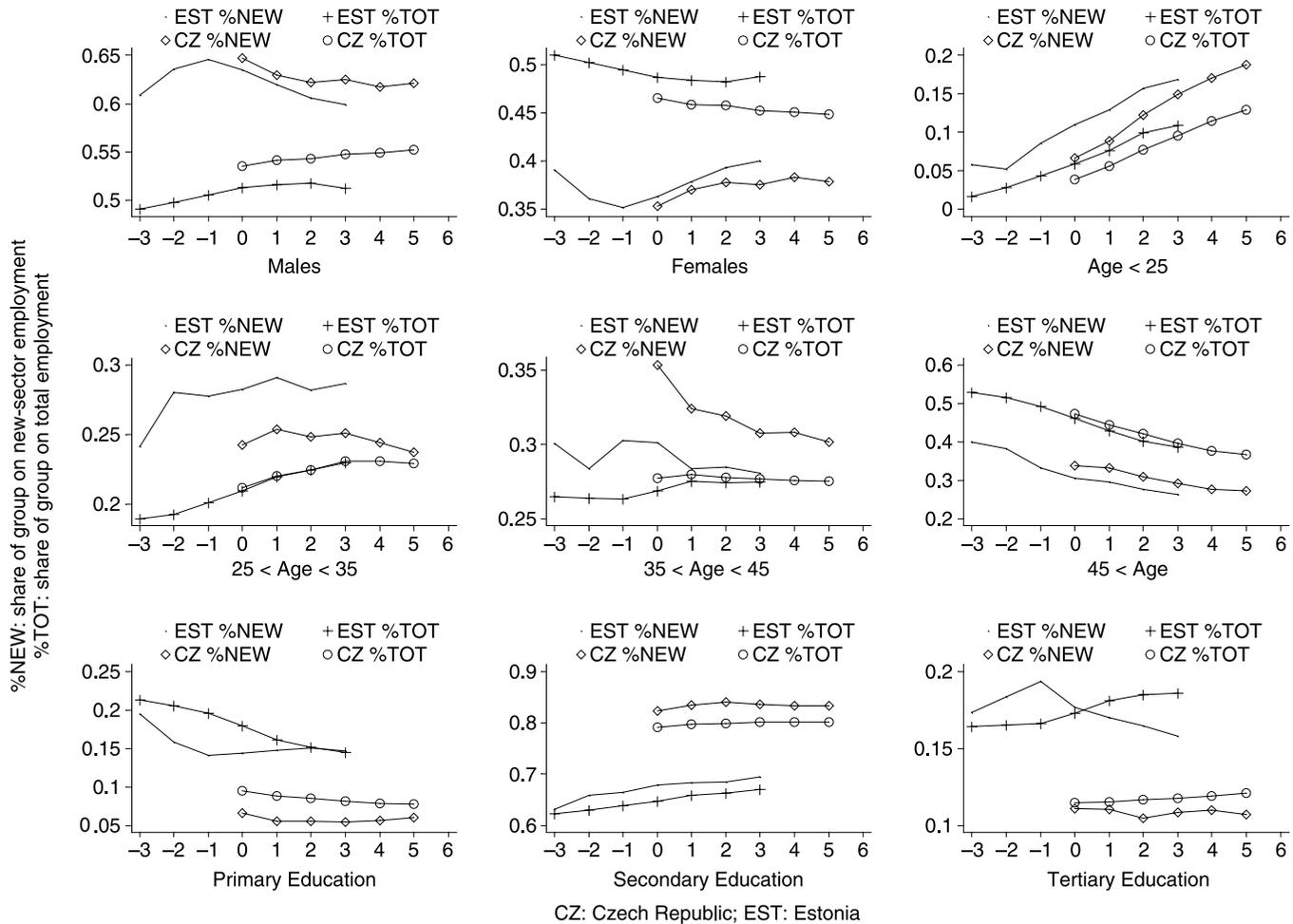
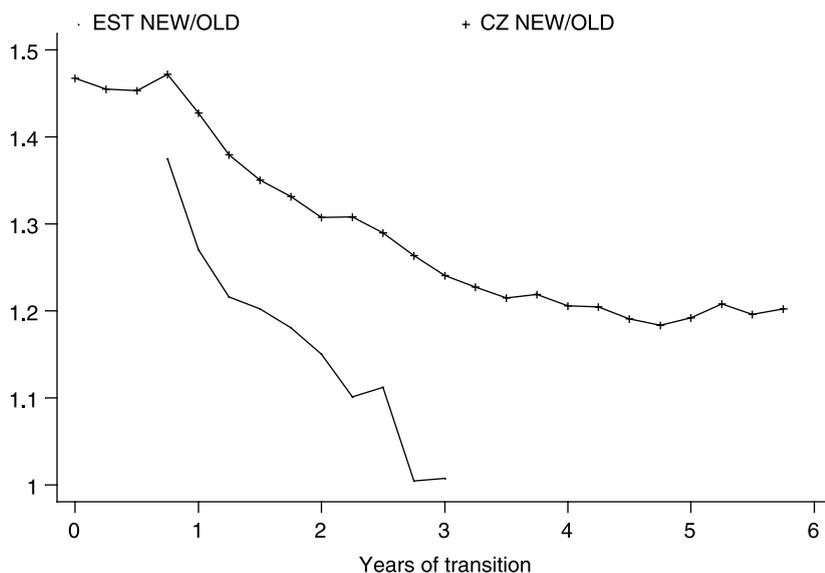


Figure 5. Relative average wages



wage level in the new sector to that in the old sector in Figure 5 reveals a similar pattern in both countries: the ratio starts out high and gradually diminishes over time in both countries. While the pattern is similar, the ratio of the average wages in the new to the old sector is always higher in the Czech transition, consistent with our expectations. The lower unemployment level, larger extent of voluntary movement and adequate unemployment insurance may allow for more job search and higher reservation wages in the Czech Republic. Alternatively, employers in the Czech new sector have to offer higher wages to attract workers from the old jobs, which were slow to close down.

While we have an intuition for why the wage gap between the old and new sector is larger in the Czech Republic, it is less clear why the initial wage premium is so large and why it gradually diminishes over the course of transition. One possible explanation for the mark-up has to do with differences in the productive characteristics of new- vs. old-sector workers. We explore this explanation using simple pooled cross-sectional regressions including a dummy for new-sector jobs and controlling for age, gender, education and firm size. The top panel of Table 2 shows that controlling for these characteristics (and imposing the same returns to these characteristics in the new and old sector), the OLS new-sector wage premium for  $t = 1$  in each country is about half the size of the unconditional premium. Nevertheless, for both countries, the initial gap remains economically significant and it declines over time, similar to the pattern in Figure 5. Moreover, the premium

Table 2. New-sector wage premium (OLS dummy coefficient)

Transition year	Czech Republic			Estonia	
	1	3	6	1	3
Whole Economy	0.256*	0.157*	0.144*	0.17*	0.040
	(0.031)	(0.02)	(0.019)	(0.032)	(0.034)
R <sup>2</sup>	0.3	0.33	0.31	0.11	0.15
N	2,435	2,639	2,681	3,963	3,953
Agriculture and Forestry	0.289*	0.124	0.107	0.097	-0.046
	(0.09)	(0.09)	(0.086)	(0.1)	(0.068)
R <sup>2</sup>	0.33	0.31	0.34	0.06	0.11
N	234	184	147	877	620
Manufacturing, Mining & Util.	0.245*	0.137*	0.116*	0.16*	-0.021
	(0.054)	(0.036)	(0.029)	(0.059)	(0.057)
R <sup>2</sup>	0.3	0.36	0.34	0.12	0.16
N	1,075	1,094	1,084	1,327	1,282
Construction	0.185*	0.161*	0.086	0.054	0.234
	(0.068)	(0.053)	(0.064)	(0.088)	(0.132)
R <sup>2</sup>	0.17	0.17	0.14	0.12	0.14
N	243	272	263	370	356
Trade	0.25*	0.117*	0.114*	0.219*	-0.003
	(0.052)	(0.055)	(0.059)	(0.064)	(0.082)
R <sup>2</sup>	0.32	0.35	0.32	0.16	0.14
N	293	356	413	554	727
Services, Rest. and Hotel	0.282*	0.201*	0.196*	0.117	0.025
	(0.061)	(0.057)	(0.058)	(0.717)	(0.068)
R <sup>2</sup>	0.32	0.31	0.33	0.14	0.24
N	362	468	481	693	823

Notes: \*denotes significance at 10 percent level with robust standard errors. All regressions control for firm size and worker age, gender, and education type. Public sector is excluded as well as observations with missing values of the regressors. Data taken from January of each year.

remains higher in the Czech Republic than in Estonia. Three years into transition, the Czech new-sector wage premium is still over 15 percent, while there is no significant difference in Estonian wages across the new and old sectors (after correcting for observable worker characteristics and firm size).

What is the source of this conditional wage premium? The large initial mark-up can be in part due to a self-selection process where those with high benefits from

moving to a start-up do so first.<sup>30</sup> Alternatively, one may think of this wage mark-up as a risk premium or as an efficiency wage that induces harder work in new jobs. Why does the new-old wage gap close over time? This could be caused by restructuring and productivity gains in the old sector (as in Aghion and Blanchard, 1994) or by competition for workers and increased effort in the old sector (as in Roland and Sekkat, 2000). If the initial wage premium has to do with self-selection, its positive effects evaporate over time, especially in Estonia. If the premium arises from the rent received from first-mover advantage (as the new firms entered unfilled niches), the advantage shrinks over time as more firms enter and competition ensues. Alternatively, the risk rent of working for the new sector goes away with transition.

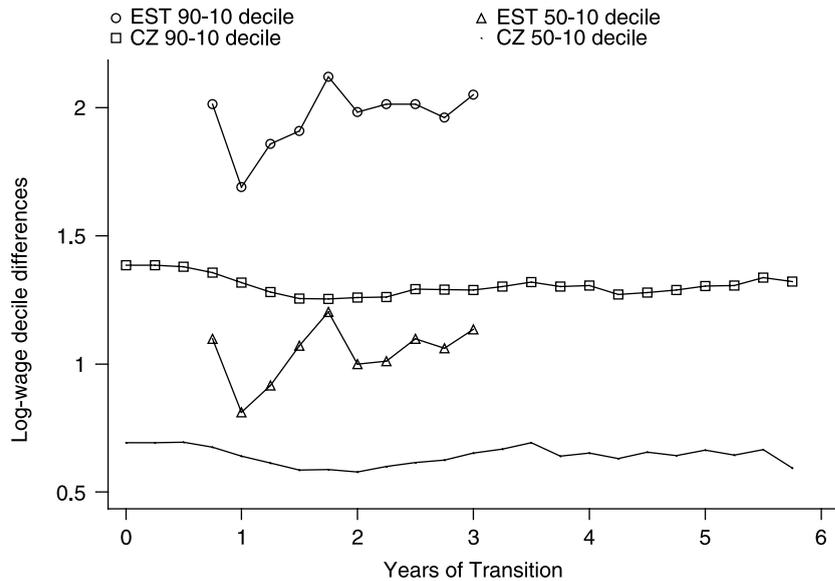
One way of learning about the nature of these wage differences is to study their evolution within industries. In Figure 3a we saw across the two countries a differential in the growth of the new sector within industries as well as a differential in the growth of total industry-specific employment. Below we ask whether those differences are reflected in the new-old wage gap. Is the wage premium larger in industries understaffed under central planning, in which the gain from filling market niches is likely to be largest? Does a large wage premium lead to a greater inflow of workers into the given industry, thereby raising the share of the new sector jobs there? Table 2 reports the OLS new-old wage premiums by industrial branch.<sup>31</sup> In the Czech Republic the industry-specific new-old wage gaps are all within one standard error of the economy-wide estimate, suggesting little industry heterogeneity in new-old wage differentials. There is more variability in the Estonian estimates, but the qualitative results are the same in that there appear to be no systematic differences in the new-old wage gap linked to the evolution of industry size or the growth of the new sector within each industry. Instead, wages in the new sector are apparently set in comparison to wages in the old sector in the same industry, no matter whether that industry is growing or shrinking, and the wage mark-up is the same across industries, irrespective of significant industry wage differentials (Munich *et al.*, 2002b). This pattern appears consistent with the efficiency wage explanation for the new-old wage premium.

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<sup>30</sup> Such self-selection gains may be largest at the start of transition. One may be interested in comparing the endogenous new-sector dummy coefficient to the average treatment effect of moving a randomly selected worker to the new sector. Estimation of such an effect would require a credible instrument predicting participation in the new sector, but uncorrelated with the benefits from moving. Using an indicator for the worker having been laid off in a mass layoff as an instrument for the new-sector dummy lowers the Czech and Estonian new-sector premium to zero at the start of transition and to large negative values later on. These results are available upon request.

<sup>31</sup> We drop finance because of the small sample size in Estonia.

Figure 6a. Wage dispersion in the new sector



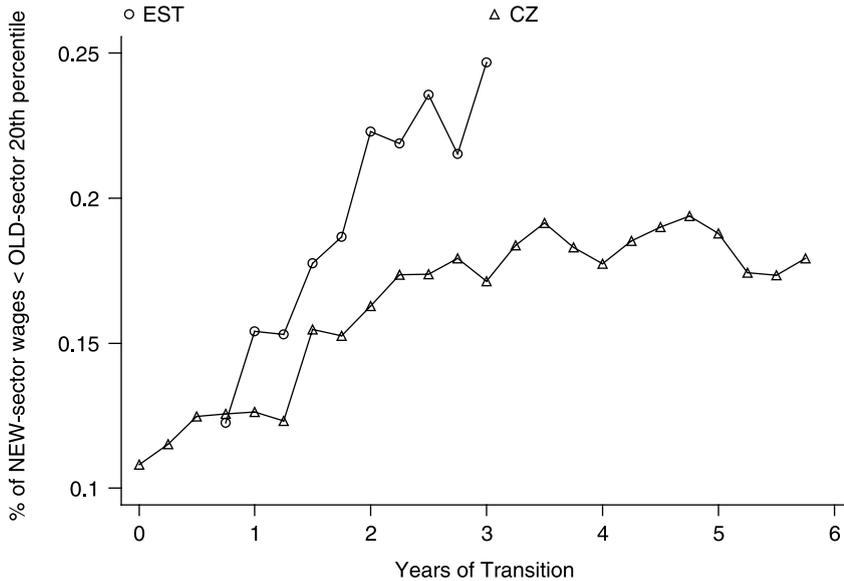
#### 4.5 Low-wage new-sector jobs

Finally, we are interested in the relative quality of the new sector jobs across the two transition paths, and use wage information to infer to what extent the new sector acts as a repository for the unemployed. In the preceding section we have learned about average wage differences across the new and old sectors. Here, we focus on the dispersion of wages. First, is the new-sector wage distribution fatter, especially at the lower end, in Estonia, where unemployment benefits are minimal? Second, using the old sector as a benchmark, does the new sector provide a larger fraction of low-wage jobs in Estonia? Third, how many of the Estonian new-sector workers would prefer to collect unemployment benefits, if they were set at the Czech level?

In Figure 6a, we present measures of wage dispersion within the new sector.<sup>32</sup> Specifically, we plot the 90–10 log-wage decile difference to present the overall wage dispersion, and the 50–10 log-wage decile difference to capture the relative position of workers at the bottom end of new-sector wage distribution as compared to median workers. Given that unemployment benefits did not provide an effective

<sup>32</sup> We use raw wages since the demographic composition of the new sector is similar in the two economies. The wage-dispersion comparison is similar when we work with residuals from Mincerian wage regressions.

Figure 6b. Extent of low-wage new jobs



wage floor in Estonia, it is not surprising to see Estonian new-sector wage dispersion to be much higher than the Czech one. The graph also indicates that a majority of the difference in the level of overall wage dispersion between the two new sectors comes from differences in the lower half of the wage distributions. Furthermore, the time changes in the 90–10 log-wage decile difference in Estonia appear driven by changes in the 50–10 log-wage decile difference.

Figure 6b plots the fraction of employment in the new sector with wages below the 20<sup>th</sup> percentile of the wage distribution in the old sector of each economy. In both countries the share of low-paying new-sector jobs (as compared to the old sector) starts below 15 percent and grows over time. This share is indeed higher in Estonia, where it also grows more rapidly than in the Czech Republic. After three years of reforms, more than 20 percent of the new-sector jobs in Estonia were paying less than the 20<sup>th</sup> percentile of the old-sector wage distribution. In contrast, this fraction remained somewhat less than 20 percent in the Czech Republic into the sixth year of reforms.

Finally, we consider the large difference between replacement ratios of the unemployment insurance system in the two countries and ask which Estonian new-sector jobs are (at the start of employment) paying less than 60 percent (the Czech replacement ratio) of the wage in the previous employment. In 1993–95, this fraction is between 0.05 and 0.06 in Estonia as compared to 0.02 to 0.035 in the Czech Republic. We thus conclude that while there is more low-wage new-sector

employment in Estonia than in the Czech Republic, the extent of this phenomenon is surprisingly small given the near absence of unemployment insurance during early Estonian transition. The growth of productive new jobs in Estonia appears as real as what we see in Czech lands.

## 5. Conclusions

This paper offers stylized facts on the type and sources of start-up job growth in early transition using data from two countries. In particular, we identify patterns of job growth in terms of niches left from central planning. Further, we compare job creation under two different transition paths: one involving drastic job destruction and high unemployment, the other based on gradual scrapping of old firms. Of course, differences or similarities in outcomes across our two countries can be due to differences in both policies and underlying fundamentals of each economy. While we do not attempt to create counterfactual evidence, we believe a careful descriptive analysis of the two different paths of transition is useful given our lack of knowledge about small-firm new-sector growth.

Given the amount of industrial reallocation needed in transition economies which over-employed resources in agriculture and manufacturing, we were surprised to find job growth within industries to be quantitatively more important than job growth due to across-industry reallocation. Furthermore, the within-industry growth of start-ups is similar in the two countries, especially given large differences in capital constraints (credit availability). We offer convergence to Western industry firm-size distributions as an explanation. We also document regularities in wage evolution across new and old firms and suggest that the new jobs were significant contributors to output (as reflected by wage level), rather than stop gap measures to relieve unemployment. Overall, we are struck by the similarities between the two countries in the structure of new-to-old reallocation in terms of industries, demographics, or wages. It appears as if the difference in macroeconomic policies was chiefly manifested on the aggregate level of unemployment and wages, but not in the composition of the new sector.

On the methodological front, our analysis illustrates the usefulness of inexpensive household data for studying structural job change. Not only does worker-level data allow for estimation of job reallocation patterns, but also individual wage information can be used to learn about the nature of job reallocation. In future research it would be ideal to combine similar data from a number of countries to estimate the effects that various policies have on the speed and nature of job reallocation and to identify differences in the reallocation patterns with potential consequences for long-term growth. The path of early transition may affect long-run growth through selection among multiple equilibria, as in Berkowitz and Cooper (1997), or through sclerosis effects from insufficient initial reallocation, as in Caballero and Hammour (2000).

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## Appendix

**Figure A1. Hiring into private firms by firm size in Estonia**

