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**Gross Job Flows in Transition Countries:  
Results from Company Accounts Data for Bulgaria,  
Estonia and Romania**

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## **Abstract**

This paper studies patterns of gross job creation and destruction in Bulgaria, Estonia and Romania. To this end a unique data set of more than 1600 Bulgarian, 350 Estonian and 3700 Romanian firms in various sectors and located in various regions is used. We find that gross job destruction dominates job creation, but the latter is picking up as transition progresses. We also find that small firms have higher gross job flows than larger ones. There are important sectoral, industry and regional differences in gross job reallocation. In addition, there is a lot of heterogeneity within sectors and within regions, as most of the excess job reallocation can be explained by employment shift within the same sector or region.

There are also important differences across countries. Estonia is characterised by higher job flows rates than Bulgaria and Romania. This indicates that there is more firm restructuring going on in Estonia than in the other two countries. Bulgaria and Romania exhibit instead a similar sectoral pattern at the two-digit sectoral level, which can be explained by technological differences across sectors that hold independent of the country. However, if only the manufacturing sector is considered, the more traditional sector, institutional differences play an important role in explaining job flows variations in Bulgaria and Romania. Furthermore, the interaction between the two effects can better account for variations in the real churning of jobs.

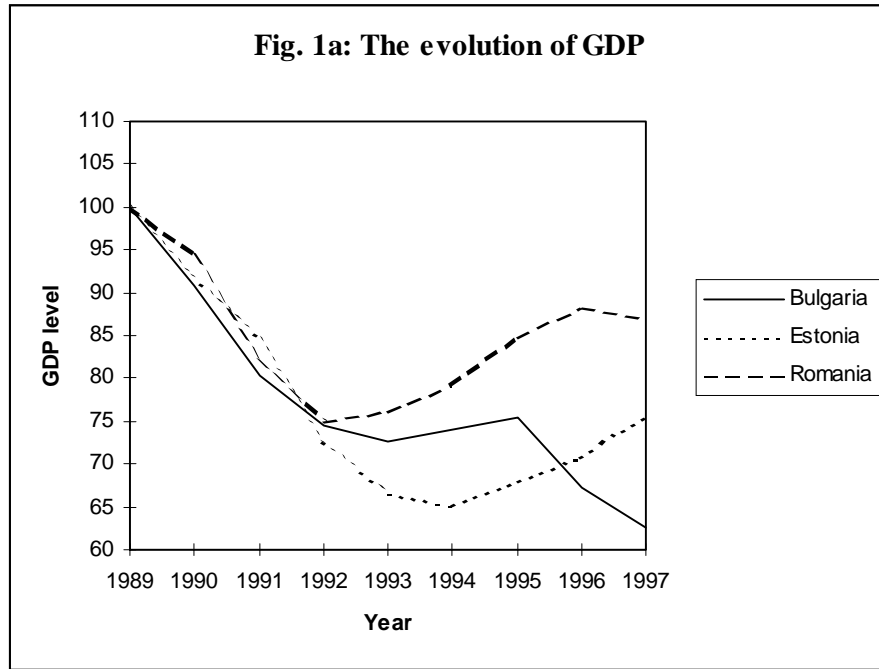
Key words: job creation, job destruction, transition economies;  
JEL classification: J6, P2.

## I. Introduction

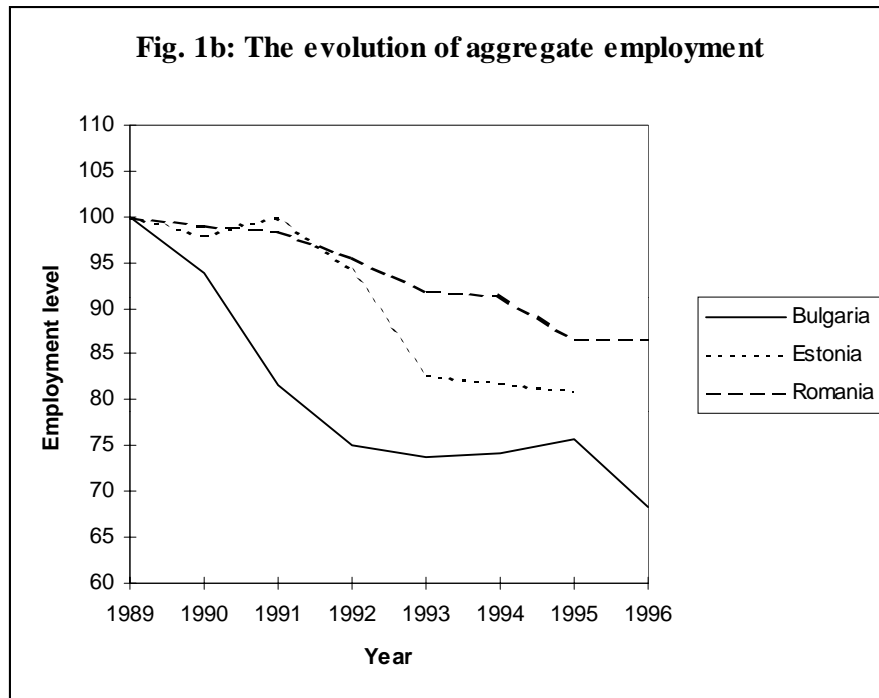
Figures 1a and b show the evolution of aggregate output and employment for Bulgaria, Estonia and Romania since the beginning of transition. The collapse in output has been substantially larger in Estonia than in Bulgaria and Romania. However, the initial collapse has been followed by consistent recovery in Estonia, while only partial recovery and further decline in Bulgaria and Romania. The evolution of aggregate employment resembles that of output for Bulgaria, whereas it shows a decreasing pattern for Romania and Estonia. The initial decline in output and employment reflects a statistical regularity that can be found in all transition countries and points to a key aspect of transition: reallocation (Blanchard, 1997). Under Central Planning the manufacturing sector was too large compared to the standards of market economies, so with transition a part of the reallocation process takes the form of moving activities from manufacturing to services, from large to small firms, from one region to another region. However, as argued by Davis and Haltiwanger (1992) and others, the macroeconomic evolution of employment might hide important gross employment flows reflecting an active reallocation and restructuring process.

Reforms in Central and Eastern Europe meant initially that hard budget constraints were imposed, implying that firms – characterised by overmanning - no longer received subsidies. This can explain the initial collapse in employment that was observed in most transition countries. Some authors refer to *initial restructuring* (Blanchard, 1997). This initial restructuring could be delayed if insiders were powerful enough, often caused by the way in which privatisation occurred or due to political constraints (e.g. Dewatripont and Roland, 1997). However, if firms want to compete in a market economy and if firms want to be viable in the long run it is also important to make strategic decisions in order to improve the efficiency of firms. Such strategic decisions can involve updating of the equipment and attempts to improve the product quality. The implications for employment are less clear-cut in this case of *strategic restructuring*. In this case, job destruction might occur due to technological progress. At the same time job creation might occur because new skills are needed in the firm. Thus with strategic restructuring we can expect a process of simultaneous job creation and destruction within narrowly defined sectors.

The purpose of this paper is to document and analyse this reallocation process in terms of gross employment flows in three transition countries, Bulgaria, Romania and Estonia. We are particularly interested to quantify the relative importance of industry, year and country effects in explaining the variation of employment flows across these countries as in Baldwin et al. (1998).



Source: EBRD, Transition Report, 1998.



We use an exceptionally rich firm level data set covering more than 1600 firms in Bulgaria between 1992-96, 350 in Estonia for the years 1992-96 and more than 3700 enterprises in Romania for 1994-96. Estonia with a population of 1.5 million is a small open economy that exports predominantly to countries outside the Former Soviet Union (FSU), its unemployment rate is very low, 5.6% in 1996 and GDP growth in 1996 was 4% (EBRD, 1998). Also Bulgaria is a small open economy, with a population of 8.4 million, but unlike Estonia, the performance of the Bulgarian economy is very weak, in 1996 the unemployment rate was 12.5%, GDP growth was -11%. Romania has a population of 22.6 and belongs also to the group of transition countries where progress is very slow, the unemployment rate in 1996 was 6.1% and output was collapsing again in 1997.

This paper is structured as follows. In the next section we describe the data and report aggregate gross flows of jobs, while section III documents gross job flows at a more disaggregated level, i.e. according to sector, region and firm size. In section IV we report a regression analysis which sheds light on the relative contribution of country, sector and year effects in explaining variations in gross job flows.

## **II. Data Description and Aggregate Gross Job Flows**

The data that we have at our disposal consist of the company accounts of all incorporated firms satisfying at least one of the following criteria: number of employees greater than 100, total assets and sales exceed 12 million USD, respectively. The unbalanced panel data set contains information on 1684 and 353 firms in Bulgaria and Estonia, respectively, over the period 1992-1996 and on 3729 in Romania over a shorter period, 1994-1996.

All the variables are retrieved from company annual accounts published by the Creditreform Bulgaria OOD, by the Estonian Krediidinfo AS and by the Romanian Chamber of Industry & Commerce<sup>1</sup>. Firm level employment is given by the total number of employees at the end of a given year. One drawback of the data is that it does not include very small firms and so in the analysis we miss out the “de novo” private firms. Nevertheless the data cover a significant part of total employment in the three economies and are representative for the traditional firms in these countries. Table 1 provides summary statistics on employment and employment growth in 1996. It can be seen that the average firm in Estonia is about half as large as the average firm in Bulgaria and in Romania. Moreover, Estonia experiences positive employment growth, whereas Bulgaria and Romania have negative growth rates. The growth decline is larger in Bulgaria than in Romania and it is more relevant at the end than at the beginning of the period. These findings are consistent with the macroeconomic picture presented in figures 1a and b, showing a further collapse in output and employment in Bulgaria since 1995.

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<sup>1</sup> Data are available on the Amadeus CD-ROM (1998), a Pan European financial database, provided by Bureau van Dijk Electronic Publishing SA.

**Table 1: Summary statistics**

<i>Country</i>	<i>Number of firms</i>	<i>Average employment (Min, Max)</i>	<i>Average employment growth 1995-96 (Min, Max)</i>	<i>Total average employment growth (Min, Max)</i>
Bulgaria	1684	462 (25, 33.227)	-0.076 (-4.950, 2.799)	-0.042 (-3.097, 2.799)
Estonia	353	285 (9, 3.447)	0.499 (-0.668, 29)	1.159 (-0.292, 231.2)
Romania	3729	566 (100, 36.387)	-0.016 (-2.817, 4.685)	0.003 (-2.010, 4.413)

Note: Employment is end-1996 employment. Only firms with non-zero end-1996 employment are included in the table. Total average employment growth refers to growth over the entire period: 1992-96 for Bulgaria and Estonia, 1994-96 for Romania.

We measure gross job creation (*pos*) as the sum of all employment gains in expanding firms divided by the total employment at t-1. Likewise we defined gross job destruction (*neg*) as the sum of all employment losses in contracting firms divided by total employment at t-1. The sum gives a measure for gross job reallocation (*gross*) and the difference yields the net employment growth rate (*net*). An alternative measure that we use is the excess job reallocation rate (*excess*) and is defined as the gross job reallocation rate minus the absolute value of the net employment growth rate. This measure indicates the amount of job reallocation that results after taking into account the gross job reallocation needed to accommodate a given net employment growth. We can interpret this measure as an indicator of deep restructuring because a high excess job reallocation rate would be the result of simultaneous high job creation and destruction, which would be the case if firms are replacing unproductive jobs with productive ones.

Tables 2a and b show annual net and gross job flows at the aggregate and manufacturing level. The effect of transition is clearly visible in table 2a. In the early years of transition the job destruction rate dominates the job creation rate, but as transition proceeds, the job creation rate picks up while the job destruction rate decreases. This makes sense when initial restructuring is over and firms enter a stage where deep restructuring becomes more important. It is worth noting that Estonia has a high job creation rate even in the early years of transition. By 1996, there is a net expansion in Estonia, which is likely due to the expansion of firms in new sectors, outside manufacturing as can be seen in table 2b. In table 2b the gross job flows for the manufacturing sector only are reported. The gross job creation rate in Estonian manufacturing is lower than the overall job creation rate, especially in 1996.

Turning to Bulgaria, it seems that the country had reached an intermediate steady-state situation by 1995, where job creation equals job destruction at the aggregate level and slightly dominates job destruction at the manufacturing level. In 1996, the aggregate job creation rate is still 3.2%, but the corresponding job destruction rate is about 15%. This compares to a job destruction rate in the manufacturing sector of 7.3%. Thus, the contraction in Bulgaria is concentrated in the non-manufacturing sector in 1996. This finding can suggest the existence of soft budget constraints for enterprises belonging to traditional sectors and the vulnerability of emerging firms in new sectors.

Finally, the limited picture of Romanian job flows shows consistently higher job destruction than job creation rates, although both are decreasing overtime.

**Table 2a: Annual net and gross job flows for Bulgaria, Estonia and Romania, 1993-1996**

<i>Year/Country</i>	<i>N° of firms</i>	<i>pos</i>	<i>neg</i>	<i>net</i>	<i>gross</i>	<i>excess</i>
<b>Bulgaria</b>						
1993	119	1.0	7.7	-6.8	8.7	1.9
1994	1434	1.0	6.7	-5.7	7.7	2.0
1995	1478	3.2	3.0	0.2	6.2	6.0
1996	1684	3.2	15.2	-12.0	18.4	6.3
<b>Estonia</b>						
1993	144	5.5	10.6	-5.1	16.1	11.0
1994	220	6.3	10.1	-3.7	16.4	12.6
1995	233	8.1	10.1	-2.0	18.1	16.1
1996	353	8.9	6.1	2.9	15.1	12.2
<b>Romania</b>						
1995	3316	5.0	10.7	-5.6	15.7	10.0
1996	3316	3.3	7.5	-4.2	10.8	6.6

Note: *pos* = gross job creation rate, *neg* = gross destruction rate, *net* = net employment growth rate (*pos-neg*), *gross* = gross reallocation rate (*pos+neg*), *excess*= excess job reallocation rate (*gross-net*).

**Table 2b: Annual net and gross job flows for manufacturing sectors in Bulgaria, Estonia and Romania, 1993-1996**

<i>Year/Country</i>	<i>N° of firms</i>	<i>pos</i>	<i>neg</i>	<i>net</i>	<i>gross</i>	<i>excess</i>
<b>Bulgaria</b>						
1993	103	1.0	7.7	-6.7	8.7	2.0
1994	883	1.3	6.6	-5.4	7.9	2.5
1995	900	3.3	2.6	0.7	6.0	5.3
1996	918	2.7	7.3	-4.6	10.0	5.3
<b>Estonia</b>						
1993	57	5.3	9.5	-4.2	14.8	10.6
1994	96	7.0	10.4	-3.4	17.4	14.0
1995	101	5.7	12.3	-6.6	18.0	11.4
1996	80	2.1	6.3	-4.2	8.5	4.3
<b>Romania</b>						
1995	1418	4.4	9.4	-5.0	13.8	8.8
1996	1418	2.5	5.9	-3.3	8.4	5.1

Note: see table 2a.

Turnover whether it is measured by gross job reallocation or excess job reallocation seems on average much higher in Estonia than in Bulgaria and Romania. By 1996, the excess job reallocation rate at the aggregate level is 12.2% in Estonia, whereas it is around 6% in both Bulgaria and Romania. This indicates – not surprisingly - that the extent of deep restructuring in Estonia was larger than in the other two countries during the sample period. Nevertheless, we can see that for Bulgaria there has been a substantial increase in the excess job reallocation rate, which was only 2% in 1993. It is also important to observe that the excess job reallocation in the manufacturing sector is only 4.3% for Estonia in 1996. A value that is much lower than that reported for the all economy, 12.2%. Thus, not only real churning is increasing with the transition towards a market economy, but also it is increasingly more concentrated in the new dynamic sectors. We can see a similar tendency in Bulgaria and Romania, though to a lesser extent.



The fact that we observe (table 2b) a positive job creation rate for manufacturing firms might be surprising, although it is also found by Lehmann and Wadsworth (1997) for Russia and Poland. It indicates that the traditional firms cannot merely destroy jobs to reduce size and become productive, but that they are also required to hire again if they want to keep on operating in the new economic environment. In other words, perhaps specific human capital is needed or the jobs that are created are very different than the jobs that are destroyed. It could reflect new technology that is adopted by some firms implying the creation of new jobs, while the destruction of old technology implies the destruction of old jobs.

### **III. Disaggregated Job Flows**

In this section we take a closer look at gross job flows at a more disaggregated level. In doing so, we hope to gain some insights in some of the cross-sectional features of job flows. We start with documenting sectoral job flows, both at 1-digit and 2-digit level, then we look at regional job flows and, finally, at the relationship between firm size and job reallocation.

#### ***III.1. Sectoral and Regional Job Flows***

As shown by Jackson and Repkin (1997) industrial restructuring varied a lot across various branches of industry, suggesting that transition feeds through very differently in different sectors. Different sectors have different adjustment costs, technologies and face different degrees of competition. So one can expect that gross job turnover varies according to sectors.

Likewise, under central planning, regional concentration of certain industries was high, often due to the fact that there were only one or a few big firms in one region. Moreover, mobility of workers was low. With the collapse of communism one can expect that some regions are hit more than others, as also reflected by big regional differences in unemployment (e.g. Lipphold, 1997). With the implementation of market reforms one would expect that market forces would change the regional economic structure which was artificially imposed by the central planner. Relocation of traditional firms and the emergence of new sectors in some regions should be reflected in differences in regional job reallocation.

In table 3 we show annual average job flows for all 1-digit sectors in Bulgaria, Estonia and Romania. First, it can be seen that some sectors have a positive net employment growth rate, while others a negative. Thus, some sectors are net creators of jobs, at least on average. The gross job reallocation and also the excess job reallocation (which can be seen as an index of deep restructuring) vary substantially across different sectors. Therefore, even within narrowly defined sectors there exists simultaneous creation and destruction of jobs. The different degrees of job reallocation over the various sectors show that not only different sectors are very heterogeneous, but also firms within narrowly defined sectors are quite heterogeneous. Secondly, Estonia is characterized by a higher job creation rates in all sectors, except for 'transport and communication'. This is also reflected in positive net employment rates and in high excess job reallocation rates. When we compare the excess job reallocation rates between Bulgaria and Romania, we can note a striking similarity regarding the ranking of sectors. In both countries we can see that the highest churning of jobs takes place in 'public services' followed by 'agriculture', 'trade' and 'construction'. This suggests that there are

some common sector-characteristics that hold independent of the country. These can include technological and product market characteristics that facilitate deep or strategic restructuring in some sectors while refrain it in other sectors. This could also be the consequence of some institutional features related to the sectors, e.g. the degree of unionisation. We will explore in this issue in section IV.

**Table 3: Annual average job flows according to sector classification ( NACE code, rev.1), 1993-1996**

<i>Country/Sector</i>	<i>Pos</i>	<i>neg</i>	<i>net</i>	<i>Gross</i>	<i>excess</i>
<b><i>Bulgaria</i></b>					
<i>Agriculture and fishing</i>	6.7	16.9	-10.2	23.6	6.3
<i>Mining and quarrying</i>	1.5	10.3	-8.7	11.8	1.5
<i>Manufacturing</i>	2.1	6.1	-4.0	8.2	3.8
<i>Electricity, gas and water supply</i>	5.2	2.9	2.3	8.2	1.6
<i>Construction</i>	1.9	8.9	-7.0	10.7	3.7
<i>Trade</i>	1.9	10.7	-8.8	12.6	3.8
<i>Transport and communication</i>	1.1	15.2	-14.1	16.3	2.2
<i>Business services</i>	0.8	6.5	-5.7	7.3	1.1
<i>Public services</i>	11.1	5.6	5.4	16.7	7.0
<b><i>Estonia</i></b>					
<i>Agriculture and fishing</i>	8.8	8.0	0.8	16.9	8.5
<i>Manufacturing</i>	5.0	9.6	-4.6	14.7	10.1
<i>Electricity, gas and water supply</i>	4.1	3.3	0.7	7.4	3.2
<i>Construction</i>	13.5	6.1	7.4	19.6	10.6
<i>Trade</i>	7.7	10.1	-2.5	17.8	15.4
<i>Transport and communication</i>	2.4	11.8	-9.4	14.2	4.7
<i>Business services</i>	13.4	1.2	12.1	14.6	1.6
<i>Public services</i>	28.1	18.1	10.0	46.2	8.5
<b><i>Romania*</i></b>					
<i>Agriculture and fishing</i>	7.2	14.0	-6.8	21.2	14.4
<i>Mining and quarrying</i>	2.1	6.3	-4.2	8.5	4.3
<i>Manufacturing</i>	3.5	7.6	-4.1	11.1	7.0
<i>Electricity, gas and water supply</i>	2.3	8.9	-6.6	11.2	4.5
<i>Construction</i>	4.9	12.6	-7.6	17.5	9.9
<i>Trade</i>	6.5	10.3	-3.8	16.9	12.4
<i>Transport and communication</i>	2.9	10.2	-7.3	13.1	5.7
<i>Business services</i>	2.6	10.6	-8.0	13.2	5.2
<i>Public services</i>	10.8	7.2	3.5	18.1	14.5

Note: Romanian figures refer to 1995-1996 averages.

Tables 4a, b and c report job flows at 2-digit manufacturing level only. As we have seen in table 3, employment in manufacturing has reduced in all countries, the manufacturing net employment growth rates are about -4.0. Also in manufacturing, Estonia seems to be the most dynamic country, even if data limitation prevents us from saying more about specific industries. In Bulgaria and Romania all industries are destroying jobs, although some at a higher speed than others are.

Despite the high job destruction in manufacturing, we can note that the excess job reallocation rate varies a lot between the different two-digit manufacturing sectors. In other words, there are different degrees of deep restructuring in various sectors.

**Table 4a: Annual average job flows in Bulgaria for manufacturing industries, 1993-1996**

<i>Industry</i>	<i>Pos</i>	<i>neg</i>	<i>net</i>	<i>gross</i>	<i>excess</i>
15 Food products and beverages	3.0	7.3	-4.4	10.3	4.4
16 Tobacco	1.9	5.1	-3.2	7.1	3.9
17 Textiles	3.0	4.9	-1.9	7.9	5.2
18 Wearing apparel	1.3	10.2	-8.9	11.5	2.7
19 Leather and leather products	2.3	4.3	-2.0	6.5	4.3
20 Wood and wood products	1.8	5.4	-3.6	7.2	3.6
21 Pulp, paper and paper products	2.9	3.3	-0.3	6.3	2.6
22 Publishing and printing	1.1	12.2	-11.1	13.2	2.2
24 Chemicals and chemical products	1.5	2.0	-0.5	3.5	1.6
25 Rubber and plastic products	2.7	5.6	-2.9	8.3	1.9
26 Other non-metallic mineral products	2.5	4.9	-2.4	7.4	3.2
27 Basic metals	1.6	2.2	-0.7	3.8	2.2
28 Fabricated metal products	1.9	6.3	-4.4	8.3	3.9
29 Machinery and equipment	1.6	11.4	-9.8	13.0	3.2
30 Office machinery and computers	0.9	12.6	-11.7	13.6	1.9
31 Electrical machinery and apparatus	2.2	5.6	-3.4	7.9	4.5
32 Radio, TV, communication equipment and apparatus	1.5	7.6	-6.0	9.1	3.1
33 Optical instruments and watches	0.5	5.5	-5.0	6.1	1.0
34 Motor vehicles, motorcycles and trailers	2.1	6.8	-4.7	8.9	4.2
35 Other transport equipment	2.6	3.9	-1.3	6.6	1.5
36 Furniture and miscellaneous	1.4	5.6	-4.2	7.0	2.8

**Table 4b: Annual average job flows in Estonia for manufacturing industries, 1993-1996**

<i>Industry</i>	<i>Pos</i>	<i>neg</i>	<i>net</i>	<i>gross</i>	<i>excess</i>
15 Food products and beverages	7.4	8.1	-0.6	15.5	7.4
17 Textiles	22.0	19.5	2.5	41.5	5.7
18 Wearing apparel	5.7	5.4	0.3	11.1	2.2
19 Leather and leather products	13.7	5.6	8.1	19.3	2.6
20 Wood and wood products	0.4	2.9	-2.4	3.3	0.9
24 Chemicals and chemical products	3.2	14.0	-10.8	17.2	3.4
25 Rubber and plastic products	3.3	13.6	-10.4	16.9	2.6
26 Other non-metallic mineral products	5.1	8.9	-3.8	14.0	8.3
28 Fabricated metal products	4.1	13.9	-9.8	18.0	4.8
29 Machinery and equipment	1.4	6.2	-4.7	7.6	2.4
33 Optical instruments and watches	1.7	4.1	-2.4	5.8	2.0
36 Furniture and miscellaneous	10.7	3.5	7.2	14.3	5.3

**Table 4c: Annual average job flows in Romania for manufacturing industries, 1995-1996**

<i>Industry</i>	<i>Pos</i>	<i>neg</i>	<i>net</i>	<i>gross</i>	<i>excess</i>
15 Food products and beverages	4.8	10.6	-5.8	15.4	9.5
17 Textiles	3.7	9.4	-5.7	13.2	7.4
18 Wearing apparel	5.2	7.8	-2.6	13.0	10.4
19 Leather and leather products	3.2	8.6	-5.4	11.9	6.5
20 Wood and wood products	3.0	8.3	-5.4	11.9	6.5
21 Pulp, paper and paper products	0.7	6.5	-5.8	7.1	1.4
22 Publishing and printing	10.6	11.6	-1.0	22.2	19.3
23 Coke, petroleum products and nuclear fuel	8.1	9.1	-1.0	17.2	3.1
24 Chemicals and chemical products	1.2	4.7	-3.5	5.9	2.5
25 Rubber and plastic products	2.9	4.3	-1.4	7.3	5.9
26 Other non-metallic mineral products	3.8	6.4	-2.7	10.2	7.5
27 Basic metals	0.8	4.4	-3.6	5.2	1.6
28 Fabricated metal products	3.8	7.8	-3.9	11.6	7.4
29 Machinery and equipment	0.9	6.6	-5.7	7.5	1.8
30 Office machinery and computers	3.0	6.9	-3.9	9.9	2.3
31 Electrical machinery and apparatus	3.5	8.7	-5.2	12.2	2.7
32 Radio, TV, communication equipment and apparatus	0.1	14.8	-14.8	14.9	0.1
33 Optical instruments and watches	3.8	10.5	-6.7	14.4	7.7
34 Motor vehicles, motorcycles and trailers	10.3	5.3	5.0	15.6	10.6
35 Other transport equipment	0.9	4.9	-4.1	5.8	1.5
36 Furniture and miscellaneous	2.4	9.6	-7.2	12.0	4.8
37 Recycling	5.0	7.1	-2.1	12.1	10.0

We can also observe substantial differences in job reallocation across regions as shown in tables 5a, b and c, where we report the annual average gross job creation and destruction rates for the regions. Once again Estonia is characterised by having high job creation and job destruction rates, while Bulgaria and Romania are characterised by higher job destruction than job creation rates and, thus, by large and negative net employment rates. Despite the fact that most regions are declining on average, there are quite a number of regions in both Bulgaria and Romania that have substantial job creation rates, but these regions have also high job destruction rates. This indicates an active process of reallocation and restructuring taking place within one region. This also suggests that regions, such as 'Timis', 'Brăila' and 'Arges' in Romania or 'Haskovo' in Bulgaria, are the most dynamic ones and important ones in terms of economic restructuring, an essential condition for successful transition. There is substantial heterogeneity in regional gross job reallocation in Estonia, Bulgaria and Romania. The average regional gross job reallocation rate is 19.8%, 13% and 9% in Estonia, Bulgaria and Romania, respectively. The regional coefficient of variation for gross job reallocation is 0.17 in Bulgaria, 0.32 in Romania and 0.42 in Estonia. So, it seems that in Bulgaria the variation in regional gross job flows is lower than in the other countries.

**Table 5a: Annual average job flows in Bulgaria according to regional units, 1993-1996**

<i>Oblast/Okrug(County)</i>	<i>Pos</i>	<i>neg</i>	<i>net</i>	<i>gross</i>	<i>excess</i>
<b><i>Sofia-oblast</i></b>					
<i>Sofia-grad</i>	2.1	11.7	-9.6	13.8	4.2
<i>Sofia</i>	2.9	5.6	-2.7	8.5	3.6
<i>Pernik</i>	1.8	6.9	-5.1	8.6	3.5
<i>Kjustendil</i>	1.7	4.3	-2.6	6.0	3.0
<i>Blagoevgrad</i>	2.1	5.6	-3.4	7.7	3.2
<b><i>Montana-oblast</i></b>					
<i>Vratza</i>	2.3	6.1	-3.8	8.3	3.6
<i>Montana</i>	2.2	6.8	-4.6	9.1	3.8
<i>Vidin</i>	1.4	6.7	-5.3	8.1	2.2
<b><i>Plovdiv-oblast</i></b>					
<i>Plovdiv</i>	1.8	6.8	-5.1	8.6	3.6
<i>Pazardjik</i>	1.7	5.1	-3.4	6.8	3.0
<i>Smoljan</i>	2.0	5.5	-3.5	7.6	1.4
<b><i>Lovech-oblast</i></b>					
<i>Veliko Tarnovo</i>	2.4	6.6	-4.2	9.0	4.5
<i>Gabrovo</i>	2.0	8.5	-6.6	10.5	3.9
<i>Lovech</i>	2.2	8.0	-5.8	10.2	4.4
<i>Pleven</i>	1.6	6.8	-5.3	8.4	3.0
<b><i>Haskovo-oblast</i></b>					
<i>Stara Zagora</i>	2.5	11.1	-8.6	13.7	1.8
<i>Haskovo</i>	5.7	3.9	1.7	9.6	2.5
<i>Kardjali</i>	1.7	5.8	-4.1	7.5	3.4
<b><i>Razgrad-oblast</i></b>					
<i>Ruse</i>	1.3	6.2	-4.9	7.5	2.1
<i>Razgrad</i>	2.5	5.1	-2.6	7.6	3.8
<i>Silistra</i>	1.2	7.2	-5.9	8.4	2.4
<i>Targovishte</i>	2.1	5.4	-3.2	7.5	3.4
<b><i>Burgas-oblast</i></b>					
<i>Burgas</i>	1.7	6.6	-4.9	8.2	3.4
<i>Jambol</i>	1.2	7.7	-6.5	8.9	2.4
<i>Sliven</i>	3.0	4.6	-1.6	7.7	4.0
<b><i>Varna-oblast</i></b>					
<i>Varna</i>	1.5	4.6	-3.1	6.1	2.8
<i>Dobrich</i>	2.7	8.7	-6.0	11.4	3.8
<i>Shumen</i>	2.3	5.0	-2.8	7.3	3.7

Note: Even if the actual administrative unit is oblast, we consider data at okrug level for comparative purposes.

**Table 5b: Annual average job flows in Estonia according to regional units, 1993-1996**

<i>Maakond (County)</i>	<i>Pos</i>	<i>neg</i>	<i>net</i>	<i>gross</i>	<i>excess</i>
<i>Harju</i>	11.6	13.1	-1.5	24.7	6.5
<i>Tallinn*</i>	8.7	9.3	-0.6	18.1	13.4
<i>Hiiu</i>	1.6	8.8	-7.1	10.4	2.6
<i>Ida-Viru</i>	8.3	10.4	-2.1	18.7	9.8
<i>Jõgeva</i>	1.0	5.4	-4.4	6.4	2.0
<i>Järva</i>	2.8	5.0	-2.2	7.8	3.9
<i>Lääne</i>	2.5	4.8	-2.3	7.3	3.0
<i>Lääne-Viru</i>	4.0	7.6	-3.6	11.7	6.0
<i>Põlva</i>	0.5	3.9	-3.4	4.4	0.1
<i>Pärnu</i>	3.9	4.9	-1.0	8.8	6.5
<i>Rapla</i>	10.5	5.2	5.3	15.8	7.0
<i>Saare</i>	9.3	5.7	3.6	15.0	9.3
<i>Tartu</i>	7.1	12.4	-5.3	19.5	9.4
<i>Valga</i>	3.4	11.4	-8.0	14.8	2.5
<i>Viljandi</i>	3.0	11.2	-8.3	14.2	3.7
<i>Võru</i>	2.7	8.5	-5.8	11.3	5.4

Note: Tallinn belongs to Harju maakond. However, given the high concentration in our sample of firms in Tallinn, we consider them separately from those belonging to the same county.

**Table 5c: Annual average job flows in Romania according to regional units, 1995-1996**

<i>Judet(County)</i>	<i>Pos</i>	<i>neg</i>	<i>net</i>	<i>gross</i>	<i>excess</i>
<i>Municipiul Bucuresti</i>	4.0	14.6	-10.6	18.6	8.0
<i>Alba</i>	3.3	5.2	-1.9	8.6	6.7
<i>Arad</i>	3.8	7.5	-3.7	11.3	7.6
<i>Arges</i>	8.4	7.0	1.4	15.4	12.1
<i>Bacău</i>	3.3	7.0	-3.7	10.3	6.6
<i>Bihor</i>	3.1	9.3	-6.2	12.4	6.2
<i>Bistrița-Năsăud</i>	2.7	7.6	-4.9	10.2	5.3
<i>Botosani</i>	5.3	7.3	-2.0	12.6	10.6
<i>Brasov</i>	2.6	7.3	-4.7	9.9	5.2
<i>Brăila</i>	9.3	5.2	4.1	14.5	10.5
<i>Buzău</i>	2.2	11.4	-9.1	13.6	4.5
<i>Caras-Severin</i>	5.6	11.2	-5.6	16.8	7.7
<i>Călărași</i>	2.4	6.3	-3.8	8.7	4.9
<i>Cluj</i>	3.2	6.3	-3.0	9.5	6.5
<i>Constanta</i>	4.0	14.3	-10.3	18.4	8.1
<i>Covasna</i>	3.0	4.8	-1.7	7.8	6.0
<i>Dâmbovita</i>	1.4	6.8	-5.5	8.2	2.7
<i>Dolj</i>	3.3	9.3	-6.0	12.6	6.6
<i>Galati</i>	2.4	5.0	-2.6	7.3	4.8
<i>Giurgiu</i>	2.8	8.0	-5.3	10.8	5.5
<i>Gorj</i>	5.1	12.3	-7.2	17.4	10.1
<i>Harghita</i>	4.7	7.7	-3.0	12.5	9.5
<i>Hunedoara</i>	1.4	4.1	-2.7	5.5	2.8
<i>Ialomita</i>	6.3	10.0	-3.7	16.2	8.6
<i>Iasi</i>	3.1	6.4	-3.3	9.5	6.2
<i>Maramures</i>	2.6	8.4	-5.7	11.0	5.3
<i>Mehedinti</i>	4.7	8.2	-3.5	12.8	9.3
<i>Mures</i>	3.1	10.7	-7.6	13.9	6.3
<i>Neamt</i>	3.1	11.4	-8.3	14.4	6.1
<i>Olt</i>	4.9	8.6	-3.6	13.5	9.8
<i>Prahova</i>	6.5	12.1	-5.6	18.7	9.6
<i>Satu Mare</i>	2.3	8.4	-6.1	10.7	4.6
<i>Sălaj</i>	3.1	9.2	-6.0	12.3	6.3
<i>Sibiu</i>	3.3	8.8	-5.5	12.1	6.7
<i>Suceava</i>	2.6	10.8	-8.2	13.5	5.3
<i>Teleorman</i>	1.9	9.8	-7.9	11.7	3.8
<i>Timis</i>	15.6	13.7	1.9	29.3	15.6
<i>Tulcea</i>	7.5	9.6	-2.1	17.1	12.4
<i>Vaslui</i>	4.1	5.2	-1.1	9.3	8.1
<i>Vâlcea</i>	5.4	8.3	-2.9	13.7	8.8
<i>Vrancea</i>	8.0	9.2	-1.3	17.2	12.4

An important question here is whether the churning of jobs occurs predominantly *within-* or *between-*sectors/regions. Following Davis and Haltiwanger (1990), we decompose excess job reallocation at the one digit sector level, the two-digit manufacturing sector level and the regional level into the component due to employment shifts within sectors/regions and the component due to employment shifts across sectors/regions. Using the method by Dunne *et al.* (1989), we rewrite excess job reallocation as:

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

where  $N_{t-1}$  stands for employment at time t-1 and  $s$  for sector/region. The first part of the right hand side of the equation gives the within component of excess job reallocation. This is measured at the sectoral level as the sum across sectors of the excess job reallocation in each sector. The second part gives the between component that is measured by summing across sectors the deviation of the absolute growth rate for the sector from the absolute growth rate at the sectoral level. In table 6, the second column, we report the fraction of the annual average excess job reallocation due to within-sector shifts for all one digit sectors. Likewise, in the third and fourth column for the two-digit manufacturing sectors and regions respectively.

**Table 6a: Annual Average Fraction of Within-sector and regional excess job reallocation**

<i>Country</i>	<i>One-digit sectors</i>	<i>Two-digit manufacturing sectors</i>	<i>regions</i>
Bulgaria	86	89	83
Estonia	73	53	76
Romania	98	81	86

Between-sector/regional employment shifts only account for a small proportion of excess job reallocation in all three countries, although in Estonia the contribution of within sector/region shifts is smaller than in Bulgaria and Romania. Thus, in the three countries, employment shifts during transition occur predominantly among establishments in the same sector or in the same region. The contribution of within sector/regional shifts seems to diminish as a country is more advanced in its transition process. These findings suggest that employment is characterised by low mobility across sectors/regions, which suggests that reallocation of resources happen within narrowly defined sectors/regions and thus heterogeneity matters.

### **III.2. Job Flows and Firm Size**

A final cut of the data is by firm size. It is well known that small firms create, but also destroy more jobs. To see whether also in Bulgaria, Romania and Estonia it is the small firms that are fundamentally the most dynamic ones we computed the gross job flows according to various firm level sizes. In table 6 it is confirmed that in all countries it is the small firms that have high job creation rates, but also high job destruction rates. Thus, it seems that it is the small firms that are fundamentally the most dynamic ones and are engaging in deep restructuring. This is also what we would expect given that the initial size of most traditional firms was too large. So, firms that engaged first in initial restructuring, by reducing their size, are able to engage in deep restructuring later on, which is reflected in high job reallocation. It can be seen that there is an inverse relationship between both the gross and the excess job reallocation rate and size of the firm.



**Table 6: Annual average gross and net job flow rates according to firm size**

<i>Country/Size</i>	<i>pos</i>	<i>Neg</i>	<i>net</i>	<i>gross</i>	<i>excess</i>
<b>Bulgaria</b>					
<i>0-249</i>	1.7	12.8	-11.0	14.5	3.4
<i>250-499</i>	2.0	14.0	-12.0	15.9	3.8
<i>500-999</i>	2.4	6.8	-4.4	9.2	4.7
<i>+1000</i>	2.6	4.6	-2.1	7.2	3.6
<b>Estonia</b>					
<i>0-249</i>	7.4	15.7	-8.4	23.1	14.2
<i>250-499</i>	6.5	9.2	-3.0	15.8	12.8
<i>500-999</i>	9.6	4.6	5.0	14.2	7.5
<i>+1000</i>	8.7	8.1	0.5	16.8	12.1
<b>Romania</b>					
<i>0-249</i>	6.5	18.5	-12.0	25.0	12.9
<i>250-499</i>	5.4	12.1	-6.7	17.4	10.7
<i>500-999</i>	3.9	11.1	-7.2	15.0	7.8
<i>+1000</i>	3.6	6.0	-2.4	9.6	7.3

Note: Firms are mostly concentrated in the sub-class 100-249: the 58% in Bulgaria, the 61% in Estonia and the 51% in Romania.

#### IV. Empirical analysis of year, country and industry differences in job flows

In this section we focus on explaining similar sectoral patterns in job reallocation across transition countries. We focus only on Bulgaria and Romania because these countries are going through a similar phase of transition. We want to test whether sectoral rankings of job reallocation are similar across countries. It is of particular interest whether it is technological characteristics across sectors or whether it is institutional differences across sectors that drive differences in gross job flows. If it is predominantly the former then we should expect to find strong sector effects in both Bulgaria and Romania, if it is the latter, we expect less important sector effects, but stronger country and time effects.

We estimate a set of regressions with job creation, job destruction, net employment growth, job reallocation and excess job reallocation as dependent variables, with country, year, industry effects and several interaction terms as regressors. Following Baldwin *et al.* (1998), we specify the following equation:

$$y_{i,t} = \beta_0 + \beta_{BUL} * DBUL + \sum_i \beta_i * IND_i + \sum_j \beta_j * TIME_t + \varepsilon_{i,t}, \quad (2)$$

where  $y_{i,t}$  stands for  $pos_{i,t}$ ,  $neg_{i,t}$ ,  $net_{i,t}$ ,  $gross_{i,t}$  or  $excess_{i,t}$  for industry  $i$  at time  $t$ .  $DBUL$  is the country dummy, equal to 1 for Bulgaria and to 0 for Romania.  $IND_i$  represents a set of two-digit industry dummies.  $TIME_t$  represents a set time dummies. In addition, we estimate models where we include country-industry and country-year interaction terms. Our purpose is to quantify the importance of different sources of variation in the employment-flows data. We want to detect whether country, industry, year effects or a combination of them are relevant in explaining differences in job flows.

In tables 7a and b we report the adjusted-R<sup>2</sup> associated with alternative specifications. A number of interesting results emerge. Focusing on table 7a, neither country nor year effects have much explanatory power in accounting for variations in any of the measures. Second, sector effects play a larger role in explaining variations in the job flow measures, but especially in explaining variations in excess job reallocation, our measure of deep restructuring. These two findings changes drastically if we consider the manufacturing sector only in table 7b. Country effects are now more important than industry effects in explaining variations in job creation and job reallocation. Yet, the contribution of industry effects remains also relative important, but only for explaining gross and excess job reallocation. This suggests that institutional differences between countries matter more in the manufacturing sector than in the economy as a whole. If both the manufacturing and non-manufacturing sector are considered it is the technological characteristics of sectors which account for most variation in excess job reallocation or deep restructuring. This is not surprising because the traditional firms and sectors were predominantly in manufacturing, hence the institutional changes initiated by transition should matter predominantly in explaining job flows in manufacturing. Technological characteristics in traditional sectors do not matter presumably because technology is obsolete anyhow and therefore it cannot have much effect on job flows.

**Table 7a: Adjusted R<sup>2</sup> associated with alternative specifications, all sectors at 2-digit industry level**

<i>Dummies included in the regression</i>	<i>pos</i>	<i>neg</i>	<i>net</i>	<i>gross</i>	<i>excess</i>
Country	0.025	-0.004	0.017	0.016	0.051
Year	0.005	0.011	0.017	-0.006	0.027
Industry	0.040	0.070	0.028	0.077	0.147
Country, year	0.030	0.007	0.033	0.011	0.060
Country, industry	0.056	0.065	0.035	0.089	0.206
Industry, year	0.047	0.083	0.047	0.071	0.188
Country, industry, year	0.063	0.079	0.055	0.083	0.220
Country, industry, year, country*industry	-0.033	0.134	-0.031	0.078	0.321
Country, industry, year, country*year	0.073	0.128	0.067	0.118	0.256

**Table 7b: Adjusted R<sup>2</sup> associated with alternative specifications, manufacturing industries**

<i>Dummies included in the regression</i>	<i>Pos</i>	<i>Neg</i>	<i>Net</i>	<i>Gross</i>	<i>Excess</i>
Country	0.042	0.008	-0.004	0.070	0.083
Year	0.012	-0.004	0.005	0.005	0.065
Industry	-0.034	0.001	-0.077	0.054	0.060
Country, year	0.055	0.011	0.005	0.078	0.093
Country, industry	0.008	0.010	-0.084	0.131	0.163
Industry, year	-0.021	-0.002	-0.072	0.063	0.121
Country, industry, year	0.022	0.014	-0.076	0.143	0.177
Country, industry, year, country*industry	-0.081	0.020	-0.226	0.204	0.328
Country, industry, year, country*year	0.045	0.078	-0.063	0.218	0.231

Note: The pooled data consider only manufacturing industries as reported in tables 5a, b and c.

## **V. Summary and Conclusions.**

This is the first paper to make a comparative analysis of gross job flows for Bulgaria, Estonia and Romania using a large comparable and representative micro data-base on firms. We found that gross job creation is low compared to gross job destruction, although job creation is picking up as transition proceeds. There are substantial differences in gross job reallocation according to country, sector, industry and region. Estonia is the most dynamic country, well advanced in the reallocation process, characterised by smaller firms, positive employment growth and higher job flows rates and hence more deep restructuring. Bulgaria and Romania are lagging behind. They have firms with larger size and lower job reallocation rates. At the sectoral level, for all countries some sectors are net creators of jobs while others are reducing. Likewise, some regions are growing while others are declining.

In order to know whether the churning of jobs occurs predominantly within- or between- sectors/regions, we decomposed the excess job reallocation into the component due to employment shifts within sectors/regions and the component due to employment shifts across sectors/regions. Between-sectors/regions employment shifts only account for a small proportion of excess job reallocation. Thus, in employment shifts during transition occur predominantly among establishments in the same sector or region. In Estonia, the more advanced country the contribution of within sector/regional shifts is somewhat lower, which suggests that as transition proceeds employment shifts occur more across sectors/regions.

Given the striking similarity in the ranking of sectors between Bulgaria and Romania, we analyzed the nature and the sources of job flows variations in the two countries. We found that both countries share common technological characteristics across sectors that account for job flow variations at the sectoral level. At the manufacturing level, however, institutional differences between countries play a more important role. Finally, we found that in Bulgaria and Romania the interaction between the two sources of variation can better explain the evolution of the real churning of jobs.

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