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ABSTRACT

Gross Job Flows in Ukraine: Size, Ownership and Trade Effects*

This Paper documents and analyses gross job flows and their determinants in Ukraine using a unique dataset of more than 2200 Ukrainian firms operating in both the manufacturing and the non-manufacturing sector for the years 1998-2000. There are several important findings in the Paper. Job destruction is dominating job creation in both 1999 and 2000. In connection with other evidence we infer from this that Ukraine is only at the beginning of the restructuring process. The most clear-cut result of our analysis is the strong positive effect of new private firms on net employment growth, a finding established for other transition economies as well. At the same time, we do not find differences in the employment growth of state-owned and privatized firms. Apart from ownership effects we also find, at the firm level, an inverse correlation of size and net employment growth and of size and job reallocation. Finally, we establish that strong foreign trade links force firms to shed labour more aggressively and to engage in more restructuring when trade is directed to and originating from Western economies. This disciplining function is absent when the trade flows are confined to CIS countries.

JEL Classification: E24, F14, J63 and P23
Keywords: job creation, job destruction, private firms, trade and Ukraine

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I. Introduction

It is generally known that 'flexibility' of the labour market is an important feature of well-functioning market economies. Davis, Haltiwanger and Shuh (1996) and Baldwin, Dunne and Haltiwanger (1998) report that in the U.S. and in Canada roughly one in every ten jobs is created and one in every ten jobs is destroyed each year. Flexibility of the labour market is important because it permits the rapid reallocation of resources to the most efficient uses and thus it may be vital for economic growth. As suggested by Aghion and Howitt (1994), we might expect a relationship between gross job creation, destruction and productivity growth. Firms (sectors) that engage in restructuring destroy low productivity jobs and create high productivity ones. This leads to high job turnover and an increase in labour productivity. Therefore, a positive correlation between productivity growth and job turnover might be expected. However, a high degree of job reallocation may also have negative effects, at least in the short run, in terms of worker displacement and earnings losses, but the aggregate and long run benefits are more likely to compensate the individual costs.

These issues are particularly relevant for the post-communist economies, characterized by highly distorted factor allocations and many inefficient firms. The reallocation of labour from inefficient firms (usually non-restructured state and privatised firms) to efficient ones (usually new private and restructured state and privatised firms) is a desirable feature of a successful transition from plan to market. Blanchard (1997) has pointed out that such an optimal reallocation is not straightforward to achieve. If the collapse in employment in the state sector is too large such that the slowly emerging new private sector cannot sufficiently compensate the job loss in the state sector, unemployment will result. On the one hand high unemployment implies lower wages, which is good for job creation. However, high

unemployment also implies that the private sector needs to be taxed more in order to finance the unemployment benefit system, which in turn dampens job creation.

The purpose of this paper is to study gross flows of jobs in Ukraine, a transition country that has been lagging behind in reforms. In doing so, we hope to contribute to the ongoing debate between gradual versus rapid approaches to reform (e.g. Roland, 1994). Haltiwanger and Vodopivec (2002) analyse the role of labour market flexibility for a small transition economy, Estonia. According to their findings, Estonia's transition process is a success story. The country's rapid approach to reform has led the economy to sustainable GDP growth and to rates of job reallocation similar to those reported for Western economies. Konings, Lehmann and Schaffer (1996) analyse gross flows of jobs in Poland at the start of transition and find high rates of gross job destruction, which are concentrated in state owned enterprises. This suggests that state owned enterprises in Poland rapidly engaged in downsizing. They also find that new private firms contribute disproportionately to job growth in the economy. The same patterns are found for most of the other Central and East European countries as shown in Faggio and Konings (2000). Basu, Estrin and Svejnar (1997) and Estrin and Svejnar (1998) find in the context of a labour demand model for the Czech and Slovak Republics and for Poland that firms adjusted their labour force fairly rapidly at the start of transition.

However, apart from Russia, little is known about the reallocation process in the slow reforming economies of the CIS, which experience the most severe output collapse and where no real signs of recovery are seen. For Russia, Brown and Earle (2002) find that job destruction and reallocation rose markedly after the beginning and that job destruction was concentrated among the less productive firms in the second half of the nineties. Konings and Lehmann (2002), in addition, show that five years

into the Russian transition employment responses in privatised firms are more strongly negatively correlated with wage movements than in state-owned firms pointing to the possibly slowly emerging beneficial effects of privatisation on productivity. The data sets of both cited papers on Russia do not include new private firms, their contribution to the employment growth of the Russian economy is documented in Acquisti and Lehmann (2000). According to their evidence new private firms have disproportionately high job creation *and* destruction rates, the latter of which might be attributed to a relatively hostile environment for new businesses in Russia and the inexperience of managers to operate in this environment. Since we have in one of our Ukrainian data sets information on whether a Ukrainian firm is state-owned, privatised or new private we can investigate such ownership effects in this paper.

Another strand of the literature on gross job flows considers the link between foreign trade and job creation and destruction tying it in with the debate on the effects of globalisation on employment in the domestic labour market. For example, Levinsohn (2000) explores the effects of trade liberalisation on the Chilean labour market and finds that size and macro effects overwhelm any trade effects, i.e. export-led, import-competing and non-traded sectors had similar employment patterns once size and macro shocks were controlled for. Klein, Schuh and Triest (2002) identify trade-related adjustment costs by estimating the effects of real exchange rates on labour reallocation using detailed data on U.S. manufacturing industries for the years 1973 through 1993. In a transition context, the effects of trade on job reallocation have not yet found much interest, even though the rapid opening up of transition economies to world markets seems to provide the basis for an excellent natural experiment. Trade ties of Ukrainian manufacturing sectors with Western markets were

virtually non-existent before independence, but developed rapidly since then. It strikes us, therefore, as fruitful to investigate how the relative openness of a sector, in which a firm operates, impacts upon the creation and destruction of jobs in this firm.

The paper has as one aim to document gross job flows in both the manufacturing and non-manufacturing sectors in Ukraine for the years 1999 and 2000, when Ukraine started to emerge from a very prolonged period of contraction and economic depression. It is the first paper that uses representative firm level data, which cover a large fraction of employment in both the manufacturing and the non-manufacturing sectors, in order to contrast gross job flows in these two sectors. Since the Ukrainian economy was even more biased towards the manufacturing sector under central planning than other Soviet and East European economies, it is of interest to see whether there are significant differences in net employment growth between the two sectors that lead to a shrinking of the manufacturing sector and an expansion of the non-manufacturing sector as a move in the direction of a market economy would suggest. Of particular interest is in this context whether job creation or job destruction is the driving force behind this possibly different net employment growth.

The main data set that we use has information on ownership types of firms, i.e. we can distinguish between new private, privatised and state-owned enterprises. This allows us to contribute to the ongoing debate about the effects of ownership on employment growth. Many papers have indicated that the employment adjustment in terms of gross flows of jobs is not very different between privatised and state-owned enterprises, but that most of the dynamics emerges from the new private firms.[1]

A third contribution of this paper is the exploration of the link between the trade orientation of Ukrainian manufacturing industries and the employment adjustment of

firms. Using data on trade flows at the 2-digit level we construct an index of relative openness that we employ in the analysis.

In the next section we describe the data set and provide a brief review of the job flow measures that we will analyse. The section also discusses the construction of the index of relative openness and how it might capture various aspects of the increased trade flows of the Ukrainian manufacturing sector. Section III reports gross flows of jobs for the entire economy, for different sectors in the economy, for different size classes and ownership categories and according to the relative openness of the sector where firms are active. In section IV we report regressions that attempt to explain the determination of employment growth and job reallocation in Ukrainian firms, while section V concludes.

II. Data, job flow measures and relative openness at the sector level

We are using two data sets to obtain a picture of gross flows of jobs in Ukraine. The first data set covers 7,303 "traditional" firms in manufacturing between 1996 and 2000, of which 6189 can be used for our purposes. The data on the manufacturing sector is provided by the Government Statistical Committee ("Derzhkomstat") and covers virtually the entire population of those manufacturing firms that already existed in Soviet times, allowing us to study the evolution of job flows over time for the "traditional" manufacturing sector. We are pretty sure that new private firms, even if they are large, are not part of the data, though. A further drawback of this data set is the lack of information on the ownership structure of firms. While this information exists, it is not easy accessible and we cannot explore this important dimension with it. Hence, as this data set only covers the "traditional" manufacturing sector, we use it to illustrate the adjustment path of the "traditional"

Ukrainian manufacturing sector over the latter half of the nineties and to check whether the job flow measures generated from the second data set are reasonable.

This second data set is based on annual company accounts data of 2,239 Ukrainian firms in both the manufacturing and the non-manufacturing sectors, where we have annual observations for the years 1998-2000. These data are retrieved from the Amadeus data set compiled by Bureau Van Dijck, a commercial data provider. The Amadeus data set consists mostly of company accounts data of European Union firms, however, they also report information on some countries in Central and Eastern Europe. To be included in the data set at least one of the following criteria has to be fulfilled: operating revenue must be at least 1.5 million Euro, total assets must be at least 3 million Euro or the number of employees has to be larger than 15. These restrictions on the data imply that micro firms are not included. Nevertheless, a substantial number of medium and small firms enters the data set. Abstracting from micro firms, the data is a representative sample of the population of firms and is therefore extremely useful in inferring some basic patterns of job reallocation in Ukraine. The ownership information of each firm in this second data set was matched in from an external source. The Amadeus data set includes the company names of all firms and based on that it was possible to identify the ownership information of the firm, taken from a listing of company names and their ownership status. Consequently, we were able to identify new private firms, privatised firms and state-owned enterprises. Both cleaned data sets that we use in the analysis comprise only firms that we can identify with certainty as continuing firms, i.e. firms that have positive employment levels in all years.

The Amadeus data set is preferred by us, even though the Derzhkomstat data set gives us nearly the universe of “traditional” manufacturing firms over a longer

time period. Having samples of new private firms and of firms in the non-manufacturing sector in the Amadeus data set helps us to get a more accurate picture of the true situation of Ukrainian firms at the end of the nineties, i.e. in a period when the restructuring process seems to have just begun. In addition, sending workers on forced unpaid leave has been a very widespread practice of Ukrainian firms in the nineties. Sample data for the years 1996 through 2001 from a survey of firms from four regions undertaken by EERC-Kiev[2] shows that the fraction of workers on such leave is often very large. Clearly, widespread unpaid leave raises the question of how to define a job. Are workers who are sent on unpaid leave and who might eventually be called back still in possession of a job? If they are called back relatively soon, then the answer should be yes; if they, on the other hand, linger on in unpaid leave for a protracted period, it is hard to consider them as job holders. What the survey data show is that most firms call back their workers on unpaid leave within three months, although this information is only available for 2000 and 2001, when the economy was performing better than in the nineties. There is, however, clear evidence in these data that in 1999 and 2000 forced unpaid leave was less of a problem than in the earlier years.

Table A1 in the appendix gives some summary statistics of the Amadeus data set for the years 1999 and 2000. From the table it is clear that Ukrainian firms on average are still very large compared to the typical Western firms. Furthermore, not surprisingly, the average firm is larger in the manufacturing sector than in the non-manufacturing sector. But even in the non-manufacturing sector the average firm size is quite large, compared to Western standards. This suggests that firms even after 10 years of transition are still characterized by over-manning levels, something that will be further discussed in the next section. Ukraine started much later than e.g. Russia

with the implementation market oriented reforms so that the initial restructuring phase that entails the elimination of over-manning levels may just have started towards the end of the nineties. Secondly, the fact that the average firm size in the non-manufacturing sector is so large also suggests that some firms in the non-manufacturing sector were previously active in the manufacturing sector. This may have been the case if some of the services that were supplied within the typical traditional manufacturing firm under central planning were re-classified as non-manufacturing firms, perhaps once they were privatised.

We can also note that the average employment growth rates in the sample are negative in both sectors, with average employment contraction in the manufacturing sector being larger in absolute value in both years.

Rates of gross and net job flows that are by now very much standard in the literature on job dynamics in Western economies (Davis and Haltiwanger, 1992, 1999) and the shares of job creation and job destruction are analysed in the paper. Gross job creation (*pos*) is defined as the sum of all employment gains in all expanding firms, while gross job destruction (*neg*) is the sum of all employment losses in all contracting firms in an economy, sector or region. Usually gross job destruction is expressed as a positive number. These gross job flows can be expressed as rates by dividing them by the total amount of jobs available in an economy, sector or region. The sum of the gross job creation rate and the gross job destruction rate is the gross job reallocation rate (*gross*), while the difference is the net aggregate employment growth rate (*net*) that can be observed in aggregate statistics. A measure of churning or reallocation of jobs which is over and above the amount of job reallocation necessary to accommodate a given net aggregate employment growth rate

is the excess job reallocation rate and is defined as the gross job reallocation rate minus the modulus of the net aggregate employment growth rate (*excess*).

While most of these job flow measures have the usual interpretation also in a transition context, one of these measures, the excess job reallocation rate, is a bit more controversial. Some authors understand this rate as a measure of deep restructuring, while other authors, including us here, give it the more conventional interpretation of a sign of heterogeneous firm behaviour within a given sector and of genuine labour reallocation within a sector.

The shares of job creation and destruction of specific sectors are given by the ratio of the number of created or destroyed jobs of these sectors over the number of all created or destroyed jobs. Comparing these shares to the employment size shares gives additional insights into the relative contributions of various categories of firms to the job creation and destruction process.

We also look at the one-year persistence rates of job creation and job destruction. The one-year persistence rate of job creation is the fraction of jobs created in year t that remain filled at the sampling date one year later. The one-year persistence rate of job destruction is the fraction of jobs that do not reappear at the sampling date one year later (Davis and Haltiwanger, 1999). Documenting these persistence rates tries to get at the question whether the observed job flows are of a temporary or more permanent nature, an issue of particular relevance in the transition context.

The Amadeus data set is a sample and not the universe of all Ukrainian firms. Apart from micro firms, it is however a random sample of Ukrainian firms in the manufacturing and non-manufacturing sectors. Because the data are not census-type data, the presented job flow rates are estimates and it is, therefore, important to

establish the precision of these estimates, i.e. to provide standard errors. One way to generate these standard errors, which is computer-intensive but computationally simple, is bootstrapping.[3] Since the sample is random this is a legitimate procedure, which thus far has been used very seldom in the literature on gross job flows in transition economies even when small random samples were analysed instead of census-type data.

The large increase in trade flows to and from Western countries that Ukrainian manufacturing sectors have experienced since independence can be used as a quasi social experiment of the effect of trade liberalisation on employment in the liberalizing economy. Using trade flow and employment data at the sector level in manufacturing we construct the following index of the relative openness of a sector:

$$Open_{j,t} = [(Imp_{j,t} + Exp_{j,t})/(Imp_{tot,t} + Exp_{tot,t})] * (employment_{j,96} / employment_{tot,96}).$$

The index gives the relative share of imports and exports of sector j in year t, weighted by its employment share in 1996. The sector *collection, purification and distribution of water*, which has no trade ties, is excluded when constructing the index. We employ a smoothed version of this index, taking averages over the years 1996-1998, which also guarantees that the index is exogenous to the analysed gross job flows of the years 1999 and 2000. The index is conceived to measure the relative degree, with which a respective sector in manufacturing industry has opened up to the world economy.[4] Ukraine as a part of the former Soviet Union has trade flows to and from countries within the CIS (mainly Russia) that were, of course, intra-country flows of goods before independence. A rise in CIS trade flows of a sector in manufacturing might reflect the re-establishment of previously existing trade links

between enterprises, i.e. the attenuation of the problems of "disorganisation" discussed in the literature[5], or it might represent a genuine opening up of this sector. We, therefore, construct the index for trade flows directed to and originating from all countries, CIS countries and finally where we net out the share of CIS trade flows. Looking at the link between relative openness of a sector and employment adjustment at the firm level across these three sets of trade flows we hope to shed some light on the nature of trade within the CIS and without.

III. Basic Patterns of Job Creation and Destruction in Ukraine

Ukraine has been a "laggard" in the reform process and experienced an unabated fall in output and real wages throughout the nineties, as Figure 1 demonstrates. The path of employment in this figure is particularly interesting, showing a decline in employment far less dramatic than the decline in GDP: real GDP collapsed to roughly 41% of its level in 1990, the year before Ukrainian independence, while employment amounted to 86% of its 1990-level in 1999.[6] Little rigorous work has been done on the Ukrainian labour market. We know, however, from aggregate data and casual evidence that, like in Russia, a precipitous fall in real wages, the wide spread practices of wage arrears and of unpaid leave have been dominant adjustment factors that can explain the very high levels of employment in a period of severe contraction. Output stabilised only in 1999 according to Figure 1 and we observe in the year 2000 for the first time an increase in real GDP and simultaneously a drop in employment in the Ukrainian economy. So, for the first time in the year 2000 we seem to see a decrease of over-manning levels, which had been increasing in the first six years of the nineties over and above the already excessive levels at the beginning of the decade.

The precipitous fall in output that we can observe in Figure 1 has been very heterogeneous across sub-sectors of the Ukrainian economy. Figure 2 shows this for the manufacturing sector, which is disaggregated into 12 industries. While we observe a common decline in output over the years 1996-1999[7], the immense variation in output contraction is striking. While the industry "ferrous metals" contracts by 5% between 1996 and 1999, the industries "chemicals" and "wood and paper" do so by more than 70% over the same period. The fact that over-manning levels have increased in this period for all industries can be seen in Figure 3, where the employment levels either decline in a much more modest way than do output levels or actually increase. Consequently labour productivity is declining between 1996 and 1999 for all industries in manufacturing as can be seen in Figure 4, which also shows dramatic variation in this variable. The sources of the fall in labour productivity and its variation are, however, twofold. A very large fall in the output of a domestic industry, brought on by the collapse of the demand for its products, can for political, social and economic reasons not be compensated by a similarly large fall in employment.[8] In other industries, output might not fall that much, but firms will hold on to labour since as a consequence of a collapsed real wage labour costs are extremely low and because they can engage in wage arrears and the sending of workers on forced unpaid leave with impunity. Both the first reason, which is of a compositional nature and the behavioural reason for the fall in labour productivity are present in the data. In some industries output declines are very large and employment falls are substantial but smaller, for example in "wood and paper" and in "light industry." In other industries output declines are more moderate, but employment stays virtually constant or rises as we can see in "ferrous metals" and "electricity."

Table 1 presents the distributions of employment growth for various years using both the Amadeus and the Derzhkomstat data sets. For both 1999 and 2000 the mean growth rates are negative in the overall sample of the Amadeus data as in the sub-samples of manufacturing and non-manufacturing. The same holds for the four years of the growth rates derived from the Derzhkomstat data. For all years and both data sets we observe a zero growth rate at the 75 percentile. So, slightly less than three quarters of all firms destroy jobs, while roughly one quarter creates jobs in each year. The mean growth rates of the overall sample of the Amadeus data set are in both years with –0.061 and –0.062 smaller than the (negative) growth rates implied by the employment levels in Figure 1, which amount roughly to –0.02. The lack of micro firms in the Amadeus data set might explain some of this discrepancy since these firms might contribute to job creation in a particularly strong fashion.

The distributions of employment growth based on the Derzhkomstat data are relatively compressed in the first three years for which we have data, in the year 2000 the distribution becomes more dispersed as shown in the increase of the standard deviation. We see a similar jump in the standard deviation between 1999 and 2000 with the Amadeus data set. In the case of the latter data set, the wider distribution in manufacturing is solely brought about because of higher levels of labour shedding, since at the 5 percentile, for example, the growth rate falls from –0.293 to –0.482. In non-manufacturing the wider distribution is a result of both more labour shedding and of an increase in employment expansion by some firms, since at the 5th percentile we see a decrease in the growth rate from -0.404 to –0.598 and an increase at the 95th percentile from 0.436 to 0.554 over the two years. So, heterogeneity in employment behaviour clearly increased in the year 2000. Since the non-manufacturing sector encompasses any branch of the economy outside manufacturing, we would expect

more heterogeneity in the former sector. This expectation is confirmed by the larger dispersion of employment growth rates in non-manufacturing.

Inspection of the figures for the manufacturing sector for the years 1999 and 2000 across the two data sets leads us to state that these distributions are "in the same ballpark." However, the employment growth distributions generated from the Derzhkomstat data are slightly displaced to the left in comparison with those generated with the Amadeus data since the growth rates based on the former data are smaller at both the 5^{th} and 90^{th} percentiles. The presence of 40 new private firms in the Amadeus manufacturing data might explain this better growth performance.

How do these employment growth distributions compare to other countries in the CIS, for example Russia? Brown and Earle (2002) present such distributions for traditional Russian manufacturing firms using Goskomstat census-type data. It is, therefore appropriate to compare the distributions based on the Derzhkomstat data. From the mid-nineties the Russian employment growth distributions show a dispersion that we observe in Ukraine only for the year 2000, again demonstrating the position of Ukraine as a "laggard" in economic reform.

Figures 5 and 6 show the distributions of the growth rates for the manufacturing and non-manufacturing sectors using the Amadeus data. From the figures it is clear that there are only continuous firms in the data set. It is, therefore, difficult to directly compare these distributions to the distributions of employment growth rates in Western economies. Nevertheless, if we compare figures 5 and 6 to those presented in Davis and Haltiwanger (1999), employment growth rates are much more compressed in Ukraine than in Western economies, even in the year 2000. Roughly 50 percent of all firms are in the interval [-0.153, 0] i.e. many firms contribute in a small fashion to the destruction of jobs. Also, whether we look at

manufacturing or non-manufacturing a relatively large number of firms contributes to the creation of jobs as the concentration of probability mass close to the right of zero in figures 5 and 6 implies. It is also evident that the majority of firms is engaged in job destruction in Ukraine in the two years under analysis. In the U.S., on the other hand, a relatively small number of firms contribute massively to job destruction as well as job creation. The different scenario in a transition economy where, like in Ukraine, reforms are very hesitant seems reasonable. In most industries, a majority of firms will shed labour and do this at a moderate rate, while a substantial minority of firms will expand employment. However, whether we deal with reallocation of labour within industries, which one might also call restructuring within industries, or reallocation of labour from declining to expanding industries can not be inferred from these figures.

In order to say something about restructuring within industries we need to look at job flow measures at a more disaggregated level. Tables A2 and A3 present estimates of the five standard job flow measures for various industries according to the NACE2 classification in both manufacturing and non-manufacturing. These tables show the tremendous heterogeneity within the two sectors. In the manufacturing sector we see only three industries with a positive net employment growth rate in 1999, while in 2000 four industries add more jobs than they destroy. So, in both years job destruction clearly dominates employment adjustment in the Ukrainian manufacturing sector. The estimates of the excess job reallocation rates are especially interesting. They range from zero, where the industry engages either only in job destruction or only in job creation, to a value of 20% in 1999 and of 19% in 2000. These latter values indicate that up to one fifth of all jobs are reallocated within industries over a period of a year. While these values are clearly an upper bound there

are many industries that reallocate between 5% and 10% of all jobs over a year and only a few that have either zero or very low restructuring levels. In other words, inspection of the estimates of the excess job reallocation rates leads us to conclude that most of the job reallocation occurs within sectors rather than between sectors.[9] In addition, these differences of the excess job reallocation that we observe across industries suggest that some structural characteristics of sectors, such as the degree of competitive pressure, may have an impact on the degree of job reallocation between firms within the same sector.

In the non-manufacturing sector similar patterns of job flows across industries can be observed in Table A3. Like in manufacturing, job destruction dominates, as does reallocation within sectors. The range of the estimates of the excess job reallocation rates in 1999 is the same as in manufacturing while in 2000 the upper bound is 8 percentage points higher. Sectors related to trade and education are industries that seem to be particularly affected by restructuring in this year when economic activity started to pick up for the first time in Ukraine.

The job flow rates that we now present are virtually all estimates based on the Amadeus data set. There is only one table (Table 4) showing job flow measures of manufacturing based on the census-type Derzhkomstat data. In all the tables that are based on the Amadeus data we also report bootstrapped standard errors of the job flow measures. These standard errors, which are based on 1000 repetitions, allow us to establish the precision of the estimates and, using various distributional assumptions, enable us to construct confidence intervals and to thus compare job flow rates across categories in a statistically meaningful way. Ninety-five percent confidence intervals of the job flow measures are very similar whether one imposes a normal distribution or uses the percentile method.[10] For the purposes of the paper is

suffices to double the shown standard error to get a pretty good approximation of half of the width of the confidence interval.

Table 2 presents estimates of the job flow rates using the overall sample of the Amadeus data set, while Table 3 shows estimates of these rates and of gross job flow shares and size shares after the data set has been split into manufacturing and non-manufacturing. While job destruction dominates job creation in the Ukrainian economy in both years, job creation rises and job destruction falls in 2000 compared with 1999. As already stated heterogeneity in employment behaviour increased in 2000 as shown by the doubling of the excess job reallocation rate. In addition, given the bootstrapping procedure, the increase in the bootstrap standard errors from 1999 to 2000 for all job flow measures apart from the job destruction rate tells us that job creation has become more heterogeneous in 2000 and not job destruction.[11]

The manufacturing and non-manufacturing sectors have very similar job flow measures in 1999. In the year 2000, on the other hand, there seem to be clear differences between the two sectors of the economy, as job creation is more than double in the non-manufacturing sector. We can, however, also see that the rise in heterogeneous employment behaviour in 2000 can be mainly attributed to the non-manufacturing sector, which makes the estimates in this sector much more imprecise than in manufacturing. The large standard error in the job creation rate does not allow us to unequivocally say that non-manufacturing has a larger job creation in the year 2000 than manufacturing. We can say, however, that non-manufacturing contributes disproportionately to job creation in both years, while its destruction shares are only marginally higher than its size shares. This sector seems to be in a steady state in the year 2000, as the job creation rate roughly equals the job destruction rate. Given the large standard errors on both *pos* and *net*, it might be hard to maintain this assertion.

Also, since the Ukrainian economy seems to have come out a deep depression only in the year 2000, there is little reason to believe that the non-manufacturing sector of the economy has already reached a steady state in that year.

The estimates of the job flow rates of the manufacturing sector are clearly more precise. The 95% confidence intervals of all the job flow rates in manufacturing given in Table 3 include the values in Table 4, where we report the same measures using the Derzkomstat census data. The upshot of this discussion has to be that while there seems to be more job creation in the non-manufacturing sector, one needs to be careful when interpreting numbers generated from our Amadeus sample. That the non-manufacturing sector is more heterogeneous in its employment behaviour than the manufacturing sector only in the year 2000 is a very interesting finding that seems to locate the beginning of the restructuring process in Ukraine in that year. This restructuring is however rather modest in international perspective since a 14% reallocation rate (Table 2) is definitely at the lower end of the range of reallocation rates found in studies on gross job flows in Western economies, which are summarised in Davis and Haltiwanger (1999). Compared with other transition countries the job reallocation rate is also small. For example, Konings, Lehmann and Schaffer (1996) report a rate of 22.5% for Polish Manufacturing in 1991, while Haltiwanger and Vodopivec (2000) a rate of 22.6% for the Estonian economy during the early period of transition.

Splicing the data by size and ownership type, we see some interesting patterns. The size categories for manufacturing and non-manufacturing in Tables 5 and 6 are not identical since in the former sector employment levels are larger. The smallest size categories in manufacturing and non-manufacturing have an upper bound of 300 employees and of 250 employees respectively to ensure that we get enough

observations with these smallest size categories. Even though, we do observe in both sectors that, at least in 1999, the smallest size categories have far larger job creation rates than the other size categories hinting at an inverse relationship between job creation and size. Since job destruction does not show such a clear pattern in 1999, the net employment growth rates in both sectors are also inversely related to size in that year. These patterns do not hold in the year 2000. We get an inconsistent picture of the correlation of size and gross job flows, so there is no apparent inverse relationship of size and net employment growth rates. However, in both years we observe more heterogeneous employment behaviour in the smallest size categories as shown by the larger excess job reallocation rates.

A comparison of the shares of job creation and destruction with the employment size shares gives a rather inconsistent picture. In 1999 small firms contribute dramatically to job creation in both sectors, while job destruction is proportional to their size. In contrast, in the year 2000 small firms have job creation shares that are only marginally larger than their size shares, while the shares of job destruction are roughly double their size shares. Similar inconsistent patterns one observes with very large firms. In the year 1999 the contribution to job creation is disproportionately small in both sectors, but in proportion to their size shares in 2000. The contributions of the middle-sized firms to job creation are roughly in line with their employment sizes, while in six out of eight cases job destruction is disproportionately large.

In spite of a somewhat inconsistent picture, small firms in Ukraine seem to contribute more to job creation than we observe in Western economies. But this size effect could be closely connected to firm age or ownership type: young firms and new private firms tend to have small employment levels. While there is unfortunately no

reliable information on the age of the firm, we can condition on ownership type and see whether the size effect is partially explained by composition effects. Table 7 presents the five job flow measures and the three share statistics for the overall sample disaggregated by three ownership types, privatised, new private and state-owned firms. There are striking differences with respect to job creation between, on the one hand, new private firms and privatised and state-owned firms, on the other hand. New private firms are much more dynamic as far as job creation is concerned, leading to positive employment growth in both years. We also observe more heterogeneity in the employment behaviour of new private firms as shown by the much higher excess job reallocation rate in both years. In particular privatised firms but also state-owned ones predominantly destroy jobs, while new private firms both create and destroy jobs, findings that were also established for the Russian economy (Acquisti and Lehmann, 2000). The good job creation performance of new private firms in both years implies that there is a genuine ownership type effect at work and not just a size effect, since small firms performed poorly but new private firms did well in 2000. Below we will try to disentangle these size and ownership effects properly within a regression framework.

New private firms contribute a disproportionately large amount of jobs to the pool of new jobs, while their contribution to job destruction corresponds roughly to their employment share. It is striking that state-owned firms outperform privatised firms on these measures, i.e. relative to their employment share privatised firms create smaller amounts of new jobs and destroy more jobs than do state-owned firms. This result could be an indication that privatised firms engage in some "initial restructuring", i.e. they have started the process of slowly eliminating over-manning

levels. This picture of job flows and job creation and destruction shares is not altered when we look at the two sectors individually as inspection of Tables 8 and 9 shows.

The final dimension that we want to look at is trade orientation. How the opening up of an economy to world trade affects job creation and job destruction in the domestic labour market is an interesting question that has been relatively little explored, mainly because of a lack of adequate data.[12] Transition economies that are at the beginning of the reform process like e.g. Ukraine in the reported period provide something close to a natural experiment, which allows us to pursue this question empirically. In a first step we look at the correlation between job flows and shares of the industries in the traded sector and the relative degree of openness of the industry, in which the firm operates. We, therefore, divide firms into three groups, those operating in an industry located in the lowest third of the distribution of the relative openness index ("low"), those operating in an industry located in the middle third ("medium"), and finally those operating in an industry located in the top third of the distribution ("high").

Table 10 shows job flow and share measures according to these three sets of firms and related to the three geographical areas of trade flows mentioned in the previous section. For 1999 the results are quite striking. Firms being active in industries that are relatively closed have higher job creation rates and lower job destruction rates than firms in more open industries, leading to a substantially larger negative growth rate, i.e. less labour shedding, in the more closed sector. However, the entries for the year 2000 suggest a non-monotonic relationship between relative openness and labour shedding, as firms in industries that are in the medium tercile of the distribution of the index decrease employment more than other firms. The evidence from these cross tabulations, therefore, does not establish a clear link

between the degree of openness of a sector and employment adjustment of firms operating in that sector.

The correlations between relative openness and employment adjustment do not exhibit any statistically significant differences across the various indices that are based on trade within three different geographic areas. In particular, on this evidence Ukrainian trade flows within the CIS and outside this area seem to generate similar patterns of job flows. However, the regression analysis undertaken below might shed more light on the impact of relative openness on firm-level employment adjustment and on the nature of trade flows in the CIS area and outside this area.

The one-year persistence rates of annual job flows in Table 11 clearly demonstrate that these flows are not of a temporary nature. Roughly 80% of jobs created in 1999 are still there one year later, and about 90% of all jobs destroyed in 1999 do not reappear in 2000. Both these rates are roughly 10 percentage points higher than those presented for the U.S. by Davis and Haltiwanger (1999). Different persistence patterns emerge in the two sectors of the economy. Creation and destruction persistence are equal and roughly 85% in manufacturing, while in non-manufacturing the destruction persistence is with 92% roughly 20 percentage points higher than the persistence of created jobs. Surprisingly the non-manufacturing sector has the higher destruction persistence. Compared to Russian manufacturing firms (s. Brown and Earle, 2002), their Ukrainian counterparts seem to have lower destruction and higher creation persistence rates, hinting at less volatility in job flows of the Ukrainian manufacturing sector.

We also find that in both sectors small firms have far lower one-year persistence rates in destruction than larger firms. This relationship is particularly striking in non-manufacturing, where the persistence rate in destruction of small firms

is more than 30 percentage points lower. Small firms seem to be more able to recover lost jobs within a short period of time. On the other hand, when the sample is spliced on ownership type there are no statistically significant differences in the persistence rates across categories. [13] Finally, firms operating in sectors with a medium degree of openness have higher creation and destruction persistence rates than firms in sectors with a different trade regime, pointing to more volatility of job flows at the tails of the openness distribution (Table 12).

IV. Employment Growth, Job Reallocation and Excess Job Reallocation

The gross job flow rates that we documented in the last section are ultimately linked to the individual firm's employment decision. Factors that influence firm level employment will most likely also shape the pattern of gross job flows in the aggregate. We therefore explore in this section what factors drive firm level employment decisions, taking into account some of the issues that we addressed in the previous section. For instance, we could not establish unequivocally whether high job creation rates in new private firms are driven by the fact that they are also typically small. So, we may want to disentangle the effects of ownership and size to establish the importance of ownership for the job generation process.

We pool the two years of data and first estimate an employment growth equation of the form:

$$g_{it} = \beta_0 + \beta_1 ln(size)_{it} + \beta_2 newprivate_i + \beta_3 privatised_i + \beta_4 \sum_j \mathbf{I}(ij) ln(avgop)_j + \sum_j \delta_{ij} inddum_j + \varepsilon_{it}, \quad (1)$$

where *size* is average contemporaneous size, *avgop* is the relative openness index averaged over the years 1996-1998, *newprivate* and *privatised* are ownership dummies, while *inddum* is an industry dummy. The indicator variable ***I(****ij)* takes the value one when firm i is in industry j, while ε_{it} is a heteroscedastic random error. Since ownership changes in the sampled firms occurred no later than 1996 and since we have taken the average of the openness index over the years 1996-1998, the ownership dummies and the openness index are by construction not correlated with the error term. For the moment we also follow the firm growth literature in assuming that average size is weakly exogeneous. Consequently, as long as this latter assumption holds equation (1) is consistently estimated with OLS.

The negative relationship between firm size and gross flows of jobs is confirmed for firm level employment flows in the case of the entire sample and in the case of non-manufacturing as columns 1 and 2 in Table 13 show. Since a significant correlation of size and growth is not found for manufacturing, firm size alone is an important factor that can explain differences in turbulence or gross flows of jobs between the manufacturing and non-manufacturing sector.

Controlling for size, new private firms have much higher growth rates than firms in the other two ownership classes, state-owned and privatised firms. While survival bias might play a role here, work on firm level growth equations done for market economies and also for emerging economies has established that a lot of potential selection bias is being picked up by including size of the firm in the regression (e.g. Evans, 1987; Konings and Xavier, 2001). While new private firms have higher average growth rates in the manufacturing sector than in the non-manufacturing sector, it is also noteworthy that privatised firms have the same employment growth as have state-owned firms. Such a finding was established by Konings, Lehmann and

Schaffer (1996) for Polish manufacturing and by Richter and Schaffer (1996) for Russian manufacturing at the start of transition. In contrast, Brown and Earle (2002) find a small positive effect of privatisation on employment growth in the Russian manufacturing sector. Our result would suggest that in Ukraine privatisation had thus far no effect on the employment behaviour of firms.

Columns 4-6 of Table 13 include relative openness at the sector level as a covariate in the regression for the manufacturing (traded) sector, covering the world, CIS countries and non-CIS countries as the three trading areas. Firms that operate in sectors that are relatively open to non-CIS trade, i.e. to trade predominantly with Western countries, engage in more labour shedding, while relative openness of a sector in the CIS trading area has no impact on employment firm growth. On this evidence it appears that trade with non-CIS countries exerts more pressure on employment policies of firms than when trade is directed towards the CIS.

Regressing the modulus of the firm level growth rate on the covariates of equation (1), we also estimate job reallocation at the firm level using the same specifications as in the employment growth regression. The results of Table 14 show that smaller firms engage in more job reallocation, whether we analyse the whole sample or the two sectors separately. Also, in the manufacturing sector new private firms reallocate more jobs than state-owned firms, while privatised firms belonging to the non-manufacturing sector have a lower job reallocation rate than state firms. The latter finding has also been established by Brown and Earle (2002) for Russia, however in the manufacturing sector. Finally, firms in a relative open sector engage in more job reallocation when trade is directed towards non-CIS countries while a strong negative relationship seems to prevail between openness of a sector and job reallocation at the firm level when trade is in the CIS area.

Estimates of the effects of the considered covariates on the excess job reallocation rate are shown in Table 15. These estimates are derived by subtracting the coefficient of the firm-level reallocation model from the absolute value of the coefficient of the employment growth model. If we take the results as evidence on restructuring *at the firm level*, the following picture emerges. Larger firms restructure less in both sectors, although in non-manufacturing the negative impact of size on restructuring is roughly three times stronger. New private firms engage in less excess job reallocation than do state-owned and privatised firms, which implies that most of the strong firm level reallocation of new private firms observed in Table 14 is due to the tremendous growth in employment. Particularly interesting is the effect of relative openness on firm level restructuring. Firms operating in sectors that have strong trade ties in the CIS restructure less than those with weaker ties, while there is a positive, albeit small effect of relative openness on firm level restructuring where trade flows in non-CIS countries are concerned. Firms operating in sectors that have strong trade ties with CIS economies seem to encounter relatively little pressure to restructure, while trade with the West imposes some discipline on firms.

V. Conclusions

This paper documents and analyses gross job flows and their determinants in Ukraine. To this end we use a unique data set of more than 2200 Ukrainian firms operating in both the manufacturing and the non-manufacturing sector for the years 1998-2000.

There are several important findings in the paper. First, job destruction is dominating job creation in both 1999 and 2000, with destruction rates of 11% in 1999 and of 8% in 2000, while the creation rates are 3% and 6% respectively. This result

and the analysis of aggregate data of GDP and employment lead us to believe that the Ukrainian economy is still at an early phase of restructuring and transition. The most clear-cut result is the strong positive effect of new private firms on net employment growth, a finding established for other transition economies as well. At the same time, we do not find differences in the employment growth of state-owned and privatised firms. We also observe an inverse relationship between size of a firm and net employment growth at the firm level in non-manufacturing. An inverse correlation between size and the firm-level reallocation rate is, however, present in both manufacturing and non-manufacturing. A fourth finding is the substantial heterogeneity in job flows in our sample as a result of large differences in employment behaviour within and across narrowly defined industries. Finally, firms located in industries with strong foreign trade links to Western economies seem to experience some pressure to downsize their workforce and to restructure more vigorously than firms with weaker links. However, the relative openness of a sector, in which a firm operates, has no predictive power with respect to firm employment growth and is negatively correlated with job reallocation when foreign trade is within CIS countries. Trade links seem to have a disciplining function when firms are in industries that trade with Western economies; this function seems absent when firms operate in industries that trade with CIS countries.

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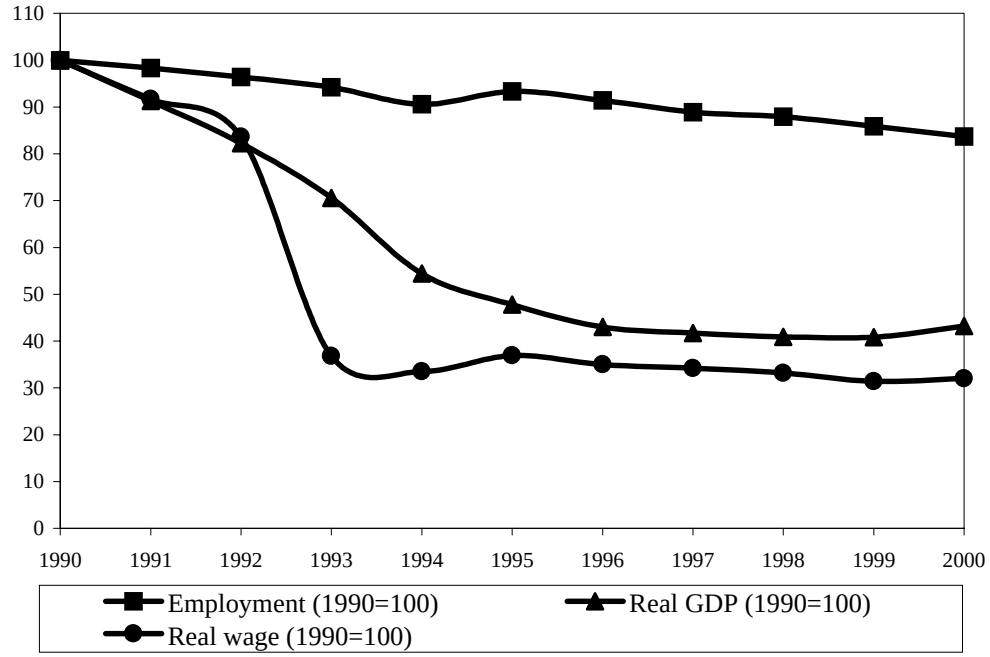
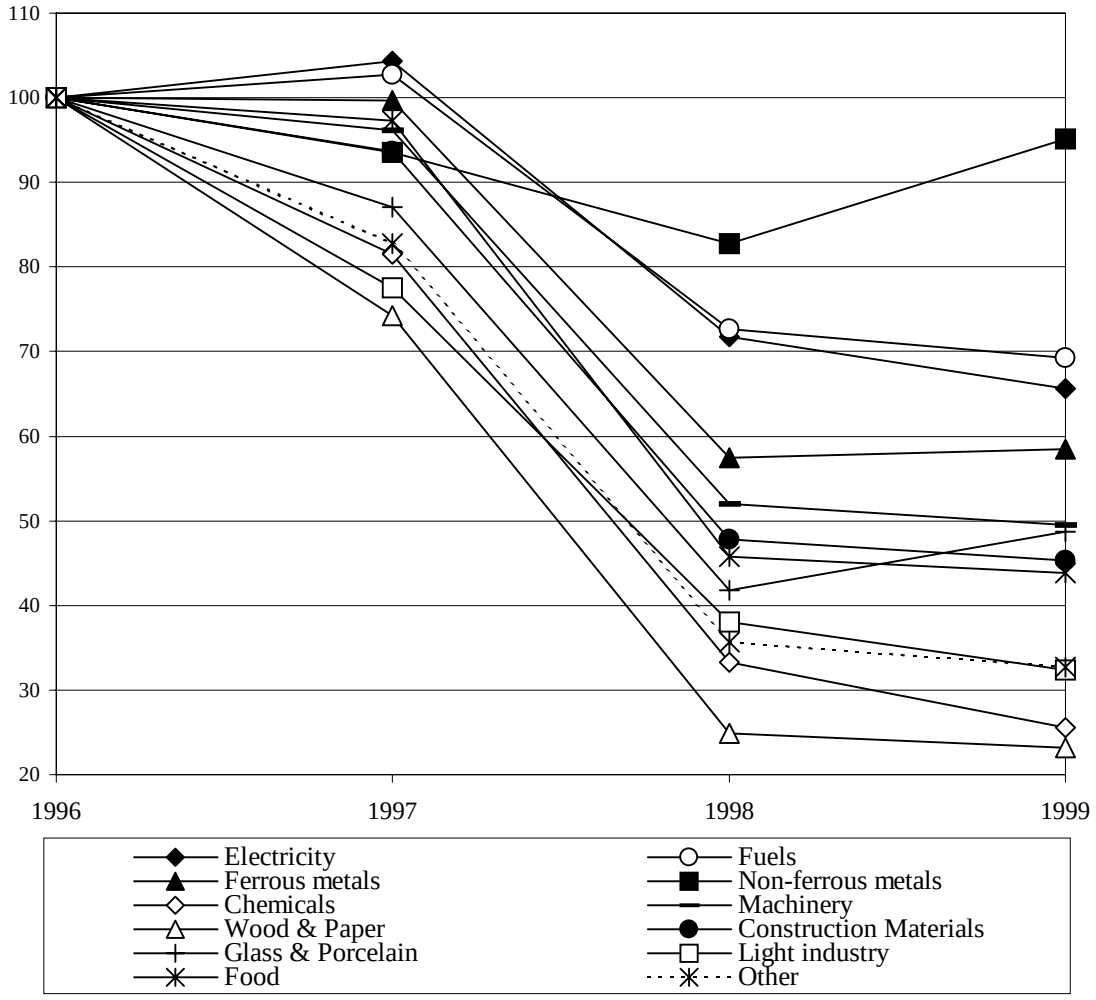
Figure 1 – GDP, Employment and Real Wage Dynamics in Ukraine: 1990 - 2000



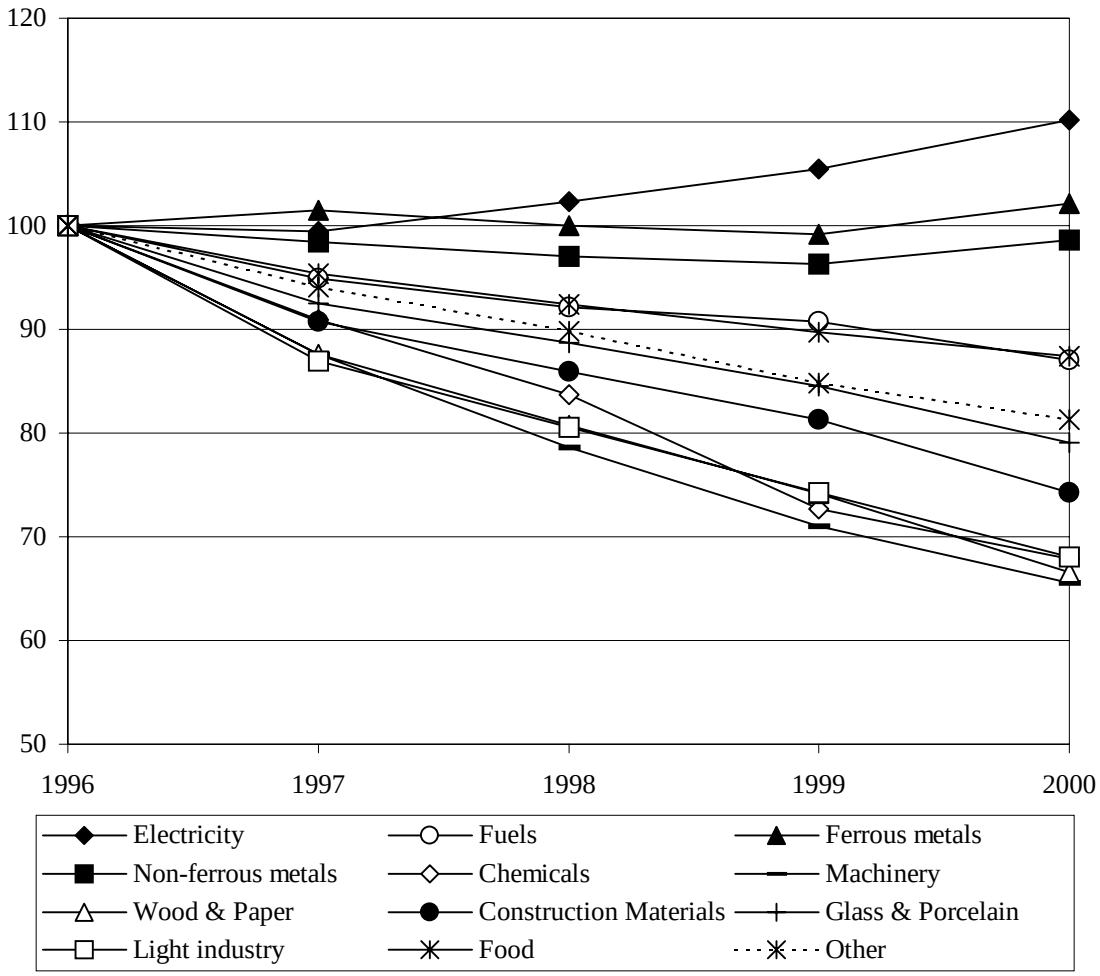
Source: Ukrainian Statistical Office – Derzhkomstat; TACIS

Figure 2 - Production in Ukrainian Industrial Sectors, 1996-1999



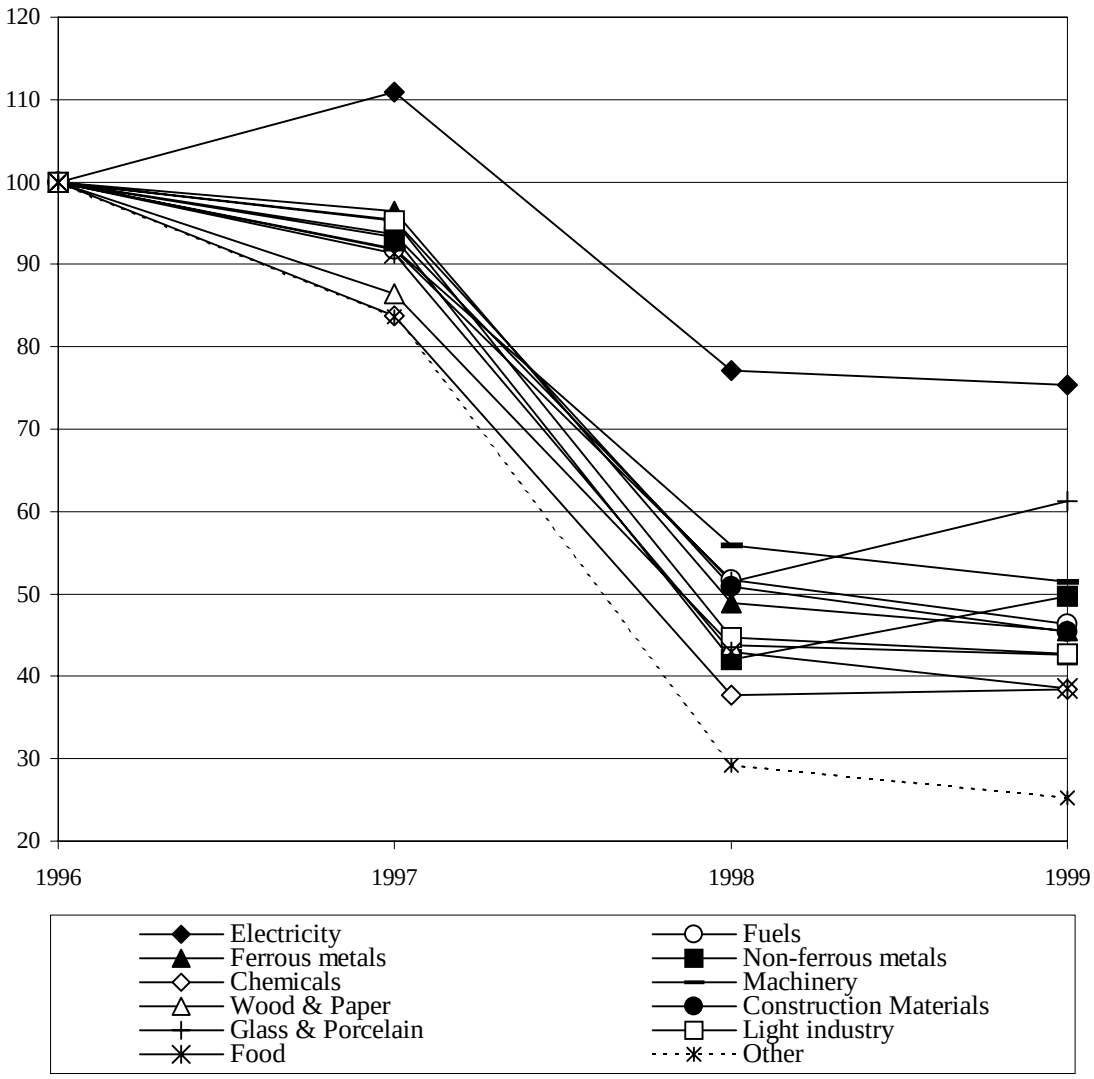
Source: Ukrainian Statistical Office – Derzhkomstat.

Figure 3 - Employment in Ukrainian Industrial Sectors, 1996-2000



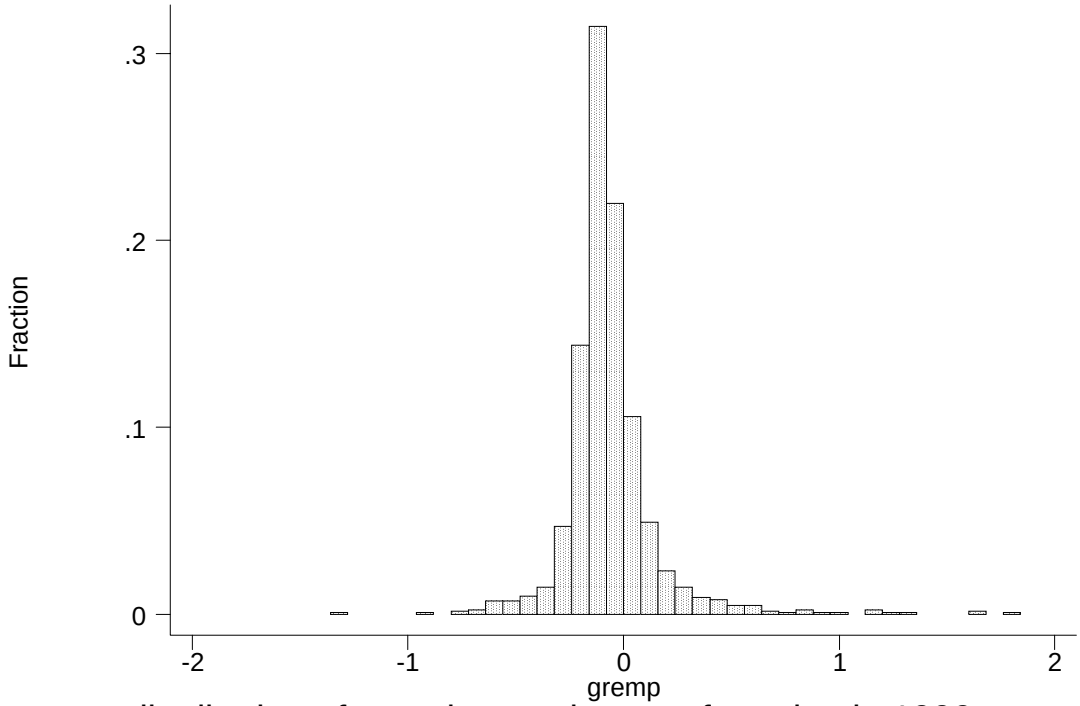
Source: Ukrainian Statistical Office – Derzhkomstat.

Figure 4 - Labor Productivity in Ukrainian Industrial Sectors, 1996-1999

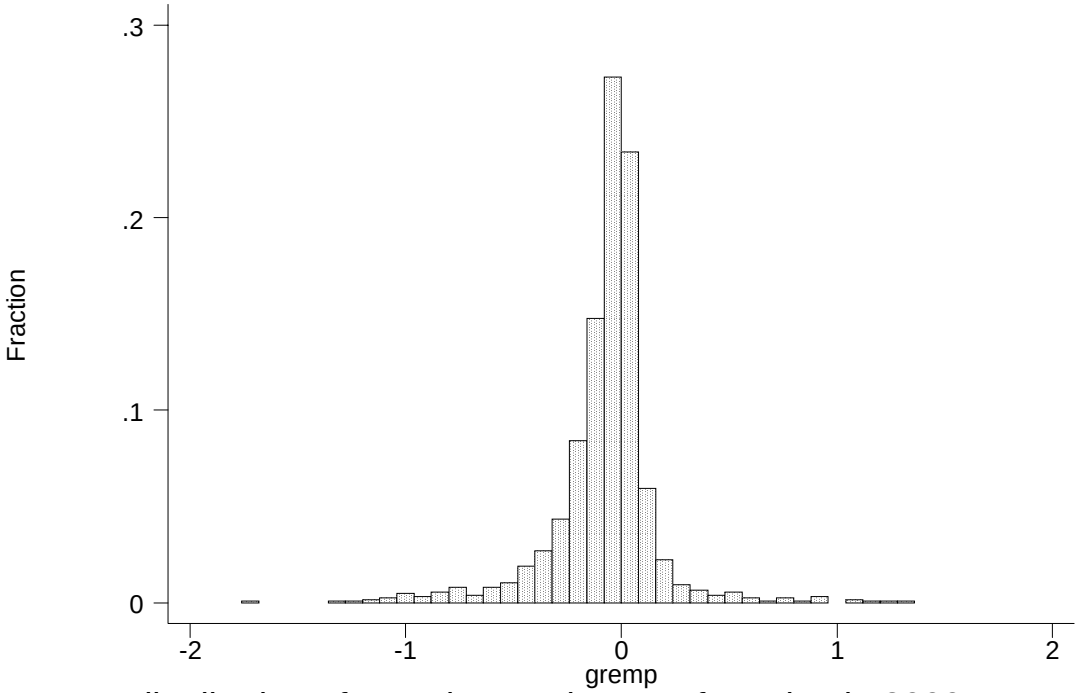


Source: Derzhkomstat

Figure 4 - Distribution of Growth Rates in Manufacturing in 1999 and 2000



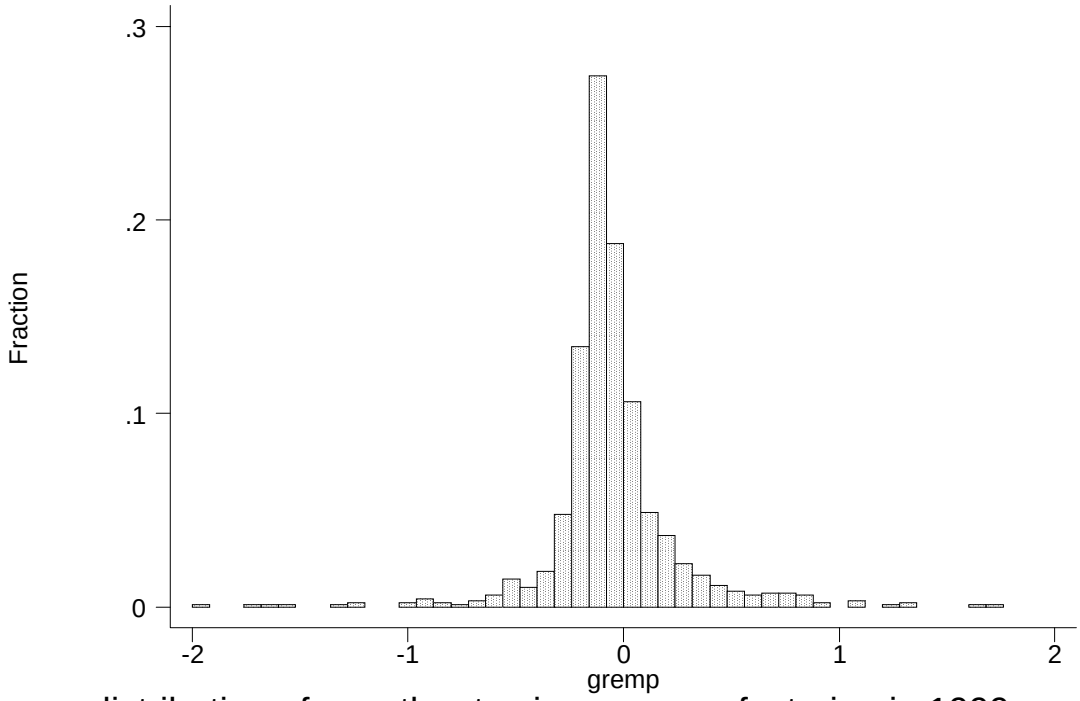
distribution of growth rates in manufacturing in 1999



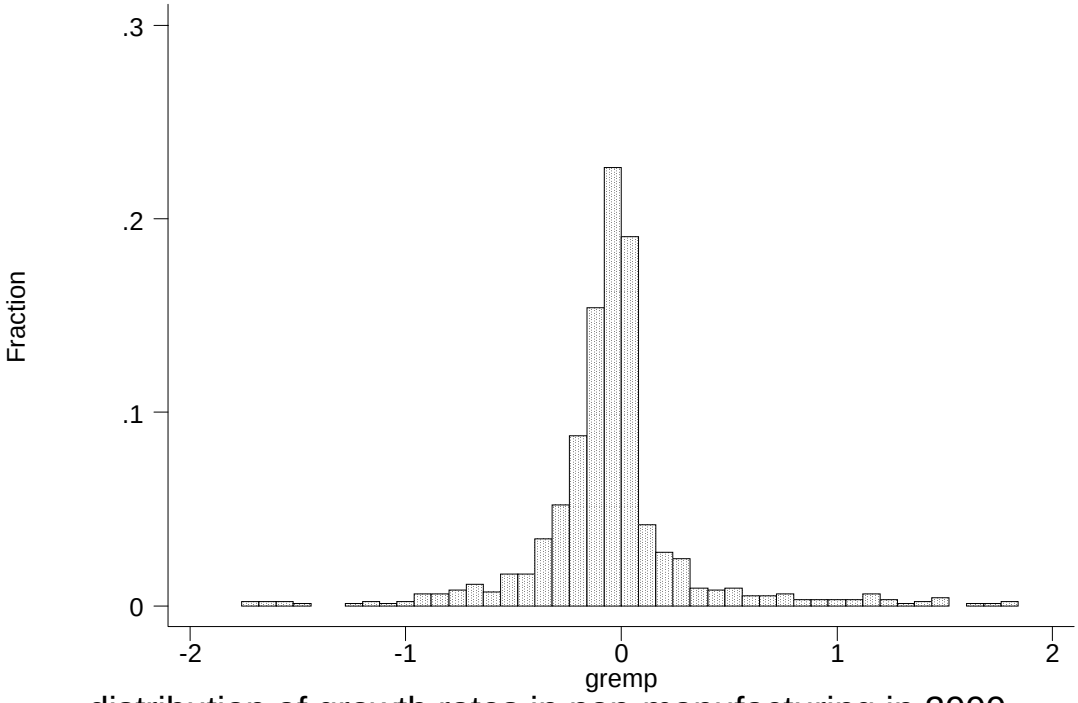
distribution of growth rates in manufacturing in 2000

Source: Amadeus data set

Figure 5 - Distribution of Growth Rates in Non-manufacturing in 1999 and 2000



distribution of growth rates in non-manufacturing in 1999



distribution of growth rates in non-manufacturing in 2000

Source: Amadeus data set

Table 1 - Distribution of Year-by-Year Employment Growth Rates

Source	Year	1%	5%	10%	25%	50%	75%	90%	95%	99%	Mean	StDev
Amadeus overall sample n=2239	98-99	-0.665	-0.341	-0.241	-0.158	-0.092	0.002	0.163	0.342	0.851	-0.061	0.254
	99-2000	-1.013	-0.518	-0.333	-0.153	-0.040	0.025	0.137	0.315	1.137	-0.062	0.307
Amadeus manufacturing n=1259	98-99	-0.582	-0.293	-0.230	-0.155	-0.094	-0.011	0.111	0.269	0.800	-0.065	0.216
	99-2000	-0.974	-0.482	-0.308	-0.138	-0.036	0.024	0.100	0.194	0.763	-0.073	0.248
Amadeus non-manufacturing n=980	98-99	-0.942	-0.404	-0.262	-0.161	-0.088	0.023	0.225	0.436	0.885	-0.055	0.296
	99-2000	-1.122	-0.598	-0.346	-0.167	-0.044	0.028	0.240	0.554	1.376	-0.048	0.369
Derzhkomstat manufacturing n=6189	96-97	-0.621	-0.308	-0.234	-0.144	-0.070	0.000	0.061	0.126	0.475	-0.078	0.185
	97-98	-0.744	-0.321	-0.229	-0.130	-0.055	0.005	0.075	0.143	0.529	-0.065	0.197
	98-99	-0.748	-0.339	-0.248	-0.141	-0.058	0.005	0.080	0.163	0.477	-0.072	0.196
	99-2000	-1.126	-0.537	-0.340	-0.168	-0.056	0.022	0.102	0.192	0.503	-0.098	0.264
	96-2000 Average	-0.810	-0.376	-0.262	-0.146	-0.060	0.008	0.079	0.156	0.496	-0.078	0.211

Table 2 – Gross Flow Rates for Overall Sample

Year	*pos*	*neg*	*gross*	*net*	*exc*	*n*
1999	0.026	0.109	0.135	-0.083	0.052	2239
	(0.003)	(0.008)	(0.009)	(0.008)	(0.006)	
2000	0.059	0.081	0.140	-0.022	0.118	2239
	(0.017)	(0.006)	(0.017)	(0.019)	(0.028)	

Note: Bootstrap standard errors in parentheses, based on 1000 repetitions.
Source: Amadeus data set

Table 3 – Job Flow Rates and Shares by Sector: 1999 and 2000

Year	*Sector*	*pos*	*neg*	*gross*	*net*	*exc*	*jcsh*	*jdsh*	*szsh*	*n*
1999	Manufacturing	0.020	0.104	0.124	-0.084	0.040	0.573	0.608	0.637	1259
		(0.003)	(0.006)	(0.007)	(0.007)	(0.006)				
1999	Non-manufacturing	0.031	0.118	0.149	-0.087	0.062	0.427	0.392	0.363	980
		(0.007)	(0.021)	(0.025)	(0.018)	(0.013)				
2000	Manufacturing	0.040	0.073	0.113	-0.033	0.080	0.431	0.571	0.635	1259
		(0.007)	(0.007)	(0.007)	(0.012)	(0.014)				
2000	Non-manufacturing	0.092	0.095	0.187	-0.003	0.184	0.569	0.429	0.365	980
		(0.048)	(0.015)	(0.048)	(0.052)	(0.048)				

Note: Bootstrap standard errors in parentheses, based on 1000 repetitions; *jcsh, jdsh* and *szsh* denote share in job creation, job destruction and size share respectively.
Source: Amadeus data set

Table 4 - Gross Job Flows in Manufacturing – Census-type Derzhkomstat Data

Year	*pos*	*neg*	*gross*	*net*	*exc*	*n*
1997	0.016	0.099	0.115	-0.083	0.032	6189
1998	0.020	0.081	0.101	-0.061	0.040	6189
1999	0.021	0.079	0.100	-0.058	0.042	6189
2000	0.034	0.079	0.113	-0.045	0.068	6189

Source: Ukrainian Statistical Office – Derzhkomstat

Table 5 – Job Flow Rates and Shares in Manufacturing by Size Category

Year	*Size*	*pos*	*neg*	*gross*	*net*	*exc*	*jcsh*	*jdsh*	*szsh*	*n*
1999	size≤300	0.095 (0.017)	0.087 (0.007)	0.182 (0.016)	0.008 (0.020)	0.174 (0.016)	0.134	0.027	0.033	193
1999	300<size≤500	0.038 (0.007)	0.110 (0.005)	0.148 (0.007)	-0.072 (0.010)	0.076 (0.013)	0.183	0.118	0.112	415
1999	500<size≤1000	0.032 (0.005)	0.118 (0.008)	0.150 (0.008)	-0.086 (0.011)	0.064 (0.011)	0.216	0.180	0.159	332
1999	size>1000	0.016 (0.004)	0.101 (0.009)	0.117 (0.009)	-0.085 (0.010)	0.032 (0.008)	0.467	0.674	0.696	319
2000	Size≤300	0.048 (0.009)	0.152 (0.014)	0.200 (0.015)	-0.104 (0.019)	0.096 (0.018)	0.056	0.100	0.048	261
2000	300<size≤500	0.032 (0.005)	0.121 (0.010)	0.153 (0.010)	-0.089 (0.012)	0.064 (0.018)	0.091	0.192	0.116	403
2000	500<size≤1000	0.048 (0.009)	0.101 (0.010)	0.149 (0.012)	-0.053 (0.015)	0.096 (0.017)	0.177	0.210	0.151	295
2000	size>1000	0.040 (0.010)	0.053 (0.009)	0.093 (0.010)	-0.013 (0.015)	0.080 (0.015)	0.675	0.498	0.686	300

Note: see Table 2
Source: Amadeus data set

Table 6 – Job Flow Rates and Shares in Non-manufacturing by Size Category

Year	*Size*	*pos*	*neg*	*gross*	*net*	*exc*	*jcsh*	*jdsh*	*szsh*	*n*
1999	size≤250	0.188 (0.023)	0.074 (0.011)	0.262 (0.023)	0.114 (0.028)	0.148 (0.022)	0.207	0.021	0.034	178
1999	250<size≤400	0.038 (0.006)	0.122 (0.008)	0.160 (0.008)	-0.084 (0.011)	0.076 (0.012)	0.176	0.145	0.140	359
1999	400<size≤650	0.028 (0.006)	0.139 (0.010)	0.167 (0.010)	-0.111 (0.013)	0.056 (0.011)	0.129	0.165	0.140	227
1999	size>650	0.022 (0.008)	0.115 (0.031)	0.137 (0.036)	-0.093 (0.028)	0.044 (0.015)	0.489	0.670	0.687	216
2000	size≤250	0.134 (0.022)	0.192 (0.017)	0.326 (0.023)	-0.058 (0.032)	0.268 (0.042)	0.070	0.098	0.048	208
2000	250<size≤400	0.061 (0.011)	0.126 (0.010)	0.187 (0.014)	-0.065 (0.016)	0.122 (0.042)	0.097	0.195	0.147	370
2000	400<size≤650	0.069 (0.014)	0.107 (0.012)	0.176 (0.016)	-0.038 (0.021)	0.138 (0.027)	0.098	0.148	0.131	207
2000	size>650	0.101 (0.071)	0.079 (0.021)	0.180 (0.071)	0.022 (0.078)	0.158 (0.052)	0.735	0.560	0.674	195

Note: see Table 2
Source: Amadeus data set

Table 7 – Job Flow Rates and Shares by Ownership Type – Overall Sample

Year	*Ownership type*	*pos*	*neg*	*gross*	*net*	*exc*	*jcsh*	*jdsh*	*szsh*	*n*
1999	Privatised	0.023	0.119	0.142	-0.096	0.046	0.503	0.619	0.567	1413
		(0.003)	(0.007)	(0.007)	(0.007)	(0.005)				
1999	New Private	0.192	0.069	0.261	0.123	0.138	0.139	0.012	0.019	132
		(0.027)	(0.020)	(0.030)	(0.036)	(0.040)				
1999	State	0.022	0.097	0.119	-0.075	0.044	0.356	0.366	0.413	685
		(0.005)	(0.017)	(0.019)	(0.015)	(0.011)				
2000	Privatised	0.049	0.089	0.138	-0.040	0.098	0.461	0.612	0.558	1413
		(0.008)	(0.008)	(0.008)	(0.013)	(0.015)				
2000	New private	0.159	0.134	0.293	0.025	0.268	0.057	0.035	0.021	132
		(0.031)	(0.028)	(0.034)	(0.048)	(0.044)				
2000	State	0.068	0.067	0.135	0.001	0.134	0.482	0.350	0.419	685
		(0.040)	(0.010)	(0.040)	(0.044)	(0.039)				

Note: See Table 2
Source: Amadeus data set

Table 8 – Job Flow Rates and Shares by Ownership Type – Manufacturing

Year	*Ownership type*	*pos*	*neg*	*gross*	*net*	*exc*	*jcsh*	*jdsh*	*szsh*	*n*
1999	Privatised	0.019	0.114	0.133	-0.095	0.038	0.566	0.771	0.705	902
		(0.003)	(0.007)	(0.008)	(0.008)	(0.006)				
1999	New private	0.273	0.077	0.350	0.196	0.154	0.122	0.008	0.010	40
		(0.068)	(0.025)	(0.061)	(0.083)	(0.050)				
1999	State	0.025	0.081	0.106	-0.056	0.050	0.308	0.221	0.283	311
		(0.008)	(0.011)	(0.014)	(0.014)	(0.015)				
2000	Privatised	0.042	0.076	0.118	-0.034	0.084	0.728	0.730	0.699	902
		(0.008)	(0.008)	(0.009)	(0.014)	(0.017)				
2000	New private	0.191	0.140	0.331	0.051	0.280	0.059	0.024	0.012	40
		(0.055)	(0.049)	(0.057)	(0.088)	(0.075)				
2000	State	0.030	0.062	0.092	-0.032	0.060	0.213	0.244	0.286	311
		(0.006)	(0.012)	(0.010)	(0.016)	(0.012)				

Note: See Table 2
Source: Amadeus data set

Table 9 – Job Flow Rates and Shares by Ownership Type – Non-manufacturing

Year	*Ownership type*	*pos*	*neg*	*gross*	*net*	*exc*	*jcsh*	*jdsh*	*szsh*	*n*
1999	Privatised	0.039	0.140	0.179	-0.101	0.078	0.419	0.385	0.325	511
		(0.005)	(0.012)	(0.012)	(0.015)	(0.011)				
1999	New private	0.148	0.065	0.213	0.083	0.130	0.161	0.018	0.033	92
		(0.020)	(0.026)	(0.030)	(0.036)	(0.051)				
1999	State	0.020	0.109	0.129	-0.089	0.040	0.420	0.592	0.641	374
		(0.007)	(0.032)	(0.036)	(0.029)	(0.015)				
2000	Privatised	0.077	0.139	0.216	-0.062	0.154	0.259	0.457	0.313	511
		(0.013)	(0.017)	(0.020)	(0.023)	(0.027)				
2000	New private	0.140	0.131	0.271	0.009	0.262	0.055	0.050	0.037	92
		(0.037)	(0.035)	(0.042)	(0.059)	(0.050)				
2000	State	0.098	0.072	0.170	0.026	0.144	0.685	0.490	0.650	374
		(0.074)	(0.018)	(0.073)	(0.079)	(0.050)				

Note: See Table 2
Source: Amadeus data set

Table 10 – Job Flow Rates and Shares by Relative Openness of Industrial Sector in Manufacturing and by Geographic Area of Trade Flows

Year	*Trade openness*	*pos*	*neg*	*gross*	*net*	*exc*	*jcsh*	*jdsh*	*szsh*	*n*
1999	Low (All)	0.050	0.063	0.112	-0.013	0.099	0.186	0.053	0.087	175
		(0.009)	(0.007)	(0.009)	(0.013)	(0.015)				
1999	Medium (All)	0.032	0.123	0.155	-0.092	0.062	0.398	0.352	0.297	383
		(0.007)	(0.015)	(0.015)	(0.018)	(0.014)				
1999	High (All)	0.016	0.101	0.117	-0.085	0.032	0.416	0.596	0.615	701
		(0.003)	(0.007)	(0.008)	(0.007)	(0.006)				
1999	Low (CIS)	0.061	0.086	0.147	-0.025	0.122	0.284	0.089	0.108	224
		(0.009)	(0.024)	(0.024)	(0.028)	(0.016)				
1999	Medium (CIS)	0.025	0.119	0.144	-0.093	0.051	0.300	0.315	0.277	334
		(0.007)	(0.013)	(0.013)	(0.017)	(0.015)				
1999	High (CIS)	0.016	0.101	0.117	-0.085	0.032	0.416	0.596	0.615	701
		(0.003)	(0.008)	(0.008)	(0.008)	(0.006)				
1999	Low (non-CIS)	0.050	0.063	0.112	-0.013	0.099	0.186	0.053	0.087	175
		(0.009)	(0.007)	(0.009)	(0.013)	(0.015)				
1999	Medium (non-CIS)	0.030	0.122	0.152	-0.093	0.059	0.385	0.357	0.304	389
		(0.007)	(0.015)	(0.015)	(0.018)	(0.014)				
1999	High (non-CIS)	0.016	0.101	0.118	-0.085	0.033	0.429	0.591	0.609	695
		(0.003)	(0.007)	(0.008)	(0.007)	(0.006)				
2000	Low (All)	0.054	0.092	0.146	-0.038	0.108	0.121	0.114	0.090	175
		(0.011)	(0.020)	(0.021)	(0.024)	(0.020)				
2000	Medium (All)	0.026	0.091	0.117	-0.064	0.053	0.191	0.363	0.291	383
		(0.005)	(0.013)	(0.014)	(0.015)	(0.011)				
2000	High (All)	0.045	0.061	0.106	-0.016	0.090	0.689	0.522	0.619	701
		(0.010)	(0.008)	(0.009)	(0.016)	(0.017)				
2000	Low (CIS)	0.046	0.084	0.130	-0.039	0.091	0.125	0.129	0.111	224
		(0.009)	(0.016)	(0.016)	(0.019)	(0.017)				
2000	Medium (CIS)	0.028	0.094	0.121	-0.066	0.055	0.186	0.349	0.270	334
		(0.006)	(0.015)	(0.016)	(0.016)	(0.012)				
2000	High (CIS)	0.045	0.061	0.106	-0.016	0.090	0.689	0.522	0.619	701
		(0.010)	(0.008)	(0.009)	(0.016)	(0.017)				
2000	Low (non-CIS)	0.054	0.092	0.146	-0.038	0.108	0.121	0.114	0.090	175
		(0.011)	(0.020)	(0.021)	(0.024)	(0.020)				
2000	Medium (non-CIS)	0.026	0.087	0.113	-0.061	0.052	0.193	0.355	0.298	389
		(0.005)	(0.013)	(0.014)	(0.014)	(0.010)				
2000	High (non-CIS)	0.045	0.063	0.108	-0.018	0.091	0.687	0.531	0.612	695
		(0.010)	(0.008)	(0.009)	(0.016)	(0.017)				

Note: See Table 2. All=trade to all countries; CIS=trade to CIS economies; non-CIS=trade to complement of CIS countries.
Source: Amadeus data set

Table 11 – One-Year Persistence Rates for Annual Job Flows: Overall Sample and by Sector

Category	***jcpers***	***jdpers***
Overall sample	0.804	0.886
	(0.023)	(0.023)
Sector	***jcpers***	***jdpers***
Manufacturing	0.852	0.861
	(0.023)	(0.034)
Non-manufacturing	0.740	0.926
	(0.039)	(0.020)

Note: Bootstrap standard errors in parentheses, based on 1000 repetitions.
Source: Amadeus data set

Table 12 – One-Year Persistence Rates for Annual Job Flows: By Trade Orientation in Manufacturing

Trade orientation	***jcpers***	***jdpers***
Low (All)	0.784	0.823
	(0.077)	(0.035)
Medium (All)	0.906	0.937
	(0.025)	(0.014)
High (All)	0.832	0.819
	(0.033)	(0.051)
Low (CIS)	0.833	0.906
	(0.053)	(0.032)
Medium (CIS)	0.899	0.927
	(0.035)	(0.015)
High (CIS)	0.832	0.819
	(0.033)	(0.050)
Low (non- CIS)	0.784	0.823
	(0.070)	(0.034)
Medium (non- CIS)	0.903	0.938
	(0.024)	(0.015)
High (non- CIS)	0.837	0.817
	(0.032)	(0.052)

Note: Bootstrap standard errors in parentheses, based on 1000 repetitions.
All=trade to all countries; CIS=trade to CIS economies;
non-CIS=trade to complement of CIS countries.
Source: Amadeus data set.

Table 13 – Estimates of Firm Level Net Employment Growth Rate (Pooled OLS Estimates)

Regressor	***total sample***	***non-manufacturing***	***manufacturing***	***manufacturing trade-all***	***manufacturing trade-CIS***	***manufacturing trade-not CIS***
ln(size)	-0.014** (0.006)	-0.045*** (0.012)	0.008 (0.005)	0.008 (0.005)	0.008 (0.005)	0.008 (0.005)
New private	0.139*** (0.030)	0.086** (0.037)	0.219*** (0.053)	0.219*** (0.053)	0.219*** (0.053)	0.219*** (0.053)
Privatised	-0.012 (0.010)	-0.016 (0.018)	-0.014 (0.012)	-0.014 (0.012)	-0.014 (0.012)	-0.014 (0.012)
Relative Openness	–	–	–	-0.019** (0.007)	-0.015 (0.028)	-0.019** (0.007)
R^2	0.047	0.051	0.055	0.055	0.055	0.055
N	4484	1994	2490	2490	2490	2490

Note: Heteroskedastic Robust standard errors in brackets; *** (**) denotes statistically significant at the 1% (5%) significance level. All regressions include 2-digit sector dummies.
Source: Amadeus data set

Table 14 – Estimates of Firm Level Employment Reallocation Rate (Pooled OLS Estimates)

Regressor	***total sample***	***non-manufacturing***	***manufacturing***	***manufacturing trade-all***	***manufacturing trade-CIS***	***manufacturing trade-not CIS***
ln(size)	-0.025*** (0.004)	-0.026*** (0.009)	-0.025*** (0.004)	-0.025*** (0.004)	-0.025*** (0.004)	-0.025*** (0.004)
New private	0.036 (0.023)	-0.013 (0.028)	0.131*** (0.042)	0.131*** (0.042)	0.131*** (0.042)	0.131*** (0.042)
Privatised	-0.016* (0.008)	-0.027* (0.014)	-0.003 (0.009)	-0.003 (0.009)	-0.003 (0.009)	-0.003 (0.009)
Relative Openness	–	–	–	0.019*** (0.005)	-0.041** (0.019)	0.020*** (0.005)
R^2	0.056	0.040	0.057	0.057	0.057	0.057
N	4484	1994	2490	2490	2490	2490

Note: Heteroskedastic Robust standard errors in brackets; *** (**) denotes statistically significant at the 1% (5%) significance level. All regressions include 2-digit sector dummies.
Source: Amadeus data set

Table 15 – Estimates of Firm Level Excess Job Reallocation Rate

Regressor	***total sample***	***non-manufacturing***	***manufacturing***	***manufacturing trade-all***	***manufacturing trade-CIS***	***manufacturing trade-not CIS***
ln (size)	-0.039	-0.067	-0.025	-0.025	-0.025	-0.025
New private	-0.139	-0.086	-0.088	-0.088	-0.088	-0.088
Privatised	-0.016	-0.027	0	0	0	0
Relative Openness	–	–	–	0	-0.041	0.001

Note: Estimates are based on coefficients of tables 12 and 13.

APPENDIX

Table A1: Summary Statistics of Amadeus Firms

	number of firms		mean employment		mean employment growth	
year	1999	2000	1999	2000	1999	2000
overall sample	2239	2239	968 (3745)	947 (3928)	-0.061 (0.25)	-0.062 (0.31)
manufacturing	1259	1259	1098 (2521)	1063 (2708)	-0.065 (0.22)	-0.073 (0.25)
non-manufacturing	980	980	800 (4883)	798 (5081)	-0.055 (0.30)	-0.048 (0.37)

Note: Standard deviation in brackets

Table A2 - Job Flows by Industrial Sector in Manufacturing

year	*nace2*	*industry*	*pos*	*neg*	*gross*	*net*	*exc*	*n*
1999	10	Mining of coal and lignite	0.007	0.172	0.179	-0.165	0.014	7
1999	15	Manufacture of food products and beverages	0.045	0.113	0.158	-0.068	0.089	295
1999	16	Manufacture of tobacco products	0.278	0.000	0.278	0.278	0.000	1
1999	17	Manufacture of textiles	0.032	0.136	0.168	-0.104	0.063	45
1999	18	Manufacture of wearing apparel; dressing and dyeing of fur	0.089	0.163	0.252	-0.074	0.177	59
1999	19	Manufacture of leather and leather products	0.022	0.121	0.143	-0.099	0.044	26
1999	20	Manufacture of wood and wood products	0.078	0.094	0.173	-0.016	0.157	17
1999	21	Manufacture of pulp, paper and paper products	0.013	0.090	0.104	-0.077	0.027	10
1999	22	Publishing, printing, reproduction of recorded media	0.033	0.106	0.139	-0.072	0.067	17
1999	23	Manufacture of coke, refined petroleum products and nuclear fuel	0.023	0.084	0.107	-0.060	0.047	15
1999	24	Manufacture of chemicals and chemical products	0.015	0.121	0.136	-0.105	0.031	38
1999	25	Manufacture of rubber and plastic products	0.000	0.175	0.175	-0.175	0.000	12
1999	26	Manufacture of other non-metallic mineral products	0.013	0.108	0.121	-0.094	0.027	92
1999	27	Manufacture of basic metals	0.009	0.083	0.092	-0.073	0.019	42
1999	28	Manufacture of fabricated metal products	0.006	0.076	0.082	-0.070	0.012	42
1999	29	Manufacture of machinery and equipment n.e.c.	0.007	0.104	0.111	-0.097	0.014	181
1999	30	Manufacture of office machinery and computers	0.027	0.094	0.121	-0.067	0.053	3
1999	31	Manufacture of electrical machinery and apparatus n.e.c.	0.016	0.124	0.140	-0.108	0.032	51
1999	32	Manufacture of radio, television and communication equipment and apparatus	0.000	0.137	0.138	-0.137	0.001	25
1999	33	Manufacture of medical, precision and optical instruments, watches and clocks	0.006	0.177	0.183	-0.171	0.012	21
1999	34	Manufacture of motor vehicles, trailers and semi-trailers	0.006	0.115	0.121	-0.109	0.011	24
1999	35	Manufacture of other transport equipment	0.013	0.106	0.119	-0.094	0.026	45
1999	36	Manufacture of furniture; manufacture n.e.c.	0.060	0.086	0.146	-0.026	0.120	37
1999	37	Recycling	0.172	0.099	0.272	0.073	0.199	9
1999	40	Electricity, gas, steam and hot water supply	0.052	0.111	0.163	-0.059	0.105	90
1999	41	Collection, purification and distribution of water	0.048	0.022	0.070	0.026	0.043	55

2000	10	Mining of coal and lignite	0.000	0.273	0.273	-0.273	0.000	7
2000	15	Manufacture of food products and beverages	0.049	0.082	0.131	-0.033	0.098	295
2000	16	Manufacture of tobacco products	0.000	0.036	0.036	-0.036	0.000	1
2000	17	Manufacture of textiles	0.025	0.153	0.178	-0.127	0.051	45
2000	18	Manufacture of wearing apparel; dressing and dyeing of fur	0.029	0.046	0.075	-0.017	0.058	59
2000	19	Manufacture of leather and leather products	0.067	0.111	0.177	-0.044	0.134	26
2000	20	Manufacture of wood and wood products	0.056	0.208	0.264	-0.153	0.112	17
2000	21	Manufacture of pulp, paper and paper products	0.097	0.028	0.125	0.069	0.056	10
2000	22	Publishing, printing, reproduction of recorded media	0.043	0.052	0.095	-0.010	0.086	17
2000	23	Manufacture of coke, refined petroleum products and nuclear fuel	0.043	0.042	0.085	0.001	0.084	15
2000	24	Manufacture of chemicals and chemical products	0.030	0.087	0.118	-0.057	0.061	38
2000	25	Manufacture of rubber and plastic products	0.007	0.132	0.139	-0.125	0.014	12
2000	26	Manufacture of other non-metallic mineral products	0.026	0.096	0.122	-0.070	0.052	92
2000	27	Manufacture of basic metals	0.079	0.018	0.096	0.061	0.036	42
2000	28	Manufacture of fabricated metal products	0.032	0.053	0.085	-0.021	0.064	42
2000	29	Manufacture of machinery and equipment n.e.c.	0.017	0.091	0.109	-0.074	0.035	181
2000	30	Manufacture of office machinery and computers	0.096	0.631	0.727	-0.535	0.192	3
2000	31	Manufacture of electrical machinery and apparatus n.e.c.	0.022	0.100	0.122	-0.078	0.044	51
2000	32	Manufacture of radio, television and communication equipment and apparatus	0.009	0.140	0.149	-0.132	0.018	25
2000	33	Manufacture of medical, precision and optical instruments, watches and clocks	0.017	0.148	0.165	-0.131	0.035	21
2000	34	Manufacture of motor vehicles, trailers and semi-trailers	0.010	0.220	0.230	-0.209	0.020	24
2000	35	Manufacture of other transport equipment	0.023	0.036	0.058	-0.013	0.046	45
2000	36	Manufacture of furniture; manufacture n.e.c.	0.051	0.102	0.153	-0.051	0.102	37
2000	37	Recycling	0.250	0.057	0.307	0.193	0.114	9
2000	40	Electricity, gas, steam and hot water supply	0.035	0.030	0.065	0.005	0.060	90
2000	41	Collection, purification and distribution of water	0.028	0.069	0.097	-0.041	0.056	55

Source: Amadeus data set

Table A3 - Gross Job Flows by Industrial Sector in Non-manufacturing

year	*nace2*	*industry*	*pos*	*neg*	*gross*	*net*	*exc*	*n*
1999	45	Construction	0.043	0.142	0.185	-0.099	0.086	202
1999	50	Sale, maintenance and repair of motor vehicles and motorcycles; retail sale of automotive fuel	0.090	0.139	0.229	-0.049	0.180	29
1999	51	Wholesale trade and commission trade, except of motor vehicles and motorcycles	0.120	0.102	0.222	0.017	0.205	97
1999	52	Retail trade, except of motor vehicles and motorcycles; repair of personal and household goods	0.068	0.166	0.234	-0.098	0.136	86
1999	55	Hotels and restaurants	0.063	0.329	0.393	-0.266	0.126	21
1999	60	Land transport; transport via pipelines	0.017	0.128	0.145	-0.111	0.034	178
1999	61	Water transport	0.051	0.114	0.166	-0.063	0.103	9
1999	62	Air transport	0.074	0.307	0.381	-0.234	0.147	9
1999	63	Supporting and auxiliary transport activities; activities of travel agencies	0.023	0.159	0.183	-0.136	0.047	64
1999	64	Post and telecommunications	0.001	0.002	0.003	-0.001	0.001	8
1999	65	Financial intermediation, except insurance and	0.099	0.000	0.099	0.099	0.000	1

		pension funding						
1999	70	Real estate activities	0.018	0.111	0.128	-0.093	0.036	58
1999	71	Renting of machinery and equipment without operator and of personal and household goods	0.023	0.000	0.023	0.023	0.000	1
1999	72	Computer and related activities	0.000	0.101	0.101	-0.101	0.000	2
1999	73	Research and development	0.012	0.163	0.175	-0.151	0.024	71
1999	74	Other business activities	0.027	0.100	0.128	-0.073	0.055	80
1999	75	Public administration and defense; compulsory social security	0.253	0.045	0.298	0.208	0.090	3
1999	80	Education	0.116	0.034	0.150	0.082	0.068	9
1999	85	Health and social work	0.003	0.170	0.173	-0.167	0.006	25
1999	90	Sewage and refuse disposal, sanitation and similar activities	0.022	0.111	0.134	-0.089	0.045	9
1999	92	Recreational, cultural and sporting activities	0.078	0.060	0.138	0.018	0.121	14
1999	93	Other service activities	0.064	0.179	0.243	-0.114	0.128	4
2000	45	Construction	0.074	0.147	0.221	-0.072	0.149	202
2000	50	Sale, maintenance and repair of motor vehicles and motorcycles; retail sale of automotive fuel	0.136	0.191	0.327	-0.055	0.272	29
2000	51	Wholesale trade and commission trade, except of motor vehicles and motorcycles	0.132	0.149	0.281	-0.017	0.264	97
2000	52	Retail trade, except of motor vehicles and motorcycles; repair of personal and household goods	0.122	0.117	0.238	0.005	0.234	86
2000	55	Hotels and restaurants	0.026	0.136	0.162	-0.110	0.052	21
2000	60	Land transport; transport via pipelines	0.260	0.092	0.351	0.168	0.184	178
2000	61	Water transport	0.014	0.097	0.111	-0.083	0.028	9
2000	62	Air transport	0.083	0.216	0.299	-0.133	0.166	9
2000	63	Supporting and auxiliary transport activities; activities of travel agencies	0.011	0.071	0.082	-0.060	0.022	64
2000	64	Post and telecommunications	0.019	0.027	0.046	-0.008	0.038	8
2000	65	Financial intermediation, except insurance and pension funding	0.000	0.240	0.240	-0.240	0.000	1
2000	70	Real estate activities	0.059	0.073	0.133	-0.014	0.119	58
2000	71	Renting of machinery and equipment without operator and of personal and household goods	0.000	0.393	0.393	-0.393	0.000	1
2000	72	Computer and related activities	0.252	0.000	0.252	0.252	0.000	2
2000	73	Research and development	0.034	0.092	0.126	-0.059	0.067	71
2000	74	Other business activities	0.053	0.143	0.196	-0.089	0.107	80
2000	75	Public administration and defense; compulsory social security	0.000	0.111	0.111	-0.111	0.000	3
2000	80	Education	0.101	0.135	0.237	-0.034	0.203	9
2000	85	Health and social work	0.037	0.115	0.152	-0.077	0.074	25
2000	90	Sewage and refuse disposal, sanitation and similar activities	0.003	0.066	0.070	-0.063	0.007	9
2000	92	Recreational, cultural and sporting activities	0.249	0.027	0.275	0.222	0.053	14
2000	93	Other service activities	0.020	0.137	0.157	-0.117	0.040	4

Source: Amadeus data set

Table A4 – Trade Flows by Industrial Sector and Trading Area in Manufacturing (% of Total)

Industry	All countries		CIS countries		Non-CIS countries	
	imports	exports	imports	exports	imports	exports
Mining of coal and lignite	4.05	0.60	5.38	0.44	3.54	0.72
Manufacture of food products and beverages	7.47	10.59	2.89	19.94	9.25	3.97
Manufacture of tobacco products	1.83	0.25	0.52	0.54	2.34	0.05
Manufacture of textiles	4.64	1.31	3.02	0.91	5.26	1.59
Manufacture of wearing apparel; dressing and dyeing of fur	0.49	2.50	0.12	0.24	0.63	4.10
Manufacture of leather and leather products	0.96	1.31	0.48	0.50	1.14	1.89
Manufacture of wood and wood products	0.85	0.59	1.06	0.17	0.77	0.89
Manufacture of pulp, paper and paper products	3.53	0.89	3.66	1.58	3.48	0.41
Publishing, printing, reproduction of recorded media	0.54	0.33	0.23	0.31	0.66	0.34
Manufacture of coke, refined petroleum products and nuclear fuel	10.91	2.10	16.21	1.61	8.85	2.45
Manufacture of chemicals and chemical products	14.95	12.47	11.61	9.19	16.25	14.79
Manufacture of rubber and plastic products	4.01	2.44	3.10	4.88	4.37	0.71
Manufacture of other non-metallic mineral products	2.20	1.53	1.96	2.25	2.29	1.02
Manufacture of basic metals	1.52	21.03	2.94	16.60	0.98	24.18
Manufacture of fabricated metal products	6.14	21.23	9.75	12.88	4.74	27.15
Manufacture of machinery and equipment n.e.c.	16.90	7.76	18.72	13.88	16.20	3.42
Manufacture of office machinery and computers	1.06	0.09	0.04	0.16	1.45	0.05
Manufacture of electrical machinery and apparatus n.e.c.	3.65	2.76	4.17	4.81	3.44	1.31
Manufacture of radio, television and communication equipment	2.79	0.52	0.60	0.55	3.64	0.49
Manufacture of medical,	2.36	0.51	1.39	0.93	2.74	0.20

precision and optical instruments, watches and clocks						
Manufacture of motor vehicles, trailers and semi-trailers	4.52	1.30	5.17	2.65	4.26	0.35
Manufacture of other transport equipment	2.01	3.40	2.69	3.48	1.74	3.34
Manufacture of furniture; manufacture n.e.c.	1.23	0.36	0.20	0.43	1.62	0.31
Recycling	0.35	3.12	0.49	0.69	0.29	4.84
Electricity, gas, steam and hot water supply	1.04	1.00	3.59	0.39	0.05	1.44
Collection, purification and distribution of water	0	0	0	0	0	0
Total (%)	100	100	100	100	100	100
Total (1000's USD)	8145623	11684914	2273702	4848568	5871921	6836346

Note: Imports and exports are taken as averages of 1996-98.

Endnotes

[1] E.g. Konings, Lehmann and Schaffer (1996); Bilsen and Konings (1998); Acquisti and Lehmann (2000) and Richter and Schaffer (1996). In contrast, Konings and Lehmann (2002) find different employment adjustment of privatised and state-owned Russian firms.

[2] For a detailed description of this data set see Stavrunova (2001).

[3] Davis, Haltiwanger and Schuh (1996) present alternative ways to compute standard errors of job flow rates.

[4] An index measuring the absolute level of openness of a sector employed by Klein, Schuh and Triest (2002) might be preferable but requires reliable data on production, unavailable in the Ukrainian case.

[5] See Blanchard and Kramer (1997).

[6]Figure 1 shows official GDP, wage and employment data furnished by Derzhkomstat. Activities of the informal sector, which might be quite large in Ukraine, are not included in GDP. Nevertheless, it is inconceivable that the widening scissors between real GDP and employment is solely a statistical artefact.

[7] The Derzhkomstat data set that we use has reliable data on real output only until 1999, so we have to exclude the year 2000 from the analysis here.

[8] The only transition economy where an extremely large contraction of output of a domestic industry was translated in an equiproportional fall in employment was Eastern Germany, where often 90% of the workforce of a firm was permanently laid off. No other transition economy has the social safety net of Eastern Germany, financed with transfers from Western Germany, certainly not the countries of the Former Soviet Union. In Ukraine, because of a lack of serious reform efforts in the first part of the nineties, output did collapse in some industries on a similar scale as in Eastern Germany. But even in authoritarian Ukraine it would have been political suicide to make redundant large parts of the workforce.

[9]We do not pursue a more formal way to establish this result here since for many industries the number of industries is small. A far larger reallocation within industries than between them has been reported by most studies on job gross flows in transition countries, though.

[10]For a discussion of how to construct confidence intervals from bootstrapped standard errors, see Efron and Tibshirani (1993). The confidence intervals are not presented in the paper but are available on request.

[11]Pos and neg are the two job flow measures from which the other three measures are derived. The bootstrapping procedure treats the sample as a population and draws 1000 random samples *with* replacement, then calculates the mean and the standard deviation of the job flow measure in question. This standard deviation is then the bootstrapped standard error. If there is more variation in e.g. job creation than in job destruction, this will show up as a larger standard deviation of the first job flow measure. In other words, very precise estimates hint at uniform behaviour across the sampled firms, while imprecise estimates hint at heterogeneous behaviour on a large scale.

[12] See the cited literature in the introduction of the paper.

[13] The tabulated one-year persistence rates by size categories and ownership type in the manufacturing and non-manufacturing sectors are not shown here, but available upon request.