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Disorganisation in the transition process: Firm level evidence from Ukraine

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Disorganisation in the Transition Process: Firm level evidence from Ukraine

May 1998

by

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Abstract

Most post-communist economies are characterized by an initial collapse in aggregate output. Blanchard and Kremer (1997) and Roland and Verdier (1997) have recently modelled supply side distortions, disorganization in the links of production, that can lead to a short-term output contraction after market liberalisation and a recovery thereafter. This paper is the first to illustrate and test the effects of disorganization in the transition process by using a unique data set of 300 Ukrainian firms. Our results show that for firms that existed under central planning disorganization constrains employment and productivity growth during the transition process to a market economy. In contrast, disorganization plays no role in the determination of employment and productivity growth in newly established private firms.

Key words: disorganization, transition process, *de novo* firms

JEL classification: P0, O0, D0

I. Introduction

The collapse of central planning in the former Soviet Union has led to a collapse in output and employment in almost every country in the region. By now, most countries have experienced an output recovery. This statistical regularity provided a challenge to theorists and led to a series of theoretical papers. Most of the theoretical literature has focused on developing explanations that were based on theories of privatisation and restructuring (e.g. Aghion and Blanchard, 1994; Dewatripont and Roland, 1992). Two recent contributions have spelled out the importance of supply side distortions, disorganization in the links of production, that can lead to a short-term output contraction after market liberalisation and a recovery thereafter (Blanchard and Kremer, 1997; Roland and Verdier, 1997). This paper is the first to illustrate and test the effects of disorganization in the transition process by using a unique data set of 300 Ukrainian firms.

As outlined in Blanchard (1997), there are two key elements of transition, reallocation and restructuring. Reallocation refers to the movement of production away from state to private ownership. Restructuring refers to changing the level and technical composition of labour and capital in search of higher production efficiency. A distinction can be made between initial restructuring and deep or strategic restructuring. Initial restructuring refers to reducing over-manning levels in response to the hardening of budget constraints. The reduction of subsidies to traditional firms should lead to a collapse of labour demand in traditional firms. So, initial restructuring would be reflected in a high job destruction rate and a low job creation rate. Deep or strategic restructuring requires that fundamental actions are taken, aimed at improving the long run performance of the firm. This type of restructuring can include various

actions such as an increase in investment into new technology, vertical innovations in products and replacement of obsolete capital.

In the absence of distortions, the level of output that results from the transition process should be a first best outcome. Many theorists would have predicted that output, in the absence of the distortions inherent to the planning system, should have expanded. Economies should not only move on to their production possibility frontiers but the frontier itself was expected to shift outwards. This did not happen in the first few years following the liberalisation of the market in countries of the former Soviet Union (see Konings and Repkine, 1997). Both Blanchard and Kremer (1997) and Roland and Verdier (1997) model the initial output decline as a second best outcome that results from the presence of supply side distortions restricting the ongoing reallocation and restructuring process. Ironically the distortions they model are institutional constraints imposed on the transition process resulting from the inefficient conditions of the initial state itself.

Blanchard and Kremer (1997) model the distortion in the transition process with “disorganization” or disruption in production links that had been established during central planning. Under central planning bilateral relationships existed between suppliers and buyers. Liberalisation of the market gave suppliers the option to switch between buyers. This gave an outside option to suppliers. An assumed presence of information asymmetries on the outside option of suppliers creates disruption or disorganization in their model. Firms cannot find out the price that alternative buyers are willing to pay to the supplier. As a result they may not pay a price that prevents suppliers switching to new buyers thus creating disruption in the production links and a fall in output during transition. Blanchard and Kremer (1997) show that when the

production system is more complex, firms are more likely to be hit by disorganization, due to the increased inefficiencies in the production links during transition.

Roland and Verdier (1997) also model disorganization in production during the transition process. They prefer not to rely on inefficiencies in the bargaining process between initial buyers and suppliers but focus on the role of search frictions created from the desire to find new partners in the chain of production. The outside option is endogenous in a model of two sided search and matching. In the long-term more efficient opportunities are available to all. Suppliers and buyers will maintain existing links until one finds a better match. Search by many bad buyers creates congestion and reduces the quality of matches in the short-run. The fall in output is not generated by the breakdown of supplier and buyer relationships that existed in the planning system but due the assumption that investments will not be undertaken in production until a long-term partner is found. No investments take place during search. Aggregate output in the years after liberalisation contracts due to a fall in investment demand and the failure to replace obsolete capital. In this model output contraction is followed by output expansion reaching higher levels of output compared to the pre-transition level.

In this paper we test the theoretical predictions of these papers using empirical proxies for disorganization of the kind described in Blanchard and Kremer (1997) and Roland and Verdier (1997). To this end, we use a unique enterprise level survey data set consisting of 300 Ukrainian firms sampled during the Autumn of 1997. The data consists both of firms that existed under central planning and newly established private or *de novo* firms. With a population of 52 million people, Ukraine is the second largest country in Europe. Moreover, the transition in Ukraine started quite late, even by 1997 disorganization could still be a feature of the transition process.

In our sample the structure of demand is not an important factor as all managers in surviving firms expected their market to grow. Collapses in demand may have forced some firms to exit rather than undergo restructuring during the transition period. The sample selection in the data set allows us to test the impact of supply side considerations without paying much attention to the impact of changing demand conditions. The firms in our sample survived the first few years of the transition process and have undertaken a wave of restructuring in employment. Yet, deep restructuring was still needed in most of the traditional firms which were endowed with old equipment.

Our results show that for firms in our sample that existed under central planning, disorganization constrains employment and productivity growth during the transition process. In contrast, disorganization plays no role in the determination of productivity and employment growth in newly established private firms, also called *de novo* firms. This may result from the presence of left censoring in our *de novo* sample. Disorganization may have acted as a barrier to entry to some firms in certain sectors but actual entrants are likely to have efficient supplier matches using best practices in production. These firms offer us a nice counterfactual as they can avoid the cost of privatisation, restructuring and disorganization that traditional firms seem to incur during the transition period.

A series of theoretical papers have looked at the effects of restructuring and how this is related to the ownership structure of firms¹. However, empirical evidence about the Central European countries showed that contrary to the initial beliefs at the

¹ Aghion, Blanchard and Burgess (1996) show how state firms can restructure even prior to privatisation. Aghion and Blanchard (1994) develop a general model in which restructuring of traditional state firms depends on the unemployment rate. restructuring. Dewatripont and Roland (1992) and Roland (1994) point out the possible existence of political constraints to privatization, which may also block restructuring.

start of transition (Portes, 1994), the growth performance of privatized and state owned enterprises was not significantly different from each other, and that the main difference was between pre-transition firms and *de novo* ones. (Belka, et al.,1994, Johnson and Loveman, 1995, Konings, et al. (1996), Konings, 1997). Mass privatisation in Ukraine was based on voucher auctions starting in 1994. Although attempts have been made to encourage outsider ownership (Leschenko, 1998), most privatized firms are controlled by insiders in Ukraine (Estrin, Rosevaer and Hare, 1998). In this paper we do not focus on the issue of ownership, instead this paper addresses the success of the reallocation and restructuring process undertaken by firms in the presence of disorganization.

In the following section we describe the data set. In section III we illustrate the extent of employment restructuring and firm heterogeneity in employment experiences in our sample. In section IV we analyse the effects of disorganization in a regression analysis. Finally, we summarize our main conclusions in section V.

II. Data Description

The data we use is based on 300 enterprise surveys in Ukraine, organized by the Leuven Institute for Central and East European Studies in the Fall of 1997. The questionnaire covered various aspects of firm behavior related to employment, competition, supplier relationships and ownership type. After an initial pilot study, the surveys were completed using a team of local interviewers. The sample of firms were drawn from both official business and private business registers. We felt it was important to obtain information on *de novo* firms. Typically, official business registers do not report the *de novo* firms, which are often operating in the informal economy. However, a number of papers have shown *de novo* firms are fundamentally a different species when compared to the state and previously state owned firms in transition countries (e.g. Konings, 1997; Richter and Schaffer, 1996 among others). For this reason the sample framework was set up to cover 50% traditional firms, being state owned and privatized (i.e. previously state owned) firms, and 50% *de novo* private firms. In addition, the sampling was done in two regions, 150 firms in Kiev and 150 in Dnipropetrovs'k. The latter region is characterized by the presence of heavy industry, while Kiev is more mixed. We require *de novo* firms to be private since they were established and the date of operation must start after 1989². Most firms in the sample operate in the manufacturing sector, 127 traditional firms and 74 *de novo* ones. In the trade and service sectors the data cover 13 and 24 traditional firms and 28 and 34 *de novo* ones respectively. Table 1 gives the sample structure and summary statistics on average size and employment growth for our three categories of firms in 1996. Of the

² If the second restriction was not included there were in fact a few firms which were private since they were established and started to operate before communism early this century. We do not consider them as *de novo* firms.

300 firms in our sample, 290 had information on employment in 1996. We see that the majority of firms in the sample are privatized ones.

Table 1: Summary Statistics for 1996

	Number of firms	Average employment	Employment growth rate
Overall sample with data on employment, 1996	290	279	- 0.023
<i>de novo</i> firms	128	29	0.10
State firms	27	598	-0.12
Privatized firms	135	452	-0.12

The average size of a *de novo* firm is typically small, 29 workers, while the average size of state owned and privatized firms is large, 598 and 452 workers, respectively, in 1996. The average employment growth in *de novo* firms is +10%, while the average employment growth in both state owned and privatized firms is -12%. Thus the average employment growth rate in privatized firms is the same as the one in state owned enterprises. In the rest of the paper we group the privatized and state owned firms into one category, the traditional firms. This is motivated by other empirical studies, mentioned in the introduction, which find little difference between the performance of state owned and previously state owned firms in terms of employment and productivity growth.

The 50-50 split between the *de novo* and traditional firms does not reflect the distribution of the population of firms. We chose this set-up in order to focus on the difference (if any) between the two categories of firms in terms of characteristics and factors that affect their performance. We expect that the possible distortions that result from conditions coming out of the planning system would not have an effect on *de novo* firms. These firms would only select themselves into markets that are expected

to exist and grow. They enter as private firms and entry is likely to be induced by the presence of an efficient supplier-buyer match and the ability to be efficient in production. We exploit this left censoring property of our sample of *de novo* firms in the empirical analysis. The considerations discussed in the theoretical work of Blanchard and Kremer (1997) and Roland and Verdier (1997) should not be empirically relevant for the employment and productivity performance of *de novo* firms. Yet they may have acted as barriers to entry and determined the size of the population of new firms and outcomes such as the sector composition of new entrants.

. Another feature of the data relates to the survivorship bias of firms in the sample. This can be a particularly important feature in our sample of traditional firms. Traditional firms in the face of liberalisation may have been inefficient but many found themselves operating in declining or non-existent markets that had been previously created and managed by the central planner. With the reforms, market demand for products produced historically by traditional firms shifted in favour of high quality products produced by new firms or foreign firms. The least cost and efficient transition path, within certain product categories, may have been best achieved with the exit and entry of firms. Entry and exit costs may be less than the cost of restructuring and privatisation within incumbent firms. Aghion and Howitt (1998) provide us with the theoretical framework for this alternative transition mechanism.

As a result, the traditional firms that survived till 1997 in our sample are presumably the ones which face a market that still exists and for which restructuring and reallocation costs were not large enough to induce exit over the transition period. Indeed, the survey asked whether the manager of a firm expected a change in sale patterns in the future. Only two traditional and two *de novo* firms expected a decrease

in sales for the years 1998-2000. Of course, this reflects a perception of managers and it is not necessarily accurate. Nevertheless, it reflects an expectation of a growing market. We believe this is an important characteristic of the traditional firms in the data. We only expect potential negative effects of disorganization on firm performance if they are adjusting towards allocative and production efficiency in a market that exists or has not enormously contracted ex-post liberalisation of the market. If there is no demand for a firm's product then disorganization presumable does not matter. Attrition over the transition period has left us with traditional firms who by their existence are making a successful transition to the market economy. The question we address is whether the degree of disorganization they faced limited their success in terms of employment and productivity growth.

III. Employment Restructuring

In this section we look at the extent of job restructuring that took place in the sample of firms we use over the period 1991-1996. From section I we might expect that over the early part of the 1990s the traditional jobs in excessively large firms would be destroyed in a process of initial restructuring. This would lay down the foundation for future job creation. The new private sector, being small in size, would be expected to grow over time. We look at employment restructuring by reporting gross job flows for the overall sample and for the two categories of firms, traditional versus *de novo* firms.

Following the literature ³ the *gross job creation rate (pos)* is derived from summing all job gains in expanding firms expressed as a fraction of all jobs in the sample a year earlier. Similarly, the *gross job destruction rate (neg)* is the sum of all job losses in contracting firms relative to the total number of jobs in the sample in the previous period. The sum of the two gives a measure for the *gross job turnover rate (gross)*, while the difference gives the *net employment growth rate (net)* of the sample. A measure which is often used for firm heterogeneity is the *excess job turnover rate (excess)*, which is the difference between the gross job turnover rate and the absolute value of the net employment growth rate. The excess job turnover rate is a measure of job churning over and above that required in the observed movement in the net employment growth rate. The index reflects heterogeneity in firm employment

³ Davis and Haltiwanger (1992), Boeri and Cramer (1992), Konings, Lehmann and Schaffer (1996).

performance as we observe simultaneous creation and destruction of jobs after taking into account the evolution in aggregate net employment growth.

Table 2 shows the aggregate gross job creation, destruction and turnover rates of the firms in our sample since 1991⁴. Due to retrospective questions on employment levels, we are able to compute job flows over time, although there are less firms in the sample as we go back in time. This is because some *de novo* firms did not yet exist and some traditional firms did not fill out employment levels for the early years of transition.

Table 2: ‘Aggregatate’ Job Turnover and Net Employment Growth

Year	Pos	Neg	Gross	Net	Excess
1991	0.001	0.078	0.079	-0.077	0.0002
1992	0.006	0.049	0.055	-0.043	0.012
1993	0.009	0.094	0.103	-0.085	0.018
1994	0.008	0.101	0.109	-0.093	0.016
1995	0.011	0.144	0.155	-0.133	0.022
1996	0.025	0.153	0.178	-0.128	0.05

Note: Pos = Job creation rate, Neg = Job destruction rate, Gross=Pos+Neg = Job reallocation rate, Net = Pos-Neg = Net employment growth rate and Excess= Gross-abs(Neg)= Excess Reallocation Rate

⁴ Note that this does not need to reflect the true aggregate gross job flows in Ukraine as our overall sample is not a representative one, yet, it illustrates the extent of restructuring based on the sample of firms we have.

The gross job turnover rate increases over time, from 8% in 1991 to 18% in 1996. Thus we observe increased turbulence over time, which we would expect during the transition to a market economy. A gross job turnover rate of 18% is relatively high compared to other transition countries. Richter and Schaffer (1996), using a comparable survey data set, report a gross job turnover rate of 8% for Russia. While the gross job destruction rate is below 10% before 1993, since 1993 the gross job destruction rate has increased above 10% to reach 15% in 1996. So, unlike in other transition countries where the job destruction rate is highest at the start of transition in 1991-92, in Ukraine the job destruction rate shoots up from 1993 onwards. In fact, in 1992 the job destruction rate had decreased from 8% to 5%. This suggests that restructuring in Ukraine only started from 1993 onwards.

Also the gross job creation rate has increased over time from well below 1% in the early years of transition to almost 3% in 1996. Thus it seems that by 1996 some deep restructuring in Ukraine is going on. The excess job turnover rate is 5% in 1996, compared to less than 1% in 1991. This implies that there exists considerable firm heterogeneity in employment experiences in 1996.

In table 3 we look at gross job flows according to ownership. We make a distinction between the *de novo* firms and the traditional firms. We focus on the year 1996 because we have more observations in this year compared to other years, which is a consequence of the later entry of *de novo* firms.

Table 3: Gross Job Flows According to Ownership in 1996

	Pos	Neg	Net	Excess
<i>De novo</i> firms	0.22	0.07	0.15	0.14

Traditional firms	0.02	0.16	-0.14	0.04
old	0.006	0.187	-0.18	0.013
young	0.05	0.06	-0.008	0.10

The gross job creation rate of *de novo* firms in 1996 is 22% and the gross job destruction rate only 7%. This compares to a gross job creation rate of 2% in traditional firms and a job destruction rate of 16%. This could just reflect a size effect but it may also reflect that the supply side determinants of employment growth are fundamentally different in *de novo* firms compared to traditional ones.

The observed pattern of job creation and destruction indicates a substantial process of restructuring and heterogeneity in employment growth. In the next section we model the forces behind employment growth at the firm level and hence model the aggregate job turnover patterns observed in this section of the paper.

IV. Disorganization and Firm Performance

In what follows we focus on the effects of disorganization on firm performance in 1996, making a distinction between *de novo* and traditional firms. We start with a preliminary analysis of the variables that we use in our regression analysis.

The Explanatory Variables: It is well known that traditional firms were characterized by the presence of obsolete machinery and the production of low quality, standardized products. Incentives for product innovation and providing high quality were low under central planning, the ultimate goal was maximising production (e.g. Estrin, 1994). To illustrate this, we inquired after the age composition of the equipment used in a firm. Table 4 shows that 85% of all *de novo* firms have new equipment, less than 8 years old, while only 40% of all traditional firms have new equipment.

Table 4: The Age Composition Equipment

age of equipment	<i>de novo</i>	traditional
less than 1 year	0.21	0.05
Between 2 and 8 years	0.83	0.35
Between 9 and 25 years	0.27	0.46
more than 25 years	0.02	0.14

Roland and Verdier (1997) model disorganization in production links as a distortion in the transition process. Their empirical prediction of their model is that in the years after liberalisation aggregate output contracts due to a fall in investment demand and the failure to replace obsolete capital. Deep restructuring involves updating equipment and penetrating new markets via product innovation. As illustrated in table 4 this seems to be highly relevant for traditional firms. Managers were asked whether the company made an investment in new production equipment or machines. They were also asked whether new products or services were sold over the period 1994-97. We report the frequency of answers for both types of firms in table 5. The differences between *de novo* firms and traditional ones are small. In both types of firms about 40% invested in new equipment, while about 75% introduced new products. Since *de novo* firms do not need to restructure, but traditional firms do, we expect that these indicators of disorganization will matter in the performance of traditional firms.

Table 5: Disorganization Indicator I

	<i>De novo</i>	Traditional
<i>new equipment in 1996</i>		
yes	0.43	0.38
no	0.57	0.62
<i>new products between 1994-97</i>		

yes	0.75	0.72
no	0.25	0.28

Blanchard and Kremer (1997) model disorganization or disruption in production links that had been established under central planning. One empirical prediction of Blanchard and Kremer (1997) is that the more complex the production system that existed in traditional firms, the more likely they will be hit by disorganization, due to the increased inefficiencies in bargaining during the transition process. Our second indicator of disorganization refers to the complexity of the production system. We asked managers to report the number of major products their firm produces. Table 6 shows the distribution of this variable according to ownership. It can be noted that 45% of both the traditional and the *de novo* firms produce one product. The theory is only relevant to the breakdown of supplier buyer relationships in traditional firms. We do not expect this measure of disorganization to affect *de novo* employment and productivity growth.

Table 6: Disorganization Indicator II

Number of products	<i>De novo</i>	traditional
1	0.45	0.44
2	0.30	0.27
3	0.14	0.11
4	0.08	0.09
5	0.02	0.09

Apart from our indicators of disorganization we will also control for a number of other factors which seem to be relevant in determining firm level employment and productivity growth. These include controls for competition in the product and input market, financial constraints, sector and regional dummies.

Transition economies are endowed with relatively rigid product market structures due to the central planning system. With transition it can be expected that competitive pressure will increase the need for deep restructuring which will have beneficial effects on firm performance. We measure competitive pressure using a firm level indicator as in Nickell (1996). Managers were asked whether they faced more than 5 competitors in their main product market. Likewise, they were asked whether they had more than 5 suppliers or not. We use a dummy equal to 1 if this was the case, zero otherwise. Table 7 shows that 67% *de novo* firms and 50% traditional firms faced more than 5 competitors and about 60% of the *de novo* firms faced competitive input markets, while only 45% of the traditional ones.

Table 7: Structure of competition in the product and input market

Competition	<i>De novo</i>	Traditional
More than 5 competitors	0.67	0.50
More than 5 suppliers	0.57	0.45
Less than 5 competitors	0.33	0.50
Less than 5 suppliers	0.43	0.55

The questionnaire also asked whether inputs were imported or not. If a firm depended on imports for inputs we have a dummy equal to 1 and zero otherwise. Liberalisation of the market gave buyers the outside option of buying from international suppliers. Table 8 shows that more *de novo* firms depended on imported inputs than traditional ones. This can reduce the cost of restructuring when there is disorganization in traditional production linkages. Overall, however, most firms depended on inputs that were not imported, so disorganization might be relevant for most firms.

Table 8: Frequency of dependence on imported inputs

	<i>De novo</i>	Traditional
Yes	0.26	0.18
No	0.74	0.82

We finally included a dummy equal to 1 if the firm experienced financial difficulties in 1996 and zero otherwise. Firms under financial distress are less likely to undertake programs of deep restructuring. Table 9 shows that especially traditional firms suffer from financial difficulties in 1996. So, the probability that traditional firms will pay their suppliers will be lower than for *de novo* firms, which offer a good outside option for suppliers.

Table 9: Frequency of financial Difficulties in 1996

	<i>De novo</i>	Traditional
Yes	0.57	0.82
No	0.43	0.18

Measures of Firm Performance: We use two measures for firm performance. The first is based on firm level employment growth. We use firm level employment growth as a proxy for firm level output growth since we do not have information on output. Employment levels are objective measures free of any monetary measurement problems, which might be highly relevant in the case of Ukraine, plagued by hyperinflation. Although there might still be some labour hoarding in firms, given that an initial phase of restructuring is over and the output collapse has been followed by a collapse in employment, employment growth in 1996 should proxy well for the growth in output. The second measure of performance is based on qualitative information about the evolution of productivity. We asked the following question:

“Did the productivity in your company since 1995 go down/remain the same/go up?”

Table 10 shows the distribution of answers for the two categories of firms. While 43% of the *de novo* firms experienced an increase in productivity, only 23% of the traditional firms did so. The latter experienced predominantly a decrease in productivity, almost 60% of all traditional firms. This is consistent with the observed collapse in aggregate productivity in most transition countries. Since this second measure is a qualitative variable we will use an ordered probit model to analyse the effects of disorganization on productivity by firm type.

Table 10: Evolution of productivity since 1995

Productivity	<i>de novo</i>	Traditional
go down	0.33	0.58
remain the same	0.24	0.19
go up	0.43	0.23

Regression Results: Table 11 reports OLS results for the employment growth equations⁵. We report first results for the overall sample and then for the split sample, *de novo* versus traditional firms. In column (1) the *de novo* and traditional firms are pooled together and we include a dummy equal to 1 if the firm is a *de novo* one. The positive and statistically significant coefficient of *de novo* firms indicates that their employment growth performance is better than that of traditional firms. Furthermore, we find evidence for firms that use imported inputs have better performance than firms that do not. By buying from international suppliers disorganization in traditional supplier links is avoided. Our disorganization indicators come in strong as measured by the number of products and investment in new equipment. The level of competition in the market, as measured by the number of competitors and the number of suppliers, does not have any explanatory power in explaining the employment growth experiences of the firms in our sample. Also, new product innovation, which should have a positive demand effect, does not seem to matter in explaining growth.

We obtain some striking differences between the two categories of firms in our split regressions. As expected both measures of disorganization are statistically

⁵ We also experimented with including lagged size as one of the regressors. This did not change our results concerning the effects of disorganization. Lagged size is potentially endogenous and could also proxy for the initial distortions on firm performance. We preferred not to include lagged size in our regressions.

insignificant for the *de novo* firms. In contrast, these effects do come in for the traditional firms. We find that for traditional firms there is a strong and statistically significant effect of disorganization on firm performance. We find that the more products a traditional firm is producing, hence a more complex production system, the lower is the employment growth rate. In addition, if a traditional firm invested in new equipment in 1996 the average employment growth rate was 16 percentage points higher than firms that did not.

We also find that import dependence has positive effects on firm performance in both traditional and *de novo firms*, while product market competition has a positive effect on employment growth only in *de novo firms*. The transition process and the distortions imposed on the transition process are not relevant factors in the determination of performance of *de novo firms*.

Table 11: Dependent variable: Firm Level Employment growth in 1996

	Overall	Overall	de novo	Traditional	Traditional & old equipment
de novo	0.022* (0.06)	0.06 (0.07)	-		
+5 competitors	0.04 (0.06)	0.03 (0.06)	0.16** (0.10)	-0.09 (0.06)	-0.06 (0.08)
Import dependence	0.16* (0.07)	0.17* (0.07)	0.24* (0.11)	0.11 (0.08)	0.08 (0.11)
+5 suppliers	0.05 (0.06)	0.06 (0.05)	0.07 (0.09)	0.04 (0.06)	0.03 (0.08)
Number of products	-0.1* (0.05)	-0.07** (0.05)	-0.08 (0.09)	-0.12* (0.06)	-0.12** (0.08)
new equipment	0.14* (0.06)	0.16* (0.06)	0.13 (0.1)	0.18* (0.07)	0.20* (0.09)
ln (employment) _{t-1}		-0.07* (0.02)	-0.09* (0.05)	-0.05* (0.02)	-0.07 (0.03)
Adjusted R2	0.13	0.17	0.07	0.15	0.12
No of observations	215	215	98	117	63

*Note: standard errors in brackets; ** denotes statistically significant at the 5% critical level. All equations include sector dummies, a dummy for Kiev and a constant.*

We next want to test the robustness of the above findings by measuring performance in terms of changes in productivity rather than employment, as summarized in table 10. Since we are modeling an ordered limited dependent variable, we use an ordered probit model as our estimation technique. The results are reported in table 12.

Table 12: Ordered Probit results, dependent variable:

Evolution in productivity:1=down, 2=the same,3=up

	Overall	Overall	De novo	Traditional	Traditional
de novo	0.51* (0.16)	0.06 (0.23)			
+5 competitors	-0.06 (0.16)	-0.07 (0.18)	-0.19 (0.27)	0.05 (0.25)	-0.26 (0.36)
import dependence	0.28** (0.19)	0.33** (0.21)	0.05 (0.30)	0.70* (0.32)	0.49 (0.52)
+5 suppliers	0.22 (0.16)	0.09 (0.17)	0.03 (0.25)	0.13 (0.25)	0.42 (0.36)
Number of products	-0.26* (0.15)	-0.20 (0.16)	0.06 (0.24)	-0.25 (0.25)	-0.71* (0.39)
new equipment	0.60* (0.16)	0.72* (0.18)	0.58* (0.27)	0.82* (0.26)	1.02* (0.41)
ln (Employment) _{t-1}		-0.22* (0.07)	0.01 (0.13)	-0.26* (0.09)	-0.11 (0.13)
Pseudo R2	0.06	0.09	0.07	0.13	0.12
No of observations	258	214	98	116	63

*Note: standard errors in brackets; ** denotes statistically significant at the 5% critical level, * at the 10% critical level. All equations include sector dummies, a dummy for Kiev and a constant.*

The results in table 12 are similar to those found in the regressions with employment growth as the dependent variable. From column (1), the regression on the

full sample, it can be seen that *de novo* firms, relative to traditional ones, have experienced a greater increase in productivity. Furthermore, the disorganization indicators have an effect on the evolution of productivity, although the estimated coefficient on ‘number of products’ is only statistically significant at the 10% critical level. A number of other factors, that were insignificant in the employment regressions are now significant. In particular, if a firm faces many suppliers, i.e. competitive upstream markets, the productivity performance is better. In addition, if a firm has experienced financial problems productivity is reduced.

When we consider the split samples, we find, as before, that disorganization as measured by the number of products the firm produces is only statistically significant for the traditional firms. The effect of our second type of disorganization is strong. Those traditional firms finding good matches make investments in new equipment and have a strong and positive effect on productivity growth, which is what we would expect if new investments are aimed at improving efficiency. This effect is also significant, although lower, for *de novo* firms.

To sum up, from the above regressions we can conclude that disorganization during the transition process does constrain employment (output) and productivity growth in our sub-sample of traditional firms but not in our sub-sample of *de novo* firms. The latter, by their nature, have limited restructuring and reallocation costs and hence disorganization in the transition process does not appear to affect their ex-post entry performance.

V. Conclusions

This paper is the first empirical study that uses enterprise level data in Ukraine to examine the role of disorganization in the transition process. We use a proxy for complexity in production, the number of products a firm produces, for measuring increasing inefficiencies in existing production links or disorganization of the nature in Blanchard and Kremer (1997). We also measure disorganisation as a lack of investment in new equipment, which is an empirical proxy for capturing matching inefficiencies between suppliers and buyers in production, as outlined in Roland and Verdier (1997). We use a unique enterprise level survey data set of 300 firms that was collected on the basis of personal interviews with key managers of traditional and *de novo* firms.

Our results show that for firms that existed under central planning, disorganization, of both types, constrains employment and productivity growth. The job destruction rate was 5% in 1992 but since then increased steadily to 15% by 1996. Deep restructuring seemed to start in Ukraine after 1994 when we observed a significant increase in both job destruction and job creation rates. Yet, restructuring was still needed in most of the traditional firms who were endowed with old equipment. Our evidence suggests that disorganization on the supply side has

constrained the ability of traditional firms to reach first best outcomes in employment and productivity during the transition process.

In contrast, disorganization plays no role in the determination of productivity and employment growth in *de novo* firms. This may result from the presence of left censoring in our *de novo* sample. Disorganization may have acted as a barrier to entry to some firms in certain sectors but actual entrants are likely to make efficient supply matches. In addition, *de novo* firms by their nature have limited restructuring and reallocation costs and hence disorganization does not appear to affect their ex-post entry performance.

The evidence provided in this paper also suggests an explanation why in the literature not much difference has been observed between the performance of state owned and privatized firms. Both have one feature in common, disorganization, while *de novo* firms do not face such a problem.

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