



THE WILLIAM DAVIDSON INSTITUTE  
AT THE UNIVERSITY OF MICHIGAN BUSINESS SCHOOL

***Firm Performance in Bulgaria and Estonia: The effects  
of competitive pressure, financial pressure and  
disorganisation***

*by Jozef Konings*

Working Paper Number 185  
July 1998

**Comments Welcome**

**Presented at the International Workshop in Transition Economics  
A CEPR/WDI Workshop Hosted by CERGE-EI  
Prague, 9/12 July 1998**

Copyright Jozef Konings, 1998. Disseminated by the Davidson Institute with permission of the author.

**Preliminary, comments welcome**

**Firm Performance in Bulgaria and Estonia: The effects of competitive pressure,  
financial pressure and disorganisation**

**by Jozef Konings**

**LICOS, Department of Economics and CEPR  
Katholieke Universiteit Leuven  
De Beriotstraat 34  
3000 Leuven  
BELGIUM  
Email:jozef.konings@econ.kuleuven.ac.be**

**Abstract:**

This paper is concerned with the analysis of firm performance, measured as total factor productivity, using a panel of over 1200 Bulgarian and 200 Estonian firms. The main empirical conclusions are (i) higher financial and competitive pressure improves firm performance in Bulgaria; (ii) disorganisation, measured by complexity of a sector, has a negative effect on productivity growth in Bulgaria; (iii) in Estonia there is no evidence that financial pressure, competitive pressure or disorganisation has any effect on firm performance, suggesting that these factors only matter at the start of transition to a market economy.

**Key words:** financial pressure, competitive pressure, disorganisation, firm performance

**JEL classification:**G3, L2, O5

## **I. Introduction**

This paper is concerned with the analysis of firm performance, measured as total factor productivity, in two reforming economies. To this end, a panel of over 2000 Bulgarian and 300 Estonian firms is used covering the years 1992-96. The former country is later and less advanced in its reforms than the latter.

Most transition countries are characterized by an initial collapse in output, followed by output growth. This has led to a series of theoretical papers. A number of papers have looked at restructuring of traditional firms, i.e. state and privatized firms (Aghion, Blanchard and Burgess, 1994, Aghion and Blanchard, 1994, among others). Restructuring in these models can involve technological and ownership changes, leading to higher productivity. As hard budget constraints are imposed and product market competition increases the incentives for firms to engage into "deep" restructuring increases. Depending on the structure of ownership such a process of deep restructuring can be blocked by insiders who risk losing their jobs. More recent theoretical contributions, however, focus on the role of disorganization for explaining a substantial part of the collapse in output in the early years of transition and a recovery after (Blanchard and Kremer, 1997; Roland and Verdier, 1997). Under central planning production in state firms was organized around bilateral relations between suppliers and buyers. Liberalisation of the market gave suppliers an outside option as they were allowed to switch between buyers and hence deliver inputs to the highest bidder. Blanchard and Kremer (1997) show that the more complex the production system in firms, the more likely firms will 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, 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. This leads to underinvestment in production until a long-term partner is found. Aggregate output in the years after liberalisation contracts due to a fall in investment demand and the failure to replace obsolete capital.

The empirical literature so far has focused predominantly on the role of privatization and ownership structure in determining firm performance. While the initial expectations of privatization were high, empirically there is no hard evidence that privatized firms perform better than state owned enterprises (Earle and Estrin, 1996; Konings, 1997; Richter and Schaffer, 1996). This could be explained by the ownership structure that emerged from mass voucher privatization in which insiders could block restructuring of privatized firms, alternatively, there are a number of other factors common to traditional firms which explain their poor performance.

This paper uses a representative sample of traditional firms to study firm performance in terms of total factor productivity to pin down some of the key characteristics of this transition process at the micro level. I will focus on three key factors which are likely to play an important role in explaining firm performance in transition countries: competitive pressure, financial pressure and disorganization. By making a comparative analysis between one advanced country – Estonia- and one country that has only recently started with implementing serious reforms – Bulgaria – I expect to gain some insights into the nature of transition and the relative importance

of those three factors. Both countries are relatively small, Estonia has a population of 1.5 million people and Bulgaria of 8.4 million. Table 1 shows some macro economic indicators which reflect the different economic conditions that both countries face. It can be seen that the output collapse has been larger in Bulgaria than in Estonia and that after a brief recovery in Bulgaria in 1994, output collapsed again in 1996. In Estonia output growth is positive from 1995 onwards. Reforms in Bulgaria have experienced substantial delays. A far-reaching programme of accelerated reforms has been under implementation only since March 1997. The private sector share in GDP in 1996 was estimated at 4.6%, with the largest share in agriculture, 76%, followed by services, 50% and only 27% in industry (EBRD, 1997). This contrasts sharply with the reforms in Estonia. The large-scale enterprise privatisation programme is virtually completed. Almost 70% of GDP was created in the private sector in 1997.

In the following section I describe the data and the econometric approach for estimating firm performance in terms of productivity. Section III discusses the results and section IV is a concluding one.

## II. Data and Econometric Approach

The data consist of the company accounts of all incorporated firms between 1992-96 satisfying at least two of the following criteria: number of employees greater than 100, total assets and sales exceed 12 million USD, respectively. All the variables are taken from published annual company accounts which were made consistent across countries by "Bureau Van Dyck". The data set is called the Amadeus data set. The data cover more than 80% of total employment in manufacturing, the non-

manufacturing sector, however, is underrepresented. One drawback is that the data do not cover the very small firms, so presumably a lot of the "de novo" private firms are not included in the data. In addition, there is no information available about the ownership structure of the companies. Nevertheless the data provide a significant part of the economy in these countries and should be considered as a representative sample of the economy. Table 2 provides summary statistics on log output (value added), log employment and log capital (net tangible fixed assets) and the appendix provides a detailed description of the variables used in the analysis. From these summary statistics it is clear that the average firm size and capital-labour ratio is very similar in both countries, thus we will be comparing the results for similar type of firms. Also note that the average firm growth in Bulgaria is negative while in Estonia it is positive. This reflects that the transition recession in Estonia is over, but not in Bulgaria.

The data are unbalanced panel data and table 3 shows the structure of the panel. In Bulgaria most firms are observed for four consecutive time periods, while in Estonia a larger fraction of firms is observed for 5 consecutive time periods. The attrition in the data is unlikely to be systematic. Missing data were presumably the consequence of the missing availability of registered company accounts. To be included in the analysis I required that a firm had to have at least 3 consecutive time observations. In addition, due to some missing observations on some variables a number of firms could not be used in the analysis.

I follow a standard approach and estimate an augmented production function as in Nickell, Nicolitsas and Dryden (1997). I estimate a standard Cobb-Douglas production

function, imposing long-run constant-returns to scale, and augment it with indicators of competitive pressure, financial pressure and disorganization, as follows

$$\underline{y_u = \beta_0 + \beta_1 + \alpha_1 n_u + (1 - \alpha_1) k_u + f_u + \varepsilon_u} \quad (1)$$

where  $\underline{y_u}$  is log real output (value added),  $\underline{n_u}$  is log employment,  $\underline{k_u}$  is log capital stock,  $\underline{f_u}$  reflects other factors that determine both the level and the growth of productivity. These factors include competition, financial pressure and disorganisation. Finally,  $\underline{\varepsilon_u}$  is a white noise error term and it is assumed to be serially uncorrelated. This will also be tested in the estimation.

The other factors  $\underline{f_u}$  that determine productivity are the focus of this paper. I will discuss them in turn.

*Competitive pressure* : With the hardening of budget constraints and changes of ownership it was expected that managerial incentives to improve performance would be improved because of the increased risk of default. For market economies the evidence that competition improves performance is mixed. Nickell (1997) finds that competitive pressure improves performance in large UK firms, while Blanchflower and Machin (1997) find that competitive pressure does not have a significant effect on plant performance in the UK. The disciplining effects of competitive pressure can, however, be replaced by efficient corporate governance and financial pressure, as



suggested by Nickell et al. (1997). In transition economies, not much evidence can be provided of the incentive enhancing effects of privatization. A potential reason why privatization does not work could be explained by the limited role of outside ownership in privatized firms. In many cases, privatization occurred via voucher auctions leading to a dominance of insiders, who might block restructuring. The data used, cover large traditional firms, so it is unlikely that any effect of ownership will be found. Since there is no information on ownership structure available, I will not be able to test this hypothesis explicitly, but it is not unreasonable to assume that corporate governance has little effect in the traditional firms included in the sample. Evidence for this can be found in Konings (1997). However, if corporate governance is not likely to discipline managers, then other factors could. One of them is increased competitive pressure. A firm not engaging in "deep" restructuring to improve its efficiency and performance could face an increased probability of bankruptcy in the case of increased competitive pressure. With reforms and liberalization it can be expected that competitive pressure is increased. So, one would expect that firms facing more competitive product markets would perform better, given they survive, than firms that face non-competitive product markets (e.g. Earle and Estrin, 1997, Konings, 1997). I will measure competitive pressure by the herfindhal index defined at the two-digit Nace classification. Of course, this is a very imprecise measure of market power, because the two-digit industrial classification level is still a very aggregated one. I was forced to use the two-digit, rather than the three or four digit because of data limitations; a more disaggregated measure for market share was difficult to compute as the number of firms at a more disaggregated level dropped

substantially. In addition, there are no official sources that report on concentration levels in these countries.

*financial pressure* : The effects of financial pressure on managerial effort can also be explained by the increased probability of bankruptcy. The hardening of budget constraints in Central and Eastern Europe leaves the option to restructure and thereby improve firm performance or not to restructure. In the latter case, the firm is faced with an increased probability of bankruptcy. So, financial pressure can discipline managers and create incentives to improve performance (e.g. Aghion, Dewatripont and Rey, 1997). On the other hand financial pressure could also be an indirect measure for disorganization. In the context of the model of Blanchard and Kremer (1997) if traditional firms have financial constraints they will find it harder to pay suppliers in time and to pay them a sufficiently high price to avoid delays in delivery or to avoid that suppliers go to alternative buyers. In the context of the model of Roland and Verdier (1997) firms facing financial pressure will be less able to invest in new machinery. Alternatively, this can be interpreted as not having the ability to engage in deep restructuring as most traditional firms were faced with old and obsolete equipment. So, if financial pressure measures indirectly disorganisation a negative effect is to be expected on firm performance. I will measure financial pressure by the interest payments relative to the cash flow of the firm.

*Disorganization* : The third factor that is likely to play a role in some transition countries, especially at the start of transition, is disorganisation as explained in the introduction. Konings and Walsh (1998) use survey data to show for Ukraine that

disorganisation, measured by the number of products a firm produces, has a negative effect on firm performance of traditional firms, but not on firm performance of de novo private firms. This is not surprising as de novo firms enter new markets where they are not likely faced with supplier constraints. In this paper the sample consists of traditional firms only. Of course, it is not clear whether disorganisation should play an important role in Bulgaria and Estonia as there were closer trade links for these countries with Western markets, while this was not so for Ukraine and Russia. In addition, disorganization is likely to play a limited role in expanding markets.

Blanchard and Kremer (1997) measure disorganisation as the degree of complexity in a market, proxied by the number of products that are being produced in a sector. In this paper I will use a similar measure and proxy the degree of complexity by the number of firms in a sector. It can be argued that the more firms are operating in a sector, the more complex the sector had to be organized under central planning. Once transition starts, it can be expected that in sectors where there are more firms there are more products on offer and there are also more opportunities for suppliers to switch to other firms. In the context of the matching model of Roland and Verdier (1998) more potential matches are possible between different firms and search costs are higher. So, it can be expected that disorganization has a negative impact on productivity in the short run.

Equation (1) will be estimated in first differenced form to control for the unobservable fixed effect  $\beta_i$ . In addition, the above effects will be taken into account in the following way,

$$\Delta y_{it} = \Delta \beta_t + \alpha_1 \Delta n_{it} + (1 - \alpha_1) \Delta k_{it} + \Delta f_{it} + f_i + \Delta \varepsilon_{it}$$

(2)

where  $f_{it}$  stands for the factors that affect the level of productivity and  $f_i$  for the factors that effect the growth in productivity. I assume that the competitive and financial pressure a firm faces affects both the level and growth of productivity, while disorganization affects only the growth of productivity. In addition, I also include time dummies to control for unobservable aggregate shocks.

I will treat the input factors as endogenous and also the measure of financial pressure. It can be argued that low firm performance increases financial pressure so that financial pressure must be treated as endogenous. To this end I use an instrumental variable general method of moments estimator proposed by Arellano and Bond (1991). Apart from other exogenous variables, valid instruments that can be used are lagged values of the endogenous variables dated t-2 and before. A key assumption is that the error term is serially uncorrelated. This implies that in a first-differenced equation there should be no second-order serial correlation. A test for second order serial correlation, which is N (0,1) distributed will be provided. In addition, a Sargan test for instrument validity will also be reported.

### III. Results

Table 4 reports the results for Bulgaria and Estonia. The first column reports the basic model, where I also controlled for the size of the market the firm is operating in, proxied by industry sales. The estimated coefficient on the input factors in Bulgaria

suggests that the marginal product of capital is equal to zero. This is not abnormal if the capital stock is obsolete and does not form an important input factor anymore. This could be the case in a country like Bulgaria, which is still in its early stages of transition. Indeed, when we compare this with the results for Estonia we note that the estimated coefficient on  $(n-k)$  equals 0.55, so employment and capital seem to have equal weighing in the production process of the average firm.

The results for Bulgaria show that firms that operate in highly concentrated industries have a significantly lower productivity growth than firms that operate in less concentrated industries. Note that the concentration ratio only has an effect on the growth rate in productivity, not on its level. So firms that operate in highly concentrated product markets are likely to have lower incentives to engage in deep restructuring and face therefore lower growth.

Turning to the effects of financial pressure, I find that firms that face higher financial pressure also have a higher productivity. This is consistent with Aghion et al. (1997) and suggests that financial pressure can discipline managers to improve performance. The mechanisms are similar as the mechanisms of competitive pressure. If firms do not engage in deep restructuring for improving performance, firms faced with tough competitive pressure or financial pressure face an increased chance of bankruptcy. This disciplines managers to improve the performance of their firm.

Finally, I find strong evidence that disorganisation matters. Disorganisation, measured as the log number of firms in the sector, has a statistically significant negative effect on productivity growth. The elasticity of disorganisation is estimated at  $-7\%$ . This means that a sector with 10% more firms (products) leads to a 7% reduction in the productivity growth of the average firm.

In column (3) I test whether firms that operate in expanding markets, measured by total industry sales growth, suffer less from disorganisation than firms that operate in markets that have collapsed. Arguably, disorganisation matters more in collapsing markets. I included an interaction term measuring disorganisation times industry sales. The results show that the effect of disorganisation diminishes in markets that are expanding.

When we contrast the results for Bulgaria with Estonia we find that none of the above factors seem to matter for explaining firm productivity performance in Estonia. It is not surprising to find no effects of disorganisation as Estonia is in a later stage in its transition process. Disorganisation should matter especially in the early stages of transition. It is more surprising to find no effects of competitive pressure or financial pressure, because these effects typically also matter in market economies (e.g. Nickell et al., 1997). An explanation why competitive pressure and financial pressure does not have a statistically significant effect on firm performance in Estonia could be related to the time when reforms related to financial discipline have been implemented and the implied time of restructuring of traditional firms. In Estonia the bankruptcy law and the financial discipline of firms was implemented since 1992. In Bulgaria, it is only recently that more financial discipline has been imposed and an efficient bankruptcy law has been implemented (EBRD, 1997). The firms in the sample are surviving firms, so the firms in Estonia presumably have restructured earlier than in Bulgaria. At the start of transition with increased competitive pressure and financial pressure those firms have restructured, so that once the restructuring has occurred competitive and financial pressure has no longer any effect because they have reached their optimum. In contrast, in Bulgaria, financial discipline and

competitive pressure is only gradually imposed. Firms are still moving up to their frontier.

A final potential explanation why in Estonia competitive nor financial pressure has any effect is that corporate governance works better there, which might be captured by the unobservable fixed effect. In Estonia there is more outside ownership than in Bulgaria, so that corporate governance disciplines managers. However, with the current data it is not possible to test this last hypothesis.

#### **IV. Conclusions**

This paper investigated firm performance in terms of its total factor productivity in two transition countries, an advanced one, Estonia, and an underdeveloped one, Bulgaria.

I focused on three factors that could be important for explaining firm performance, competitive pressure, financial pressure and disorganisation. I find different results for the two countries. In Bulgaria I find evidence that both competitive pressure and financial pressure affect firm performance. I also find strong evidence that disorganisation matters in Bulgaria. This is not surprising as most Bulgarian firms were still facing soft budget constraints and that Bulgaria is still in the early stages of transition. However, firms that operate in expanding sectors do not face problems of disorganisation.

In contrast, in Estonia, I find no evidence that competitive pressure, financial pressure nor disorganization has any effect on total factor productivity. This suggests that Estonian firms face no problems related to transition factors. Presumably in Estonia restructuring occurred earlier and more efficiently than in Bulgaria.

#### References

- Aghion, P. And Blanchard, O. (1994). "On the Speed of Transition in Central Europe", *NBER Macroeconomics Annual*, pp. 283-320.
- Aghion, P., Blanchard, O. And Burgess, R. (1994). "The Behavior of State Firms in Eastern Europe Pre-Privatisation", *European Economic Review*, Vol. 38, pp. 132-49.
- Aghion, P., Dewatripont, M., and Rey (1997). "Competition, Financial Discipline and Growth", *European Economic Review*, Vol. 41, pp 797-805.
- Arellano, M. and Bond, S. (1991). Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations", *Review of Economic Studies*, Vol. 58, pp. 277-298.
- Blanchard, O. (1997). "The Economics of Post Communist Reforms", Clarendon Press
- Blanchard, O. and Kremer, (1997). "Disorganisation", *Quarterly Journal of Economics*
- Blanchflower, D. and Machin, S. (1996). "Product Market Competition, Wages and Productivity: International Evidence from Establishment Level Data", Centre for Economic Performance, LSE, DP 286.



Earle, J. and Estrin, S. (1996). "Privatisation versus Competition: Changing Enterprise Behaviour in Russia", CEP discussion paper 316, LSE.

EBRD (1997). Transition Report

Konings, J. (1997a). "Firm Growth and Ownership in Transition Countries", *Economics Letters*, Vol. 55, pp. 413-18.

Konings, J.(1997b). "Competition and Firm Performance in Transition Economies: Evidence from Firm Level Surveys in Slovenia, Hungary and Romania", CEPR discussion paper 1770.

Nickell, S. (1996). "Competition and Corporate Performance", *Journal of Political Economy*, vol. 104, pp. 724-746.

Nickell, S., Nicolitsas, D, and Dryden, N. (1997). "What Makes Firms Perform Well?" *European Economic Review*, Vol. 41, pp. 783-796.

Roland, G. And Verdier, T. (1997). "Transition and the Output Fall", *CEPR Discussion Paper* 1636, May.

Richter A. and Schaffer M. (1996). "Growth, investment, and newly-established firms in Russian manufacturing". Commander, S., Fan, Q. and Schaffer, M. (eds.), *Enterprise Restructuring and Economic Policy in Russia*, EDI/World Bank.

**Appendix: Data description**

**Output ( $y$ ): Value added is defined as: profit (loss) for period+remunerations, social security costs, pensions+depreciation+debt changes. This is valued in US dollars X 1000 000. So it reflects real value added.**

**Capital ( $k$ ): net tangible assets, value in US dollars.**

**Employment ( $n$ ): total number of employees**

**Financial pressure: interest paid, i.e. debt charges, divided by cash flow (profit/loss for period+depreciation)**

**Industry Sales: total industry sales at the 2 digit NACE level, computed from sample.**

**Table 1: Macro Economic Indicators**

	1990	1991	1992	1993	1994	1995	1996
<i>GDP at constant prices (% change)</i>							
Estonia	-8.1	-7.9	-14.2	-8.5	-1.8	4.3	4
Bulgaria	-9.1	-11.7	-7.3	-2.4	1.8	2.1	-10.9
<i>Unemployment</i>							
Estonia	Na	Na	Na	5	5.1	5.1	5.6
Bulgaria	1.5	11.5	15.6	16.4	12.8	10.5	12.5

Source: EBRD transition report, 1997.

**Table 2 : Summary Statistics**

	<b>Bulgaria</b>	<b>Estonia</b>
<b>employment growth</b>	-0.05 (0.22)	-0.01 (0.54)
<b>output growth</b>	-0.35 (0.82)	0.28 (1.01)
<b>ln (output)</b>	6.34 (1.30)	6.85 (1.22)
<b>ln (employment)</b>	5.88 (0.82)	5.62 (0.81)
<b>ln (capital)</b>	6.73 (1.74)	6.67 (1.72)
<b>number of firms</b>	101 (76.3)	12.4 (9.28)
<b>financial pressure</b>	2.14 (44.4)	0.75 (4.202)

**Table 3: Structure of the Panel**

<b>number of time units</b>	<b>Number of firms in Bulgaria</b>	<b>number of firms in Estonia</b>
<b>3</b>	<b>347</b>	<b>47</b>
<b>4</b>	<b>922</b>	<b>70</b>
<b>5</b>	<b>11</b>	<b>81</b>

**Table 4: Results: Dependent Variable:  $\Delta y$**

	BULGARIA		ESTONIA	
	(1)	(2)	(1)	(2)
$\Delta (n-k)$	1.24* (0.17)	1.22* (0.16)	0.41* (0.23)	0.56* (0.22)
$\Delta herf$	-0.25 (0.23)	-0.35 (0.23)	-0.03 (0.46)	-0.03 (0.44)
Herf	-0.43 (0.18)	-0.44* (0.18)	0.10 (0.26)	0.09 (0.26)
$\Delta$ financial pressure	0.007* (0.003)	0.007* (0.003)	0.23 (0.23)	0.26 (0.23)
Financial pressure	-0.07 (0.06)	-0.06 (0.06)	-0.30 (0.24)	-0.28 (0.22)
Disorganisation	-0.067* (0.024)	-0.05* (0.02)	-0.06 (0.09)	0.014 (0.09)
Industry sales	0.36* (0.101)	0.21* (0.10)	-0.04 (0.12)	0.27 (0.40)
Industry sales X disorganisation	-	0.04* (0.017)	-	-0.15 (0.20)
Year 95	-0.08 (0.12)	-0.10 (0.11)	0.12 (0.12)	0.22* (0.11)
Year 96	-1.22* (0.24)	-1.15* (0.24)	0.12 (0.11)	0.07 (0.12)
Constant	0.51* (0.13)	0.44* (0.13)	0.10 (0.33)	-0.06 (0.03)
Sargan test	12.8 (df=9)	12.08 (df=9)	12.9 (df=9)	12.9 (df=9)
SOC test	0.895	0.896	-0.796	-0.876

Notes: heteroskedastic robust standard errors in brackets, \* denotes statistically significant at the 5% critical level. Employment, capital and financial pressure are treated as endogenous, instruments include all available moment restrictions of the endogenous variables starting at t-2 and before.