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PERFORMANCE IN TRANSITION
ECONOMIES: EVIDENCE FROM FIRM
LEVEL SURVEYS IN SLOVENIA,
HUNGARY AND ROMANIA**

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TRANSITION ECONOMICS



Centre for Economic Policy Research

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ABSTRACT

Competition and Firm Performance in Transition Economies: Evidence from Firm Level Surveys in Slovenia, Hungary and Romania*

In this paper firm level data are used to test whether competition affects productivity performance in three transition countries, Hungary, Romania and Slovenia. The data are based on interviews taken in more than 300 state-owned, privatized and newly-established private firms between September 1996 and April 1997. The paper finds evidence that long-run competitive pressure has a positive impact on firm performance in Hungary and Slovenia, but not in Romania, while in Romania short-run competitive pressure has a positive impact on performance. The paper also finds evidence that ownership matters. Traditional firms (being state-owned and privatized enterprises) tend to perform worse than newly-established firms in Hungary and Slovenia. In Romania, the results are somewhat mixed; state-owned enterprises do worse than employee-owned (privatized) and newly-established private firms.

JEL Classification: O12, P00, L00

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NON-TECHNICAL SUMMARY

An old theme in the economics profession is the analysis of the effects competition has on firm performance. Competition is generally seen as a good thing, reducing monopoly power and forcing more efficient production methods. The implementation of market reforms in Central and Eastern Europe should have an impact on the emergence of competition and on the degree of competition firms face. This paper takes a first step in analysing the emergence of competition and its effects on firm performance. It starts with an overview of the theoretical and empirical literature on the effects of competition on firm performance.

In the analysis, firm level data are used to test whether competition affects productivity performance in three transition countries – Hungary, Romania and Slovenia. To this end, firm level interviews in more than 300 state-owned, privatized and newly-established private firms have been undertaken between September 1996 and April 1997. These interviews covered questions on inputs, outputs and various aspects of competition and ownership. In terms of sales and employment growth the 'de novo' private firms outperform the more 'traditional'. The former firms are also smaller than the latter. This pattern holds for all three countries.

One novelty of the paper lies in the way in which competition is measured. Three different measures are used. A traditional way of measuring competition is one that uses a concentration index, which captures the number of competitors in a market. A firm-level measure is used to capture the number of rivals a firm is facing. This was obtained by asking managers how many competitors they faced in their product market. One problem with using the number of rivals as a proxy for the degree of competition is that a high concentration ratio or a small number of competitors does not necessarily reflect weak competition. It is possible that a firm faces very tough price competition even though there are only one or a few rivals. Also, the number of rivals a firm is facing could be endogenous, i.e. good firm performance might induce new entry and hence the performance of firms determines the number of competitors. For these reasons the number of rivals a firm is facing is seen as a short-term measure for competitive pressure. A new measure is introduced that aims to capture the degree of price competition. This measure tries to capture the expected fall in price-cost margins if a new firm enters the market. This reflects the responsiveness of firms to prices if more firms start operating in the market. This depends on the underlying technology and

demand tastes the firm is facing, which do not regularly change. For this reason this measure is interpreted as long-term competitive pressure. A final measure is used to capture the extent of changing competition. Managers were asked whether they experienced an increase, a decrease, or no change in the number of rivals in their product market.

The results show that in all three countries competition has increased. In Hungary and Slovenia about 70% of the firms face many rivals, while in Romania this figure is only 43%. This suggests that in Romania there are still more state monopolies or firms with substantial monopoly power. In all three countries about 35% of the firms face long-run competitive pressure, i.e. 'tough' price competition. These firms are predominantly 'traditional' firms – state-owned or privatized enterprises.

To assess the impact of competitive pressure on firm performance, a production function was estimated taking into account the different ownership structures of the firm, the sector the firm was operating in and the competition measures. The regression analysis shows evidence that long-run competitive pressure has a positive impact on firm performance in Hungary and Slovenia, but not in Romania. In contrast, in Romania short-run competitive pressure has a positive impact on productivity performance of firms. In addition, ownership matters. In Hungary and Slovenia, the larger the ownership share of the state and of employees, relative to outside private investors, the lower is performance. In Romania, the results are somewhat mixed. The larger the ownership share of the employees in the firm relative to outside ownership the better is performance. It still remains the case that the larger the share of the state the worse the performance of firms relative to outside ownership.

If dynamic adjustment of sales is taken into account the above results still hold for Romania and Hungary, but become weaker for Slovenia. Outliers might drive some of the results, although accounting for potential outliers did not affect the estimated effects.

I. Introduction

For decades one of the key research themes in the economics' profession has been concerned with the driving forces behind competition and how competition affects firm performance. Competition is generally seen as a good thing, reducing monopoly power and forcing a more efficient way of organizing production. Many important policy measures are based on the argument of safe-guarding competition, such as the anti-cartel laws, deregulation and privatization of public utilities and recently, many of the economic reforms in Central and Eastern Europe. Yet, empirical evidence supporting the virtues of competition is mixed and rather weak². The purpose of this paper is to investigate the effect competition has on firm productivity performance in transition countries. To this end I use firm level data for Slovenia, Hungary and Romenia and use various measures for competitive pressure, ranging from a "traditional" measure capturing the number of rivals firms face in their product market to a more modern measure capturing the extent of price sensitivity with respect to potential entrants in the market as in Sutton (1991). I will refer to these measures as short run versus long run indicators of competition. In addition, I will take into account the ownership structure of the firms which allows me to test whether corporate control has any effect on productivity performance.

It is of particular interest to analyse the emergence of competition in the product market and how it affects productivity performance in firms in transition countries for

² Recent contributions include Nickell (1996) reporting positive competition effects on firm performance for the UK, while Blanchflower and Machin (1996) find no or very weak effects of competition on productivity performance. In international trade the focus has been on the effects of import competition on firm performance. MacDonald (1994) finds that only in concentrated industries

at least three reasons. First, the analysis of firms in transition countries provides a natural experiment to test whether competition has any effect on firm behaviour. This is of particular interest as many transition countries emerged from a highly distorted product market system where prices were regulated and mass production under the form of state monopolies was promoted. Second, due to the limited data availability, very little is known about the way competition works in the newly emerging market economies. Third, many of the economic reforms have been driven by the idea that competition improves performance, hence it is important to evaluate this argument with real data.

In section II I provide a theoretical and empirical background of the existing literature and I explain the way in which competition is measured. In section III the data set is discussed. They are based on firm level data collected via interviews with either the owner or the general manager of privatized, state owned and newly established private firms in Slovenia, Hungary and Romania. The surveys were performed between September 1996 and April 1997, so recent information on firm behaviour six years in the transition is available which suffers less from bias due to initial transition shocks as was the case with some other studies based on surveys. Section IV reports the econometric results and section V does some robustness checks. I conclude in section VI.

import penetration has positive effects on productivity growth and Levinsohn (1993) estimates that trade liberalization in Turkey forced firms to price more competitively.

II. Theoretical and Empirical Background

II. 1. The existing literature

The collapse of communism in Central and Eastern Europe led to a privatisation wave of state owned enterprises and a series of economic reforms aimed at creating a “competitive” market environment in which it is hoped firms will blossom and generate economic wealth. Most of the literature so far has focused on the virtues of privatisation in those countries and investigated whether privatisation led to better performance³. There exists a substantial, predominantly theoretical, literature that investigates the determinants of corporate performance (e.g. Hart, 1983; Mookherjee, 1984; Grossman and Hart, 1986; Boycko, Shleifer and Vishny, 1996). The theoretical results can be summarized as follows: One class of models deals with incentive effects of privatization. Privatization leads to better incentives because the firm objective is to maximize profits (or to survive) and private ownership of equity leads to private owners to bear the financial consequences of their decisions. Another class of models is related to human capital explanations of performance. Private owners choose the best managers to run their firm efficiently. Thus privatization works if it attracts new and different managers to the firm. Empirically, however, a lot of the privatizations involved a transfer of ownership to insiders, which can explain why privatized firms in many countries do not perform much better than state owned companies (Aoki and Kim, 1995).

³ Some recent empirical papers on this include Barberis, Boycko, Shleifer and Tsukanova (1996); Earl, Estrin, Leshenko (1996); Konings (1997) and references therein.

Another way to achieve better corporate performance is related to the effects competition has. Competition can affect company behaviour in various ways. Competition reduces managerial slack and stimulates worker effort. Nickell (1996) argues that since competition erodes product market rents unions ability to share in these rents is weakened. In a model where unions bargain over both wages and effort, increases in product market competition lead to increases in bargained efforts. Alternatively, in the context of efficiency wage models, Konings and Walsh (1994) show that firms have more incentives to pay an efficiency wage as product market competition is tougher, which then leads to better productivity performance. The intuition behind this result is that the wage premium firms pay voluntarily (in contrast to the one paid under bargaining) generates positive effects in the product market performance of the firm. If competition is hard, then the incentive to pay a wage premium is high as it generates a cost advantage which can be used to outperform rival firms that do not pay efficiency wages. A number of principal-agent models show that increased competition also affects managerial effort. Willig (1987) shows that it depends on the demand elasticity whether managers raise or reduce effort in response to increased competition, while Martin (1993) shows that there is an unambiguous negative effect of increased competition on managerial effort.

Other effects of competition are related to investment strategies of firms. If competition is tough firms might respond by implementing cost reducing investments or alternatively by making quality improving expenditures as in the models of vertical product differentiation (Sutton, 1991). Moreover, more competition can also lead to entry deterring strategies of incumbents without affecting productivity performance.

To date, however, little is known about the way in which competition in transition economies affects firm performance, let alone in capitalist societies. Hersch, Kemme and Bhandari (1993) estimated a standard model of the determinants of price-cost margins on firm level survey data for Hungary, Poland and the former Czech and Slovak Republic. When the data for the countries are pooled they found evidence that the number of rival firms face has some restraining effect on the price-cost margins of private firms. However, when the estimates are considered for the individual countries in their sample, only for Poland there seems to exist a strong effect of rivals on price-cost margins. Earle and Estrin (1996) investigated whether competitive forces and privatization had an efficiency enhancing role in Russia and found that privatization is having an impact on enterprise efficiency, but domestic market structure and hardening of the budget constraints mostly had little effect⁴. For capitalist societies, Nickell (1996) finds that competition has a positive effect on productivity growth in UK firms, while Blanchflower and Machin (1996) find no effect of competition in UK plants. An important difficulty inherent to the empirical tests is the way in which competition is measured.

II.2. Measuring Competition

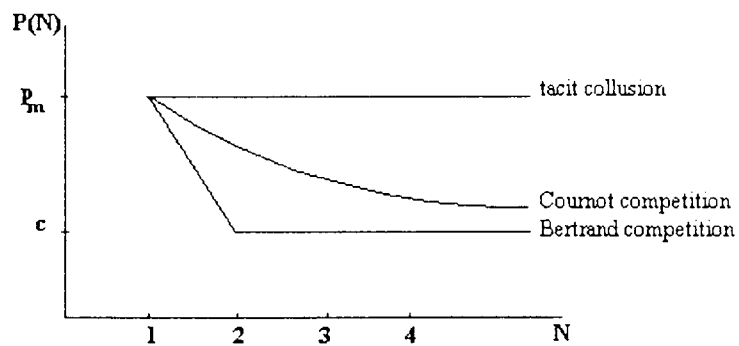
Empirically, most papers have measured competition either at the industry level by some measure of concentration (Sleuwaegen and Dehandschutter, 1986) or at the firm

⁴ The evidence of the effect competition has on productivity performance in capitalist societies is also mixed. Nickell (1996) finds positive effects for UK firms, while Blanchflower and Machin (1996) find no or very weak effects.

level by a subjective measure reflecting the number of rivals the firm faces (Nickell, 1996; Blanchflower and Machin, 1996). This is an equilibrium measure and reflects a “steady state” situation in a firm’s product market and is therefore endogenous. Hence, such a measure might be inappropriate to use in empirical work. Moreover, especially in transition countries it is likely that concentration levels or the number of rivals firms face will change in response to the transition shocks. I will illustrate this point: In the context of a two stage game, in stage 1 firms decide to enter or not to enter the market which involves paying a sunk cost of entry, while in stage 2 “price competition” takes place. Price competition can take the form of any oligopoly game such as Cournot, Bertrand or Joint Profit Maximization. By solving such a two stage game one can obtain an equilibrium number of firms in the market. It is clear that this equilibrium number of firms is highly endogenous and that it will depend on the level of sunk costs and the degree of price competition in the second stage of the game. Thus measuring competition by measuring the number of rivals in a market might be inappropriate as the number of rivals a firm faces or industry concentration does not necessarily reflect the intensity of price competition firms face. It is perfectly possible that an industry consisting of only a few firms is very competitive. This would be the case in a Bertrand type of setting. Alternatively, a large number of firms can be consistent with very weak price competition. This would be the case when there is for instance collusion, more firms could enter the industry without exerting downward pressure on prices. I therefore use also an alternative measure of competition, inspired by the work of Sutton (1991).

The toughness of price competition is measured as the corresponding fall in prices if a new firm was to enter the market. In this case Bertrand competition reflects a situation

in which firms face extremely tough price competition: with one firm in the market monopoly prices are set, a second firm pushes the prices to marginal costs. The case of tacit collusion reflects the other extreme of very weak price competition as an extra firm in the market does not affect (monopoly) prices set in the market. All oligopoly models can be modelled between these two extremes. This is illustrated in figure 1. It is this $P(N)$ function which I want to capture as an alternative measure for competition, where P stands for price and N is the number of firms.



It can be seen from figure 1 that for a *given* number of firms, the $P(N)$ function measures the *intensity* of price competition. It is a *long run* measure for competition since this intensity of competition (or the underlying oligopoly model) remains the

same irrespective of the size of the market. This $P(N)$ function, however, may shift in response to some exogenous shocks. In the case of transition economies any price competition was absent, so the $P(N)$ function was a horizontal line. With economic reforms, it is expected that the $P(N)$ function becomes steeper. At the same time the number of firms or rivals will change, so to control for the number of firms, I will also use the traditional measure of competition, N , which can be viewed as a measure of *short run* competition. In the short run the number of rivals gives some indication of competitive pressure, but in the long run, the number of rivals a firm faces depends on the interaction between the sunk costs of entering and the *intensity* of price competition or long run competition.

III. Data Description

Micro economic data are extremely scarce to obtain for any of the transition countries and in particular if one is interested in aspects of firm performance and restructuring. An alternative to obtain some information of the micro economic aspects of transition is by doing field work and collect data on the basis of firm level surveys as in Barberis et al. (1996), Earle and Estrin (1996) and Hersch et al. (1994). One main advantage of using survey material is that information can be used based on qualitative managerial responses which would not be available if only company accounts data are used.

The data used here are therefore also based on a detailed survey of 346 firms in Slovenia, Hungary and Romania. The firms were visited by interviewers between September 1996 and April 1997. Since there exists substantial evidence by now that it

is especially the “de novo” private firms that outperform the privatized and state owned enterprises, with little or no difference in performance for the two latter categories (e.g. Richter and Schaffer, 1996; Konings, 1997), the sample structure was chosen to cover 50% “de novo” private firms and 50% “traditional” ones (being state owned or privatized firms). A “de novo” firm was defined as a firm that since it was established is 100% privately owned and that was founded after the first of January 1990. The questionnaire inquired after various kinds of topics including aspects of ownership, production, industrial relations, competition and finance. Also retrospective questions were asked on the number of employees in the firm, sales, and some other variables which will form the basis of the analysis.

In table 1a the average employment and sales growth rate, the log sales and the log employment for the three countries in 1996 are reported. The sales data used in the analysis are all expressed in US dollar, which makes comparisons between the countries easier and sales can then be interpreted as real sales. The average real sales growth is largest in Slovenia, 5%. In Hungary and Romania real sales growth is negative on average, but in the latter the decline in sales is very large, 52% on average in 1996. This reflects the different stages of development in the three countries with Slovenia and Hungary the more advanced ones. This is consistent with macro economic performance indicators, Hungary and Slovenia being more advanced also in the economic liberalisation process. The average employment growth in the three countries, however, is positive.

In terms of employment, the average firm is largest in Romania, followed by Hungary and Slovenia. In terms of sales, however, Romania has on average the lowest sales. This already suggests that labour productivity in Romania is the lowest.

In table 1b similar summary statistics are reported, but separate for the two broad categories of firms, “de novo” versus “traditional” firms. A clear pattern emerges. Average sales and employment growth is higher in the “de novo” firms than in the “traditional” ones, moreover, as expected the “traditional” firms are larger both in terms of employment and real sales. In the analysis below I will use a more refined proxy for ownership type, based on the ownership share of the state and employees.

The key variables in the analysis are related to competition. To measure the degree of competition the following questions were asked:

Suppose a new firm (competitor) would enter in your market. How would this affect your prices?

- 1. stay the same*
- 2. go down moderately*
- 3. go down a lot*

In Hungary, there was no firm that indicated that the price would go down a lot, in Slovenia only four firms said so and in Romania only two. Therefore, I created a dummy (*tough*) if the firm indicated 2 or 3 in the above question and zero otherwise.

In table 2 it can be seen that there are not many differences between the three countries, around 35% of the firms said they faced tough price competition. As suggested before it is a measure of *long run* price competition and tells something

about how prices will move as there would enter new firms in the market. It suggests that 65% of the firms do not face tough competition in the long run. With the transition towards a market economy, the P(N) function has shifted downward, yet a substantial fraction of the firms seem to face a flat P(N) function as in the communist era. Interestingly, more traditional firms reported that they faced tough competition than “de novo” firms. In particular, for the three countries about 40% of the traditional firms reported tough price competition, while this compares to respectively 24%, 23% and 31% for the “de novo” ones in Hungary, Romania and Slovenia. This suggests, that the P(N) function has shifted predominantly for the privatized firms now faced with market conditions. It also suggests that the “de novo” firms operate on the flat part of the P(N) function, since they are small, most likely they operate at marginal cost at the far right side of the P(N) function. This is the case if there are many firms in their product market.

Two other measures for competition are used and they relate to short run aspects of price competition, i.e. the number of rivals the firm is facing. The following questions were asked:

How many competitors does your firm face in its product market?

Dominant firm

A few

Many

I constructed a dummy (*few, many*) for each of these categories and table 2 shows the responses in the three countries. It can be seen that especially in Hungary and Slovenia the firms faced many rivals, while this was so to a lesser extent in Romania. This reflects the slower pace of transition in Romania and confirms the interpretation that this measure of competition can be seen as a *short run* competition measure. Especially the “de novo” firms faced many rivals, 74% in Hungary, 53% in Romania and 68% in Slovenia. To capture the idea of *changing* competition, an additional question was asked:

Did the number of competitors your firm faces in its product market change in the following periods?

1990-93: *go up* *go down* *stay the same*

1994-96: *go up* *go down* *stay the same*

A dummy (*increase*) was constructed if the firm responded that the number of competitors went up. There were hardly no firms that responded it went down. In table 2 it can be seen that in Hungary and Slovenia 66% respectively 62% experienced an increase in the number of competitors, while in Romania this was only 50%.

IV. Methodology and Results

The empirical model is based on a standard production function, but which takes into account aspects of restructuring and transition. To focus ideas, let

$$Y=F(aL,bK) \tag{1}$$

where Y is output, L is labour input, K is capital input, a and b are parameters that denote labour and capital augmenting effects. The competition effects are modelled through these terms. In particular, I assume that

$$a=f(\text{comp, tough, increase, ownership}) \tag{2}$$

$$b=g(\text{comp, tough, increase, ownership}) \tag{3}$$

I assume a linear approximation of (1), (2) and (3) which yields the following specification

$$y = \alpha_0 + \alpha_1 l + \alpha_2 k + \alpha_3 \text{tough} + \alpha_4 \text{few} + \alpha_5 \text{many} + \alpha_6 \text{increase} + \alpha_7 \text{SOE} + \alpha_8 \text{Empl} + \varepsilon$$

where y stands for log sales, l stands for log employment, k is log capital, *tough*, *few*, *many* and *increase* have been defined before. Ownership is measured by the share of the company that is owned by the state (SOE) and the share of the company owned by

the employees (Empl), the category that is left out is the bench mark which represents the share of the firm owned by private owners (i.e. the manager, outside investors,...)

To find a good measure for capital is quite difficult especially in transition countries. First, a lot of the machine stock in the formerly communist countries is obsolete and is not used anylonger. Second, in a survey it is difficult to ask for an exact estimate of the capital stock of a firm, because it can be a sensitive question or managers sometimes do not have an idea themselves. Therefore, capital is proxied by two variables: a dummy equal to 1 if the firms has more than one subsidiary (*subsidiaries*) and a dummy equal to one if the firm has made a new investment in equipment (*new equipment*). While the former is fixed over the sample period, the latter varies by year. As the survey asked retrospective questions on employment and sales going back till 1990 the observations are pooled for the several years and controlled for common aggregate shocks to production by using time dummies. A second reason why time dummies are important is to control for unobserved price movements⁵. So, the data are treated as a panel in which some variables are time varying (investment in new equipment, increased competition, employment) while others are fixed.

I used several estimation techniques. Table 3a starts with showing the results for the three countries using Ordinary Least Squares. Competition seems to affect productivity performance, but in a different way in the three different countries. In Hungary and Slovenia there is a strong positive effect of the impact of *tough* price

⁵ Common industry effects can be controlled for by sector dummies. However, no information is available on the sectoral classification, at least not at a narrowly defined level. Industry effects are controlled for via the competition variables, which refer to the the relevant product market and they are therefore in fact more precise. When the regressions were performed with a dummy for manufacturing, the results remained the same.

competition on performance, i.e. long run competitive pressure has a positive impact. The short run competitive pressure, measured by the number of rivals and increased competition, also plays a role. In Hungary, when the firm faces a few rivals, superior performance results viz à viz the bench mark case of being the dominant firm, yet it is only statistically significant at the 10% critical level. In Slovenia, it is the increase in the number of rivals, rather than the level of rivals that has a positive impact on performance. Finally, in Romania, long run competitive pressure as measured by *tough* does not have a statistically significant impact on performance. This can be expected as transition started later in Romania. However, the number of rivals seems to matter. If the firm faces a few rivals than performance is improved and if the firm faces many rivals, the estimated coefficient is also positive, but not significant.

The ownership effects also have an impact on performance. In Hungary relative to (de novo) private firms the larger the share of the state and the larger the share of the employees (via privatisation) the lower the performance. The same holds for Slovenia, except that the ownership share of the state is not significant. In Romania, the larger the share of the state the lower the performance, but the opposite holds for employee ownership.

Thus, the results reported in table 3a suggest a positive effect of competitive pressure on firm performance and this effect feeds through in different ways in different countries. The long run competitive pressure, measured by *tough*, only is important in the more advanced countries.

However, in the above regressions, there is a potential endogeneity problem with employment. I therefore used Instrumental Variables to test whether the results are seriously affected by that and table 3b shows the results. The instruments I used, include log employment in t-1 and t-2 and union recognition. The results are confirmed and more clear cut. In particular, in the two more advanced countries, Hungary and Slovenia, there is only evidence for positive effects of *long run* competitive pressure, *tough*, while in Romania, only *short run* competitive pressure is important. The results on ownership remain the same.

V. Robustness

In this section I test the robustness of the above findings. In particular, I will take into account a dynamic adjustment process of output. In table 4 I show OLS results where lagged output (in period t-2) is taken into account⁶. Some interesting results emerge. Starting with Hungary, output is highly persistent. The results on competition remain robust at least concerning the sign of the effect and the significance level. Firms that face *tough* price competition or long run competitive pressure do better. Interestingly, ownership does no longer attract a significant coefficient, which suggests that ownership does not affect output growth, but rather output levels. Also, investment in new equipment becomes significant. Turning to Romania, the same results hold as before, short run competition measured by the number of rivals has a positive effect on performance and the toughness in price competition is now significant at the 15% level. Again, ownership no longer is statistically significant. Finally, the results for

⁶ If instrumental variables are used, similar results hold.

Slovenia are different. In particular, the toughness of price competition now has a negative, rather than a positive, effect on output performance. Thus, the results for Slovenia do not seem to be very robust to the inclusion of some adjustment process in output. However, the negative effect on the toughness of price competition seems to be driven by a few observations where firms were facing extremely tough price competition, i.e. firms that indicated that the price would go down *a lot* if a new firm was to enter the market. When the regression was done again, excluding these observations, no statistical significant effect of toughness of competition was found in Slovenia, using the dynamic model. Thus, this suggests that there is no unique linear relationship between the P(N) function described earlier and performance. A more refined measure of the P(N) function will be able to shed more light on this issue. It is clear, however, that the traditional measure of competition, i.e. the number of rivals does not affect performance in Slovenia, nor in the static model or the dynamic one. The ownership effect is still important, but only for the ownership share of the state. The higher this share the less productive the firm.

Some further robustness checks have been performed. In particular, some of the results might have been driven by outliers. To test whether the results are significantly affected I estimated the dynamic specification again, but used robust regression techniques. This technique is an iterative regression method that exists in starting with the usual regression, calculating the residuals, and then weighting the residuals according to their distance to the average predicted regression line. Outliers are given a smaller weight, so that their importance in determining the coefficient is reduced. All the results reported in table 4 were confirmed and, as expected, the statistical significance was increased.

VI. Conclusion

In this paper I used firm level data collected by surveys to test whether competition affects productivity performance in three transition countries, Hungary, Romania and Slovenia. Little is known about the determinants of productivity performance and in particular about how competition feeds through in newly emerging market economies. This paper takes a first step in filling this gap.

I introduced three measures for competition. The first is a “long run” one and measures the extent of potential price competition. In particular, it measures how unit margins fall as a new entrant would enter the market. This can be related to specific oligopoly models which proxy in an abstract way the toughness of price competition. The other two measures are “short run” measures and capture the number of competitors a firm is facing and how these have changed during the transition period. I reported evidence that the toughness of price competition or long run competitive pressure improves productivity performance in Hungary and Slovenia, but not in Romania. While in Romania, short run competitive pressure affects firm productivity performance in a positive way, but not long run. This is consistent with the idea that competition has been more developed in Hungary and Slovenia than in Romania and therefore short run competitive effects have already occurred in the two former countries.

When some dynamics were introduced the results for Slovenia changed, but this was due to a few outliers. It is suggested that the relationship between long run competitive pressure and productivity performance need not be a linear one and

therefore a more refined measurement of this concept should shed further light on the issue.

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TABLE 1A: Summary Statistics for 1996

	Hungary	Romania	Slovenia
Employment Growth	0.021 (0.32)	0.087 (0.34)	0.042 (0.21)
Sales Growth	-0.15 (0.49)	-0.52 (0.65)	0.049 (0.98)
ln (employment)	4.22 (2.13)	5.64 (2.55)	3.79 (2.12)
ln (sales)	8.41 (2.86)	6.17 (2.17)	9.95 (2.72)

Note: standard errors in brackets, sales are in US dollars and x 1000.

TABLE 1B: Summary Statistics

	Hungary		Romania		Slovenia	
	Novo	Traditional	Novo	Traditional	Novo	Traditional
Employment Growth	0.10 (0.23)	-0.029 (0.36)	0.25 (0.48)	-0.023 (0.10)	0.11 (0.26)	-0.024 (0.13)
Sales Growth	0.09 (0.74)	-0.29 (0.17)	-0.34 (0.58)	-0.64 (0.68)	0.05 (0.25)	0.04 (1.33)
ln (employment)	2.49 (1.8)	5.41 (1.39)	2.98 (1.01)	7.48 (1.41)	2.18 (1.23)	5.37 (1.55)
ln (sales)	6.81 (2.93)	9.41 (2.33)	4.44 (1.32)	7.26 (1.87)	8.67 (2.87)	11.12 (1.98)

Note: standard errors in brackets

TABLE 2: Summary Statistics

	Hungary	Romania	Slovenia
Increase competition	66.5 %	49 %	53 %
tough competition	35 %	34 %	36 %
few rivals	29 %	37 %	26 %
many rivals	69 %	43 %	66 %

Table 3a: Ordinary Least Squares Estimates of productivity equation

	Hungary	Romenia	Slovenia
ln (emp)	0.565* (0.069)	0.815* (0.55)	0.871* (0.072)
subsidiaries	-1.201* (0.224)	0.638* (0.231)	-0.173 (0.302)
new equipment	0.154 (0.197)	0.147 (0.175)	-0.35 (0.259)
few competitors	1.249** (0.734)	0.646* (0.225)	-0.181 (0.522)
many competitors	0.654 (0.742)	0.31 (0.248)	-0.202 (0.475)
tough	0.437* (0.203)	-0.126 (0.164)	0.831* (0.254)
increased comp.	0.145 (0.219)	0.066 (0.187)	0.457** (0.276)
SOE	-0.959* (0.44)	-0.732* (0.383)	0.167 (0.615)
employee owned	-1.265* (0.363)	0.699** (0.398)	-1.667* (0.58)
Adj. R-sq.	0.373	0.766	0.5
observations	580	464	310

Note: All equations include time dummies, a constant and a dummy for manufacturing, * respectively ** denotes statistically significant at the 5% respectively 10% critical level

Table 3b: Instrumental Variables of the productivity equation

	Hungary	Romenia	Slovenia
ln (emp)	0.515* (0.091)	0.759* (0.066)	0.891* (0.088)
subsidiaries	-1.392* (0.286)	0.45* (0.262)	-0.057 (0.342)
new equipment	0.159 (0.245)	-0.224 (0.203)	-0.324 (0.297)
few competitors	1.045 (0.916)	0.677* (0.254)	-0.53 (0.576)
many competitors	0.67 (0.929)	0.232 (0.282)	-0.408 (0.527)
tough	0.539* (0.248)	-0.16 (0.185)	0.594* (0.29)
increased comp.	-0.036 (0.276)	0.057 (0.216)	0.205 (0.314)
SOE	-0.871** (0.523)	-0.373 (0.42)	-0.101 (0.687)
employee owned	-1.393* (0.446)	0.785 (0.453)	-1.888* (0.67)
Adj. R-sq.	0.342	0.626	0.403
observations	380	326	216

Notes: As in table 3a, instruments include log employment t-1,t-2 and union recognition.

Table 4: Dynamic specification

	Hungary	Romania	Slovenia
ln (output)_{t-2}	0.962* (0.018)	0.736* (0.033)	0.816* (0.025)
ln (emp)	-0.003 (0.032)	0.091** (0.052)	0.046 (0.043)
subsidiaries	0.013 (0.097)	0.004 (0.169)	0.126 (0.136)
new equipment	0.175* (0.083)	-0.052 (0.140)	0.188 (0.118)
few competitors	0.363 (0.284)	0.495* (0.163)	-0.145 (0.237)
many competitors	0.249 (0.287)	0.348* (0.183)	-0.020 (0.221)
tough	0.172* (0.085)	0.172 (0.121)	-0.295* (0.121)
increased comp.	-0.096 (0.096)	-0.100 (0.139)	0.063 (0.126)
SOE	-0.025 (0.184)	-0.158 (0.267)	-0.620* (0.267)
employee owned	-0.134 (0.154)	0.287 (0.303)	0.059 (0.289)
adj. R-sq.	0.9	0.8	0.9
Observations	385		

notes: as in table 3a.