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Competition and ownership structure: Substitutes or complements?[1]

Evidence from the Warsaw Stock Exchange

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Abstract

In this paper we analyse the impact of product market competition and ownership structure on firm performance. Our results show that product market competition has a positive and significant impact on performance. Concerning the effect of ownership concentration, we find a U-shaped relationship with performance. Firms with relatively dispersed and relatively concentrated ownership have higher productivity growth than firms with an intermediate level of ownership concentration. This correlation between concentration of ownership and productivity growth is not explained by the type of the controlling shareholder. Finally, product market competition and good governance tend to reinforce each other rather than to be substitutes. Competition has no significant effect on performance for the firms with 'poor' governance; on the contrary, it has a significant positive effect in the case of firms with 'good' corporate governance.

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1. Introduction

The impact of competition and ownership concentration on firms' performance has largely been studied in corporate governance literature. It has also been recently discussed in the context of a more general debate concerning large-scale institutional change in Central and Eastern Europe. This unusual experiment provides an opportunity to test a number of hypotheses concerning the link between various policy measures and their impact on firm performance. One of the claims that has been formulated in this context is that privatization strategy failed to create adequate corporate governance arrangements and that ownership transformation could have been postponed. Competition, it is argued, turned out to be more important than ownership and it should have been at the centre of the transformation strategy from the very beginning (Bolton, 1995; Stiglitz, 1999). More attention, the argument goes, should have been given to managerial incentives and supervision rather than to ownership changes. In particular, mass privatization is often criticized because of important perverse effects: by freely transferring assets to certain groups of the population, it creates vested interests that can block further reforms (Russia) or brings about a rigid (and often dispersed) ownership structure unable to offer efficient monitoring to firms. In the absence of good corporate governance arrangements, competition, it is argued, could be considered as a substitute: it could provide managers with appropriate disciplinary mechanisms. In terms of policy recommendation, the conclusion of such analysis is clear: instead of focusing on privatization, reformers should have been more concerned with competition.

In this paper we use the available data on the non-financial firms listed on the Warsaw Stock Exchange to analyse the impact of competition and ownership concentration on firm performance. The relationship between ownership concentration and firm performance is crucial for the issue of corporate control. First, we study the separate effects of competition and ownership concentration on productivity growth at firm level. Next, we investigate their interaction: are they substitutes or complements? The substitution effect would mean that, when corporate governance is weak, competition plays an important role as a disciplinary device forcing managers to improve performance and reducing slack; if, on the contrary, agency costs or other problems of corporate governance are not too severe, the role of competition in stimulating managerial efficiency may be more limited. On the other hand, if competition and corporate governance were complementary, they would reinforce each other: the effectiveness of corporate governance would be enhanced by market competition, and vice versa. In such a case, product market competition alone might not be sufficient to reduce productive inefficiencies in an environment with poor corporate governance.

Our results show that product market competition has a positive and significant impact on firm performance, notably in the case of privatized firms. Concerning the effect of ownership concentration, which turns out to be quite high in Poland, we find a U-shaped relationship with performance. Firms with

relatively dispersed ownership (no shareholder with more than 20 percent of the voting shares) and firms, in which one shareholder has more than 50 percent of the voting shares, have higher productivity growth than firms with an intermediate level of ownership concentration. This correlation between concentration of ownership and productivity growth is not explained by the identity of controlling shareholders. We also find that product market competition and 'good' ownership structure tend to reinforce each other rather than to be substitutes. Competition has no significant effect on productivity growth in firms with 'poor' governance; on the contrary, it has a significant positive effect in the case of firms with 'good' corporate governance.

Our empirical strategy takes care of the crucial problem of the potential endogeneity of explanatory variables by using the GMM estimators proposed by Arellano and Bond (1991). We control for unobserved heterogeneity and, consequently, for several types of potential selection bias. For instance, as it is possible that initially more productive firms had specific ownership structures, fixed effects should capture such initial differences in productivity level. Moreover, we control for industry fixed effects affecting the rate of growth of productivity. Hence, it is unlikely that the ownership structure (and the correlation with performance that we identify) simply reflects industry characteristics (such as industry-specific trends of productivity).

The paper is organized as follows. In Section 2, we summarize the theoretical arguments concerning, first, the impact of competition on firm performance, and second, the relationship between ownership concentration and performance. The empirical strategy and the data are described in Section 3. Results are presented in Section 4. In Section 5, we conclude.

2. Theoretical background and empirical evidence

2.1 Competition and firm performance

The impact of competition on firm performance can *a priori* be ambiguous. According to standard economic theory, competition forces prices to equal marginal costs, which brings about allocative efficiency. It also helps the selection of the fittest in the sense that, in the long run, competitive markets stimulate the survival of the more efficient firms. Competition may also affect performance and foster efficiency by improving managerial incentives (Hart, 1983; Shleifer and Vishny, 1986; Schmidt, 1997). Increasing the probability of bankruptcy, competition induces managers to the greater effort and cost reduction necessary to avoid bankruptcy. On the other hand, offering opportunities for comparison (relative to other firms throughout the economy or within the same industry), competition provides better incentives to work hard, in order to get higher rewards.

But competition can also hinder efficiency. Since Schumpeter, competition has been viewed as an impediment to innovation and growth. If market power is considered as a prerequisite for innovation, competition, through a Schumpeterian channel, may have a negative impact on firm performance (Aghion and Howitt, 1997). Schmidt (1997) also argues that the relation between competition and performance is ambiguous, cost reduction being maximized for an intermediate degree of competition.

In the context of transition economies, competition is likely to have an additional impact on firm performance. On the downside, as emphasized by Blanchard and Kremer (1997), competition may worsen firm performance during the 'disorganization phase'. On the upside, however, during the period of deep economic transformation increased competition can, first, play the role of a signal of the regime change: through hardening the firm's budget constraint it may influence the expectations and incentives of managers and employees. Moreover, in the period of great uncertainty about what should be produced and how, competition in the product market may also help to generate information about various investment opportunities and about the quality of managers. Given the huge need for firm restructuring, transition-specific effects of competition should be stronger in the case of the previously state-owned enterprises than in the newly created firms. In the former, coming out from the old regime, the scope for cost-reducing measures is bigger, whereas the latter, created in a competitive environment, do not need, at least initially, to be restructured and are less subject to managerial slack. So, newly created firms may be expected to be less responsive to competition than privatized firms.

For a summary of the empirical evidence about the impact of competition on performance in transition countries, see Carlin and Horvath (2000), Brown and Earle (2000) and Djankov and Murrell (2002).

2.2 Ownership concentration and firm performance

What are the characteristics of 'good' corporate governance arrangements? The answer will clearly depend on the underlying theory of the firm. Since Berle and Means (1932) the literature on governance has been dominated by the concern about the dispersion of ownership and the resulting separation of ownership from control.[2] The key question studied was how to maximize shareholder value and to ensure efficient control of managers by owners.[3] When equity is widely dispersed,

[2] For a review of the literature see Shleifer and Vishny (1997). La Porta *et al.* (1999), who have recently compared corporate ownership structure around the world, found that most large corporations have controlling shareholders. They conclude that monitoring the managers is not the main problem of corporate governance. The real concern is the risk of the expropriation of minority shareholders.

[3] More recent works suggest that the theory of the firm should not focus exclusively on the agency relationship between owners and managers. Berglöf and von Tadden (1999) and Allen and Gale (2000) argue that managers should be made responsible not only to shareholders but also to other stakeholders, such as employees, suppliers or customers. It would be obviously appealing to have an alternative to shareholder value taking into account various externalities. However, the design of an appropriate

shareholders do not have appropriate incentives to monitor managers. Such conflict can hinder the provision of external finance to a firm. Concentration of ownership stakes is usually considered as a potential solution to this problem.

Other theoretical models suggest that the impact of ownership concentration on performance may be more ambiguous than initially expected. First, if concentrated ownership provides incentives to monitor, it also reduces the manager's initiative or incentives to acquire information (Aghion and Tirole, 1997). In this perspective, Burkart *et al.* (1997) view dispersed ownership as a commitment device ensuring that shareholders will not exercise excessive control, which might hinder managerial activism.[4] This suggests that when managerial initiative and competence is particularly valuable (which may be the case, for instance, when firms face high uncertainty), concentrated ownership may be harmful. Second, dispersed ownership implies higher liquidity of stocks, which, in turn, improves the informational role of the stock market (Holmström and Tirole, 1993). This may, again, be more valuable in an uncertain environment (Allen, 1993), or when it is essential to ensure that the control of underperforming firms changes hands. Third, concentrated ownership is costly for large shareholders because it limits diversification and reduces owners' tolerance towards risk (Demsetz and Lehn, 1985). Allen and Gale (2000) conclude that in the second best world of incomplete contracts and asymmetric information, separation of ownership and control can be optimal for shareholders.[5]

Overall, it appears difficult to state *a priori* the characteristics of a 'good' ownership structure. For Morck (2000), 'economic theory provides equally ample resources for constructing models in which concentrated corporate ownership is either good or bad'.[6] Empirical evidence on the impact of ownership concentration on performance is not conclusive. Demsetz and Lehn (1985) find no significant positive relationship between ownership concentration and the accounting profit rate. In Nickell *et al.* (1997), control by a financial company improves performance whereas control by a non-financial company tends to be negatively correlated with productivity growth. Leech and Leahy (1991) do not get clear-cut results; they show that the correlation between performance and concentration depends on the concentration variable chosen. Finally, Bianco and Casavola (1999), using a panel of Italian firms, find a negative correlation between ownership concentration and profitability. According to them, this suggests that

managerial incentive promoting the stakeholder society turns out to be an excessively complex task (Tirole, 2001).

[4] Cremer (1995) also shows that the principal may choose an inefficient monitoring technology to commit not to verify the action of management and renegotiate *ex post*. *Ex ante*, this provides powerful incentives to the management.

[5] As pointed out by Bolton and von Thadden (1998), 'the issue is not whether ownership concentration *per se* is desirable or not. The issue rather is how often and at what points in the firm's life ownership should be concentrated'.

[6] Some argue that ownership structure is endogenously determined and adjusts to the firm's environment, depending on the industry considered, the riskiness of investments and the stability of the environment (Demsetz and Lehn,1985; Allen, 1993; Carlin and Mayer, 1999).

the concentration of ownership may have made control insufficiently contestable, hampering the selection of individuals who hold control. For the Czech Republic, Claessens and Djankov (1999) find that there exists a non-monotonic relationship between concentration and performance: foreign and non-bank-sponsored-funds ownership are associated with higher profitability.

2.3 Governance and competition: complements or substitutes?

How do product market competition and corporate governance interact when affecting firm productivity? The question is whether corporate governance and competition reinforce each other (are complementary) or if one can be considered as a substitute for the other. If they were complements, the impact of product market competition would be greater in firms with efficient governance structures. Aghion and Howitt (1997) and Aghion *et al.* (1999) propose a model in which competition appears as a substitute for 'good' corporate governance (measured by financial pressure) at the firm level. On the contrary, Holmström and Milgrom (1994) analyse initiative and various incentive mechanisms as complementary in a multitask principal-agent framework. Empirical evidence concerning the relationship between product market competition and control is scarce. Nickell *et al.* (1997) find that competition and control (or financial pressure) can be considered as (weak) substitutes in a panel of British firms. Identifying a joint effect of competition and corporate governance may have important policy implications. This is particularly true in the case of the countries that undertake profound reconstruction of their institutional infrastructure.

3. Empirical framework and the data

3.1 Empirical model

Consider a firm run by a manager (either a salaried manager or a controlling shareholder) whose role is to allocate different inputs, organize production and make investment decisions. His decisions are summarized in a vector of 'efforts' e. We assume that this effort affects the overall productivity, more precisely it enters the production function as a multiplicative factor.

We assume that the production function can be written:

$$Y = A(e) \cdot F(K, L) \tag{1}$$

where $F(K, L)$ is assumed to be a Cobb-Douglas production function with no restriction on returns to scale. As in Nickell (1996) and Nickell *et al.* (1997), we estimate the production function directly, which allows the factors explaining the performance of the firm to be identified. According to the literature described in

the previous section, the ownership structure and the degree of competition in the product market may affect the productivity of the firm when managers do not maximize profits. The equilibrium effort level e^* depends on the ownership structure OS, on the degree of competition on the product market C, and on the interaction term:

$$e^* = e^*(OS, C, OS \cdot C) \tag{2}$$

The interaction term between ownership structure and competition allows the potential complementarity or substitutability between corporate governance and product market competition to be discussed.

The log linear empirical specification (in which we also include a lagged effect of output) is:

$$y_{it} = \rho y_{it-1} + (1-\rho)\alpha \cdot l_{it} + (1-\rho)\beta \cdot k_{it} + \gamma_i(e^*) \cdot t + \beta_i + \beta_t + s_j \cdot t + \varepsilon_{it} \tag{3}$$

where y is log (real) output, l log employment, k log (real) net capital stock (revalued by using the aggregate investment price index), and γ_i embodies factors that affect productivity growth and that do not depend on the level of production factors and are affected by the competence and behaviour of management. β_i are firm fixed effects, which covers all unobserved firm-specific factors influencing the level of productivity. β_t are time effects, which control for common shocks. ε_{it} reflects all other productivity shocks that are not correlated among firms and are assumed to be serially uncorrelated (we shall check later that this assumption is supported by the data). The lagged dependent variable takes into account potential persistence in the dynamics of the production process. Finally, we control for systematic industry differences in the rate of growth of productivity by including industry fixed effects s_j. By controlling for such industry fixed effects, it is unlikely that the competition and ownership effects capture different trends of productivity growth across industries.

The parameters of this model can be estimated after differencing to eliminate the individual fixed effects (as all explanatory variables are potentially correlated with these fixed effects), and treating lagged output and factor inputs as endogenous to control for the potential endogeneity bias. Therefore the model is estimated as a productivity growth model.

We estimate the following equation:

$$\Delta y_{it} = \lambda_1 \Delta y_{it-1} + \lambda_2 \Delta l_{it} + \lambda_3 \Delta k_{it} + \gamma_i (e^*) + \Delta \beta_t + s_j + \Delta \varepsilon_{it} \quad (4)$$

where $\lambda_1 = \rho$, $\lambda_2 = (1 - \rho)\alpha$ and $\lambda_3 = (1 - \rho)\beta$. Therefore, the long-term impact on productivity growth of factors embodied in the variable e^* is given by $\gamma_i / (1 - \rho)$. As long as the ε_{it} are serially uncorrelated, all lags (dated $t - 2$ or before) on y, l and k are valid instruments. Due to the short time dimension of our panel we will limit ourselves to moment conditions based on the level variables y, l and k dated $t - 2$. These moment conditions are valid if the error term is not serially correlated. In all estimations, tests for serial correlation confirm the validity of this hypothesis. Other moments include other right hand side variables in level, with the same two period lag. We will use the generalized method of moment technique (for a general exposition of the GMM techniques see Matyas, 1999) developed by Arrelano and Bond (1991, 1998), by focusing on the productivity growth equation.[7]

3.2 Sample

Our sample includes all firms listed on the Warsaw Stock Exchange (WSE), i.e., about 200 non-financial companies over the period 1991–98. The quality of the data is exceptionally good for a country in transition, as the informational requirements of the WSE are comparable to those of Western European stock markets. Prudential regulation of the WSE is quite stringent and effective. The Polish regulatory strategy is often given as an example for other countries in transition (see Glaeser *et al.*, 2001). According to Pistor *et al.* (2000), who provide an assessment of stock market integrity in transition economies, the Polish score (4/6) is the highest in 1992, although several other countries perform better later in the 1990s.

Our database relies on published, audited accounts of balance sheets and income statements. The high quality of the data is especially important in the case of the book value of fixed assets, which, in non-listed firms or in firms listed on a less informationally demanding emerging stock market, would be much less reliable. The information from the balance sheets and income statements has been extended by including information on the origin of firms (newly created firms or ex-state-owned privatized firms), on ownership structure and on employment. The information on the ownership structure includes the identity of all

[7] Concentrating on the productivity growth equation however has a cost. As shown by Blundell and Bond (1998), the coefficient of capital will be underestimated as the consequence of the weak correlation between the rate of growth and past levels of the capital stock. Still, this technique remains the most sophisticated one available for such productivity growth equations.

shareholders holding more than the mandatory disclosure threshold of 5 percent of the shares (for some firms we have information about smaller shareholders), the percentage of shares and voting rights they hold, and the identity of the CEO (and his stake in the firm). This yields an unbalanced panel with on average four years of consecutive observations per firm.

3.3 Competition and ownership structure variables

We discuss here competition and ownership structure variables. Other variables are defined in the appendix.

3.3.1 Competition variables

We concentrate on the impact of competition on productivity growth. When the time span is short this is more intuitively appealing than looking at the impact of competition on the productivity level. It also makes the interpretation of the interaction term (with ownership) more natural. We use two firm level measures of competition.[8]

Market share

Market share is defined as a ratio of firm's sales to total sales in the two-digit industry. In order to deal with the problem of simultaneity, we take, in the differenced equation, $mktsh_{i,t-1}$. In other words, we assume that it takes one period for market power (proxied by market share) to affect the rate of growth of productivity. This variable is correlated with $\varepsilon_{it} - \varepsilon_{it-1}$, hence we treat it as endogenous (and use as instruments $mktsh_{i,t-2}$ and $mktsh^2_{i,t-2}$).

Rent

The variable 'rent' is defined in the following way: (gross earnings minus the user cost of capital, time (total debt + total equity)) divided by total assets. Gross earnings are earnings before taxes, interest payments and depreciation. We use as a proxy for the user cost of capital the lending rate of interest (obtained from the IMF International Statistics), deflated for inflation, plus a constant depreciation rate (10 percent). The main drawback of this type of measure of *ex post* monopoly power is that it is clearly strongly correlated not only with market power but also with profitability, whatever the precise definition chosen (see for instance Nickell, 1996). Still, the combination of the two competition measures used allows us to test, although imperfectly, the robustness of our results. Again, we assume that it takes one period for the *ex post* rents to affect the rate of growth of productivity.

3.3.2 Ownership structure variables

We measure ownership concentration by the equity stake held by the largest shareholder. We take two threshold values of the first owner's voting share: 20

[8] We also tested for non-linear impact of competition by adding the square of market share or rent, but they turned out to be insignificant.

percent and 50 percent. Below 20 percent the firm may be considered to be widely held[9] and beyond 50 percent the main shareholder has perfect formal control. These two thresholds divide the sample into three sub-groups of respectively 42, 95 and 51 firms (the corresponding dummy variables are *Disp*, *Conc2050* and *Conc50*).

We also define dummy variables to control for the identity of controlling shareholders (assuming that effective control requires to have at least 20 percent of voting rights): non-financial firm, individual (other than CEO), bank, National Investment Fund, CEO, or the state. Additionally we use dummy variables for large foreign ownership (more than 20 percent of voting rights) and for newly created firms.

Ownership concentration may be correlated with the size of the firm. For instance, one could expect smaller firms to have more concentrated ownership. We will test the robustness of our main results to the inclusion of variables capturing size effects.

3.4 The data

The firms in our sample are either newly created firms or previously state-owned enterprises which have been privatized. Among the privatized firms, 89 were privatized directly by Initial Public Offering or through direct sale, 35 were privatized in the framework of the mass privatization programme and their shares were initially allocated to National Investment Funds (NIFs),[10] 14 firms were privatized through leveraged employee and managerial buy-outs. Fifty firms were created *de novo* and are now quoted on the stock market.

In Table 1, we display the distribution of voting rights (respectively cash flow rights) of the largest shareholders in our sample – i.e., the number and percentage of companies for which the largest voting right (respectively cash flow right) lies in the specified range.

The median size of the largest voting block for companies listed on the WSE is 33 percent (mean 38 percent). It is comparable to some European countries (for instance Spain: 34.2 percent), rather than to the US and the UK. (Becht and Röell, 1999). Ownership is therefore rather concentrated, with almost two-thirds of the firms lying in the range [20–75 percent] of voting rights.

[9] According to La Porta *et al.* (1999), the idea for choosing this 20 percent threshold is 'that this is usually enough to have effective control of a firm'.

[10] For the description of the National Investment Funds programme see, for instance, Hashi (2000).

Table 1. Voting rights (cash flow rights) distribution of the largest shareholders in firms listed on the Warsaw Stock Exchange

Range [x, y]	Number	Percentage
0–10%	10 (12)	5.3 (6.3)
10–20%	32 (31)	16.9 (16.4)
20–30%	35 (40)	18.6 (21.2)
30–50%	60 (64)	31.7 (33.9)
50–75%	39 (32)	20.6 (16.9)
75–90%	11 (9)	5.8 (4.8)
90–100%	2 (1)	1.1 (0.5)

Source: Own calculation.

Table 2. Ownership structure of privatized and new firms

	New firms (50)	Privatized firms (139)
Concentration measures		
Disp	28%	20.1%
Conc2050	40%	53.9%
Conc50	32%	28.0%
Shareholders		
State	0%	42.1%
NIF	6.6%	21.7%
CEO	50%	11.2%
Bank	29.4%	45.7%
Controlling Shareholders		
NIF	0%	18.3%
Bank	0%	9.3%
Individual (other than CEO)	18.6%	4.0%
CEO	25.9%	4.7%
State	0%	8.8%
Non-financial firm	27.1%	34.3%

To be read:
top lines: for example, 28 percent of new firms and 20.1 percent of privatized firms are widely held.
middle lines: for example, the State is shareholder in 0 percent of new firms and in 42.1 percent of privatized firms.
bottom lines: for example, National Investment Funds control 0 percent of new firms and 18.3 percent of privatized firms.
Disp = 1 if the largest shareholder has less than 20 percent of voting rights, 0 otherwise.
Conc2050 = 1 if the largest shareholder has at least 20 percent, but not more than 50 percent of voting rights, 0 otherwise.
Conc50 = 1 if the largest shareholder has more than 50 percent of voting rights, 0 otherwise.

In Table 2, we compare the ownership structure of new firms and privatized firms. Surprisingly, the concentration of ownership is quite similar for the new and privatized firms. The main difference is that CEOs are more often major shareholders (with more than 5 percent of voting rights) in new firms. Moreover, CEOs control a larger proportion of new firms than of privatized firms. New firms are controlled only by individuals (CEO or not) or non-financial firms, whereas there is more variety in the type of controlling shareholder for privatized firms.

Table 3. Descriptive statistics

Descriptive statistics for employment, market share and rent			
	Employees	**Market Share**	**Rent**
Mean	1110	1.55%	8.30%
Median	618	0.39%	4.30%
St. dev.	2236	4.70%	22.30%
Percentage of new and privatized firms according to size			
	New firms		**Privatized firms**
Fewer than 300 employees	59.2%		13.90%
Between 300 and 1000 employees	36.7%		46.00%
More than 1000 employees	4.1%		40.10%
Percentage of firms with different ownership concentration according to size			
	Disp	***Conc2050***	***Conc50***
Fewer than 300 employees	29.30%	24.50%	25.5%
Between 300 and 1000 employees	39%	42.50%	49%
More than 1000 employees	31.70%	33%	25.5%
Average debt ratios according to ownership concentration			
	Disp	***Conc2050***	***Conc50***
TDTE (total debt over total equity)	1.33	1.25	1.09
TDTA (total debt over total assets)	0.39	0.37	0.35
LTDTD (long-term debt over total debt)	0.16	0.12	0.12

Disp means that the largest shareholder has less than 20 percent of voting rights.
Conc2050 means that the largest shareholder has at least 20 percent and not more than 50 percent voting rights.
Conc50 means that the largest shareholder has more than 50 percent voting rights.

In Table 3, we present descriptive statistics on employment and competition variables, on the size distribution of new and privatized firms, on the size distribution of firms with various levels of ownership concentration and on average debt ratios according to ownership concentration.

4. Competition and firm performance: empirical evidence

We first investigate the impact of competition on firm performance. More specifically, we look at the impact of market power in the domestic market (as proxied by the market share and monopoly rents) on the rate of growth of productivity. Second, we test whether the impact of competition differs according to the type of firm. The results of the estimations are displayed in Table 4. Note that all regressions include time dummies that allow aggregate shocks for each year considered to be controlled for. All regressions also include industry dummies that control for industry-specific effects.

The results show a positive impact of competition on firm performance (column 1). They provide evidence that market power is negatively related to productivity growth in the following period.[11]

Note that it is very unlikely that reverse causality explains our result. First, we use the lagged market share. Second, reverse causality would imply that firms with higher productivity growth obtain larger market share. Hence, we would get a *positive* correlation between market share and productivity growth (see the discussion in Nickell, 1996).

We obtain a similar result with the *ex post* measure of rent (column 2). As we said, the rent variable has a major drawback in the sense that it is strongly correlated with profitability. Note, however, that if our results were driven by profitability (which is partly correlated with productive efficiency), and not by market power, then, again, we should obtain a positive coefficient, not a negative one. It is indeed natural to expect that more profitable firms have higher productivity growth, not the other way around.

[11] The coefficient is significant at 10 percent. We tried to look for a non-linear relationship between competition and performance which has been found, for instance, in the study of 3000 firms from 20 transition countries (Carlin *et al.,* 2000). To test for such a non-monotonic effect, we included in the regression $mktsh_{it-1}$. This term turned out to be insignificant.

Table 4. Competition and performance
(GMM Estimation (1994–98) 153 Firms, 493 Obs.)

Dependent Variable: Δy_{it}	(1)	(2)	(3)	(4)	(5)	(6)
Δy_{it-1}	0.317***	0.257***	0.229***	0.208***	0.203***	0.264***
	5.43	*3.92*	*4.48*	*4.25*	*4.35*	*5.36*
Δl_{it}	0.34***	0.42***	0.48***	0.46***	0.486***	0.43***
	4.32	*4.02*	*7.46*	*7.51*	*5.8*	*6.69*
Δk_{it}	0.037	0.052	0.003	0.037	0.038	0.018
	1.12	*1.31*	*0.106*	*1.33*	*0.99*	0.57
$mktsh_{it-1}$	–0.074*	.	.	.	.	–0.09**
	–1.61					–2.31
$rent_{it-1}$	.	–0.07*	.	–0.07**	.	.
		–1.67		–2.02		
*mktsh*NewF*			0.373	–0.178	.	.
			0.56	*–0.29*		
*mktsh*PuF*			–0.12***	–0.09***	.	.
			–2.907	*–2.52*		
$rent_{it-1}$**NewF*					–0.06	–0.03
					–0.66	*–0.46*
$rent_{it-1}$**PuF*					–0.09***	–0.043**
					–3.30	*–1.89*
W	213.94 (4)	135.42 (4)	239.47 (5)	292.38 (6)	182.09 (5)	266.54 (6)
	0.0000	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*
Sargan Test	36.36 (36	42.49 (36	48.15 (40	53.34 (49	42.74 (40	49.18 (49
	0.5	*0.25*	*0.25*	*0.5*	*0.5*	*0.5*

Note: All equations include firm fixed effects, industry fixed effects and time dummies
Heteroskedastic robust estimates, asymptotic t-statistics are reported (in italic).
*, **, ***: significant respectively at 10, 5 and 1 percent levels. Instruments include all combinations of explanatory variables (and their square), in level, with a 2-period lag. For all tests, we report degrees of freedom (in parentheses) and p-values (in italic). W: Wald Test of Joint Significance of all Explanatory Variables; Sargan Test: Test of Over-Identifying Restrictions (asymptotically chi-2).

Serial correlation tests:	(1)	(2)	(3)	(4)	(5)	(6)
	–2.75	–1.99	–2.20	–1.86	–1.66	–2.37
z1	(137)	(137)	(137)	(137)	(137)	(137)
	0.01	*0.02*	*0.01*	*0.03*	*0.05*	*0.01*
	–0.58	–0.24	–0.28	–0.12	–0.051	–0.29
z2	(112)	(112)	(112)	(112)	(112)	(112)
	0.28	*0.41*	*0.39*	*0.45*	*0.48*	*0.38*

z1 is a serial correlation test of order 1: using residuals in 1st difference, asymptotically standard normal.
z2 is a serial correlation test of order 2: using residuals in 1st difference, asymptotically standard normal.

In columns 3 to 6, we test whether different types of firms react differently to competitive pressures. It has been argued (see Section 2.1) that competition may have an ambiguous impact on privatized firms. On the one hand, it may have a negative impact at the time of restructuring, by disorganizing the production process and networks between clients/suppliers, etc. On the other hand, the impact of competitive pressures may be positive (and stronger for privatized firms than for newly created firms) because competition gives a signal of regime change, hence providing strong incentives to reduce all sources of slack within former state-owned enterprises. As we said, we expect that there is more scope for slack reduction in former state-owned enterprises than in newly created firms. To test this hypothesis, we interact the competition variable with a dummy variable (*NewF*) which is equal to 1 if the firm is a new firm, and 0 otherwise; conversely, $PuF = 1 - NewF$ is equal to 1 if the firm is a former state-owned enterprise. Our results show that the impact of competitive pressures is insignificant for newly created firms whereas it is positive and strongly significant for privatized firms.[12] So, if disorganization may indeed have happened at some initial stage of transition, it did not have lasting effects on firms' performance.

For all regressions, we also report several tests. Let us just mention that the Sargan test of over-identifying restrictions never rejects the validity of the instruments (p-values are between 0.25 and 0.5). Tests on the residuals show that there is first order autocorrelation in the equations in difference but no second-order autocorrelation. Hence, the assumption on the residual in the level equation is confirmed, and this justifies the choice of only two lags for the instruments.

Table 4b. Relevance of the instruments

(Instruments set: y_{it-2}, k_{it-2}, l_{it-2}, ${y_{it-2}}^2$, ${k_{it-2}}^2$, ${l_{it-2}}^2$, $mktsh_{it-2}$, $mktsh_{it-2}^2$, time dummies, industry dummies)

	Obs	R^2	F-test
Δy_{it-1}	418	0.29	3.8
Δl_{it}	411	0.2	2.27
Δk_{it-1}	418	0.39	6.02
$mktsh_{it-1}$	418	0.96	204.92
$rent_{it-1}$	418	0.1	1.05

[12] Let us note that new firms do not differ significantly from privatized firms in terms of productivity growth: the coefficient of the dummy variable for new firms in a simple productivity growth equation is not significant.

In Table 4b, we display a simple test of the relevance of our main instruments by regressing each right hand side variable on the full set of instruments. The R-squared and F-tests of these regressions show that our set of instruments is broadly satisfying, although the R-squared are relatively low for the production function variables (which is consistent with recent works, see Blundell and Bond, 1999) and the rent variable.

5. Ownership structure and firm performance: empirical evidence

5.1 Ownership concentration

We check first whether firms with dispersed ownership structure (according to the definition given in Section 3.3) perform differently from the average firm. If the relevant agency cost is due to the conflict between shareholders and management, we may expect a negative effect on productivity growth. But this will only be the case if appropriate incentive mechanisms are not available (such as performance based compensations for managers, managerial equity holdings, the threat of take-over, etc.). On the contrary, if managerial initiative and competence are important, or the cost of expropriating minority shareholders is high, limited ownership concentration may have a positive effect on performance.

The results are displayed in Table 5. Firms with relatively dispersed ownership, i.e., those in which the largest shareholder has less than 20 percent of voting rights, experience on average higher productivity growth. The coefficient of 0.027 means that in firms with dispersed ownership productivity rate of growth is on average 2.7 percent higher than in a representative firm, after controlling for factors of production, individual fixed effects, aggregate shocks, and industry fixed effects. We partially control for an important source of potential reverse causality – if the ownership structure reflected differences in productivity levels, individual fixed effects would capture this effect. Moreover, industry dummies control for industry-specific productivity growth, which could have affected the ownership structure.

Table 5. Competition and ownership structure
(GMM Estimation (1994–98) 153 Firms, 493 Obs.)

Dependent Variable: Δy_{it}	(1)	(2)	(3)	(4)	(5)	(6)
Δy_{it-1}	0.317***	0.29***	0.30***	0.29***	0.309***	0.26***
	4.39	*4.14*	*4.05*	*4.14*	*5.38*	*5.04*
Δl_{it}	0.409***	0.428***	0.42***	0.428***	0.337***	0.36***
	3.46	*3.65*	*3.53*	*3.65*	*4.35*	*5.02*
Δk_{it}	0.025	0.031	0.035	0.03	0.045	0.07**
	0.59	*0.704*	*0.76*	*0.704*	*1.35*	*2.13*
Disp	0.027**		.	.	.	.
	2.19					
Conc2050	.	*–0.039****	.	.	.	.
		–3.27				
Conc50	.	.	0.029**	.	.	.
			2.24			
Disp + Conc50	.	.	.	0.039***	0.043***	0.042***
				3.27	3.74	4.001
$mktsh_{it-1}$		.			–0.12***	–0.106**
					–2.53	–2.35
$rent_{it-1}$		.				–0.08**
						–2.43
W	134.74 (4)	157.89 (4)	155.52 (4)	157.89 (4)	281.21 (5)	332.12 (6)
	0.0000	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*
Sargan Test	27.39 (27)	28.51 (27)	28.37 (27)	28.51 (27)	37.55 (36)	48.38 (45)
	0.5	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*

Note: All equations include firm fixed effects, industry fixed effects and time dummies. Heteroskedastic robust estimates, asymptotic t-statistics are reported (in italic).

*, **, ***: significant respectively at 10, 5 and 1 percent levels Instruments include all combinations of explanatory variables (and their square), in level, with a 2-period lag. For all tests, we report degrees of freedom (in parentheses) and p-values (in italic). W: Wald Test of Joint Significance of all Explanatory Variables. Sargan Test: Test of Over-Identifying Restrictions (asymptotically chi-2).

Disp = 1 if the largest shareholder has less than 20 percent of voting rights, 0 otherwise.

*Conc*2050 = 1 if the largest shareholder has at least 20 percent, but not more than 50 percent of voting rights, 0 otherwise.

*Conc*50 = 1 if the largest shareholder has more than 50 percent of voting rights, 0 otherwise

Serial correlation tests:	(1)	(2)	(3)	(4)	(5)	(6)
	–2.51	–2.51	–2.38	–2.51	–2.93	–2.48
z1	(137)	(137)	(137)	(137)	(137)	(137)
	0.01	*0.01*	*0.01*	*0.01*	*0.01*	*0.01*
	–0.52	–0.59	–0.58	–0.59	–0.68	–0.43
z2	(112)	(112)	(112)	(112)	(112)	(112)
	0.31	*0.37*	*0.28*	*0.27*	*0.25*	*0.33*

In columns (2) and (3), we show that the correlation between performance and ownership concentration is non-monotonic. Firms, in which the largest shareholder has at least 20 percent but not more than 50 percent of voting rights, have lower productivity growth (3.9 percent lower than the average). In firms with very high concentration of ownership (i.e., the largest shareholder has absolute majority of voting rights), the correlation turns out to be positive again: the productivity growth is 2.9 percent above the average.

In summary, we have three types of firms with different productivity growth rates: (1) firms with a relatively dispersed ownership and productivity growth 2.27 percent above the average, (2) firms with intermediate levels of ownership concentration, and productivity growth 3.9 percent lower than the average, (3) firms with high levels of ownership concentration and productivity growth 2.9 percent above the average. The effects of ownership concentration on productivity growth are therefore sizeable. There are great variations in productivity growth across firms, and these variations are strongly correlated with the ownership structure. If we group together the subsamples (1) and (3), we obtain two subgroups of similar sizes (column (4)). In columns (5) and (6) we check that the correlation is robust to the inclusion of competition variables.[13]

So far, our results suggest that there exists a non-linear relationship between performance and ownership concentration.[14] This may simply reflect the complexity of the mechanisms at hand. As we discussed in Section 2.2, ownership concentration may have an ambiguous impact on firm performance. In particular, there are several competing explanations for our result that firms with a relatively dispersed ownership have higher than average productivity growth. First, leaving enough initiative to the management may be important in a very uncertain and changing environment. Second, monitoring managers may be less important when the stock market plays its informational and disciplinary roles, thus aligning the objectives of managers and owners. Third, the shares of firms with dispersed ownership may be more liquid thus enhancing information acquisition by outsiders, or ensuring that ownership changes indeed take place when needed. Finally, shareholders are less likely to be risk-averse with respect to productive decisions when ownership is dispersed. At the other end of the ownership spectrum, firms with highly concentrated ownership may have good incentives to monitor the management and, therefore, simply face less agency problems than

[13] The diversity in ownership structures, and our results, may reflect other firms' characteristics, in particular, their size. For instance, we may expect that ownership is more concentrated in small firms, and thus that our *conc50* variable simply selects small firms. First, simple descriptive statistics suggest that size probably does not explain our results (see Table 3). Second, the coefficients of *Disp*, *Conc2050* and *Conc50* variables remain significant after inclusion of size dummy variables, which are not significant. Results of the regressions are available from the authors upon request.

[14] To check the robustness of the U-shaped correlation between productivity growth and ownership concentration, we also ran the basic regression replacing the ownership concentration dummies by the (log of) share of voting rights held by the largest shareholder and its square. We obtained respectively the coefficients of 0.05 and 0.02, which is consistent with the U-shaped relationship generated by our main regression using ownership concentration dummies.

the average firm. In between, the situation is unclear. The fact that firms with the largest shareholder having between 20 and 50 percent of voting rights show lower productivity growth than other firms may be due, as suggested by La Porta *et al.* (1999), to the conflict between the controlling shareholder and other shareholders.[15]

5.2 Identity of controlling shareholders

In order to check whether our previous results were not driven by the identity of the largest shareholder, we introduce this dimension to the regressions (Table 6).

First, we check whether firms with significant foreign shareholders behave differently from other firms with concentrated ownership. Foreign ownership may indeed be a direct mechanism allowing the transfer of Western competence and efficient organization of production.[16] For this purpose, we define a dummy variable *FNG20* which equals 1 if and only if there is a foreign owner with more than 20 percent of shares. The result is clear: we obtain a coefficient of 0.039, which is significant at the 5 percent level. Moreover, the ownership dummy for highly concentrated and dispersed ownership remains significant at the 1 percent level. Therefore, the presence of a large foreign owner increases productivity growth by 3.9 percent, even after controlling for ownership concentration.

Second, we look at the impact of the identity of the largest shareholder, when the largest shareholder owns more than 20 percent of voting rights. The principal owner may be (1) an individual (other than the CEO), (2) the CEO, (3) a non financial firm, (4) a National Investment Fund (NIF), (5) the State, (6) or a bank. The results show that the firms in which the largest shareholder is the CEO, a NIF or a bank, have lower productivity growth. The presence of the state, of a non-financial firm, or of an individual (other than CEO) does not have a significant impact on performance. The negative impact of the CEO as the largest blockholder is consistent with the entrenchment argument: the CEO with a large stake in the firm he manages can make decisions without taking into account the opinion of other shareholders or more generally the opinion of the market. The negative impact of bank ownership may be due to the fact that banks are not really good monitors. However, it may also be due to the fact that a special law on financial restructuring of enterprises and banks allowed the Polish banks to swap debt into equity, so banks may have become shareholders of poorly performing firms, with lower subsequent productivity growth. Unfortunately, we do not have specific information about the way banks acquired their equity holdings. The

[15] As in La Porta *et al.* (1999), we checked whether other shareholders are likely to monitor the controlling shareholder. We assume that a minority shareholder has the incentive to monitor the controlling shareholder only if he has a sufficiently large stake in the firm. If we take the 20 percent cut-off rule for other shareholders, the probability of control is only 0.2; it increases to 0.52 with the 10 percent cut-off rule. This suggests that the conflict between majority and minority shareholders may indeed be an important issue.

[16] See for instance Frydman *et al.* (1999) and Djankov and Murrell (2002) for the empirical evidence about the positive impact of strategic foreign investors in the firms in transition economies.

important point is that the previously discussed results are not driven by the identity of controlling shareholders (columns 3 and 4): in particular, the dummy variable for the intermediate level of ownership concentration (with a voting stake of the largest shareholder between 20 percent and 50 percent) remains negative and significant (column 4).[17]

Table 6. Competition and ownership structure type of the controlling shareholder
(GMM Estimation (1994–97) 153 Firms, 493 Obs)

Dependent Variable:					
Explanatory Variables:	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
Δy_{it-1}	0.26***	0.28***	0.24***	0.23***	0.27***
	5	*3.77*	*4.18*	*4.22*	*5.22*
Δl_{it}	0.37***	0.49***	0.44***	0.43***	0.35***
	4.85	*4.29*	*5.98*	*6.01*	*4.89*
Δk_{it}	0.086***	0.012	0.08**	0.07**	0.06*
	2.51	*0.25*	*2.22*	*1.97*	*1.85*
$mktsh_{it-1}$	–0.096**	.	–0.07	–0.075	–0.09**
	–2.03		*–1.16*	*–1.3*	*–2.03*
$rent_{it-1}$	–0.08**	.	–0.09***	–0.089***	–0.078**
	–2.43		*–3.15*	*–3.09*	*–2.39*
Disp + Conc50	0.044***	.	0.021*	.	0.036***
	4.23		*1.68*		*3.39*
Conc2050				–0.029***	
				–2.45	
Foreign owner: (> 20% of votes)	0.039**				
	2.29	.	.	.	.

…cont/

[17] We also checked how managerial ownership affects performance when the manager owns shares but is not a controlling shareholder (column 5). It turned out that, even after controlling for the ownership concentration dummy, productivity growth is higher when the manager has a stake (lower than 20 percent) in the firm. Thus, our results corroborate the empirical evidence presented by Morck *et al.* (1988) who find a non-linear relationship between performance and managerial ownership.

Table 6 (cont). Competition and ownership structure type of the controlling shareholder

(GMM Estimation (1994–97) 153 Firms, 493 Obs)

Dependent Variable:					
Explanatory Variables:	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
Main shareholder: (> 20% of votes)					
CEO	.	–0.056*	–0.07***	–0.051**	.
		–1.81	*–3.05*	*–2.15*	
Individual (except CEO)	.	–0.013	.	.	.
		–0.37			
Non-financial firm	.	–0.0004	.	.	.
		–0.03			
Financial firm (except NIF)	.	–0.101***	–0.057***	–0.04**	.
		–3.59	*–2.79*	*–2.02*	
NIF	.	–0.053***	–0.049***	–0.03*	.
		–2.60	*–2.54*	*–1.68*	
State	.	–0.026	.	.	.
		–1.30			
Non-controlling CEO owns shares: (< 20% of votes)					0.045**
					1.92
W	350.93 (7)	211.20 (9)	389.26 (9)	382.81 (9)	324.19 (7)
	0.0000	*0.0000*	*0.0000*	*0.0000*	*0.0000*
Sargan Test	49.18 (45)	30.15 (27)	52.59 (45)	50.82 (45)	49.5 (45)
	0.25	*0.3*	*0.25*	*0.25*	*0.25*

Note: See Table 5.

Disp = 1 if the largest shareholder has less than 20 percent of voting rights, 0 otherwise.

Conc2050 = 1 if the largest shareholder has at least 20 percent, but not more than 50 percent of voting rights, 0 otherwise.

Conc50 = 1 if the largest shareholder has more than 50 percent of voting rights, 0 otherwise.

For all tests, we report degrees freedom (in parentheses) and p-values (in italic). W: Wald Test of Joint Significance of all Explanatory Variables. Sargan Test: Test of Over-Identifying Restrictions (asymptotically chi-2).

serial correlation tests:	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
	–2.53	–2.54	–2.52	–2.47	–2.62
z1	(137)	(137)	(137)	(137)	(137)
	0.01	*0.01*	*0.01*	*0.01*	*0.01*
	–0.51	–0.616	–0.46	–0.44	–0.48
z2	(112)	(112)	(112)	(112)	(112)
	0.31	*0.27*	*0.32*	*0.33*	*0.31*

Overall, the results suggest that the rate of productivity growth is strongly correlated with the ownership structure. This effect is not explained by initial differences in productivity (as our level equation includes individual fixed effects), by industry-specific effects or by the intensity of product market competition. Finally, taking into account the identity of the controlling shareholder does not modify this result.

5.3 Competition and corporate control: substitutes or complements?

Finally, we focus on the way corporate control and product market competition interact in affecting firm performance (Table 7). The question is whether incentives provided by ownership and competition reinforce each other (are complements) or if they can rather be considered as substitutes.

We present the regression in which a measure of competition is allowed to differ for firms with 'good' corporate governance (*disp+conc50*) and for firms with 'bad' corporate governance (*conc2050*). We use the two measures of competition that are available. Although each measure of competition is imperfect, if we obtain the same result with both variables, we can be more confident about the robustness of the effect that we find.[18]

Our results strongly support the idea that good ownership structure and competitive pressures are complements rather than substitutes. Competition affects productivity growth in firms characterized by 'good' corporate governance. In firms with 'bad' corporate governance the effect of competition is insignificant. So, competitive pressure in Poland did not compensate for poor corporate governance mechanisms.[19]

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[18] We also checked that our results are not affected by the inclusion of the size dummy variables. Results in equations (1), (2) and (4) are unchanged while the coefficient on rent in equation (2) loses its significance.

[19] In this paper, we concentrate on corporate governance exercised by shareholders and do not consider the role of financial pressure (we analyse financing patterns and the impact of financial pressures on performance in a forthcoming paper). Let us simply note here that the descriptive statistics presented in Table 3 suggest that our concentration classification does not simply reflect financing patterns. If the firms in our subgroup *Conc2050* were, for instance, highly indebted, and conversely the firms in our subgroups *Disp* and *Conc50* were exposed to weak financial pressure, our results could be interpreted as reflecting the substitutability between financial pressures and competition (as in Aghion *et al.,* 1999) instead of the complementarity between corporate governance and competition. Simple statistics suggest that this is not the case. Indeed, the average debt to equity ratio is 1.33, 1.25 and 1.09 respectively for the subgroups *Disp*, *Conc2050* and *Conc50*. The ratio of long-term debt to total debt is 0.16, 0.12 and 0.12, respectively for the subgroups *Disp*, *Conc2050* and *Conc50*.

Table 7. Competition and ownership structure. Complements or substitutes
(GMM Estimation (1994–98) 153 Firms, 493 Obs)

Dependent Variable: Δy_{it}

Explanatory Variables:	**(1)**	**(2)**	**(3)**	**(4)**
Δy_{it-1}	0.31***	0.27***	0.21***	0.23***
	6.58	*6.56*	*4.77*	*6.68*
Δl_{it}	0.34***	0.34***	0.507***	0.405***
	6.06	*6.48*	*6.73*	*8.51*
Δk_{it}	*0.039*	*0.07***	*0.015*	*0.06***
	1.28	*2.34*	*0.39*	*1.96*
$mktsh_{it-1}$	.	.	.	*–0.139****
				–4.06
$rent_{it-1}$	.	*–0.07****	.	.
		–2.75		
$rent_{it-1}$ *Conc2050	–0.425	–0.556		
	–0.98	*–1.46*		
$rent_{it-1}$ *(*Disp+Conc50*)	–0.11***	– 0.112***		
	–2.53	*–2.73*		
$rent_{it-1}$ *Conc2050	.	.	0.033	0.02
			0.42	*0.68*
$rent_{it-1}$ *(*Disp+Conc50*)	.	.	–0.12*	–0.123**
			–1.65	-2.39
Disp+Conc50	0.035**	0.038***	0.049***	0.054***
	2.4	*3.09*	*2.73*	*4.33*
W	365.37 (6)	456.89 (7)	187.28 (6)	430.12 (7)
	0.0000	*0.0000*	*0.0000*	*0.0000*
Sargan Test	46.27 (45)	54.75 (54)	47.08 (40)	59.57 (54)
	0.5	*0.5*	*0.25*	*0.3*

Notes: See Table 5.

6. Conclusion

Our results show that competition has a positive and significant impact on productivity growth in our sample of Polish firms. Concerning the effect of ownership concentration, we find a U-shaped relationship with performance. Firms with relatively dispersed and relatively concentrated ownership have higher productivity growth than firms with an intermediate level of ownership concentration. This correlation between concentration of ownership and productivity growth is not explained by the identity of controlling shareholders. Finally, product market competition and good governance tend to reinforce each other rather than to be substitutes. Studying the joint effect of product market competition and ownership concentration we find that the impact of product market competition depends on the ownership structure of the firms considered: competition has stronger impact on firms with a relatively dispersed or highly concentrated ownership structure. To the extent that such ownership structures are associated in our sample with higher productivity growth, this can be considered as evidence that competition and corporate governance are complements: the effectiveness of corporate governance is reinforced by product market competition. This result suggests that a transition strategy focusing solely on competition might not be useful.

References

Aghion, P., M. Dewatripont and P. Rey (1999). 'Competition, financial discipline and growth', CEPR Discussion Paper no. 2128, London: CEPR.

Aghion, P. and P. Howitt (1997). 'A Schumpeterian perspective on growth and competition', in D. Kreps and K. F. Wallis (eds.), *Advances in Economics and Ecoxnometrice: Theory and Applications*, Cambridge, Cambridge University Press.

Aghion, P. and J. Tirole (1997). 'Formal and real authority in organizations', *Journal of Political Economy*, 55, pp. 1–27.

Allen, F. (1993), 'Stock markets and resource allocation', in C. Mayer and X. Vives (eds.), *Capital Markets and Financial Intermediation*, Cambridge: Cambridge University Press.

Allen, F. and D. Gale (2000). *Comparing Financial Systems*, Cambridge, MA: MIT Press.

Arellano, M., and S. Bond (1991). 'Some tests of specification for panel data: Monte Carlo evidence and an application to employment equation', *Review of Economic Studies*, 58, pp. 277–97.

Arrelano, M. and S. Bond (1998). 'Dynamic panel data estimation using dpd98 for Gauss: a guide for users', mimeo, ftp://ftp.cemfi.es/pdf/papers/ma/dpd98.pdf.

Becht, M. and A. Röell (1999). 'Blockholdings in Europe: An International comparison', *European Economic Review*, 43, pp. 1049–1056.

Berglöf, E. and E. L. von Tadden (1999). 'The changing corporate governance paradigm: Implications for transition and developing countries', paper presented at the Annual World Bank Conference on Development Economics, Washington, DC.: http://papers.ssrn.com/so13/papers.cfm?abstract_id=183708.

Berle, A. A. and G. C. Means (1932). *The Modern Corporation and Private Property*, New York, World. Inc.

Bianco, M. and P. Casavola (1999). 'Italian corporate governance: effects on financial structure and firm performance', *European Economic Review*, 43, pp. 1057–1069

Blanchard, O. and M. Kremer (1997). 'Disorganization', *Quarterly Journal of Economics*, 112(4), pp. 454–65.

Blundell, R. and S. Bond (2000). 'GMM estimation with persistent panel data: an application to production functions', The Institute for Fiscal Studies, Econometric Reviews, 19(3), pp. 321–40.

Bolton, P. (1995). 'Privatization and the separation of ownership and control: lessons from the Chinese enterprise reform', *Economics of Transition*, 3(1), pp. 1–11.

Bolton, P. and E. L. Von Thadden (1998). 'Blocks, liquidity and corporate control', *The Journal of Finance*, February, 53(1), pp. 1–25.

Brown, D. and J. Earle (2000). 'Labor productivity, competition and ownership in Russia', paper presented to the 4th Annual International Conference on Transition Economics, Beijing, July.

Burkart, M., D. Gromb and F. Panunzi (1997). 'Large shareholders, monitoring and the value of the firm', *Quarterly Journal of Economics*, 112, pp. 693–728.

Carlin, W., S. Fries, M. Schaffer and P. Seabright (2000). 'Competition and enterprise preformance in transition economies: Evidence from a cross-country survey', paper presented at the CEPR/WDI Annual International Conference on Transition Economics, July, Moscow.

Carlin, W. and R. Horvath (2000). 'Competitive pressures and enterprise performance in transition countries', mimeo, University College London.

Carlin, W. and C. Mayer (1999). 'Finance, investment and growth', CEPR discussion paper no. 2233, forthcoming in *Journal of Financial Economics*.

Claessens, S. and S. Djankov (1999). 'Ownership concentration and corporate performance in the Czech Republic', *Journal of Comparative Economics*, 27, pp. 498–513.

Cremer, J. (1995). 'Arm's length relationships', *Quarterly Journal of Economics*, 110, pp. 275–300.

Demsetz, H. and K. Lehn (1985). 'The structure of corporate ownership: causes and consequences', *Journal of Political Economy*, 93(6), pp. 1155–77.

Djankov, S. and P. Murrell (2002). 'Enterprise restructuring in transition. A quantitative survey', forthcoming in *Journal of Economic Literature*.

Frydman, R., C. Gray, M. Hessel and A. Rapaczynski (1999). 'When does privatization work? The impact of private ownership on corporate performance in the transition economies', *Quarterly Journal of Economics*, 114(4), pp. 1153–91.

Glaeser, E., S. Johnson and A. Shleifer (2001). 'Coase versus the Coasians', *Quarterly Journal of Economics*, 66(3), pp. 853–900.

Hart, O. (1983). 'The market mechanism as an incentive scheme', *Bell Journal of Economics*, 14(2), pp. 366–82.

Hashi, I. (2000). 'The Polish National Investment Fund programme. Mass privatization with a difference?' *Comparative Economic Studies*, 42(1), pp. 87–134.

Holmström, B. and P. Milgrom (1994). 'The firm as an incentive system', *American Economic Review*, 84(4), pp. 972–91.

Holmström, B. and J. Tirole (1993). 'Market liquidity and performance monitoring', *Journal of Political Economy*, 101, pp. 678–709.

La Porta, R., F. Lopez-de-Silanes and A. Shleifer (1999). 'Corporate ownership around the world', *Journal of Finance*, 54, pp. 471–517.
Leech, D. and J. Leahy (1991). 'Ownership structure, control type classifications and the performance of large British companies', *The Economic Journal*, 101, pp. 1418–37.
Matyas, L. (ed.) (1999). *Generalized Method of Moments Estimation*, Cambridge: Cambridge University Press.
Morck, R. (2000). *Concentrated Corporate Ownership*, Chicago and London: The University of Chicago Press.
Morck, R., A. Shleifer and R. Vishny (1988). 'Management ownership and market valuation: An empirical analysis', *Journal of Financial Economics*, 20, pp. 293–315.
Nickell, S. J. (1996). 'Competition and corporate performance', *Journal of Political Economy*, 104(4), pp. 724–46.
Nickell, S. J., D. Nicolitsas and N. Dryden (1997). 'What makes firm perform well?' *European Economic Review*, 41, pp. 783–96.
Pistor, K., M. Raiser and S. Gelfer (2000). 'Law and finance in transition economies', *Economics of Transition*, 8(2), pp. 325–68.
Schmidt, K. M. (1997). 'Managerial incentives and product market competition', *Review of Economic Studies*, 64, pp. 191–213.
Shleifer, A. and R. Vishny (1986). 'Large shareholders and corporate control', *Journal of Political Economy*, 94(3), pp. 461–48.
Shleifer, A. and R. Vishny (1997). 'A survey of corporate governance', *Journal of Finance*, 52(2), pp. 737–83.
Stiglitz, J. (1999). 'Whither reform? Ten years of transition', paper prepared for the Annual Bank Conference on Development Economics, Washington D.C., April 28–30.
Tirole, J. (2001). 'Corporate governance', *Econometrica*, 69(1), pp. 1–35.

Data appendix

Definitions of variables

All production variables are expressed in logarithms.

1) Output y – We use the value of sales deflated by the GDP deflator. We are not able to construct a measure of value added because we have no information on the wage bill.
2) Capital k – We use the book value of net fixed assets, revalued by using the Investment Price Index. As we consider net capital, instead of gross capital, we do not need any specific assumption on the economic depreciation rate.
3) Labour l – Total number of employees.
4) Ownership Structure
   Disp: equals 1 if and only if no shareholder has more than 20 percent of voting rights, 0 otherwise.
   Conc2050: equals 1 if and only if the largest shareholder has at least 20 percent of voting rights but not more than 50 percent, 0 otherwise.
   Conc50: equals 1 if and only if the largest shareholder has more than 50 percent of voting rights, 0 otherwise.

ConcCEO: equals 1 if and only if the CEO is the controlling shareholder.
ConcNIF: equals 1 if and only if a National Investment Fund is the controlling shareholder.
ConcBK: equals 1 if and only if a financial firm (typically a bank) is the controlling shareholder.