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COMPETITION, RESTRUCTURING AND FIRM PERFORMANCE: EVIDENCE OF AN INVERTED-U RELATIONSHIP FROM A CROSS-COUNTRY SURVEY OF FIRMS IN TRANSITION ECONOMIES

by

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Competition, Restructuring and Firm Performance: Evidence of an Inverted-U relationship from a Cross-country Survey of Firms in Transition Economies[1]

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Abstract

This paper examines the importance of competition in the growth and development of firms. We draw on a survey of 3,300 firms in 25 transition countries to shed light on the factors that influence restructuring by firms and their subsequent performance. These data have three main advantages over those used in previous work. First, they measure directly the degree of competition perceived by each firm in its principal market rather than attempting to infer this from market data as measured by statistical agencies. Second, the fact that transition countries have market structures inherited from the past avoids some of the endogeneity problems associated with measures of competition in market economies. Third, the breadth of cross-country variation provides a method of dealing with the fact that firm-level measures of the external environment will not be independent of the firm's own performance. We find evidence of a robust inverted-U effect of competition on performance that is both statistically and economically significant.

Keywords: competition, restructuring, privatization, soft budget constraints, transition

Journal of Economic Literature Classification Numbers: P0, L1, L33, O12

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1. Introduction

How much does competition matter for the growth and development of firms? This is an important and long-standing question in economics, but one to which convincing answers have been frustratingly difficult to find. Theories of the influence of competition on firm behaviour and performance suggest that this influence can work through many different channels, and many different potential effects have been postulated, some of them mutually offsetting, so the question can only be settled empirically. However, there are many obstacles in the way of finding a convincing empirical answer to the question. These are partly due to lack of appropriate data, notably concerning measures of the competitive pressure faced by firms: proxies such as shares of administratively defined product markets identified by SIC codes may be a long way from identifying the true nature of economic competition. Partly they are due to the difficulty of identifying the appropriate counterfactual against which actual outcomes can be measured: when the degree of competition varies many other things typically vary as well, including technology and other aspects of regulation, and it is not easy to see which of these variations should properly be considered exogenous to the economic processes under investigation.

In this paper we present evidence that competition matters for firm performance, but in a non-monotonic way. Specifically, we find evidence that firms facing a few rivals may perform better than either monopolies or firms facing many rivals. There is weaker evidence that monopolies perform worse than firms facing many rivals, though this is not statistically significant. That is, there is an inverted U-shaped relationship between competition and firm performance, with competition between a few rivals having the most positive effects. This is consistent with a broadly Schumpeterian view of the relationship between competition and performance (such as has begun attracting renewed theoretical interest in recent years), though we do not set out to test any of Schumpeter's hypotheses directly.

Our evidence comes from a survey of 3,300 firms in 25 transition countries in the late 1990s. This evidence offers a number of advantages over previous work. The first is that the survey is specifically designed to investigate the impact of competition, and contains a number of questions that elicit from firms a much more intuitive and economically-grounded view of their competitive circumstances than has previously been possibly in surveys on this scale. The second advantage is that in transition economies many aspects of market structure and the competitive pressure faced by firms were either inherited from the command economy or were the outcome of many random events during the liberalisation process early in the transition. This does not entirely remove concerns about the endogeneity of measures of competition. But it does suggest that transition economies may constitute a closer approximation to a large-scale "natural experiment" than we are ever likely to find again, at least on such a scale.

Of course, one disadvantage of the natural experiment offered by transition is that a change in the degree of competition was only one of many changes to the economic environment. In particular, many countries implemented privatisation programmes, as well as changes in regulations affecting a large number of aspects of the business environment. All these countries have also been going through profound

social transformation that affects everything from the aspirations of entrepreneurs to perceptions of the socially acceptable level of corruption. In order to isolate the influence of competition, we control for a number of general features of firms and their external environment (e.g., their size, economic sector, the presence of soft budget constraints). A third advantage of our data is that its cross-country variation provides us with a method of dealing with the fact that firm-level measures of the external environment will not be independent of the firm's own performance.

We contrast new firms with those that had existed under central planning, whether or not the latter were privately owned at the time of the survey We look at two measures of performance, namely growth in sales and growth in labour productivity (we do not have sufficiently reliable data on capital to make cross-country comparisons of total factor productivity growth). We not only look at the overall impact of competition on performance, but also investigate the channels through which such an impact may work. In particular, we examine the way in which competition influences aspects of firms' restructuring activities, and in turn, how these affect performance. Our results show convincingly that competition matters for performance, and matters in an intriguing and complex way.

The structure of the paper is as follows. In section 2 we review briefly the theoretical and empirical literature on the link between competition and performance – do we have any reason to expect there to be a link at all? In section 3 we describe our data, and in section 4 we discuss empirical specifications. Section 5 presents our results and section 6 concludes.

2. Why should competition matter for firm performance?

Identifying the possible influences of competition on firm performance is not easy. Even if the degree of competition it faces has no direct causal influence on the behaviour of any individual firm, it may be that more competitive market environments see a faster replacement of relatively inefficient by relatively efficient firms. In this case, a correlation emerges over time between a measure of competition at industry level and the average efficiency of those firms that survive. Even if survival as such is not differentially affected, the degree of competition may affect how large a share of output is occupied by the products of relatively efficient firms. In short, competition may work not just through *incentives* but also through *selection* (see Aghion & Schankerman, 2000; Carlin, Haskel & Seabright, 2001).

In fact it is quite likely that competition does have a direct influence on behaviour via incentives, but economic models show that the effect may be ambiguous. One example of ambiguity comes from Willig's (1987) model, in which he demonstrates two offsetting effects of increased competition on the incentives for managers to exert effort. Whilst increased competition makes profits more sensitive to managerial effort, it also depresses demand for the firm's output, which dampens profits and hence blunts the incentive.

In the innovation literature, there are models that suggest that more competition is good for innovation and others that highlight a hump-shaped

relationship, in which a moderate degree of competition is better than either monopoly or intense competition. For reasons first suggested by Schumpeter and recently analyzed more formally by others (see Aghion & Howitt, 1998, for example), some degree of prior market power may be important in providing firms with sufficient retained earnings to finance investment. Moreover, the prospect of some future profits may be essential to ensure that current retained earnings are indeed invested instead of wasted. Alternatively, the adverse effects of knowledge spillovers to competitors on the incentive to invest may offset the direct productivity-enhancing impact of the spillovers themselves (Dutta & Seabright, 2002).

Other models stress a monotonic relationship with greater competition inducing productivity growth. For example, the emergence of new competitors threatens the temporary monopoly profits from innovation and increases the incentive of the incumbents to shorten the innovation cycle (Aghion, Dewatripont & Rey 1997). More recently, the basic Schumpeterian model has been extended by allowing incumbent firms to innovate (Aghion, Harris, Howitt & Vickers 2001). This produces an inverse-U shaped relationship between competition and innovation. At low levels of competition, the incentive to innovate is sharpened as more competition raises the incremental profits from innovation. When competition becomes intense, further competition may inhibit innovation as the standard Schumpeterian effect offsets the pressure to innovate so as to escape competition.

Many models stress that at least some degree of competition is necessary to enable managers to be given adequate performance incentives (see Meyer & Vickers, 1997), though there may be one or two particular industries where the natural monopoly characteristics of the technology override incentive considerations. The controversy arises mainly over whether competition continues to be beneficial for incentives once a small number of competitors are already present.

Empirical support for the role of competition as a spur to performance comes from recent econometric research using a variety of performance measures. For instance, Blundell, Griffith and Van Reenen (1995) use numbers of innovations as a measure. The results are consistent with those of a quite different methodology (bench-marking using case studies) in which Baily and Gersbach (1995) found that "head-to-head" competition in the same market resulted in faster innovation in several manufacturing industries. Nickell (1996) controls for industry level concentration and import concentration and tests whether a firm-level measure of competition is correlated with performance. He finds that indicators of competitive pressure at firm level are significantly related to the level and growth of total factor productivity. A robust inverse U-relationship between product market competition and the patenting activity of UK firms has been reported by Aghion, Bloom, Blundell, Griffith & Howitt (2002). In an empirical study of entry thresholds, Bresnahan and Reiss (1991) found that most of the competitive impact from entry comes from the first two entrants to challenge a monopolist, with the effect levelling out once market participants number around five. Other results come from industry studies (Kwoka, 1996; Neven & Roeller, 1996; Ng & Seabright, 2001) or from economy-wide studies using indices to proxy for competitive effects across a range of sectors (Nicoletti & Scarpetta, 2003).

Finally, studies are beginning to accumulate that examine specifically the role of competition in the transition from central planning to the market economy.[2] Transition economies have long been recognised as providing an important source of evidence about the consequences of weak competition for incentives. Nickell motivates his 1996 paper by noting the paucity of evidence for market economies of a causal link from competition to improved performance. He observes that the most convincing evidence comes from a "broad brush" comparison between the lack of dynamism of centrally planned as compared with market economies (Nickell, 1996).

Naturally, all studies of the impact of competition need to control for other factors, and studies vary in the extent and manner in which they do so. For mature market economies there is a broad consensus that, in the words of Megginson & Netter (2001), "privately-owned firms are more efficient and more profitable than otherwise-comparable state-owned firms". Since privately-owned firms also tend to operate in a different competitive environment, failure to control for ownership might lead to significant bias. For transition economies such a conclusion is less clear, both in the sense that different studies report a greater variety of results, and in the sense that the results of privatisation appear to depend on a greater number of complementary circumstances.

A recent attempt has been made to use the statistical technique of meta-analysis to synthesize the empirical results of over one hundred studies of transition economies (Djankov and Murrell, 2002). Although there are important questions about the reliability of meta-analysis techniques, especially where there is reason to suspect that empirical biases may be correlated across studies,[3] their findings are nevertheless illuminating. Pooling 37 studies, they found that privatization improved performance significantly. For the Commonwealth of Independent States (CIS) countries (former Soviet Union), however, there was no robust significant difference between the performance of state-owned and privatized firms.

Bearing these findings in mind, as well as the difficulty of taking the endogeneity of the privatisation decision into account, we have controlled for the difference between new firms and old firms in estimating the impact of competition,

[2] Grosfeld and Tressel (2002) apply Nickell's methodology to a panel of Polish firms listed on the stock market. They find that a reduction of 10 percentage points in the firm's market share is associated with faster total factor productivity growth of 1.4 percentage points. In a study of Bulgaria, Jones et al. (1998) found a positive effect of larger market share on performance. Using a measure of competition at industry level, Konings (1998) found in a study of Bulgaria and Estonia that more competitive pressure in the industry enhanced firm performance in Bulgaria but not in Estonia. For Russia, Earle and Estrin (1998) found that greater competition in the market complemented the effect of privatization in enhancing performance. Brown and Earle (2000) reported strong positive effects of domestic and import competition in the product market on total factor productivity. A study of Georgian firms (Djankov and Kreacic 1998) found that competition from foreign producers tended to be associated with employment cuts and changes in suppliers (but tended to reduce the likelihood of the disposal of assets, renovations and computerization). By contrast, firms with a larger market share were more likely to engage in computerization, renovations, the establishment of a new marketing department and the disposal of assets. Djankov and Murrell (2002) pool 23 studies and report a positive impact of competition on performance. Whereas for the non-CIS, both domestic and foreign competition are effective, for the CIS countries, domestic competition is sometimes significant and import competition has a *negative* effect.

[3] For a survey of the methodological problems associated with "narrative" and meta-analysis reviews, see Chalmers and Altman (1995).

without distinguishing separately between privatised and currently state-owned firms. In any event the latter distinction proved insignificant in our preliminary work, though we consider it impossible to draw strong negative conclusions from this fact.

We have also sought to control for the degree to which firms expect poor performance to be underwritten by the state, through the institution of soft budget constraints. There is prior evidence that these may matter significantly (see Schaffer, 1998). In Djankov and Murrell's meta-analysis, they pool the results of 11 studies and report a link between soft budget constraints and weaker firm performance. This is less robust for CIS countries alone. A major problem that all studies of this type face is how to identify the chain of causality between performance and budget softness. By definition, firms with soft budget constraints are rescued because they are performing poorly; but does the very existence of soft budget constraints cause firms to perform poorly in the first place? It is difficult to solve this endogeneity problem through the use of instrumental variables estimation because of a lack of suitable instruments. The use of meta-analysis cannot help here; this is a case where the direction of the bias is very likely to be consistent across studies. We return to this issue below.

To summarise, therefore, theory provides good reasons to expect that monopolists will be less efficient and innovative than rivalrous oligopolies, with a small number of exceptions in naturally monopolistic industries. Empirical evidence tends to confirm this view. Both theory and evidence are less clear, however, as to whether competition has a monotonically beneficial effect on performance or whether many competitors are actually less good for performance than just a few. Theory and evidence also suggest that any attempt to test for such a relationship needs to control for firm size and industry characteristics, as well as for ownership and soft budget constraints.

We now describe the survey and the dataset to which it gave rise.

3. Data and Variables

In order to collect evidence on the role of competition in performance and restructuring, we designed a block of questions to be included in the EBRD/World Bank survey of enterprises in twenty transition countries conducted in the early summer of 1999. Surveys of five more transition countries were completed later in 1999. The aim was to investigate how enterprise restructuring behaviour and performance were related to competitive pressure, the quality of the business environment, and the relationship between enterprises and the state. The survey was a cross-section and, as will become clear below, cannot therefore answer some of the questions more appropriate to panel data. However, its size and broad scope are unusually valuable, as is the fact that it poses detailed questions about the firms' competitive environment, and about the different restructuring actions taken by them in the recent past.

The full sample size was 3,954 firms. The survey included approximately 125 firms from each of the 25 countries, with larger samples in Poland and Ukraine (over 200 firms) and in Russia (over 500 firms). Sampling was random from the population

of firms in each country, except that minimum quotas were imposed for state-owned firms and large firms. Initial analysis of the data suggested that developments in the agricultural sector were quite different from those in the non-agricultural business sector. We therefore omit from the analysis 453 firms in agriculture as well as firms missing any of the most basic indicators (industry, size classification, ownership classification, sales growth and employment growth) leaving us with a sample of 3,305 firms. The figures reported in the tables below sometimes rely on a smaller sample because of missing values in an indicator of interest; the econometric analysis in the next section removes all firms with missing values in any variable in use, reducing the sample to 2,245 firms.

Just over half the firms in the sample were newly-established private firms, 8% were privatized to insiders (managers and/or employees), 22% were privatized to outsiders, and 16% remained state-owned. Table 1 provides some basic information on the distribution by size, sector and region of the sample of firms. The sample is dominated by small and medium-sized enterprises; just over half the sampled firms employed fewer than 50 persons, and less than 8% employed more than 500. The firms are divided fairly evenly between industry (46%) and services (54%); just over one-third of firms are from the manufacturing sector. About one-third of the sample is from the Central and Eastern European region (including the Baltics) and 12% of firms are Russian. Most firms were located in either large cities or national capitals (41%) or in medium-sized cities (34%), with the remaining one-quarter in towns and rural areas.

[Table 1 here]

Table 2 presents data on the average performance by firms using the performance measures that we concentrate on in this paper: the growth of real sales and of real sales per worker. These measures were calculated from self-reported figures for the real growth of sales and of employment over the previous three years.

In the sample as a whole, 30% of firms reported a contraction in sales (in real terms) over the previous three years; just under one-quarter reported flat sales and just over 46% reported growing sales. The Central and Eastern European region including the Baltic States (CEB) and the South East European region (SEE) were the only regions in which more than one half of firms reported growing sales. In line with the macroeconomic performance across different regions, the proportion of firms with shrinking sales in a region ranged from just over one-fifth in CEB to one-third in Russia and 40% in the Western and Southern CIS.

For state-owned and privatized firms, average growth of sales was negative; it was positive for new firms. The opposite was true of productivity growth: average growth of sales per worker was negative in new firms and positive in old ones. For both privatized and new private firms, average growth increased with the size of the firm. This was not the case for state firms. In old firms, where between 55 and 60% of firms had declining sales, the more rapid shedding of labour than reduction of output lies behind the positive productivity growth recorded. In new firms, average productivity growth was negative but there is a clear size effect: as we move to higher size classes, productivity growth becomes less negative. In the largest size class, positive productivity growth was recorded for new firms. A possible explanation for

this size effect is the endogeneity of size. Larger firms may be larger at the time of survey because they grew faster (or shrank less rapidly); we return to this issue in the next section when we discuss our econometric estimations.

In addition to measures of performance based on sales growth, we sought to uncover the steps undertaken by firms to improve their performance. Two kinds of restructuring were explored in the survey. To capture the extent of strategic or deep restructuring, firms were asked questions about whether they had developed a new product line or upgraded an existing one, whether they had opened a new plant and whether they had obtained ISO9000 quality accreditation in the previous three years. The extent of defensive or cost-oriented restructuring was elicited by asking whether employment had been reduced by more than 10%, a product line had been discontinued or a plant closed down.

The restructuring variables used in our estimations are constructed using the method of principal components analysis from responses to the questions described above.[4] For our basic restructuring measure *r* we used responses to four questions on whether, in the preceding three years, firms had developed a new product line or upgraded an existing one, opened a new plant, or obtained ISO9000 accreditation. Our "defensive restructuring" measure *d* was constructed using responses to three questions on whether firms had reduced employment by more than 10%, discontinued at least one product line, or closed at least one plant. In the case of our restructuring measure *r*, the first of the four components explains 44% of the total variation, more than double that of the second component. The introduction of a new product or upgrading an existing one are given the largest weights in the construction of the index. The first principal component of the defensive restructuring measure *d* explains 55% of the total variation, almost double that of the second component. The index therefore gives the largest weighting to labour shedding. In both cases, the indexes are normalized so that the minimum value is zero and the maximum value is the number of possible restructuring measures. This is done to facilitate interpretation of the regression results – a unit increase in the index corresponds, roughly speaking, to the introduction of another restructuring measure.

[Table 2 here]

The survey instrument was expressly designed to discover the extent to which firms believed themselves to be facing significant competitive challenge. It began by asking firms three questions designed to elicit different indicators of the extent of competition in the market for the firm's main product:

- The first question concerned the number of competitors the firm believed itself to face in this market, distinguishing in the replies between no competitors, one to three competitors, and more than three competitors. Note that although this looks like a simple market concentration measure, it measures concentration in what the firm believes to be its main market, rather than the

[4] The use of these summary measures is more conservative than the alternative of including all the individual components as explanatory variables in the various regressions. With so many regressors, a likely outcome of this alternative procedure is a finding that some regressors are significant and with the expected sign, some are insignificant, and some are significant but with the opposite of the expected sign, making it difficult to reach an overall interpretation of the results.

administrative category of products the firm is placed in by the national statistical agency. The answers revealed a striking difference between the competitive environment reported by state and private firms. One-quarter of state firms reported that they faced no competition in the domestic market for their main product. For privatized firms, this was true of less than one in ten firms and for new firms, of one in 20.

- The second question concerned what firms believed to be the likely reaction of customers to a real 10% rise in the price of its main product, its competitors' prices remaining unchanged in real terms. This represented an attempt to ascertain directly the firm's perceived own-price elasticity of demand. Four categories of response were allowed, representing progressively less elastic responses of overall demand. Once again the responses indicated a difference between the environment reported by state and private firms, with private firms reporting a much greater own-price elasticity. Whereas just over one-quarter of state firms believed that a 10% price rise would lead many customers to switch to alternative suppliers, this was closer to 40% for private firms.
- The third question concerned the mark-up of prices over variable costs (a method of ascertaining directly the Lerner index of market power). This reported mark-up was highest for new firms and lowest for state firms. This may reflect the sharing of rents with workers in state firms that have monopoly power.

In fact the responses to these three questions complement one another. Carlin & Seabright (2001) show, using these data, that firms in concentrated markets report higher own-price elasticities, and profit from these elasticities to raise their margins, which is an entirely intuitive relationship. In addition, indicators of market power are generally related directly to size, the first two positively, the third negatively. Most strikingly of all, firms facing between one and three competitors had average sales growth of over 11%, while monopolists had more or less zero growth and firms facing more than three competitors had growth of only 2%. Whether this bivariate correlation stands up to more rigorous econometric estimation will be investigated in section 3.

The survey also sought to investigate the impact of perceived competitive pressure on decisions by managers to undertake strategic and defensive restructuring measures. In addition, managers were questioned about the firm's relationships with suppliers, customers and banks and about changes in the firm's organizational structure. The questions about restructuring are important since they enable us to explore more closely how performance improvements come about. A smaller proportion of state firms as compared with other firms reported pressure from domestic competitors as playing a significant role in their decision to enter new markets or introduce new products. Amongst private firms, one in five reported pressures from foreign competitors as significant in stimulating the introduction of new products. New entrants reported less pressure from foreign competition, which may reflect their small average size.

Finally, the survey collected information on the external environment as perceived by the firm, as well as on the presence of soft budget constraints; we focus

here on the latter.[5] In principle, a soft budget constraint is a feature of the environment faced by a particular firm, namely the likelihood that it would receive a subsidy or could run up arrears on its debts if it wished. In practice, however, at best all we can observe are the subsidies the firm has actually received. Such measures are obviously endogenous to performance. Are firms without arrears or subsidies firms that are performing well and so do not need the arrears or subsidies to which they in principle have access? Or are they firms that have come to terms with hard budget constraints and so perform better than they would otherwise do? We take as our measure of soft budget constraints a 1/0 variable indicating whether or not a firm is in arrears in its tax payments to central or local government. Toleration of non-payment of taxes is a frequently used and relatively unambiguous indicator of the presence of soft budget constraints in a country (Schaffer 1998). We discuss in the next section the various ways in which we have sought to exploit the broad cross-country structure of the dataset to control for the potential endogeneity of the soft budget constraint.

We now turn to our econometric estimation and modelling strategy.

4. Econometric estimation and modelling strategy

Our objective is to make use of this large multi-country cross-sectional firm-level data-set to examine the determinants of restructuring and performance. There are serious shortcomings with the data that limit the analysis that can be undertaken. In particular, there is no true time-series dimension. We have only self-reported information on the change in real sales as well as on the kinds of restructuring activities carried out by the firms over the preceding three years. We need to keep these problems in mind when analyzing the results.

However, other features of the data balance the lack of a true time series dimension. First, the extent of country variation in the sample is very valuable. With 25 countries, it is possible to address the problem of the endogeneity of soft budget constraints. We, like previous researchers, have at our disposal firm-level indicators of budget softness. However, as we argued in the previous section, in a study covering just one or a few countries, these raw data are of limited use in an econometric testing framework. It is difficult or impossible to disentangle the possible impact on performance of an environment of soft budget constraints from the effect of the firm's performance on its own experience of budgetary softness. With 25 countries covered by our sample, we are able to address this issue by exploiting the cross-country dimension to increase the number of instruments available for instrumental variables estimation.

Secondly, as we noted in the introduction, the measurement of competitive pressure in an economy is very difficult. In many studies, only industry level proxies for competition in the form of indicators of market structure are available (e.g., concentration ratios). The problem is that the "industry" may be quite distant from the

[5] In our preliminary work, we also investigated the survey responses on the quality of the business environment. The econometric results using measures of the business environment are less than clear-cut because of problems in addressing their endogeneity, and hence we do not use these in the work reported here. More details about the indices of the various dimensions of business environment can be found in Carlin, Fries, Schaffer and Seabright (2001).

concept of the "market" that is relevant to a firm's products. Moreover, concentration measures may not accurately reflect the competitive threat in an industry, especially in so-called endogenous sunk-cost industries. The firm-level measures of perceived competition described in the previous section provide a measure closer to the economic concept in which we are interested.

It was argued earlier that transition countries provide a valuable opportunity for attempting to measure the impact of competition on performance because endogeneity is less of a problem than in established market economies. There, the market structure may have been shaped by the successful performance of some firms, leading to a positive correlation between the degree of monopoly and performance with the causality from performance to structure. In transition countries, it is more plausible to think that the extent of competition in the market is exogenous to the firm. We must recognize, however, that our firm-level measures of "perceived competition" may indeed reflect actions taken by the firm to introduce new products or enter new markets where it will face less competition. Innovation may be motivated by the prospect of market power and successful innovation may be rewarded by market power, albeit temporary. Hence, we cannot escape entirely from the problems of the endogeneity of market structure.

Third, as described in section 3, the data are very rich in their restructuring variables. This helps us to narrow down the ways in which competition and soft budget constraints affect restructuring and performance. The survey reports information about the constraints faced by firms, the actions taken by them in response to those constraints, and the outcome of these actions in terms of performance. It would be tempting, but misleading, to think that the causality runs from a firm's external constraints through the restructuring decisions it takes to the performance outcome. Although this may often be true, sometimes the causality runs the other way. It may be the firm's poor performance that provokes its owners or managers to take certain restructuring decisions. If these are good decisions they may improve performance relative to what it would otherwise have been, even if they are associated with a deterioration of performance relative to what it was in the past. Likewise, it may be the firm's good performance, or the observed willingness of its managers to take difficult restructuring decisions that makes the firm an attractive prospect for privatization. These difficulties in disentangling the direction of causality have been even greater for many previous studies that have tried to link the firm's external constraints directly to performance; the presence of restructuring information provides important clues about the likely ways in which the causality may operate.[6]

Our strategy is to estimate equations for performance, with the dependent variable measured in two ways: first, by the real growth of sales over the preceding three years, and second by the growth of real labour productivity over the same period.[7] We take performance to depend on four types of variable: competition, the

[6] See Djankov (1999a,b), Earle and Estrin (1997), Bilsen and Konings (1997).

[7] As a robustness test, we re-estimated our performance regressions using winsorized measures of sales and productivity growth. Winsorizing truncates the distribution of a variable at some arbitrary point – in our case, at the 2.5% and 97.5% percentiles – but then rather than, say, discarding the outlier observations, accumulates them at the truncation points. We winsorized by country, and hence to construct winsorized log sales and productivity growth, the 5% of firms with the highest and lowest growth in a country have had their reported growth truncated in this way. The results did not change significantly.

extent of restructuring activity, whether the respondent was a new or old firm, and the presence of soft budget constraints. The restructuring and soft budget constraint variables are those constructed as described in section 3. The common equation structure is:

$$y = \beta_0 + \beta_1 comp + \beta_2 r + \beta_3 new + \mathbf{X\beta_4} + \beta_5 sbc + u_1 \quad (1)$$

where *y* is the performance variable (growth of sales or labour productivity), *comp* and *r* are variables for the extent of competition and restructuring, respectively, *new* is a dummy variable for *ab initio* private firms (those without a state-owned predecessor), **X** is a set of controls (size of firm as measured by the log of employment, location as measured by a dummy for whether the firm is located in a large city, sector as measured by a dummy for the service sector, and a set of country dummies/fixed effects[8]), *sbc* is the soft budget constraint dummy (indicating the firm is in arrears on its tax payments), and *u* is an error term.

As noted earlier, there may be a spurious correlation between performance as measured over the preceding three years and size as measured at the time of survey, because *ceteris paribus* firms that grew during the period will tend to be larger at the end of the period. We therefore use average employment during the period as our size measure in the sales growth equation, calculated from observed end-period employment[9] and employment growth during the period (both in logs).[10] This measure of size is problematic for the productivity equation because employment growth is used in the construction of both the size and the productivity variables, and measurement error in employment growth will generate a spurious positive correlation between them. On these *a priori* grounds, and on the *ex post* grounds of the absence of robust size effects in the sales growth equation (see below), we omit size from the productivity equation.

The restructuring estimating equation is

$$r = \gamma_0 + \gamma_1 comp + \gamma_2 pressure + \gamma_3 new + \mathbf{X\gamma_4} + \gamma_5 sbc + u_2 \quad (2)$$

where *pressure* is the firm's response to three questions on the influence of domestic competition, foreign competition, and customers on developing new products and entering new markets (in each case rated on a scale of 1=not important to 4=very important), and the other variables are as defined above. The defensive restructuring equation is the same except for the omission of *pressure*:

$$d = \delta_0 + \delta_1 comp + \delta_2 new + \mathbf{X\delta_3} + \delta_4 sbc + u_3 \quad (3)$$

[8] We have also estimated, but do not report, the instrumental variables analogue of the random effects model, Baltagi's (1981) error-components 2-stage least squares (EC2SLS) estimator. Our reason for not reporting these is that all such estimates fail the overidentifying restrictions tests (see below); however, it is encouraging to note that the random effects estimates are all qualitative extremely similar to the fixed effects estimates.

[9] Firms report employment by choosing 1 of 6 size categories; our end-period "log employment" is the log of the midpoint of the reported category.

[10] We note that when the sales growth equation is reestimated using end-period size, it is positive and highly significant. In the results reported below using average-period size, it is statistically insignificant.

Although we report estimates using *d* as a dependent variable we do not use it as an explanatory variable in our performance equations because of endogeneity problems. Our measures of defensive restructuring (e.g., labour shedding) are likely to depend on firm performance, and we lack adequate instruments to deal with this problem.

We are, however, able to address the endogeneity of *sbc*. We proceed by assuming that soft budgets are a country-level characteristic that is exogenous to the individual firm. What we want to measure is the probability that a poorly performing firm will be bailed out. But whether or not a firm is in arrears on its taxes is evidently endogenous to its performance. In a country with very soft budget constraints, poor performance by a firm will typically lead to a bailout via toleration of non-payment of taxes, while in a country with hard budget constraints, the same degree of poor performance will not generate a tax arrears bailout. Thus poor performance will lead to tax arrears, and will do so (we assume) according to a relationship that varies across countries but is constant within them. Our procedure is then to use as instruments for these different relationships the interaction of the dummy for each country with the competition variables (which enter into the performance equations directly as well as indirectly via restructuring).[11] What does this mean? It means that we are assuming entrepreneurial behaviour to be the same across countries, so that we constrain the effect of competition *per se* on performance to be that which appears on average across countries. Conversely, we interpret any differences in the way competition affects performance across countries to be due to differences in the soft budget constraint variable. The validity of the interaction effects as instruments can be tested using a test of overidentifying restrictions, and we do so.

The full set of instruments available are thus the country-competition interaction effects and the *pressure* variables that appear as determinants of restructuring in equation (2).[12] Equation (1) is identified through the exclusion of the country-competition interaction effects and the *pressure* variables; equation (2) is identified by the exclusion of the interaction effects and the performance variables. However, our prior is that defensive restructuring is spurred by poor performance but we do not have the instruments available to estimate equation (3) with *y* as an explanatory variable. Hence, the defensive restructuring structural equation is unidentified. Estimation of the defensive restructuring equation without performance as an explanatory variable means equation (3) is in effect partially a reduced form equation, and the estimated coefficients need to be interpreted in this light.[13] Similarly, the *a priori* exclusion of *y* as an explanatory variable in the restructuring equation (2) means it is identified, but this exclusion may be questioned. An

[11] The approach is analogous to the approach adopted in Angrist and Krueger's (1991) study of the returns to education. They estimated earnings equations for a sample of American males in which years of education was an endogenous regressor and dummies for year and state of birth were exogenous regressors. Angrist and Krueger created instruments for years of education by interacting quarter-of-birth with state-of-birth and quarter-of-birth with year-of-birth.

[12] To conserve on degrees of freedom, we limit the set of competition variables interacted with the country dummies based on the general results from the performance regressions. (a) We use only the dummy variable for "1-3 competitors", and omit both the "0 competitors" and ">3 competitors" from the interactions. (b) We treat the market power (10% test) variable as a single cardinal variable instead of as 3 separate dummies. This reduces the number of excluded instruments from well over 100 to under 50. The motivation here is that a large number of instruments can lead to substantial finite sample bias problems, especially when instruments are weak. See, e.g., Staiger and Stock (1997).

[13] That is, the reported coefficients include both direct and indirect impacts, the latter operating via firm performance.

additional issue involving equation (2) concerns the *pressure* variables: one may question whether a response to a question on whether the firm "faces pressure" is exogenous. A separate problem is that ideally restructuring activity should be measured *prior* to the period in which performance is measured, but all we have is restructuring and performance measured contemporaneously.

Because of these concerns, we first present reduced form estimates of the restructuring and performance variables regressed against the exogenous variables. These yield striking results, the main features of which are robust to our explorations using instrumental variables estimation of equations that include the endogenous variables. We then report the results of various methods of instrumenting for our endogenous variables, namely soft budget constraints and (in the performance regressions) strategic restructuring.

For these instrumental variables estimations we employ several diagnostic tests and three estimation methods. The benchmark regression is a 2SLS fixed effects specification. For each dependent variable in the regression we report an F-test of the exclusion of the instrument set in the first-stage regression. This diagnostic test is known to have important limitations when there is more than one endogenous regressor, and hence we also report a statistic designed to overcome these shortcomings, the "partial R^2" due to Shea (1997).[15] As we have cross-section data, heteroskedasticity is a potential problem, and so we also report the Pagan & Hall (1983) test statistic for heteroskedasticity in 2SLS estimations.[16] Our second estimation method, two-step efficient GMM, is motivated by the heteroskedasticity problem; it is efficient in the presence of arbitrary heteroskedasticity. The third estimation method uses the modification of limited-information maximum likelihood (LIML) proposed by Fuller (1977); we set the Fuller parameter $\alpha=1$, giving us the mean-unbiased version of his estimator. Our instruments have relatively weak explanatory power in the first-stage regressions, meaning we have a "weak instruments" problem, and in such circumstances 2SLS can suffer from substantial finite sample bias. Hahn et al. (2001) show that Fuller's LIML with $\alpha=1$ performs relatively well in these circumstances.

[15] The problem is that, for example, the excluded instruments may have enough explanatory power for an equation with only one endogenous regressor (and this would be indicated by the first-stage F-test) but lack the explanatory power to enable estimation of an equation with two endogenous regressors (which would *not* be picked up by the F-test). A drawback of the Shea measure is that it does not have a tabulated distribution, and hence should be interpreted with some caution. See Shea (1997).

[16] Standard tests for heteroskedasticity such as Breusch-Pagan and White/Koenker will be valid tests of heteroskedasticity in a 2SLS estimation only if the heteroskedasticity is present in that equation and nowhere else in the system; the Pagan-Hall test is designed to be robust to this problem. To conserve on degrees of freedom, we use the "fitted values" of the dependent variable and its square as the variables hypothesised to be related to heteroskedasticity. "Fitted values" here means the predicted values based on the estimated coefficients, the exogenous regressors, and the predicted (not actual) values of the endogenous regressors. See Pagan & Hall (1983) or Baum et al. (2002) for further details.

For each of the three estimation methods we present a test of overidentifying restrictions appropriate to the chosen estimation. This is a test of the joint hypothesis that the instruments are valid (i.e., uncorrelated with the error term) *and* that none of the instruments should have been included in the set of regressors and were not. In the case of GMM, the overidentifying restrictions test is Hansen's J statistic; for LIML, the test statistic is that due to Anderson and Rubin. For the 2SLS estimations, we report Sargan's overidentifying restrictions test if heteroskedasticity is not present, and Hansen's J statistic (which is robust to the presence of heteroskedasticity) otherwise. All estimations were done using the Stata statistical package.[17]

All regression estimates use country fixed effects and have a sample size of 2245 observations (the total number of firms for which there were no missing observations).

5. Results

Reduced form estimation

We begin by reporting in Table 3 the results of reduced form estimations of the restructuring and performance indicators on the exogenous variables. When interpreting the results, it is important to recall that the average growth of sales and of productivity of firms was close to zero and only just over 40% of firms reported positive sales growth over the preceding three years. The findings are striking.

[Table 3 here]

The nature of competition in the product market has important effects on the performance of firms. There are strong indications of a non-monotonic ("inverse-U") relationship with performance. Sales and productivity growth were higher in firms facing between one and three competitors in the market for their main product than in firms that either faced no competition at all or that faced more than three competitors. The positive effect of an intermediate degree of product market competition is economically as well as statistically significant. Firms facing between one and three competitors reported growth in both sales and productivity a little over 10% higher than other firms. Firms reporting more than three competitors have around 4% higher growth than monopolists, though this difference is not statistically significant.

The second indication that competition effects are important comes from the positive sign on the variable for firms reporting that sales would fall only slightly or not at all in response to a 10% price rise. These firms saw sales growth between 14% and 17% higher than others, and productivity growth between 6% and 8% higher than others.

The own-price elasticity (unlike the number of competitors) also shows up as significant in the restructuring regressions. It is positively related to new product restructuring and negatively related to defensive restructuring, which may reflect the fact that defensive restructuring tends to be somewhat confrontational and therefore tempting for firms with market power to avoid.

[17] For further details of the estimation routines used, see Baum, Stillman and Schaffer (2002).

New product restructuring is an important determinant of sales growth and as we shall see below, the pressure from foreign competitors and from customers to introduce new products are both significant determinants of restructuring. This highlights a third channel through which competition effects are playing a role in the performance regressions.

Controlling for other factors, new private firms have significantly higher sales growth and lower productivity growth than established firms (whether the latter are state-owned or privatized). They also show higher levels of new product restructuring and lower levels of defensive restructuring. It is, of course, impossible to tell how much of the positive relationship between new entry and sales growth is due to "survivor bias", namely the fact that the only new firms observed are the successful ones. The weaker productivity growth of new entrants is likely to indicate that such firms have been attracting labour faster than their sales have been growing. Unfortunately, the data are not available to examine the relative productivity *level* of new entrants as compared with incumbent firms.

The coefficients on the various control variables all have reasonable signs: restructuring is positively related to size but performance is not. Both restructuring and sales growth are larger in big cities, though productivity growth is not. Restructuring and productivity growth are lower in the service sector (reflecting perhaps the greater prior over-manning of manufacturing firms). Country fixed effects are highly significant.

We now explore in more detail the channels by which competition effects appear to be working.

Restructuring

All of the instrumental variables estimations revealed the instrument set to be relatively weak, though still significant at at conventional levels.[18] Table 4 reports the results of the equation for new product restructuring. Nearly 30% of firms reported that they had introduced a major new product line. Fortunately, the regression results using 2SLS, GMM and LIML are broadly consistent, and confirm that:

- Larger firms are much more likely and those in the service sector much less likely to have engaged in new product restructuring.
- The number of competitors is not a significant determinant of the decision to innovate.
- Market power as measured by the 10% test *is* an important positive determinant of new product development, but so is pressure from foreign competitors and customers (pressure from domestic

[18] The first-stage F-statistic for the joint significance of the excluded instruments is 1.69 with a p-value of 0.002. Staiger and Stock (1997) suggest that, in the case of a single endogenous regressor, a weak instruments problem is present if the first-stage F-statistic less than 10. Because the restructuring equations have only one endogenous regressor, the Shea partial R^2 coincides with the standard partial R^2, and hence conveys the same information as the F-statistic.

competitors is positive but insignificant).[19] Domestic and foreign competition appear therefore to be only imperfect substitutes.

- Soft budget constraints are a significant disincentive to new product restructuring.

[Table 4 here]

Table 5 reports the results for defensive restructuring. These are very interesting, because the impact of competition is the opposite of that for new product restructuring. Although the number of competitors is insignificant, firms with market power as measured by the 10% test are significantly *less* likely to have engaged in defensive restructuring. New firms are also less likely to have undertaken defensive restructuring (this doubtless reflects the fact that old firms inherited from central planning a workforce too large for their current requirements). The effect of size is similar to that for new product restructuring.

[Table 5 here]

Controlling for these other factors, soft budget constraints are associated with *more* defensive restructuring. This suggests we may be having some difficulty identifying precisely how soft budget constraints work: they may be a way in which poorly-performing firms continue to survive, but defensive restructuring may be part of the price the state extracts for its continued support.

We can summarize our findings for the determinants of restructuring. Although some questions remain about the quality of the instrument set, the effects of competition on restructuring are strong, and robust to the estimation method. New product restructuring increases with market power, and with pressure from foreign competitors and customers. By contrast, firms that do not face much competition do less defensive restructuring.

Performance

We now look again at the determinants of performance once we include the effects of the endogenous variables for soft budget constraints and new product restructuring. The instruments are again weak but significant at conventional levels.[20] Table 6 shows the determinants of sales growth. The really important feature to

[19] For new entrants in particular, there is a possible endogeneity associated with market power as measured by the 10% test. Compared with an average reported mark-up of 17 percentage points, a previous decision to develop a new product or market was associated for new entrants with an increased mark-up of 2.7 percentage points, and a decision to upgrade an existing product with an increased mark-up of 2.1 percentage points (the former statistically significant at 5% and the latter at 10%).

[20] The Shea partial R^2 measures are virtually the same magnitude as the conventional partial R^2 measures, which are not reported but are essentially equivalent to the reported F-statistics. These F-statistics indicate that the excluded instruments are significant at conventional levels but that a "weak instrument" problem is present. As noted above, however, the Shea statistic should be treated with some caution.

emerge from these tables is that having between one and three competitors contributes positively and significantly to sales growth in a *direct* way, even when the role of new product restructuring is taken into account[21]. However, market power as measured by the own-price elasticity of demand appears to work partly *indirectly*, via promoting new product restructuring, since when restructuring is taken into account the coefficient on the dummy for a slight fall in sales falls to around two-thirds of its value in the reduced form equation. The soft budget constraint appears to have no independent influence on sales growth except *indirectly*, via inhibiting new product restructuring. Not surprisingly, firms in the service sector grow faster once one takes account of the fact that they do less restructuring. New entrants also grow faster.

[Table 6 here]

Table 7 reports the determinants of productivity growth. The results for numbers of competitors are similar to those for sales growth, except that the coefficient on 1-3 competitors is now significant in all three specifications. The effect of market power (the 10% test) is positive but significant in only one of the three specifications, implying that it works mainly through its effect on new product restructuring, which has a strong positive impact on productivity growth that is significant in all specifications. The coefficient on new firms is now negative.

Altogether the two tables reveal some very intuitive and plausible channels for the various influences on firm performance. They do not contradict the main message of the reduced form regressions, but they cast important light on how competition works.

6. Concluding remarks

The chief finding of this study is the power of competition in influencing performance.[22] At the time of designing the survey we did not expect to find it so clearly, and we did not expect to find evidence of a non-monotonic effect. In the growth of sales and productivity, as well as in new product restructuring, the presence of some market power together with competitive pressure, especially from foreign suppliers, strongly and robustly enhances performance. New product restructuring is in turn an important contributor to firm performance, so this non-monotonic character of competition ("some market power but not too much") appears to have both direct and indirect effects. In particular, the presence of rivals seems to work directly on both sales growth and productivity growth, whereas a low own-price elasticity of demand works chiefly through providing an incentive for developing new products and finding new markets. Whether this indirect channel is due to the role of market power in relaxing financing constraints (which are important for firms in this survey, as Carlin, Fries, Schaffer and Seabright, 2001, report) or whether it is through the attractive prospect of future rents, is not possible to say on the evidence we have. However, these findings are certainly consistent with the presence of a

[21] The coefficient is not quite significant at conventional levels in the LIML estimation, the only time it fails to be significant in any of the performance regressions.

[22] Strictly speaking this is perceived competition, and interesting questions arise about the robustness of the link between perceived competition and the objective character of the market environment, questions we cannot pretend to have given adequate consideration here.

Schumpeterian-type competitive process at work, albeit one accompanied by considerable disruption and turbulence (see Carlin, Haskel and Seabright, 2001). Consistently also with the findings of Bresnahan and Reiss (1991), this evidence suggests that it is the presence of a handful of seriously competing firms that generates competitive conduct. And retained profits – in the presence of competitive pressure – appear also to be important for financing the restructuring that helps firms to succeed.

The presence of soft budget constraints appears to have a broadly negative impact on firm performance, since it inhibits new product restructuring. However, it probably also enables defensive restructuring, possibly as the price the state extracts for its support. This effect is not so econometrically robust as the competition effect, though this is unsurprising since it is a country-level effects and significantly endogenous.

Turning to policy implications, our findings strongly reinforce the message that unchallenged monopoly is a drain on performance. It is certainly more important to ensure that monopolists face at least some challenge than to try refereeing the necessarily confused process of rivalry among the few. It is true that at the same time as the importance of competition is becoming more apparent, so are the difficulties in the way of bringing about such a process effectively, especially in countries trying to establish market systems from scratch (see Fingleton, Fox, Neven and Seabright, 1996). But our results help to illuminate the many ingredients needed for the competitive process to work. Not only must there be a market structure in which firms face rivalry rather than secure monopoly but also: an end to soft budget constraints, removal of the obstacles facing new entrants, and financial systems that can support major investments in restructuring.

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Table 1. Number of firms by size, sector and region.

(In proportion of firm type, %)

		Manu-facturing	Other industry	Retail & wholesale trade	Other services	Total
Full sample	All firms	1129 (34.2)	377 (11.4)	1049 (31.7)	750 (22.7)	3305 (100)
	Micro	176	71	504	221	972 (29.4)
	Small	210	94	292	168	764 (23.1)
	Medium	374	144	186	214	918 (27.8)
	Large	369	68	67	147	651 (19.7)
CEB		317 (28.5)	90 (8.1)	361 (32.6)	340 (30.7)	1108 (100)
SEE		334 (44.6)	69 (9.2)	209 (27.9)	137 (18.3)	749 (100)
Russia		131 (32.3)	65 (16.0)	155 (38.1)	55 (13.6)	406 (100)
Western CIS		116 (37.3)	47 (15.1)	104 (33.4)	44 (14.2)	311 (100)
Southern CIS		125 (28.6)	55 (12.6)	164 (37.5)	93 (21.3)	437 (100)
Central Asia		106 (36.1)	51 (17.4)	56 (19.1)	81 (27.6)	294 (100)

Note. Micro firms (employment < 10); small firms (employment 10-49); medium firms (50-199), large (>200). “Other industry” comprises mining, construction and electricity; “other services” comprises transport, financial, personal, business and miscellaneous services.

Table 2. Real sales and productivity growth by ownership of firm

Full sample (non-agricultural businesses), mean log 3-year sales and productivity growth

		Old firms		New firms	All firms
		SOE	Privatized		
Number of firms (in proportion of firm type, %)		529 (16.0)	976 (29.5)	1800 (54.5)	3305 (100)
Sales growth		-0.010	-0.020	0.062	0.026
Number of firms, in proportion of firm type (%)	Increase in sales	39.7	44.8	48.9	46.2
	Zero growth	30.0	20.1	24.1	23.9
	Decline in sales	30.6	35.1	26.8	29.9
		100	100	100	100
Productivity growth		0.089	0.082	-0.030	0.022

Note: The question asked was, “By what percentage have your sales changed in real terms over the last three years?” “Productivity” growth is calculated from the change in sales and in employment reported over the last three years.

Table 3. Reduced form estimates of determinants of restructuring and performance

Dependent variables	New product restructuring	Defensive restructuring	Sales growth	Labour prod. growth
No. of competitors, omitted is "zero"				
1-3 competitors	0.053	-0.000	0.109**	0.117**
	(0.113)	(0.052)	(0.042)	(0.041)
>3 competitors	-0.118	-0.020	0.043	0.044
	(0.010)	(0.046)	(0.035)	(0.036)
Market power (10% test), omitted is "many customers would change suppliers"				
Sales would fall a lot	0.100	-0.069*	0.044	0.029
	(0.063)	(0.031)	(0.028)	(0.025)
Sales would fall slightly	0.250**	-0.104**	0.138**	0.084**
	(0.067)	(0.032)	(0.027)	(0.024)
No change in sales	0.321**	-0.192**	0.171**	0.059*
	(0.089)	(0.039)	(0.034)	(0.031)
Pressure from domestic competitors, omitted is "not at all important"				
Slightly important	0.116	-0.006	-0.025	-0.017
	(0.081)	(0.037)	(0.033)	(0.029)
Fairly important	0.093	0.030	-0.064	-0.034
	(0.085)	(0.038)	(0.034)	(0.032)
Very important	0.100	0.082	-0.080*	-0.041
	(0.091)	(0.043)	(0.039)	(0.034)
Pressure from foreign competitors				
Slightly important	0.257**	0.058	0.056	0.035
	(0.074)	(0.035)	(0.031)	(0.026)
Fairly important	0.178**	-0.012	0.089**	0.033
	(0.071)	(0.034)	(0.028)	(0.025)
Very important	0.273**	0.036	0.083*	0.048
	(0.080)	(0.037)	(0.035)	(0.030)
Pressure from customers				
Slightly important	0.029	-0.005	0.080*	0.024
	(0.086)	(0.039)	(0.036)	(0.032)
Fairly important	0.158	-0.014	0.090*	0.020
	(0.084)	(0.040)	(0.037)	(0.033)
Very important	0.200*	-0.005	0.079*	0.028
	(0.093)	(0.043)	(0.041)	(0.033)
Log employment	0.096**	0.080**	0.007	(omitted)
	(0.020)	(0.009)	(0.007)	
New entrant	0.164**	-0.204**	0.136**	-0.088**
	(0.062)	(0.030)	(0.026)	(0.020)
Services	-0.473**	-0.071**	0.013	-0.034
	(0.054)	(0.026)	(0.022)	(0.020)
Big city	0.156**	-0.018	0.063**	0.005
	(0.053)	(0.025)	(0.021)	(0.019)
R^2				
Within	0.102	0.146	0.052	0.023
Between	0.194	0.189	0.323	0.345
Overall	0.110	0.152	0.062	0.040
Test of significance of fixed effects:				
F(24,2202)	8.85	5.10	6.70	5.06
(p-value)	(0.000)	(0.000)	(0.000)	(0.000)

* = significant at 5%
** = significant at 1%
Robust standard errors in ()
N=2245

Table 4: Determinants of new product restructuring

Estimation method	2SLS	GMM	F-LIML (α=1)
Number of competitors			
1-3 competitors	0.063	0.075	0.071
	(0.112)	(0.108)	(0.115)
>3 competitors	-0.119	-0.120	-0.121
	(0.098)	(0.096)	(0.100)
Market power (10% test)			
Sales would fall a lot	0.072	0.077	0.052
	(0.065)	(0.064)	(0.069)
Sales would fall slightly	0.220**	0.215**	0.199**
	(0.069)	(0.068)	(0.072)
No change in sales	0.291**	0.304**	0.269**
	(0.090)	(0.087)	(0.093)
Pressure from domestic competitors			
Slightly important	0.144	0.149	0.164
	(0.082)	(0.081)	(0.086)
Fairly important	0.134	0.128	0.165
	(0.086)	(0.084)	(0.089)
Very important	0.104	0.115	0.107
	(0.091)	(0.089)	(0.094)
Pressure from foreign competitors			
Slightly important	0.284**	0.268**	0.304**
	(0.078)	(0.076)	(0.082)
Fairly important	0.169*	0.158*	0.162*
	(0.072)	(0.071)	(0.076)
Very important	0.299**	0.305**	0.312**
	(0.082)	(0.080)	(0.085)
Pressure from customers			
Slightly important	0.050	0.036	0.065
	(0.086)	(0.084)	(0.090)
Fairly important	0.170*	0.172*	0.178*
	(0.084)	(0.082)	(0.087)
Very important	0.230*	0.234*	0.252**
	(0.095)	(0.093)	(0.099)
New entrant	0.101	0.096	0.056
	(0.069)	(0.067)	(0.072)
Soft budget constraint	-0.632*	-0.587*	-1.087**
	(0.292)	(0.279)	(0.302)
Log employment	0.107**	0.106**	0.115**
	(0.020)	(0.020)	(0.021)
Services	-0.516**	-0.506**	-0.547**
	(0.020)	(0.056)	(0.060)
Big city	0.085	0.090	0.034
	(0.064)	(0.062)	(0.067)
Test of overidentifying restrictions:	Hansen J	Hansen J	A-R
$\chi^2(47)$	41.6	41.6	39.7
(p-value)	(0.695)	(0.694)	(0.765)

* = significant at 5% Robust standard errors in ()
** = significant at 1% N=2245

Pagan-Hall test of heteroskedasticity (IV): $\chi^2(2)=51.2$, p-value=0.000

Tests of instrument relevance in first-stage regressions:
Soft budget constraint: Shea Partial $R^2=0.0363$, $F(48,2154)=1.69$, p=0.0022

Table 5: Determinants of defensive restructuring

Estimation method	**2SLS**	**GMM**	**F-LIML (α=1)**
Number of competitors			
1-3 competitors	-0.004	-0.028	-0.012
	(0.050)	(0.048)	(0.052)
>3 competitors	-0.007	-0.010	-0.011
	(0.043)	(0.042)	(0.044)
Market power (10% test)			
Sales would fall a lot	-0.062*	-0.063*	-0.052
	(0.031)	(0.030)	(0.032)
Sales would fall slightly	-0.099**	-0.112**	-0.089**
	(0.032)	(0.031)	(0.033)
No change in sales	-0.190**	-0.205**	-0.177**
	(0.038)	(0.035)	(0.040)
New entrant	-0.174**	-0.158**	-0.151**
	(0.033)	(0.031)	(0.034)
Soft budget constraint	0.299*	0.381**	0.529**
	(0.127)	(0.112)	(0.133)
Log employment	0.074**	0.074**	0.070**
	(0.009)	(0.009)	(0.010)
Services	-0.052	-0.041	-0.036
	(0.027)	(0.026)	(0.028)
Big city	0.018	0.015	0.043
	(0.028)	(0.027)	(0.029)
Test of overidentifying restrictions:	Hansen J	Hansen J	A-R
$\chi^2(47)$	65.0	65.0	57.3
(p-value)	(0.042)	(0.042)	(0.144)

* = significant at 5% Robust standard errors in ()
** = significant at 1% N=2245

Pagan-Hall test of heteroskedasticity (IV): $\chi^2(2)=123.6$, p-value=0.000

Tests of instrument relevance in first-stage regressions:
Soft budget constraint: Shea Partial $R^2=0.0373$, $F(48,2163)=1.75$, $p=0.0012$

Table 6. Determinants of Sales Growth

Estimation method	2SLS	GMM	F-LIML (α=1)
Number of competitors			
1-3 competitors	0. 090*	0.074*	0.074
	(0.040)	(0.035)	(0.045)
>3 competitors	0.041	0.033	0.045
	(0.033)	(0.032)	(0.038)
Market power (10% test)			
Sales would fall a lot	0.022	0.011	0.009
	(0.028)	(0.026)	(0.031)
Sales would fall slightly	0.090*	0.073**	0.057
	(0.028)	(0.026)	(0.032)
No change in sales	0.111*	0.097**	0.076
	(0.034)	(0.030)	(0.039)
New entrants	0.093**	0.099**	0.070*
	(0.028)	(0.026)	(0.031)
Soft budget constraint	-0.121	-0.098	-0.129
	(0.102)	(0.084)	(0.117)
New product restructuring	0.183**	0.173**	0.318**
	(0.045)	(0.039)	(0.051)
Log employment	-0.005	-0.006	-0.019
	(0.009)	(0.009)	(0.010)
Services	0.082**	0.073**	0.148**
	(0.033)	(0.030)	(0.036)
Big city	0.021	0.023	-0.005
	(0.025)	(0.023)	(0.029)
Test of overidentifying restrictions:	Sargan	Hansen J	A-R
$\chi^2(49)$	50.9	54.1	47.6
(p-value)	(0.398)	(0.286)	(0.531)

* = significant at 5% Robust standard errors in ()
** = significant at 1% N=2245

Pagan-Hall test of heteroskedasticity (IV): $\chi^2(2)=2.35$, p-value=0.310

Tests of instrument relevance in first-stage regressions:
Soft budget constraint: Shea Partial $R^2=0.0382$, $F(51,2160)=1.70$, p=0.0016
New product restruct.: Shea Partial $R^2=0.0351$, $F(51,2160)=1.56$, p=0.0074

Table 7. Determinants of Productivity Growth

Estimation method	2SLS	GMM	F-LIML (α=1)
Number of competitors			
1-3 competitors	0. 106**	0.074*	0.102**
	(0.039)	(0.034)	(0.041)
>3 competitors	0.040	0.022	0.044
	(0.034)	(0.033)	(0.035)
Market power (10% test)			
Sales would fall a lot	0.016	0.001	0.009
	(0.026)	(0.023)	(0.026)
Sales would fall slightly	0.061*	0.042	0.047
	(0.026)	(0.023)	(0.026)
No change in sales	0.033	0.013	0.017
	(0.033)	(0.029)	(0.034)
New entrants	-0.100**	-0.086**	-0.107
	(0.023)	(0.023)	(0.024)
Soft budget constraint	-0.082	-0.087	-0.141
	(0.102)	(0.080)	(0.105)
New product restructuring	0.078*	0.079*	0.122**
	(0.041)	(0.036)	(0.041)
Services	-0.030	-0.008	0.017
	(0.030)	(0.028)	(0.031)
Big city	-0.016	-0.009	-0.031
	(0.023)	(0.021)	(0.023)
Test of overidentifying restrictions:	Sargan	Hansen J	A-R
$\chi^2(49)$	42.5	44.8	42.0
(p-value)	(0.731)	(0.643)	(0.750)

* = significant at 5% Robust standard errors in ()
** = significant at 1% N=2245

Pagan-Hall test of heteroskedasticity (IV): $\chi^2(2)=1.57$, p-value=0.457

Tests of instrument relevance in first-stage regressions:
Soft budget constraint: Shea Partial $R^2=0.0384$, $F(51,2161)=1.71$, $p=0.0015$
New product restruct.: Shea Partial $R^2=0.0364$, $F(51,2161)=1.61$, $p=0.0041$

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