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# FIRM TURNOVER, RESTRUCTURING AND LABOUR PRODUCTIVITY IN TRANSITION: THE CASE OF POLAND

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# Firm Turnover, Restructuring and Labour Productivity in Transition: The Case of Poland

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This paper explores the impact of turnover and  restructuring on labour productivity in the Polish economy over the period 1988-1993. Changes in aggregate productivity are decomposed into elements corresponding to productivity growth among survivors, market share growth by survivors and the contributions of entering and exiting firms. The traditional entry and exit effects begin to work as transition to a market economy progresses. However, initial productivity improvements are due to changes to market shares of the existing firms following the break-up of large enterprises. Regression analysis shows that changes in the firm-level productivity are affected by restructuring and a more competitive economic environment.

# 1. Introduction

Recent large-sample empirical work on the processes of entry, exit and growth in developed economies has tended to advance a neo-Schumpeterian view of firm turnover. Manufacturing industries typically exhibit substantial heterogeneity among their constituent firms  (see Bartelsman and Doms (2000) for a survey) and the variability of measured productivity across these is surprisingly great. However, high levels of firm turnover result in greater exit among less productive firms, many of which are of recent origin. Their replacements typically benefit from up-to-date capital equipment although they might not yet manifest the productivity gains resulting from managerial experience and learning-by-doing (Jensen et al, 2001).  On the whole, turbulence within the capitalist economies appears to raise productivity. Thus the replacement of less productive firms by new entrants of at least average productivity, the mobility of market share from less productive to more productive firms and the potential for productivity growth among those newcomers that survive may together exert a significant upward push on overall industrial performance. Indeed, establishment-level work [e.g. Disney et al (2003)] suggests further gains from intra-firm turbulence, as production is relocated to more productive establishments within multi-plant firms.

Outside the developed capitalist economies this picture is less clear. In some studies of developing economies (see Tybout (2000) for a survey) new entrants are typically *less efficient* than their industry mean. However, the cohort of such entrants, or more specifically the survivors therein, typically exhibit higher-than-average post-entry productivity growth. Thus Aw et al (2001) report that the productivity differential between exiting firms and surviving entrants in Taiwanese manufacturing is an important source of productivity growth. The evidence for selected industrial and developing countries[1] is brought together by Bartelsman et al (2004), with the conclusion that there are large differences in how creative destruction works in different groups of countries.

The extent and variety of industrial turbulence involved in a change of economic system makes the transition economies of Eastern Europe an unusual special case First, the economic dislocation accompanying transition clearly exceeded that typically experienced in macroeconomic downturns in mature economies, with potentially adverse consequences for enterprise development, at least in the short-run (Carlin et al, 2001). Second, high rates of *de novo* entry occurred, often on a very small scale, because of under-developed capital markets. And third, while the circumstances of transition clearly generated opportunities for new firms, they also resulted in restructuring of existing enterprises on an unprecedented scale. This involved not merely the transfer into private ownership of existing state-owned activities, but the break-up of large numbers of such enterprises. This process is not adequately documented in the official statistics[2], so that increased turnover to some extent reflects the fragmentation of some multi-plant state enterprises. Lizal et al (2001) consider the break-up of large state-owned enterprises to be among the most important changes accompanying transition.

In western economies changes in asset ownership, brought about by mergers, divestments and spinoffs, offer the opportunity to restructure enterprises and improve efficiency. While by no means all such transactions turn out to be successful, on average they appear to raise productivity [Seabright (2000)]. Particular gains appear to follow the divestment of assets to management buyouts and to third parties holding complementary resources- see Haynes et al (2002) and references therein. The evidence from transitional economies suggests a positive role for divestment. Lizal et al (2001) examine break-ups of Czechoslovak state-owned enterprises in 1991 and find a significant positive effect on productive efficiency and profitability for both the divesting parent and the spinoff; although the percentage gains are sensitive to the relative size of the two parties. Similarly, Hanousek et al (2004) confirm a positive performance effect for spinoffs, a result they attribute to the elimination of inefficiencies resulting from diseconomies of scale, weak managerial incentives, and a lack of focus on core competencies. Both studies use relatively small sample divested

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[1] The dataset, corresponding to a 2-digit level of industrial classification, includes OECD countries, emerging economies of Latin America and East Asia and several transition economies (Estonia, Latvia, Hungary, Romania and Slovenia).

[2] This is not restricted to Poland and centrally collected statistics from other transition countries suffer from the same limitations (see e.g. Halpern and Korosi (2001) for Hungary).

activities and each acknowledges the possibility of systemic losses elsewhere, but they point to potentially large gains resulting from a reversal of the large-scale enterprise policy that was necessary to facilitate central planning.

This paper explores the impact of turnover and restructuring on the aggregate productivity in the Polish economy over the period 1988-1993, that is the period surrounding the fall of the Communist system. Productivity changes are decomposed into elements corresponding to productivity growth among survivors, market share growth by survivors and the contributions of entering and exiting firms. As a check for robustness, we follow Disney et al (2003) in using alternative productivity decompositions. The results are complex, as might be expected given the extent of turbulence in the Polish economy of the time. They point to the initial importance of the market share effect, as resources flowed from less efficient to more efficient enterprises and the subsequence importance of entry and exit, presumably reflecting the break-up of traditional enterprises and the creation of new ones from their assets. As entry, exit and market share adjustments affect productivity indirectly, by increasing market contestability and placing the competitive pressures on survivors, we analyse the impact of the changing economic environment on the productivity of incumbents.

The paper is organised as follows: Section 2 describes the database and presents a preliminary analysis of the productivity characteristics of entrants and exits over the transition period. In section 3 we present some decompositions of aggregate productivity to try to determine the relative importance of intrinsic productivity growth, the transfer of market share to more productive units and the impact of entry. Section 4 explores the impact of firm and industry characteristics on firm-level productivity change in the early 1990s. A brief conclusion follows.

## 2. Data and Preliminary Characteristics

The Polish Central Statistical Office (GUS) maintains the register of all firms and collects detailed questionnaires covering various aspects of firms' performance. The design of different questionnaires and the requirement to report changed over the

years. Initially it was mostly state-owned enterprises filling in monthly questionnaires. Later on all firms complying with double-entry accounting rules were obliged to submit their reports on a monthly or annual basis depending on their size. The GUS processes the reports and publishes the resulting aggregates in the statistical yearbook and other more specialised publications.

Our dataset is compiled from the questionnaires on financial results (F-01) initially submitted mostly by the state-owned enterprises but later on routinely collected from all firms employing 5 or more workers, independent of their ownership status. Table 1 gives the information about the number of manufacturing firms registered and their aggregate sales, as reported in the statistical yearbook, in comparison to our dataset. The period covered is 1988 to 1993, from just before the transition started, into the first years of transition. The dataset covers around 2% of the firms registered but this count includes the corporate sector as well as self-employed. The coverage is very high in terms of sales, with the aggregate output of the firms in our database accounting for around 90% of total sales in Polish manufacturing.

Table 1  Officially published aggregates and the dataset

|  | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 |
|---|---|---|---|---|---|---|
| *Aggregate official statistics:* |  |  |  |  |  |  |
| Firms registered | 237844 | 297983 | 346299 | 340400 | 356000 | 307850 |
| Sold output (milliard zloty, current prices) | 32695.4 | 102729.5 | 577292.6 | 758877.8 | 983786.6 | 1384680.5 |
|  |  |  |  |  |  |  |
| *Dataset:* |  |  |  |  |  |  |
| Firms registered | 4654 | 4654 | 5183 | 6381 | 11062 | 11498 |
| as % of all | 1.96% | 1.56% | 1.50% | 1.87% | 3.11% | 3.73% |
| Sold output (milliard zloty, current prices) | 31231 | 87578 | 491153.9 | 630551.0 | 946034.0 | 1255195.2 |
| as % of all | 95.52% | 85.25% | 85.08% | 83.09% | 96.16% | 90.65% |

Table 2 shows the behaviour of labour productivity across all Polish manufacturing industry over the transition period. Disney et al. (2003) note that the choice between total factor productivity (TFP) and labour productivity as the preferred measure of firm performance usually involves a trade-off: TFP contains more information but is typically subject to greater measurement error via the capital input variable. While the coverage of the database here is almost complete across Polish manufacturing firms, it is suspected that the capital data are much less reliable than the output and

employment numbers. Accordingly, this paper uses labour productivity, defined here as the log of real output per head, rather than TFP. In support of this, we note that many other productivity studies, including Disney et al (2003), report that labour productivity and TFP typically generate very similar results.

From Table 2, it is immediately apparent that productivity fell sharply in the immediate aftermath of transition. This is to be expected in that Poland, although to a lesser extent than some other former Communist countries, experienced an immediate contraction in output with subsequent labour adjustment. After 1991 there was a rapid increase in productivity, although the high associated standard deviation points to a considerable dispersion in outcomes.

**Table 2        Average productivity across all manufacturing industries 1988-93**

|  | Mean | Std.dev. |
|---|---|---|
| 1988 | 1.6548 | 0.6903 |
| 1989 | 1.6963 | 0.6782 |
| 1990 | 1.5861 | 0.7673 |
| 1991 | 1.5850 | 0.8422 |
| 1992 | 1.7888 | 1.1176 |
| 1993 | 1.9293 | 1.1454 |

Poland, more than most transition economies, experienced an upsurge in entry in the years immediately following transition. It can be seen in Table 3 that the average number of entrants per year per industry rose from under two, in 1988-89 to almost 32 in 1991-92. However, it will also be seen that most of these entrants were relatively small. The result was that in spite of the extraordinary rate of entry, new entrants collectively enjoyed a fairly small market share. In contrast to this, exiters were relatively large, suggesting to the amount of restructuring concealed behind exit and entry activity. Some of the apparently new firms were actually new entities created via privatisation and restructuring of the old firms, due to the official statistics not adequately reporting the restructuring process.

**Table 3     Entry and exit in Polish manufacturing, 1988-1993; descriptive statistics (averaged across 152 industries)**

|  | 1988-89 | 1989-90 | 1990-91 | 1991-92 | 1992-93 |
|---|---|---|---|---|---|
| Number of entrants per industry | 1.81 | 4.26 | 10.88 | 31.94 | 18.18 |
| Entry rate | 0.24 | 0.22 | 0.46 | 0.99 | 0.23 |
| Average size of entrant (relative to the industry sales) | 0.0517 | 0.0286 | 0.0188 | 0.0093 | 0.0086 |
| Overall market share of entrants | 0.0919 | 0.1028 | 0.1988 | 0.2663 | 0.1236 |
|  |  |  |  |  |  |
| Number of exits per industry | 2.42 | 0.72 | 2.16 | 2.93 | 15.82 |
| Exit rate | 0.11 | 0.04 | 0.09 | 0.09 | 0.21 |
| Average size of exit (relative to the industry sales) | 0.0290 | 0.0476 | 0.0466 | 0.0338 | 0.0072 |
| Overall market share of exiters | 0.0548 | 0.0331 | 0.0881 | 0.0991 | 0.0928 |
|  |  |  |  |  |  |

Source: Roberts and Thomson (2003)

It can be seen immediately that the characteristics of new entrants as well as exiters change with transition. In 1989 and 1990 new entrants were considerably large. Nevertheless, the average new firm's size was only half that of an exiter. This might reflect a situation in which most of the apparently new firms in 1990 and 1991 were actually new entities created via privatisation and restructuring. Therefore their capital equipment is of a previous vintage, although, of course, the changed incentive structures may well have enabled them to enjoy subsequent survival benefits.

## 3. Decomposition of productivity growth

From our analysis of Tables 2-3, it is clear that the beginning of transition has to be seen as a period of increased turnover and improved productivity. We now set out to investigate the links between these two. However, the overall turbulence makes it difficult to disentangle the relative contribution of turnover and restructuring, since the impact on average productivity may be transmitted through individual firm effects as well as market share changes. In the next part of this paper we attempt a decomposition exercise to isolate these effects. The productivity literature exhibits several alternative decomposition procedures. We follow Disney et al (2003) in using three of these as a check for robustness.

For the decomposition analysis we define aggregate productivity in year t:

$$P_t = \sum_i s_{it} p_{it}$$

where $s_{it}$ is the share of firm i in year t and $p_{it}$ is productivity.

To determine the effects for S (survivors), N (entrants), X (exits) we use the decomposition proposed by Baily, Hulten and Campbell (1992) [henceforth **BHC**], where the change in average productivity between t-k and t is given by:

$$\Delta P_t = \sum_{i \in S} s_{it-k} \Delta p_{it} + \sum_{i \in S} \Delta s_{it} p_{it} + \sum_{i \in N} s_{it} p_{it} - \sum_{i \in X} s_{it-k} p_{it-k} \qquad \textbf{(BHC)}$$

where the first term = the "within" effect, shows the contribution to productivity growth of the survivors;

the second term = the "between" effect, shows the contribution of changes in shares for the survivors weighted by final period productivity;

and the third and fourth terms = the net entry effect, represent the contribution of entering and exiting firms.

The external effect captured by the last two terms in the **BHC** decomposition has been the subject of criticism. In particular, replacing less efficient exits with more efficient entrants could produce an unsatisfactory negative effect if the market shares of the entrants were sufficiently small and those of the exits sufficiently high. For this reason, Foster, Haltiwanger and Krizan (1998) [henceforth **FHK**] propose decomposition relative to average productivity:

$$\Delta P_t = \sum_{i \in S} s_{it-k} \Delta p_{it} + \sum_{i \in S} \Delta s_{it} \left( p_{it-k} - P_{t-k} \right) + \sum_{i \in S} \Delta s_{it} \Delta p_{it}$$
$$+ \sum_{i \in N} s_{it} \left( p_{it} - P_{t-k} \right) - \sum_{i \in X} s_{it-k} \left( p_{it-k} - P_{t-k} \right)$$

**(FHK)**

The first term remains the same but the second term shows the positive between – survivors effect only if market shares increase for the survivors with above average base year productivity. The new cross effect in the third term is positive when market shares increase (fall) for the firms with growing (falling) productivity. The net entry effect is now comprised of entry and exit elements that are unambiguously positive (negative) if entrants' (exits') productivity is greater than (less than) the mean. **FHK** concede, however, that their approach is highly sensitive to measurement error in assessing market shares and relative productivity levels in the base year. Griliches and Regev (1995) [henceforth **GR**] suggest an alternative formulation with time-averaging procedure to reduce measurement error:

$$\Delta P_t = \sum_{i \in S} \overline{s_i} \Delta p_{it} + \sum_{i \in S} \Delta s_{it} \left( \overline{p_i} - \overline{P_i} \right)$$
$$+ \sum_{i \in N} s_{it} \left( p_{it} - \overline{P_i} \right) - \sum_{i \in X} s_{it-k} \left( p_{it-k} - \overline{P_i} \right)$$

**(GR)**

where the bar indicates a time average over the base year (t-k) and the end year (t).

We examine productivity between 1991 and 1993 as substantial improvements were experienced over this period. Before decomposing productivity change and apportioning it among different types of firms, in Table 4 we look at the characteristics of entrants, exits and survivors. In 1992 there is a large number of very small entrants, around one third of the average size for that year. There are relatively few exits but, as they are very large, they account for a relatively large amount of total manufacturing output. In 1993 there are far fewer entrants but their average relative size more than doubles. At the same time, the number of exits increases dramatically, with exiting firms becoming much smaller than the average. There are productivity differentials between entrants and exits, with exits exhibiting surprisingly high productivity, exceeding that of survivors. Productivity among the survivors increases and is above the end year average. The relative size and productivity of exits in 1992 and the characteristics of new entrants appear consistent with a certain amount of restructuring through the break-up of large firms.

In both periods productivity increases, but there might be different processes behind productivity improvement. Table 5 gives components of productivity change using the decomposition methods outlined at the beginning of this section.

**Table 4**       **Output share, size and relative productivity of entrants, exits and survivors**

| | Total numbers | | Size relative to average | | | |
|---|---|---|---|---|---|---|
| | Entrants, t | Exits, t-1 | Entrants, t | Exits, t-1 | Survivors, t-1 | Survivors, t |
| 1992 | 5126 | 465 | 0.3393 | 1.6941 | 0.9454 | 1.5747 |
| 1993 | 2770 | 2334 | 0.7134 | 0.2415 | 1.2028 | 1.0909 |
| | | | | | | |
| | Total shares | | Productivity relative to average | | | |
| | Entrants, t | Exits, t-1 | Entrants, t | Exits, t-1 | Survivors, t-1 | Survivors, t |
| 1992 | 0.1579 | 0.1235 | 1.1823 | 1.2025 | 0.9820 | 1.0630 |
| 1993 | 0.1719 | 0.0510 | 1.0697 | 1.1131 | 0.9698 | 1.0772 |
| | | | | | | |

**Table 5**       **Decomposition of productivity**

| | Components of productivity change | | | |
|---|---|---|---|---|
| | Within | Between | Cross | Net entry |
| Labour productivity 1991-92 (productivity growth 8.1%) | | | | |
| BHC | -27 | 97 | - | 30 |
| FHK | -27 | 51 | 89 | -13 |
| GR | 17 | 97 | - | -14 |
| Labour productivity 1992-93 (Productivity growth 7.9%) | | | | |
| BHC | 32 | -149 | - | 217 |
| FHK | 32 | -18 | 23 | 63 |
| GR | 44 | -1 | - | 57 |

Note: All values are per cent of total change

The **BHC** decomposition gives very large individual contributions. Similar results are obtained by Baily et al (1992) in their original application, where large individual effects are offset by a negative effect so that all contributions add up to 100%. Productivity growth among survivors can come from improvements in their individual productivity and from changes in the output shares. Even though average productivity and size among survivors increase, the within effect is negative. This is because some firms with large output share experience a decline in productivity. In 1992 there is a strong "between" effect accounting for 97% of total growth. This effect is determined by the change in the shares of survivors weighted by their final year productivity. A large positive effect indicates that firms experiencing large share increases were also characterised by high productivity. On the other hand the between effect for 1992-93 is very large and negative. In this period the average size of a survivor went down and the majority of firms experienced a decline in their shares. There is a very strong effect of net entry on productivity growth, especially in 1992-93. This strong effect is partly due to a large share of entrants, compared with the share of exits (see Table 4), not just a result of the  underlying productivity differentials. Indeed, the **BHC** decomposition is often criticised on the grounds that the interpretation of relative contributions of entry and exit is unclear.

The **FHK** decomposition is considered superior to the **BHC** one because of the ease of interpretation of the individual effects. In 1991-92 the between survivor effect (=51%) is positive as the firms with above average productivity experience market share increases. However, growth in productivity is mostly explained by the cross effect (=89%) indicating that market shares increased for the firms with growing productivity. The effect of net entry was small and negative (-13%). This was due to the contribution of exits with relatively high productivity and large share. In the period of 1992-93 changing productivity is mostly explained by the net entry effect. The large positive effect (= 63%) is driven by the entrants with high productivity relative to the average. The **GR** decomposition gives us the estimates of the net entry effects fairly consistent with the **FHK** estimates (-14% for 1991-92 and 57% for 1992-93).

Bartelsman et al (2004) identify the within-firm performance as a major factor behind productivity growth in industrial and emerging economies. The effect of reallocation

of resources among existing firms, due to changing market shares, varies across countries. The net contribution of entry and exit is generally positive and in transition economies examined by Bartelsman et al (2004) the entry of new firms often makes a strong contribution to productivity.

In contrast to these regularities, the results for Poland at the beginning of transition display a different pattern. Initially, the within effect is negative, indicating that productivity among the existing firms actually declines. The net entry effect (FHK and GR decompositions) is negative in 1991-92, which does not support the creative destruction hypothesis. There are positive and strong between- and cross- effects though, as market shares grow (decline) for the firms with the productivity above (below) the average. This gives indirect support to the importance of the Schumpeterian forces, in this case acting through market share adjustments rather than entry and exit as such. In the second period (1992-93), net entry is the main factor behind productivity improvements. A relatively strong within effect (between 32 and 44%) means that productivity improvements can also be attributed to the existing firms, as long as their contributions are weighted by their initial output shares. Changes to the market share continue to be an important factor, as shown by a large negative between effect.

Instead of a distinction between incumbents, entrants and exits, and their respective contributions to aggregate productivity, Disney et al (2003) contrast internal and external restructuring. The former is measured by the "within" effect, while the remaining effects are an indication of external restructuring. The process involves market selection whereby low productivity firms exit and are replaced by higher productivity entrants, alongside higher productivity incumbents gaining market share. For the UK in the 1980s and early 1990s, internal restructuring accounted for around 50% of labour productivity growth and external restructuring was the main factor behind productivity growth in terms of total factor productivity. For Poland at the beginning of transition internal restructuring accounts for at most 44% of productivity growth (GR decomposition for 1992-93), while the bulk of productivity growth is explained by external restructuring. This takes the form of some firms leaving and new firms entering although changes in market shares of the survivors exert very

strong influence on overall productivity. Behind these processes there is genuine turnover but the characteristics of exits and entrants suggest an amount of restructuring by the break-up of large firms. Instead of contrasting internal and external restructuring, Bartelsman et al (2004) promote the view that these processes are closely related and could be interpreted as contestability effects, whereby greater competitive pressures may induce incumbents to perform more efficiently. For this reason, in the following section we examine the environmental determinants of productivity changes in the immediate post-transition period.

## 4. Determinants of productivity change

There have been numerous models in the theoretical literature [see Nickell (1995) for a survey] that have considered the impact of competition on the manager-agent's incentive to exert effort on behalf of shareholder-principals. Most, although by no means all, of these have concluded that market share and concentration, certainly at high levels, offer managers some cushion and opportunity to reduce effort. Empirical work, using developed country data [e.g. Nickell (1996), and Bottasso and Sembenelli (2001)] has generally supported this. The picture may be different in developing countries [see Tybout (2000)] where, typically, many plants can be beneath the minimum efficient scale in less concentrated industries. However, in transition economies, where the prior absence of competition was widely believed to have harmed productivity [Porter (1990)], there is the added potential effect of the initial shock of competition. Indeed, Aghion et al (2002) survey firms in 25 transitional economies and find that competitive pressure enhances the performance of new as well as old firms.

It is acknowledged in the literature [see Nickell (1996)] that market competition is difficult to measure in an empirical study. Conventional measures of market structure, such as the HHI, are flawed insofar as intrinsic industry differences in R&D- and advertising intensity have been shown to place bounds on market concentration [see Sutton (1998)]. However, Disney et al (2003) argue that *changes* in market structure will typically act as indicators of competitive pressure. We also follow these authors

and Nickell (1996) in using *ex ante* rents as an indicator of the inverse of the competitive pressure being experienced by managers and workers. Therefore we expect that increases in concentration and leading firm market share will signal less competitive pressure and generate lower productivity gains. Similarly, we anticipate that the incentive to improve productivity will be reduced among firms already earning high rents.

In transition economies there are likely to be additional incentive effects associated with the privatisation and the restructuring of industry. In particular, we might expect managers of newly-privatised enterprises to face much stronger incentives to reduce costs than did their predecessors in state-owned firms. In the first place, privatisation introduces the sanction of bankruptcy for failing firms. In Poland this was accompanied by hard budget constraints, tight bank lending policies and a credible policy of no state bail-outs [Pinto et al. (1993)]. Secondly, post-privatisation managers may well have a direct equity involvement, particularly where the privatisation was effected by a management buy-out, as was frequently the case in Poland [Filatochev et al. (1996)]. Even where this did not occur, it appears plausible that the senior managers' remuneration will be more closely tied to performance than that of their predecessors. Finally, in as much as restructuring in transition economies generally involved the breaking up of multi-product, multi-plant enterprises into smaller units it may have affected incentives by establishing a more transparent connection between managerial effort and firm performance.

As indicated throughout this paper, privatisation and associated restructuring were ubiquitous features of the Polish economy over the period. The database allows us to control for state ownership and identify those firms that moved out of the state sector in 1989-91 and retained their firm identifier. In some cases this probably amounted to no more than a reclassification of co-operative enterprises to the private category. Nonetheless it probably serves to distinguish such enterprises from the regular state-owned ones. Of course, elsewhere privatisation will have involved both breaking up and reclassifying firms. Among other firm-level characteristics, we also make a distinction between the older firms, which existed before transition, and the new firms

which entered in or after 1990. Firm size, measure by the log of employment, was included to capture any greater potential to realise size-related productivity growth.

We also control for the environment within which firms operate, in particular, the size of the state-owned sector and the existence of any foreign firms within industry. It is difficult to make an *a priori* assessment of the likely impact of the continuing presence of state enterprises on productivity growth across firms in the industry. State firms themselves may possess low incentives to effect productivity growth, but their very inertia could generate opportunities for private innovation. We control for the share of the state-owned firms in the 3-digit industry with no strong prior. There is a clear association between foreign direct investment, technology transfer and productivity growth, see Tybout (2000), although whether this extends, via spillovers, to domestic rivals of foreign-owned plants is the subject of some debate. We include an indicator variable to denote the presence of foreign MNEs in the industry, with the expectation that technology transfer effects and/or spillovers will generate a positive coefficient. Finally, in recognition that the model will inevitably omit some specific entry barriers, we include realised entry, measured as the log of the number of entrants (+1) to the industry over the period.

Productivity regressions are run for a pool of all firms surviving throughout the period 1990-1993 (results in column 1 in Table 6) and for the firms existing in 1992 and 1993 (column 2). The majority of variables are self-explanatory but the additional variables are defined as follows. 'High concentration' is a dummy assuming the value of 1 if the HHI exceeds 0.20. The rents dummy is equal to 1 if the price cost margin is greater than 10%.

The results indicate mixed support for the effects of competitive pressure. The change in concentration carried the expected significant negative sign, with an additional strong negative effect for the change in market share in high concentration industries. Similarly, productivity growth was significantly lower in industries characterised by high existing rents. However, the change in market share alone carried a significant *positive* effect. It was unclear whether this was picking up a firm size effect or reflected some kind of Chicago mechanism – see Demsetz (1973) – in which firms

displaying superior productivity performance expand relative to their rivals. The inclusion of an entry variable, intended to capture another dimension of competitive pressure, proved insignificant; perhaps because any competitive stimulus to productivity growth was offset by the dilution effect of small, sub-optimal scale entrants in some industries. This conjecture is reinforced by the very large positive coefficient attaching to size.

The importance of ownership was demonstrated in two ways: First, the Ownership Change binary variable carried a large positive coefficient. Second, when this variable was replaced by a State Ownership binary variable[3], the latter carried a large negative coefficient. While there may be some selection bias, in that those enterprises with the best prospects may have been privatised earlier in transition, the results are strongly consistent with a large privatisation effect. However, we find no comparable effect when state ownership is measured at the industry level. The industry's proportion of state-owned enterprises attracted a negative but insignificant coefficient. By contrast, industries with foreign-owned enterprises exhibited significantly higher productivity growth, a result consistent with the expected advantages of multinationals in both technology transfer and experience of the market economy.

The performance of the new entrant cohort dummies suggested that new entrants enjoyed significantly higher productivity growth than those survivors from the start of the period. However, the entry variable, that represented the (log of) number of entering firms, was negative and indeed significant for the 1992-93 period. Since this variable was intended to capture competitive pressure, through the ease of entry, this result appears surprising, especially given the previously reported *positive* productivity effect enjoyed by entrants. However, there is a very substantial variation in the number of new entrants across industries and it may be that reflects differences in underlying technology that also correlate with the potential for productivity growth. The low overall fit of our regressions is unsurprising given the enormous heterogeneity among the population of Polish firms in the immediate aftermath of transition.

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[3] State ownership is only included for 1992-1993 but not for 1990-1993. The reason is that in 1990 the majority of firms in our database was state-owned. Similarly Ownership Change is only included in 1990-1993 because the ownership changes we trace are limited to the initial period of transition.

**Table 6        Changes in productivity for the surviving firms**

| | Change in productivity | |
|---|---|---|
| | Firms surviving between 1990-1993 | Firms surviving between 1992 and 1993 |
| Constant | -0.5890 (-9.87) | -0.5347 (-8.23) |
| Change in market share | 7. 8810 (16.2) | 9.4064 (10.51) |
| Change in market share * high concentration | -6.2124 (-10.81) | -7.5662 (-6.89) |
| Change in concentration (HHI) | -0.7400 (-3.96) | -0.2241 (-0.65) |
| High rents | -0.0443 (-3.57) | -0.1610 (-8.07) |
| | | |
| If entered in 1990 | 0.1481 (8.24) | |
| If entered in 1992 | | 0.3895 (17.98) |
| If ownership change | 0.1144 (7.48) | |
| If state-owned | | -0.2567 (-9.99) |
| Size (log of employment) | 0.1079 (17.89) | 0.1641 (21.16) |
| | | |
| Size of state-owned sector | -0.0273 (-0.82) | -0.0628 (-1.07) |
| If any foreign firms in industry | 0.0438 (2.69) | 0.0763 (1.99) |
| Entry | -0.0033 (-0.54) | -0.0292 (-2.95) |
| | | |
| N | 3 * 3104 = 9312 | 8257 |
| R-bar squared | 0.072 | 0.0911 |
| | | |

Note:   Regression in column 1 also included year dummies

        t-values in parentheses

## 5. Conclusions

This paper represents a first attempt to evaluate the alternative sources of aggregate productivity change in a transition economy experiencing the full throws of change. In particular, the beginning of transition is characterised by restructuring of existing enterprises and increased turnover. We employ a comprehensive database, covering almost all medium and large Polish manufacturing firms existing in the period to evaluate changes to aggregate productivity. The decomposition analysis points to a strong role of external restructuring, involving entry, exit as well as market share adjustment effects. Initially, changes to market shares of the existing firms following the break-up are the main factor behind productivity improvements. Later on, the traditional entry and exit effects are at work, supporting the notion of creative destruction. It is not possible to distinguish completely the effects of privatisation and restructuring from genuine *de novo* entry. In a period where so much change was occurring, many new entrants were presumably re-cycling existing buildings and equipment if not entire business units. However, market share adjustments as well as net entry exert a strong effect on overall productivity.

The importance of external restructuring goes beyond its accounting contribution to aggregate productivity growth. Increased contestability and competition may affect the productivity of incumbents. We investigate this by examining how the new economic environment influenced the incumbents' productivity. The results give some support for the effects of competitive pressure and organisational change.

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