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Abstract

Transition started by a sudden collapse of corporate efficiency, as one important element of the transformational recession. It was followed by a consolidation period, with rapidly increasing efficiency and improving returns to scale. During this period performance was frequently improved by downsizing, thus fast improving corporate performance could not be translated into economic growth. This consolidation period ended in 1995-6, after that mean firm level efficiency only changed slowly. However, the March 1995 stabilization created a favourable environment for substantial investments into the Hungarian corporate sector. These investments largely increased the market share of the better performing firms and sectors, and the massive investments, together with substantial structural improvements brought about rapid economic growth.

Market characteristics play a changing role during transition. Import competition, sectoral concentration and efficiency are important explanatory factors for the development of market share of a firm. Heterogeneity can be observed across sectors, according to ownership and to size. The differences, however, are not that large and were diminishing, what makes the hypothesis of the importance of market environment in the determination of corporate performance plausible.

One of the major tasks facing a transition economy is to create the competitive environment of a properly functioning market economy. This paper attempts to analyse the relationship of market structure, market imperfections and corporate performance by mark-up pricing. Our results clearly indicate that substantial market imperfections exist in the Hungarian manufacturing sector. These imperfections can yield substantial rents. However, foreign owned firms have larger chance for exploiting market imperfections and can collect larger rents than domestic firms.

Introduction

Transition from planned to market economy is a unique possibility to study interactions of different policies. The recession phase had already been described by Kornai (1993), and excellent theoretical studies are available on different models of restructuring. However, much fewer studies investigate the interactions of different policies in different periods of transition, from recession to growth. Aghion, Carlin and Schaffer (2002) is an important contribution in providing insights into this interaction, based on an in-depth firm level survey for a large number of transition economies.

Our objective in this paper is to investigate such interactions for a single country, using firm level balance sheet data. We aim to explore the dynamics of the transition process as well as the possibility of heterogeneous behavioural responses according to sectors, ownership and size.

This paper assesses different aspects of transition in Hungary: efficiency, pricing, resource reallocation and the role of market. The first part describes the theoretical background. The second part deals with the notions and the links among them. The third part presents the detailed analysis of the Hungarian economy. The fourth part attempts to describe the role of different policies. Then conclusions follow.

Theoretical background

The drive for efficiency in corporate sector can be modeled in different ways. The X-efficiency way of reasoning claims that greater competition induces an expansion of output by incumbent firms through improved internal technical efficiency without any reallocation of resources across firms. (Cf, Horn, Lang and Lundgren, 1995). The incentive type explanation argues that incentive schemes for managers will generate better results the greater the number of players (firms) involved because of greater opportunities for performance comparison. See Holmström (1982), Nalebuff and Stiglitz (1983).

The industrial rationalization argument postulates that firms compete for market share in an oligopolistic environment (Schmidt, 1997). In transition economies, increased competition may have negative effect on efficiency. Competition creates incentives for breaking contracts when institutions are weak (Blanchard and Kremer, 1997).

The link between product market competition (PMC) and innovation depends on the nature of the market. If the capital market is perfect as it is assumed in Romer (1990) or Aghion and Howitt (1992), the effect of PMC is negative on innovation what is only determined by the monopoly rent emanating from it. This conclusion is contradicted by empirical studies like Nickell (1996), Blundell et al. (1999) and Aghion, Bloom, Blundell, Griffith and Howitt (2002) for UK and by Carlin, Fries, Schaffer and Seabright (2001) and Grosfeld and Tressel (2001) for transition economies.

Aghion, Dewatripont and Rey (1999) developed a model that is consistent with this empirical finding. In the model two types of firms exist; profit-maximizing ones and non-profit maximizing ones with 'satisficing' managers who minimize effort subject to remaining in business, in order for them to preserve their private benefits of control. Firms with dispersed outside ownership are good candidates for this type of managerial behavior.

The model predicts that better corporate governance, as measured by higher managerial stakes in the firm's monetary profits or by a higher debt-asset ratio and higher enforcement power by creditors, tends to reduce the impact of product market competition on growth. However, that is in contradiciton with Grosfeld and Tressel (2001). The authors report for

Polish firms listed on Warsaw Stock Exchange that PMC raises TFP growth and that the effect is stronger for firms with both concentrated and relatively dispersed ownership.

There is a different way how to model the innovation process. Aghion, Harris, Howitt and Vickers (2001) and Aghion and Howitt (2002) assume that incumbent firms can also innovate. In earlier endogenous growth models, innovation was done only by outside firms or by the most backward ones. In this framework, innovation incentives depend upon the difference between post-innovation and pre-innovation rents and not so much upon post-innovation rents only. Competition and hard budget constraints are complementary in this model. Aghion, Carlin and Schaffer (2002) lends empirical support to this model on a large sample of firms from transition economies.

The link between PMC and efficiency is in the centre of this paper. As we do not have any direct information on R&D – either input or output sides – innovations are only present indirectly. Annual estimation of best practice technologies measures the distance of all firms from production frontier, hence gives an indirect measure of the efficiency of resource allocations, thus on R&D activities. Corporate governance may exacerbate this link, therefore it is represented by different measures in our empirical approach. Restructuring as a precondition for efficiency improvement is proxied by job reallocation.

Policies are still difficult to be addressed, just as in case of estimations based on survey data. They are analysed in the framework of a market share model, where different market characteristics and firm efficiency are supposed to provide sufficient explanation.

Some important empirical results

Davis and Haltiwanger (1997) compare job creation and destruction rates of several transition economies to those in developed economies. Only the Czech Republic had job reallocation rates comparable to market economies in the initial phase of transition; job creation rates were extremely low in all other transition economies, typically at around 1%. Konings (2003) finds that some successfully restructuring transition economies (especially Poland and Slovenia with 13% excess reallocation ratio) gradually approached the intensity of job reallocation rates of the developed economies by the late 1990's, but many had still low job turnover, and some less successfully restructuring transition economies (eg, Bulgaria and Romania) were characterised by net job destruction even in the late 1990's. This inflexibility is a clear indication on the poor performance of these transition economies, but it also is an impediment on the process of corporate restructuring.

Djankov and Murrell (2002) present an impressive survey of the empirical evidence on the relationship of privatisation and the emerging ownership structure and productivity. Their most robust conclusion was that outside ownership leads to faster and larger productivity gains that insider or state ownership. However, as mentioned earlier, this finding was qualified by Grosfeld and Tressel (2001), suggesting that the concentration of the ownership structure also has a strong influence on efficiency.

Two recent studies compare productive efficiency of transition economies to that of developed market economies. It is no surprise that 'western' firms are more efficient, and they determine the efficiency frontier. However, Loecker (2002) found that the productivity gap between Belgian and Czech or especially between Belgian and Polish firms is small, and the gap decreased relatively rapidly in the second half of the 1990's. Funke and Rahn (2002) seems to have found much more substantial efficiency difference (approximately twice as large gap) between Eastern and Western German firms than the gap between the Eastern and the Western firms in Loecker (2002), and the efficiency gap only seems to narrow in the

engineering in Germany, but not in the other sectors. Even though there are important differences in model specification and data definitions, thus these results are not directly comparable, it is intriguing how large the efficiency gap between West and East Germany has remained, despite the fact that institutional changes were more thorough in Eastern Germany than in any other transition economy, and Eastern Germany received a much larger financial investment from the west throughout the 1990's than all other transition economies put together. This demonstrates the lack of a straightforward relationship between investment inflow and efficiency. Obviously, investment is one of the main factors of productivity growth, but a reasonable mix of macro-economic conditions is an essential precondition for efficiency improvement. The highly distorted macro-economic terms of German unification seems to have a lasting and substantial negative effect on efficiency catch-up of the East German economy.

Konings, Van Cayseele and Warzynski (2002) analyses the relationship between mark-up ratios and ownership structure in Bulgarian and Romanian manufacturing. They found clear evidence that foreign-owned firms have higher mark-ups than domestic ones. (Interestingly, they also found that state owned firms had the lowest average mark-up ratio.) They also found evidence import penetration brings down mark-ups in highly concentrated sectors.

Methods

Four different methods will be used together in order to assess the depth and width of economic transformation in Hungary between 1990 and 2000.

Restructuring

The magnitude of gross job destruction and job creation and their balance is used as the first indicator of restructuring economic activity. It is assumed that the higher the turnover rate – average of creation and destruction rates – in employment the deeper the restructuring itself. For the overall employment and growth, however, the net effect – the difference between destruction and creation – matters. Gross job creation rate is the sum of employment at new firms of the sector, plus the surplus employment at those firms in the same sector where employment increased, relative to the total sectoral employment. Gross job destruction is defined analogously, while net job creation is the difference of the above gross measures.

Efficiency

We measure corporate efficiency by using a frontier production function. We assume that technology can be described by a Cobb-Douglas production function. As firms had to adjust production to very rapidly changing market conditions, while frequently had to face strong liquidity constraint, we used dynamic models to allow for gradual adjustment:

$\log(Y)_t = c + d * \log(Y)_{t-1} + a * \log(L)_t + b * \log(K)_t + v_t - u_t,$

where *Y* is real value added (output), *L* is employment, *K* is capital stock, *v* the usual regression disturbance, while *u* measures productive inefficiency ($u>0$).

Efficient firms use resources more productively. We measure relative (in)efficiency by the frontier production function: the 'best practice' firm is the benchmark. Differences in the average efficiency of specific groups of firms may reflect differences in endowment levels, market conditions as well as managerial effort.

We also assume that the returns to scale measures firms' efficiency in optimally allocating resources. Suboptimal resource allocation may lead to substantial waste, and thus losses.

Market structure and efficiency

Efficiency and changes in market structure can be related to each other in both directions. Nickell (1996) and Nickell et al (1997) assume that competition and policies affect resource allocation directly. Hay and Liu (1997) on the other hand assume a reverse relationship: resource allocation determines the technical efficiency of firms, and this technical efficiency will affect the market share of firms in conjunction with variables describing the market environment, policies included. They also relate efficiency to investment.

Halpern and Kőrösi (2001) found little evidence for a direct effect of market structure on corporate efficiency. However, efficiency proved to be an important factor influencing market share. The following relationship is assumed:

$$S_t = d_0 + d_1 * S_{t-1} + d_{2a} * u_a + d_{2b} * u_b + d_3 * CN_t + d_4 * IC_t + e_t,$$

where S stands for the market share of the firm, u_a for its own efficiency, u_b for that of its competitors, CN for market concentration, and for IC import penetration. We assume that efficient firms gain market share, however, their ability in doing so is limited by their competitors efficiency, as well as by import competition.

Mark-up pricing

We also analyse market structure with a different method: we estimate sectoral price mark-ups. Following Hall (1988), mark-ups are used to measure the consequences of oligopolistic price setting. Under perfect competition in an efficient market, firms set their prices at their marginal costs. Deviations from perfect competition and/or perfect markets can be identified by the discrepancy between prices and marginal costs. Hence, relaxing the assumption of perfect market competition allows analysing different pricing behaviour and policies of the firms. If the demand curve slopes downward, a monopolist may shift the equilibrium point:

$$p = \mu \, mc$$

where p is product price, mc is marginal cost and μ is the mark-up ratio ($\mu > 1$). The consequence is the formation of a price mark-up, when the equilibrium price exceeds marginal cost. Roeger (1995) solved the most important measurement problem inherent in Hall's model by using the Solow residual of both the production function of the firm and that of the corresponding cost function. We assume that productive technology is reasonably represented by a Cobb-Douglas production function with constant returns to scale. In the case of perfect competition the rate of change of total factor productivity is:

$$s_j = \mathrm{d}\, y_i - \alpha \, (\mathrm{d}\, l_i) - (1 - \alpha) \, (\mathrm{d}\, k_i),$$

where Y_i is the output of firm i, L is labour, K is the capital stock, lower case indicates logarithms, "d" denotes the (logarithmic) differences, and α is the elasticity of output with respect to labour, which is by definition equal to the share of labour costs in the firm's revenue. If the firm operates under imperfect competition and prices deviate from marginal costs, the Solow residual of can also be decomposed into:

$$s_i = B \, (\mathrm{d}\, y_i - \mathrm{d}\, k_i) + (1 - B) \, \mathrm{d} t_i,$$

where $\mathrm{d} t_i$ measures the change in productive efficiency and B is the Lerner index: $B = 1 - 1/\mu$. Similarly, the Solow residual, derived from the cost function under imperfect competition:

$$s^*_i = - \mathrm{d}\, p_i + \alpha \, (\mathrm{d}\, w_i) + (1 - \alpha) \, (\mathrm{d}\, r_i) = - B \, (\mathrm{d}\, p_i - \mathrm{d}\, r_i) + (1 - B) \, \mathrm{d} t_i$$

where P_i, W_i and R_i denote firm's price, labour and capital costs. Taking the difference of the two equations:

$$s_i - s^*_i = B \left[(\mathrm{d}\, y_i + \mathrm{d}\, p_i) - (\mathrm{d}\, k_i + \mathrm{d}\, r_i) \right] + \varepsilon_i$$

Under perfect competition $B = 0$ ($\mu = 1$). As the bracketed expression can be computed from measured variables, the test for perfect markets is equivalent to testing the $B = 0$ null hypothesis. We also analyse the relationship of market structure and mark-ups by using a varying coefficient model. We assume that the Lerner index (B) is a function of variables describing some important characteristics of the market position of the firm: market concentration, import competition, and ownership structure. We assume that concentration will increase the probability of mark-ups, strong import competition limits them, while foreign ownership may indicate excessive power of the firm, not measured at the domestic market.

Three periods in 1990's

According to three different indicators – GDP, productivity and efficiency – the Hungarian development in the 1990s can be divided into three subperiods. (See Figure 1) During the *recession* these indicators moved very closely together with a sharp decline in 1991 and a fast recovery in the next year. GDP growth became positive in 1994, while productivity and efficiency had already increased in 1992. Falling external demand, rapidly increasing (mostly import) competition and deep structural changes (bankruptcy and accounting system reforms) were the main forces leading to this substantial loss in economic activity.[4] As a consequence large number of jobs were destructed.

The recession was followed by a *consolidation* period, with occasional reversals of economic policy. It is known that different factors – political business cycle (elections in 1994), and macroeconomic mismanagement – explain the relatively low growth rate after a successful corporate restructuring (banking sector included). They also contributed to the necessity of the March 1995 stabilization package. The results of deep restructuring, including accelerated privatisation of former state-owned enterprises, and reforms coupled with restored macroeconomic equilibrium appeared in 1996-7, when net job creation became positive and the growth rate accelerated.

Finally, GDP growth rate increased to around 5% from 1997. This can be labelled as *growth* period. Net job creation, increasing efficiency, higher returns to scale.

Recession (1990-2)

We do not have data for this period on job creation-destruction. If we extrapolate from the curvature of Figure 2 backward, much larger job destruction with smaller creation, hence higher then 10% net destruction can be hypothesized. It can be partly supported by the employment data, as in 1992 employment fell by 15% in our corporate sample (see Table 8 and Table 9).[5] Aggregate employment fell by 12.5% in 1992.

Transformational recession was accompanied by asymmetric adjustment of employment to output prospects: downward elasticities were much higher than upward elasticities, indicating the combined effect of initial slack in employment and strong pessimism on the growth prospects of the firms. (See Kőrösi, 1997)

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[4] See Halpern and Wyplosz (1998).

[5] On the basis of a much smaller sample the employment fall peaked in 1992 and was double digit since 1989. (See Table 6 and Table 7.) Firms with positive output growth have never reduced the employment by more than 7%.

Efficiency closely followed the pattern of labour productivity and growth, as it reached the bottom in 1991, meaning that the average distance from the best practice firm was the largest. That heterogeneity can be illustrated by the large efficiency difference across sectors in 1990-2. (See Figure 7 and Figure 8). Size (Figure 9) and ownership –(Figure 10) disaggregation points to the same direction: the difference between the least efficient firm and the best one is the largest in these early years. Further disaggregation reveals an interesting temporary reversal, as large foreign owned firms were less efficient in 1992-3 than their domestic counterparts. (See Figure 11 and Figure 12.)

It is no surprise that the other measure of efficiency – the return to scale – is not significantly different from the average distance from the firm on the frontier. Large variations and much lower values can be observed during the early 1990's. (See Figure 13 and Figure 14.)

Consolidation (1993-6)

Firm and bank restructuring created the necessary microeconomic conditions for sustainable growth. Large number of company exits and break-ups, together with substantial FDI inflow shaped the new industrial structure. That turbulent period can be characterised by more than 20% gross job destruction and creation with net job loss still dominating. The trend, however, was towards a stabilization of these rates somewhere between 10 and 15 per cent. Mining and energy sector was an exception: job creation decreased much faster, and was below 10% already in 1995. (See Figure 4.) On the opposite side, Engineering and Services turned to net job creators in 1995 and 1996, respectively. (See Figure 5 and Figure 6.)

Efficiency differences moderated from two sides, by the catching up of the least efficient groupings – agriculture, light industries, medium sized firms, especially domestic owned – and the most efficient ones – Services, Chemistry – declining. Explanations are different, foreign firms have somewhat reduced monopoly rents in different sectors, and market possibilities were fundamentally changed.

Returns to scales were growing and getting very close to unity in almost all sectors. According to ownership classification this general increase was mainly due to domestic private and other owners (non-foreign, non-state and non-domestic private). Differences in size dimension show that small firms were behind this important increase, their overall return to scale went up to 1.17 in 1996 from 0.73 in 1993.

Growth (1997-2000)

GDP growth rates varied between 4.2 and 5.2% in this period. Accordingly, net job creation was positive in general, however, employment growth obviously was inhomogeneous: for example, in mining and energy sector the net loss was increasing and reached 10% in 2000. On the other hand, engineering had 12.9% net job creation rate in 2000.

Efficiency improved only marginally after the consolidation period. The tendency of difference reduction has continued. State owned firms became the least efficient by the end of this period. Mean inefficiency consists of two different components, individual and compositional effects. Our hypothesis is that compositional effect might dominate the individual one. Foreign firms were always the most efficient ones since 1993. Surprisingly, domestic firms achieved the same level by 2000. Besides the compositional effects it is not obvious whether domestic firms acquired the necessary skill or foreign firms lost their rent possibilities. Both might have happened.

Combining ownership and size criteria we can observe a long-term trend of catching up in case of small and medium sized firms between foreign and domestic owners. (See Figure 12.)

Large firms had the opposite tendency: foreign firms increased their advantage between 1993 and 1999. However, there is a substantial reversal in 2000, as the difference was reduced to almost zero. It is not yet clear, whether it is just an outlier or a new trend has emerged.

Sectors have had increasing returns to scale with a very few exceptions. Astonishingly small difference can be observed across ownership groups. Large firms had fluctuating returns to scale varying between 0.5 and 0.7 following cyclical pattern, while the other two size groups had slightly increasing trend with less variation in case of medium size firms.

It is noteworthy that the differentiation of firms continued unabated after 1997 despite the rapid economic growth. (See Table 8) While a large number of firms could increase their output very substantially from year to year (by an average 25-35%), an almost equal number of firms had to downsize production, and their average loss of output was by no means negligible (15-20%). This clearly indicates that structural adjustment was a continuing process throughout the 1990's.

Policies and markets

Three issues will be treated, the relationship between pricing and markets, the link between efficiency and markets and the interaction between different policies.

Pricing and markets

First, we present the simple panel estimates for the mark-up ratios for the consolidation and growth periods. (See Table 3.) Mark-ups are significantly different from unity in all manufacturing sectors in both subperiods, as prices exceed marginal costs by 30-40% on average. There are some variations in the mark-up ratios between the two periods, but there does not seem to be any substantial change in any direction.

In the second step varying coefficient models were estimated for the same two periods. Import competition, foreign ownership and relative standard deviation of sales as a measure of concentration were used. The results are presented in Table 4 and Table 5. These variables are jointly significant in most sectors according to the Wald-test.

Interestingly, while concentration was less important in explaining corporate performance, it seems to be quite an important market structure variable enabling companies to charge prices in excess of their marginal costs.

Import penetration was the least controversial variable. In principle, it should have a negative impact on mark-ups and there is only one exception (NACE 37 in 1997-2000). Its role increased marginally in the second period.

An alternative possibility is that market imperfections are related to ownership. Ownership causes very characteristic differences in corporate efficiency; it may also be related to market imperfections. Ownership structure may obviously influence the ability of firms to exploit market imperfections. However, sample sizes in many sectors are too small for further disaggregation. So instead of exploring structural breaks similarly to studying efficiency differences, we alternatively assumed that the mark-up of prices over marginal costs depends on ownership variables, too.

Ownership seems to matter for many sectors, although not for all. Foreign owned firms tend to have higher mark-ups than other firms, while – surprisingly – domestic private firms seem to have lower mark-ups on the average than other firms in the same sector.

Our results clearly indicate that substantial market imperfections exist in the Hungarian manufacturing sector. These imperfections can yield substantial rents. However, foreign

owned firms have larger chance for exploiting market imperfections and can collect larger rents than domestic firms.

Efficiency and market

Two aspects of efficiency may affect firm's performance in our approach, its own and that of competitors. Own efficiency had always the expected positive effect on market share. We expect that the competitors' efficiency have negative instantaneous effect. That was the case especially in the second half of the decade, what permits to infer the increasing role of competition. There was one group, state owned firms, for which the positive link between efficiency and market share ceased to exist since 1998.

Import competition had negative effect on market shares. It means that import and domestic supplies were substitutes. That effect was significant in manufacturing and in the whole corporate sector between 1996 and 1999. There was no such effect in 2000.

Concentration increases market share. That was dominantly the case during the consolidation period. In 1999-2000 that effect did not prevail in the manufacturing sector.

State owned firms are the least efficient. Their market share is not affected by import competition, by sectoral concentration or by efficiency after 1997. Their efficiency, however, is positively correlated with both profit and investment rates.

Small firms were the most efficient. Market share is reacting to all variables in the expected ways. There is a positive correlation between profitability and efficiency, but the link between efficiency and investment is missing. Both relations exist for medium sized firms.

Interaction of policies

The conclusion that emerges from analytical literature (Tybout 2000) is that almost anything can happen when a country protects its manufacturers, depending on the assumptions. One of the empirical issues is the relationship between openness and pricing behaviour. In our exercise we found negative and somewhat strengthening relationship. It can be interpreted in a standard way: foreign competition squeezes monopoly rents, or put differently, it disciplines the pricing behaviour of domestic producers. No doubt, alternative interpretation is also possible, when the increased import penetration is induced by currency real appreciation, which exerts downward pressure on output prices. We can, however, borrow some support for the first argument from the ownership effect, as foreign ownership has an important positive effect on mark-up. That calls for further investigation as pricing might be related to intra-firm trade via transfer pricing, which is beyond the scope of this paper.

Trade liberalization is thought to be associated with rising efficiency levels. The standard interpretation is that foreign competition drives inefficient domestic producers to exploit scale economies, eliminate waste, adopt best practice technologies, or shut down. This is challenged by the coincidence of reduced productivity dispersion and fall in mark-up. When efficiency is associated with low dispersion improvements in productivity, it cannot be distinguished from the mark-up squeeze due to trade liberalization. Or the other way around, when trade liberalization goes together with devaluation, the favourable price increase for tradables drives profitability upwards. This looks like an increase in efficiency, if output is not measured in physical units. That calls also for product level investigations. Our results, however, seem to support the standard link, as both efficiencies explain firm level market share, import competition has negative effect, and concentration had only limited effect on those market shares.

Our approach has little to say on technology transfers, on spillover effect through trade or foreign direct investment. Our estimations showed that the economy went through quite a substantial restructuring. It is enough to recall that in all years the estimated production functions were structurally different from the previous and subsequent years, so no panel estimation was possible. It is supported by the high intensity of job reallocation. It is also showed that ownership really mattered, foreign owned firms had an impact on domestic markets and competitors, while domestic private owned firms kept pace with foreign owned ones. We do not, however, claim that our approach is able to deal with the endogeneity of ownership.

We had little to add on financing aspects of transition, it is an important statement that the most efficient firms –small ones – have no easy access to finance, as investment and efficiency are not correlated with each other. It is known that this is the case in other countries, too.

Conclusions

Policies can have major impact on behaviour of firms. Uncertainties about policies, demand conditions and inefficient law enforcement affect both firms and markets. (Recent examples in Hungary are the huge minimum wage increases and the exchange rate policy.)

Although we have documented an impressive performance during transition from planned to market economy in case of Hungary, there remain quite a few tasks to be addressed; the role of foreign owned firms, the endogeneity of ownership, the different forms of spillover (dissemination of technologies, its effect on labour turnover, etc.), better measurement of prices, output and productivity.

Hungary will enter EU in 2004 and hopes to join eurozone by 2006-7. It is thought that it will be the major step towards market economy. Whether corporate sector and domestic markets will be able to cope with competitive pressure depends on the consistency of different policies and on domestic market conditions. As we demonstrated despite the fast growth reached by the end of 1990's the adjustment of corporate behaviour to market and the restructuring of the corporate sector were very much an ongoing process even in 2000. It is questionable whether this adjustment process will lead to a sustainable corporate structure capable to cope with external and domestic challenges.

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Technical appendix

The sample for the job creation and destruction figures (Figures 1-6) is employment at all incorporated firms, and at non-incorporated ones that exceed a relatively low sales threshold. It excludes most family enterprises, especially agricultural ones. Gross job creation and destruction values were inflated by frequent changes of corporate identifier (tax file number) before 1995: firms with new identifier were treated as newly created ones, firms with discontinued identifier were assumed to be liquidated.

Figures 7-16 are derived from estimates in Table 1 and 2; Figures 8 and 14 from Table 2, all other from Table 1. The sample for the estimates was drawn from the sample used for calculating job creation and destruction; however, it only covers a subset of all observations. Only firms employing more than 20 people (before 1996) and more than 10 people after are included; sampling was biased towards larger firms.

The ownership of the firm is classified by majority ownership of the given type; state also includes ownership by local government. Firms are classified small if they employ less than 50 people, their output or capital is below a given threshold value. An enterprise is large if it employs more than 500 people or its sales or capital is larger than a threshold.

Mark-up estimates assume Cobb-Douglas technology with constant returns to scale; output variable is sales total. The difference of the Solow residuals from the production and the cost functions was the dependent variable of the regressions. Sectoral concentration was measured by the relative standard deviation of sales. Random individual and fixed time effect was used in the panel. One asterisk indicates significance at 0.05 probability level, while two asterisks indicate it at 0.01 level. The null hypothesis for μ is: $\mu = 1$.

Tables 8 and 9 contain weighted averages. Firms are always classified according their status in the current year; thus the composition of the sample changes with variations in the corporate characteristics.

Legend to Tables 1 and 2: The dependent variable (y_t) is the log of value added at fixed 1992 prices. L: average employment; K: fixed assets at fixed 1992 prices; σ is the overall standard error of the estimation, while σ_u/σ_v gives the ratio of the standard errors of the two disturbances. Inefficiency is weighted average inefficiency of all firms in sample in percentages.

(market) Share: Sales of the firm divided by the market size, where market size is the sectoral production plus competing imports less exports, all measured at the NACE four-digit sectoral level. The sectoral classification of imports is based on the four-digit product classification;

Import competition: The ratio of the sectoral imports to the above defined market size;

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Concentration: The share of the 3 largest firms in the sales total of the four-digit sector;

Competitor's efficiency is the weighted average of *u* for all other firms in the four-digit sector.

One asterisk indicates significance at 0.05 probability level, while two asterisks indicate it at 0.01 level. The null hypothesis for the returns to scale is CRS.

NACE-2

15 Manufacture of food products and beverages
16 Manufacture of tobacco products
17 Manufacture of textiles and textile products
18 Manufacture of wearing apparel and fur products
19 Manufacture of leather products, luggage and footwear
20 Manufacture of wood products (except furniture)
21 Manufacture of pulp, paper and paper products
22 Publishing, printing and recorded media
23 Manufacture of coke and petroleum products
24 Manufacture of chemicals and chemical products
25 Manufacture of rubber and plastic products
26 Manufacture of other non-metallic mineral products
27 Manufacture of basic metals
28 Manufacture of fabricated metal products
29 Manufacture of machinery and equipment
30 Manufacture of office machinery and computers
31 Manufacture of electrical machinery and apparatus
32 Manufacture of radio, TV and communication equipment
33 Manufacture of precision and optical instruments
34 Manufacture of motor vehicles and trailers
35 Manufacture of other transport equipment
36 Manufacture of furniture
37 Recycling

Figures

Figure 1

GDP, Productivity and Efficiency in Hungary

Job creation and destruction

Figure 2

Total

Figure 3

Manufacturing

Figure 4

Mining and energy

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Figure 5

Engineering

Figure 6

Services

16

Efficiency

Figure 7

Efficiency in different sectors

Figure 8

Efficiency in industrial sectors

Figure 9

Efficiency in size groups

Figure 10

Efficiency in ownership groups

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Figure 11

Efficiency in manufacturing by size and ownership

Legend: Small foreign — Small domestic —o— Medium foreign · · · Medium domestic · o · Large foreign – – Large domestic –o–

Figure 12

Efficiency difference between foreign and domestic firms in manufacturing by size

percentage points

Legend: Small —— Medium · · · Large – – –

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Return to Scale

Figure 13

Figure 14

Figure 15

Return to scale in ownership groups

Domestic private — — ▪ ▪ ▪ State — – – Foreign —□— Other

Figure 16

Return to scale in size groups

Small — – – Medium ▪ ▪ ▪ Large

Tables

Table 1

Estimation result for the entire sample

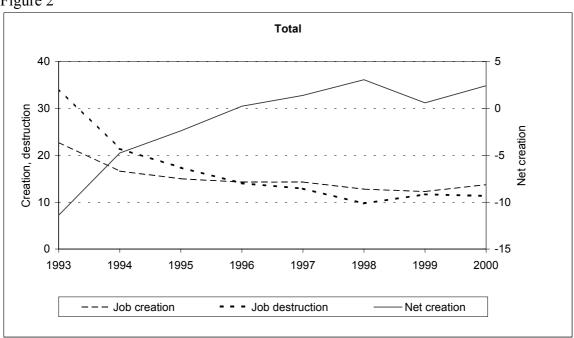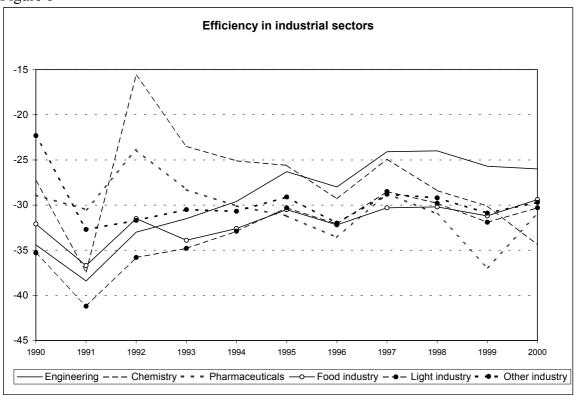| Variable	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Production											
Constant	1.50 **	1.70 **	0.67 **	0.75 **	0.46 **	0.18 **	0.18 **	0.26 **	0.38 **	0.29 **	0.22 **
y_{t-1}	0.63 **	0.64 **	0.25 **	0.53 **	0.55 **	0.65 **	0.71 **	0.68 **	0.71 **	0.73 **	0.71 **
log(L)	0.00	-0.03 **	0.47 **	0.26 **	0.30 **	0.25 **	0.23 **	0.21 **	0.18 **	0.18 **	0.21 **
log(K)	0.10 **	0.05 **	0.15 **	0.11 **	0.11 **	0.11 **	0.09 **	0.11 **	0.10 **	0.10 **	0.11 **
Σ	0.92 **	1.15 **	0.93 **	0.89 **	0.77 **	0.72 **	0.73 **	0.70 **	0.71 **	0.70 **	0.68 **
σ_u/σ_v	1.08 **	1.21 **	1.28 **	1.24 **	1.25 **	1.04 **	1.31 **	1.02 **	1.13 **	1.26 **	1.15 **
Return to scale	0.29 **	0.06 **	0.83 **	0.78 **	0.92 **	1.02	1.07 **	1.02	0.96 **	1.05 **	1.10 **
Nob	4515	5082	5144	8472	9704	10075	10298	11409	13173	13291	12963
$\bar{y}$	3.94	3.36	3.26	3.19	3.24	3.15	3.08	2.99	2.92	2.90	2.92
σ_y	1.26	1.31	1.31	1.34	1.38	1.45	1.49	1.49	1.52	1.56	1.59
R^2	0.64	0.52	0.69	0.73	0.80	0.83	0.85	0.85	0.86	0.88	0.88
Inefficiency	-30.19	-36.08	-30.33	-30.75	-30.31	-28.49	-30.91	-27.22	-27.36	-28.59	-28.48
Market share											
Constant	-0.01	-0.01 *	-0.02 **	0.00	-0.02 **	0.01	0.00	-0.02	-0.04 **	0.00	-0.01 **
$Share_{t-1}$	0.91 **	0.91 **	0.60 **	0.91 **	0.60 **	0.94 **	0.83 **	0.38 **	0.56 **	0.97 **	1.00 **
Own efficiency	0.83 **	0.71 **	1.67 **	1.07 **	1.57 **	1.22 **	1.01 **	2.08 **	1.76 **	1.09 **	0.87 **
Competitors' efficiency	-0.03	-0.03 *	-0.07 **	-0.01	-0.06 **	0.03	-0.01	-0.07 *	-0.09 **	-0.01	-0.05 **
Import penetration	0.02	0.00	-0.02 **	-0.01	-0.01 **	0.00	-0.01 **	-0.02 **	-0.03 **	-0.01 **	0.00
concentration	0.01	0.02 **	0.06 **	0.02	0.04 **	0.01 **	0.02 **	0.06 **	0.13 **	0.02 *	0.01
$\bar{y}$	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
σ_y	0.08	0.07	0.07	0.12	0.09	0.10	0.09	0.09	0.10	0.10	0.11
SEE	0.02	0.02	0.05	0.08	0.05	0.05	0.03	0.07	0.07	0.04	0.03
R^2	0.93	0.86	0.40	0.55	0.72	0.75	0.84	0.40	0.40	0.86	0.91
White-hetero	817 **	2922 **	830 **	40 **	6914 **	338 **	4017 **	2752 **	2203 **	2391 **	3806 **
Reset y^2, y^3	81 **	428 **	64 **	9 **	3531 **	38 **	694 **	6850 **	172 **	107 **	497 **
Profit rate	0.31	0.44	0.32	0.17	0.12	0.17	0.17	0.14	0	0.24	0.22
Investment rate											

Table 2

Estimation results for manufacturing

Variable	1990		1991		1992		1993		1994		1995		1996		1997		1998		1999		2000	
Production																						
Constant	1.36	**	1.31	**	0.61	**	0.78	**	0.49	**	0.23	**	0.15	**	0.27	**	0.36	**	0.24	**	0.23	**
y_{t-1}	0.59	**	0.48	**	0.29	**	0.49	**	0.48	**	0.60	**	0.67	**	0.62	**	0.63	**	0.68	**	0.69	**
log(L)	0.01		0.11	**	0.47	**	0.25	**	0.31	**	0.25	**	0.23	**	0.25	**	0.20	**	0.20	**	0.19	**
log(K)	0.17	**	0.15	**	0.16	**	0.17	**	0.17	**	0.15	**	0.12	**	0.15	**	0.16	**	0.14	**	0.14	**
σ	0.91	**	1.14	**	0.92	**	0.87	**	0.77	**	0.66	**	0.66	**	0.70	**	0.64	**	0.68	**	0.59	**
σ_u/σ_v	1.10	**	1.49	**	1.50	**	1.69	**	1.40	**	0.90	**	1.16	**	1.25	**	1.13	**	1.40	**	1.12	**
Return to scale	0.44	**	0.50	**	0.89	**	0.84	**	0.93	**	1.01		1.08	**	1.05	**	0.99		1.07	**	1.08	**
Nob	1644		1613		1825		2834		3334		3523		3604		3972		4508		4539		4446	
$\bar{y}$	3.79		3.19		3.27		3.30		3.40		3.38		3.35		3.24		3.22		3.22		3.28	
σ_y	1.35		1.33		1.34		1.42		1.46		1.52		1.55		1.57		1.57		1.62		1.64	
R^2	0.70		0.58		0.73		0.80		0.84		0.86		0.88		0.88		0.89		0.89		0.91	
Inefficiency	-30.32		-40.20		-27.70		-31.85		-30.20		-25.33		-28.23		-27.72		-25.80		-28.35		-26.02	
Market share																						
Constant	-0.01		0.00		-0.02		0.01	**	0.00		0.01	*	0.00		-0.01		-0.07	**	0.00		-0.03	*
$Share_{t-1}$	0.90	**	1.03	**	0.45	**	0.95	**	0.96	**	1.02	**	0.87	**	0.25	**	0.50	**	0.93	**	1.01	**
Own efficiency	1.21	**	1.00		1.66	**	1.08	**	1.42	**	2.19	**	1.83	**	2.38	**	3.45	**	1.64	**	1.74	**
Competitors' efficiency	-0.04		-0.02		-0.06		-0.02		-0.07	**	0.03		-0.02		-0.05		-0.24	**	-0.01		-0.12	**
Import penetration	-0.01		-0.02		-0.03	**	0.00		-0.01		0.00		-0.01	**	-0.03	**	-0.07	**	-0.01	**	0.00	
concentration	0.00		0.01		0.04	**	0.01		0.01		0.01		0.03	**	0.08	**	0.17	**	0.02		0.01	
$\bar{y}$	0.03		0.02		0.02		0.03		0.03		0.03		0.03		0.03		0.03		0.04		0.04	
σ_y	0.09		0.08		0.07		0.09		0.09		0.09		0.09		0.12		0.13		0.13		0.14	
SEE	0.03		0.03		0.05		0.03		0.03		0.03		0.04		0.10		0.11		0.05		0.05	
R^2	0.92		0.89		0.35		0.91		0.85		0.92		0.77		0.27		0.32		0.88		0.89	
White-hetero	340	**	998	**	265	**	1086	**	982	**	878	**	196	**	352	**	639	**	2602	**	1540	**
Reset y^2, y^3	35	**	210	**	21	**	123	**	171	**	134	**	79	**	1800	**	302	**	284	**	218	**
Profit rate	0.33		0.48		0.38		0.46		0.39		0.39		0.40		0.40		0.18		0.23		0.35	
Investment rate					0.15		0.18				0.14		0.22		0.14				0.15			

Table 3
Estimated mark-up, random effects, 2 digits level

Nace	1993-6			1997-2000		
	Nob	$\overline{\mu}$	R^2	Nob	$\overline{\mu}$	R^2
15	1424	1.39 **	0.44	2026	1.46 **	0.54
16	14	1.51 *	0.73	22	2.25 **	0.79
17	320	1.26 **	0.33	554	1.31 **	0.34
18	719	1.13 **	0.16	979	1.14 **	0.18
19	295	1.21 **	0.24	419	1.19 **	0.20
20	343	1.36 **	0.37	567	1.42 **	0.49
21	147	1.55 **	0.60	196	1.29 **	0.43
22	509	1.35 **	0.43	772	1.36 **	0.46
24	322	1.50 **	0.59	450	1.64 **	0.56
25	484	1.34 **	0.47	819	1.42 **	0.47
26	423	1.39 **	0.45	588	1.40 **	0.52
27	140	1.37 **	0.47	239	1.34 **	0.45
28	918	1.29 **	0.37	1854	1.28 **	0.31
29	917	1.29 **	0.30	1473	1.26 **	0.34
30	39	1.69 **	0.60	75	1.47 **	0.58
31	381	1.39 **	0.53	565	1.20 **	0.27
32	191	1.42 **	0.37	313	1.28 **	0.35
33	241	1.53 **	0.54	363	1.19 **	0.29
34	155	1.47 **	0.44	311	1.31 **	0.44
35	55	1.20 **	0.32	90	1.15 **	0.18
36	387	1.23 **	0.31	564	1.23 **	0.31
37	27	1.39 **	0.64	35	1.47 **	0.56

Table 4
Estimated mark-up, varying coefficients, random effects, 1993-6

Nace	constant	Imp comp	foreign	Rel sd of sales	R^2	Wald-test	$\overline{\mu}$
15	0.29 **	5.02	0.02	-0.01	0.44	1.91	1.39 **
17	0.17 **	-0.73	0.15 **	0.01	0.34	11.06 *	1.30 **
18	0.22 **	-11.88 *	0.06 *	-0.01	0.16	11.10 *	1.15 **
19	0.30	16.14	-0.04	-0.08	0.24	3.6	1.22 **
20	0.34 **	-2.4	0.04	-0.03	0.36	2.38	1.36 **
21	0.39 **	-0.16	0.24 **	-0.03	0.6	22.07 **	1.70 **
22	0.31 **	-23.09 **	-0.03	0	0.43	15.63 **	1.35 **
24	0.20 **	-10.95 *	0.17 **	0.06 **	0.6	36.60 **	1.55 **
25	0.43 **	7.03	-0.04	-0.07 **	0.45	18.04 **	1.37 **
26	0.49 **	-6.1	0.07 *	-0.10 **	0.47	26.24 **	1.44 **
27	0.22 **	-6.97	-0.05	0.05	0.49	4.91	1.36 **
28	0.22 **	-1.31	0.10 **	0	0.37	16.78 **	1.30 **
29	0.36 **	-22.53 **	0.11 **	-0.03	0.33	49.02 **	1.31 **
30	0.46 **	24.06	0.05	-0.05	0.56	1.27	1.99 **
31	0.40 **	-12.45 *	0	-0.02 *	0.53	11.46 **	1.41 **
32	-0.18	-14.47	0.27 **	0.11 **	0.46	33.60 **	1.62 **
33	0.29	6.17	0.15 **	0	0.56	12.74 **	1.54 **
34	0.48 **	-33.65 **	0.23 **	-0.04 **	0.65	120.69 **	1.39 **
35	0.31	-27.46	-0.11	-0.02	0.37	11.83 **	1.25 **
36	0.05	9.61	0.16 **	0.02	0.36	31.62 **	1.23 **
37	0.41	0	0.04	-0.09	0.63	0.41	1.30 **

Table 5
Estimated markup, varying coefficients, random effects, 1997-2000

Nace	constant		Imp comp		foreign		Rel sd of sales		R^2	Wald-test		$\bar{\mu}$	
15	0.20	**	-11.79	*	0.01		0.04	**	0.55	44.36	**	1.46	**
16	-11.46		-1791		0.29	**	12.08		0.85	10.55	*	2.49	**
17	0.22	**	-9.25	*	-0.04		0.02	*	0.35	8.04	*	1.31	**
18	0.30	**	-28.97	**	0.06	**	-0.01		0.19	35.38	**	1.15	**
19	0.37	*	9.75		-0.07	*	-0.07	**	0.22	20.68	**	1.20	**
20	0.28	**	4.19		0.07	*	0		0.49	4.73		1.43	**
21	0.46	**	-13.43		0.02		-0.04	*	0.49	6.34		1.34	**
22	0.47	**	-12.61		0.17	**	-0.06	**	0.51	75.31	**	1.39	**
24	0.38	**	-5.5		0.04		0.01		0.56	2.41		1.67	**
25	0.51	**	-42.61	**	0.07	**	0		0.51	70.23	**	1.40	**
26	0.39	**	-20.12	**	-0.04		-0.02		0.54	33.89	**	1.40	**
27	0.04		13.97	*	-0.01		0.06	**	0.47	15.46	**	1.34	**
28	0.16	**	-3.11		0.07	**	0.02		0.32	21.70	**	1.28	**
29	0.28	**	-13.36	**	0.03		0		0.34	14.90	**	1.27	**
30	0.59	**	-10.61		0.07		-0.03	*	0.58	7.80	*	1.52	**
31	0.34	**	-22.54	**	-0.02		0		0.28	12.81	**	1.21	**
32	0.75	**	-26.16	*	-0.04		-0.05	**	0.37	15.25	**	1.33	**
33	0.04		-1.1		0.08		0.03		0.29	4.65		1.20	**
34	-0.27		-3.02		0.08	*	0.15	**	0.46	16.61	**	1.30	**
35	-0.06		60.03	**	0.32	*	-0.02		0.47	48.08	**	1.23	**
36	0.29	**	-3.02		-0.02		-0.02		0.31	2.27		1.24	**
37	0.80	*	0		-0.25	**	-0.15		0.68	14.93	**	1.49	**

Table 6
Sample means of large exporting firms

Variable	1987	1988	1989	1990	1991	1992
Entire sample						
Number of observations	508	498	520	532	677	579
Employment	1968	1961	1695	1437	966	796
Employment (% change)	-2.1	-3.9	-11.2	-12.8	-18.6	-21
Labour cost (% change)	4.8	23.9	17	2.5	-3.9	21
Production (% change)	1.6	-0.2	-4.4	-14.2	-31.2	-9.9
Profit margin (%)	4.2	2.6	2	0	-3.9	-18.5
Change of production > 0						
Number of observations	350	211	187	109	133	145
Employment	1979	1837	1583	1284	785	710
Employment (% change)	-1.1	-2.5	-6.7	-1.1	-4.7	-1.6
Labour cost (% change)	5.7	26.2	12.5	11.8	6.7	30.3
Production (% change)	9.3	10.6	10.1	13.5	27.5	100
Profit margin (%)	4.6	3.1	3.2	3.5	2.7	-2.6
Change of production ≤ 0						
Number of observations	158	287	333	423	544	434
Employment	1943	2053	1759	1477	1010	824
Employment (% change)	-4.2	-4.8	-13.3	-15.1	-20.8	-25.3
Labour cost (% change)	2.8	22.2	19.6	0	-6.6	17.6
Production (% change)	-7.9	-7.1	-10	-22.6	-37.2	-35.2
Profit margin (%)	3.2	2.3	1.3	-0.8	-5.5	-23.8

Table 7

Sample means of large exporting firms

Variable	1989	1990	1991	1992
No foreign owner				
Number of observations	507	497	556	433
Employment	1627	1375	957	857
Employment (% change)	-11.3	-12.9	-21.7	-23.4
Labour cost (% change)	17.3	2.3	-3.7	25.3
Production (% change)	-4.5	-14.1	-33.5	-9
Profit margin (%)	1.9	-0.2	-5.4	-20.4
Small foreign ownership (< 25%)				
Number of observations	11	23	39	18
Employment	3381	2364	1651	968
Employment (% change)	-12.7	-14.8	2.7	-14
Labour cost (% change)	9.3	4	-17.4	-5
Production (% change)	-3.3	-18.2	-28.2	-31.4
Profit margin (%)	2.9	2.6	-0.6	-63.8
Important foreign owner (25-50%)				
Number of observations	2	9	49	48
Employment	9796	2746	714	540
Employment (% change)	-4.4	-6	-7.3	-9.7
Labour cost (% change)	0.8	3.7	-3.5	18
Production (% change)	-0.1	-10.3	-2.7	-27.1
Profit margin (%)	8.5	2	4.6	-8.5
Majority foreign owner				
Number of observations		3	33	80
Employment		700	685	579
Employment (% change)		-7.9	-2.9	-7.2
Labour cost (% change)		32.9	12.2	14.1
Production (% change)		11.2	-9.2	0.5
Profit margin (%)		5.8	5.5	-3.9

Table 8

Sample means of all firms

Variable	1992	1993	1994	1995	1996	1997	1998	1999	2000
Entire sample									
Number of observations	8139	10575	11386	11721	12097	14054	14644	14384	14018
Employment	182	127	135	125	120	105	104	102	102
Employment (% change)	-15	-11.8	-0.4	-8.4	-3.5	-1.2	1.3	-2.2	-0.3
Labour cost (% change)	5.9	7.7	3.7	-9.3	-4.7	2.9	3.8	6.8	4.5
Output (% change)	-16.3	1.1	8.7	0.4	3.6	10	14.2	12.7	10.6
Export share (%)	15.2	13.9	14.6	18.2	20	24.2	26.3	27.6	27.8
Profit margin (%)	-7.3	-5.7	-0.6	0.7	1.1	2.5	2.3	2.6	2.5
Inefficiency (%)	-58.3	-54.5	-47.7	-41.3	-45.8	-39.7	-41.6	-42.8	-40.2
Change of output > 0									
Number of observations	3081	5270	6252	4973	5202	6754	8741	7565	6897
Employment	134	120	135	138	125	110	110	120	123
Employment (% change)	6.6	1	13.9	4	4.7	7.2	8.1	5.1	8.1
Labour cost (% change)	10	12.9	5.8	-4.2	0	12.2	4.5	8.7	8.3
Output (% change)	79.7	39	29.4	26.2	28.6	33.6	32.8	31.8	26.3
Export share (%)	17.2	15.6	16.6	23.8	23.3	30.4	28.1	28.1	32.7
Profit margin (%)	-1.9	-3.4	0.3	2.6	2.6	3.6	3.3	2.9	3.2
Inefficiency (%)	-46.9	-43.2	-39.1	-33.4	-35.7	-33.3	-35.8	-35.7	-33.6
Change of output ≤ 0									
Number of observations	5058	5305	5134	6748	6895	7300	5903	6819	7121
Employment	212	134	134	116	116	100	96	82	82
Employment (% change)	-21.1	-20.6	-13.6	-17.1	-9.2	-8.4	-8.5	-12.2	-10.4
Labour cost (% change)	3.1	2.3	1.1	-13.2	-8.4	-5.7	2.5	4.6	0.6
Output (% change)	-39.6	-25	-18.2	-20.8	-17.2	-18.3	-16.5	-15.8	-16.6
Export share (%)	13.8	11.8	11	11.5	15.7	12.9	21.7	26.7	17.1
Profit margin (%)	-11.1	-8.5	-2.4	-1.7	-0.9	0.4	0	2	0.9
Inefficiency (%)	-65.6	-66	-58.3	-47.3	-53.7	-45.7	-50.4	-51.1	-46.9
Private									
Number of observations	22	1460	1872	2073	2141	2307	2353	2247	2200
Employment	85	118	143	143	137	133	158	130	131
Employment (% change)	-27.9	-15.8	-4.1	-6.4	-5	-2	-1.3	-6.6	-4.9
Labour cost (% change)	11.4	9.3	6.8	-7.8	-5.9	-0.5	5.6	8.4	5
Output (% change)	-21.1	0.7	4.1	-4.7	0	-0.7	7.8	3.1	6.6
Export share (%)	1.6	17	15.1	14.9	13.7	14.3	15.1	13.8	14.9
Profit margin (%)	-7.6	-3	-1.3	1	1	1.7	-0.4	1	1.1
Inefficiency (%)	-64.5	-51.2	-45.7	-40.1	-46	-39.6	-41.4	-42.3	-39.4
Foreign									
Number of observations	699	1239	1406	1535	1672	2114	2285	2270	2195
Employment	157	158	160	186	192	176	192	198	210
Employment (% change)	-0.9	-2.1	4	2.5	1	4.3	6.6	3	8.3
Labour cost (% change)	11.6	5.4	6.4	-6.5	-0.3	3.6	5.4	8	5.1
Output (% change)	14.9	19.3	27.8	8.7	12.9	24	21.4	21.3	15.2
Export share (%)	15.9	17.1	20.4	26.6	31.7	37.7	37.5	39.6	39.1
Profit margin (%)	-5.5	-2.8	-0.7	0.9	2.8	3.6	4	3.5	3.3
Inefficiency (%)	-43.9	-43.1	-37.2	-35.4	-38.8	-33.8	-35.7	-37.7	-35.4
State									
Number of observations	1537	1361	1144	981	792	724	706	677	631
Employment	472	383	494	444	472	424	338	407	415
Employment (% change)	-17.1	-11.1	0.4	-14.9	-5.7	-5.5	-3.3	-2.7	-2.4
Labour cost (% change)	15.3	21.1	12.9	-6.9	1.7	2.6	9.9	5.2	3.5
Output (% change)	-14.7	-4.7	0.5	-2.5	-1.8	2.5	1.3	3.9	5.9
Export share (%)	16.3	13.9	14.1	16.1	14.3	13.9	11.9	10.8	13
Profit margin (%)	-8.5	-11.1	-0.4	-1	-3.9	-2	-2.6	-0.4	-1
Inefficiency (%)	-59	-56.9	-50	-44.6	-48.8	-42.7	-43.6	-43.9	-42.8

Table 8 continued

Variable	1992	1993	1994	1995	1996	1997	1998	1999	2000
Other									
Number of observations	5470	6073	6537	6751	7097	8484	8914	8818	8676
Employment	113	69	64	60	57	48	48	47	45
Employment (% change)	-15.1	-15.1	-6.1	-5.3	-3.7	-1.2	1.3	-3.4	-3.9
Labour cost (% change)	3	4.9	-0.3	-11.4	-7.2	4	1.5	5.4	4
Output (% change)	-26.9	-4.9	6.1	-3.4	-3	1.4	10.1	2.5	2.5
Export share (%)	12.7	7.9	6.8	9.7	10.9	11.7	12	11.7	12.2
Profit margin (%)	-7	-1.3	-0.6	1.7	2.5	2	2	1.9	2.2
Inefficiency (%)	-60	-57.2	-50.2	-42.7	-47.2	-41	-43	-44.2	-41.5
Small firms									
Number of observations	4909	7276	7788	8305	8690	10527	10872	10672	10395
Employment	40	36	35	35	34	31	32	32	31
Employment (% change)	-28.2	-10.6	-5.9	-7.5	-6	-2.4	0.9	-5.2	-6.1
Labour cost (% change)	4.8	7.1	3.8	-10.5	-5.2	3	2.9	6.7	4.5
Output (% change)	-13.3	7.2	11.2	-2.5	-3.8	3.3	13.8	2.6	3.5
Export share (%)	11.9	10.6	8.7	10.8	10.9	16.1	18	16.4	16.7
Profit margin (%)	-5.1	-3.6	-2.1	0	0.2	1.1	0.8	1	1.1
Inefficiency (%)	-58.1	-54	-47.9	-41.5	-46	-39.9	-41.7	-43.2	-40.6
Medium sized firms									
Number of observations	2647	2776	2953	2774	2769	2865	3054	2988	2897
Employment	178	157	152	154	152	147	143	138	137
Employment (% change)	-20.9	-19.7	-7.1	-13.9	-3.3	-1.1	0.6	-2	-0.5
Labour cost (% change)	6.7	9.3	1.7	-7	-5	2.2	5.7	6.6	4.1
Output (% change)	-31.1	-8.3	4.1	-2	-2.3	1.6	6.7	2.9	4.5
Export share (%)	10.8	11.4	12.3	15.5	17	17.7	19.4	21.2	21.6
Profit margin (%)	-10.6	-5	-2.4	0.4	1.5	2.2	0.2	1.7	1.7
Inefficiency (%)	-62.5	-57.5	-48.7	-41.8	-46.2	-39.9	-42.2	-42.7	-39.7
Large firms									
Number of observations	583	523	645	642	638	662	718	724	726
Employment	1401	1235	1265	1170	1157	1101	1032	987	975
Employment (% change)	-7	-6.1	5.8	-5.3	-2.5	-0.7	1.9	-0.9	2.7
Labour cost (% change)	13.2	9.7	9.9	-5.4	1.3	3.9	6.7	8.5	5.4
Output (% change)	-9.7	3	9.4	2.1	8	15.3	16.6	18.8	14.4
Export share (%)	17.7	15.9	17.3	21.5	23.7	28.9	31.1	32.9	32.8
Profit margin (%)	-6.7	-6.6	0.4	1	1.2	3	3.5	3.3	3.1
Inefficiency (%)	-42.6	-44.1	-40.7	-37.2	-41.2	-35.2	-36.8	-38.7	-36.2

Table 9

Sample means of manufacturing firms

Variable	1992	1993	1994	1995	1996	1997	1998	1999	2000
Entire sample									
Number of observations	2639	3297	3726	3849	3949	4556	4845	4757	4657
Employment	206	158	153	151	147	134	134	134	133
Employment (% change)	-11.2	-12.3	-5	-1.7	-1.6	2	3.2	-1.2	2.6
Labour cost (% change)	9.1	15.9	5.7	-5.3	-3.6	0	6.2	7.6	8
Output (% change)	-0.2	6.6	10.6	10.3	7.4	19.2	16.7	19.2	16.7
Export share (%)	25.5	26.3	27.5	33	37.5	44.7	49.5	53.3	52.1
Profit margin (%)	-8.5	-2.6	-0.6	2.2	2.8	3.8	4	3.9	3.7
Inefficiency (%)	-60.6	-58.4	-48.9	-35.3	-39.3	-42.7	-37.6	-42.6	-34.6
Change of output > 0									
Number of observations	1102	1867	2257	2011	1850	2342	2918	2440	2741
Employment	159	157	157	161	153	158	127	139	155
Employment (% change)	3.2	-6.1	2.1	6	7.8	9.1	12	8.9	10.2
Labour cost (% change)	14.4	23.3	5.7	1.2	3.3	6.4	9.3	9.6	11.6
Output (% change)	87.4	31.1	25.1	25.5	36.2	38.6	42.2	44.8	30.2
Export share (%)	25.5	24.5	28.3	36	49.1	50	59.6	61.6	60.4
Profit margin (%)	-3.3	-1.1	0.2	2.8	4.7	4.6	5	4.5	4.4
Inefficiency (%)	-46.8	-46.1	-40.4	-29.9	-31.2	-35.3	-32.5	-34.9	-29.7
Change of output ≤ 0									
Number of observations	1537	1430	1469	1838	2099	2214	1927	2317	1916
Employment	240	159	148	139	141	108	144	128	103
Employment (% change)	-16.8	-19.2	-14.6	-10.1	-9.2	-7.3	-6.7	-10.7	-10.7
Labour cost (% change)	5.2	6.4	5.8	-12.6	-9.5	-6.5	1.3	5.2	2.4
Output (% change)	-35.7	-22.1	-20.4	-14.6	-12	-20.5	-14.1	-11.2	-15.6
Export share (%)	25.4	29.6	25.3	27.1	25.5	28.7	32.1	41	31.5
Profit margin (%)	-14.1	-5.3	-2.8	0.9	0.8	1.2	2.5	3	1.7
Inefficiency (%)	-69.7	-75.3	-62.2	-41.5	-46.5	-50.7	-45.4	-50.9	-41.9
Private									
Number of observations	5	504	687	748	783	844	865	821	795
Employment	133	170	192	203	199	194	202	184	188
Employment (% change)	-27.9	-24.9	-5.9	-1.6	-2.9	-0.4	0	-8.2	-5
Labour cost (% change)	19	15.1	12	-1.7	-5.8	-1.5	6.6	12.3	4.1
Output (% change)	-15.2	3.1	5.5	7	-0.7	1.9	3.3	0.9	8
Export share (%)	3.2	29.3	24.6	25.2	23.9	26.8	28.9	28	31.1
Profit margin (%)	-12.3	-3.5	-0.2	2.4	1	0.7	-1.1	0.8	0.8
Inefficiency (%)	-56.9	-57.5	-46.4	-34.6	-40.6	-43.7	-38.8	-44.7	-35
Foreign									
Number of observations	359	602	746	823	887	1080	1180	1183	1152
Employment	179	205	196	211	219	209	230	243	254
Employment (% change)	-2.1	-4.2	2.7	2.7	2.9	6.3	7.5	4.1	10.4
Labour cost (% change)	13.3	11.9	7.3	0.2	0.5	6.4	3.9	7.6	8.3
Output (% change)	18.8	22.8	27.6	19	19.4	34.5	23.6	26.3	19.6
Export share (%)	28.2	28.2	33	42	51.5	61.4	59.4	62.9	61.1
Profit margin (%)	-5.5	-3.5	0	2.1	4.3	5	5.5	4.8	4.4
Inefficiency (%)	-45.5	-48.1	-39.8	-32.7	-34.5	-38	-34.4	-38.9	-31.7
State									
Number of observations	566	384	288	209	125	89	78	71	61
Employment	500	456	489	493	528	402	301	329	321
Employment (% change)	-18.8	-14.5	-12.8	-8.5	-9	-2.8	-10.5	-4.4	-1
Labour cost (% change)	17.8	27.1	15.2	-13.1	5.7	-1.9	32.3	3.7	11.2
Output (% change)	1.6	-2.2	0.3	3	-2.9	30.9	-6.6	-4.2	19.3
Export share (%)	23.4	26.2	26.9	28.2	21.6	44.1	36.4	37.3	28.2
Profit margin (%)	-7.9	-2	-1.8	1.9	-0.3	-5	2.1	-0.9	2.7
Inefficiency (%)	-62	-66.3	-57.9	-39.2	-45.3	-51.8	-40.6	-53.5	-38.5

Table 9 continued

Variable	1992	1993	1994	1995	1996	1997	1998	1999	2000
Other									
Number of observations	1531	1635	1828	1910	2002	2367	2556	2525	2517
Employment	115	73	69	67	70	60	59	62	58
Employment (% change)	0	-7.5	-3.4	-1.4	-2.4	1.1	2.1	-3	-2
Labour cost (% change)	5	16	0.2	-9	-6.2	-4.3	6.8	5.5	9.4
Output (% change)	-14.6	4.9	6.9	5.9	-1.9	3.8	7.2	2.3	9.1
Export share (%)	30.4	20.6	17.2	21.1	23.7	22.3	21.8	23.6	23
Profit margin (%)	-13.7	-1.6	-1.2	1.5	2.2	2.6	3	2.8	2.6
Inefficiency (%)	-64	-61.2	-52.3	-36.4	-40.5	-44.4	-38.5	-43.4	-35.8
Small firms									
Number of observations	1623	2147	2378	2516	2585	3112	3263	3108	3012
Employment	47	42	40	40	41	39	38	39	37
Employment (% change)	-20.5	-6.5	-3.7	-2	-2.7	0.2	0.2	-4.2	-4.5
Labour cost (% change)	8.2	15	9	-5.8	-5.4	-1.3	6.3	7.8	8.4
Output (% change)	-21.4	6.7	12.6	7.3	-2.6	5.4	10.9	2.8	2.4
Export share (%)	14.9	15.9	14.9	20.7	20.1	21.8	24	25.8	24.6
Profit margin (%)	-5.6	-3.8	-3.2	0.2	0.8	1.7	2.5	2.5	1.7
Inefficiency (%)	-60.1	-59.5	-49	-35.4	-39.5	-43	-37.6	-42.9	-35
Medium sized firms									
Number of observations	772	916	1043	1002	1044	1116	1231	1308	1300
Employment	187	172	166	171	170	166	164	157	155
Employment (% change)	-18.1	-19.8	-2.9	-0.1	-1.6	2	2.2	-1.4	0.1
Labour cost (% change)	10.2	16.7	-2.4	-4.8	-3.5	1.6	5.4	5.9	7.6
Output (% change)	-21.7	5.2	11.7	8.8	1.7	3.5	8.2	2.8	10.5
Export share (%)	23.9	23	24.9	29.3	32.3	32.8	36.8	38.1	38.3
Profit margin (%)	-10.7	-4.7	-2.5	0.2	1.1	2	1.7	2.2	2.2
Inefficiency (%)	-64.9	-58.3	-49.8	-35.4	-39	-42.7	-37.9	-42.5	-34.5
Large firms									
Number of observations	244	234	305	331	320	328	351	341	345
Employment	1324	1174	989	929	926	927	916	916	893
Employment (% change)	-5.1	-9.4	-6.6	-2.5	-1.2	2.8	5	0.1	7.2
Labour cost (% change)	11.8	20.7	11.8	-3.7	7.4	4.4	7.2	11	7.4
Output (% change)	11.3	7	10.1	11.1	10.7	26	19.5	24.9	19.4
Export share (%)	27.3	28.9	30.1	35.8	41.2	50.9	55.9	59.9	58.1
Profit margin (%)	-8.3	-1.8	0.3	3	3.5	4.5	4.8	4.4	4.2
Inefficiency (%)	-47.8	-50	-44.7	-34.1	-38.1	-39.9	-37	-40.8	-31.9

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