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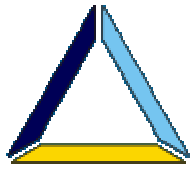

Working Paper No.13

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March 2002

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Determinants of Enterprise Restructuring in Ukraine: the Role of Managerial Ownership and Human Capital

Iryna Akimova and Gerhard Schwödiauer

Abstract

For a set of data from a survey of middle-sized and large industrial enterprise in Ukraine after privatisation regression equations are estimated that explain the response of restructuring and performance indicators to ownership structures, competitive pressure, hardening budget constraints and changes in human capital. The training of managers has a strong positive impact on both the restructuring activities and performance of Ukrainian firms. As far as ownership is concerned, only the extent of managerial ownership influences restructuring and performances favorably while outside ownership does not matter. Competition exerts a positive effect on the performance of enterprises that are subject to harder budget constraints.

I Introduction

Enterprise restructuring in transition economies and its main determinants has been a much studied topic (see, for example, Carlin et al., 1995; Carlin and Aghion, 1996; Djankov and Pohl, 1998; Pohl et al., 1997; Bonin, 1998). In empirical studies of the early 1990s, combinations of various passive and active measures were used as proxies for restructuring efforts. Since the mid-1990s the research focus has shifted towards the analysis of various performance indicators as proxies for successful restructuring. This is understandable given that most of the studies on enterprise restructuring were dealing with eastern Central European economies, which proceeded rather fast with their economic reforms. However, in slow-transforming economies, like Ukraine (and other CIS countries), the advances in enterprise restructuring have been less pronounced. In this case, it is useful to study the determinants of different restructuring measures per se. Together with the analysis of performance indicators, this could help create a more balanced picture of the restructuring process in slow-developing economies which are still at an early stage of transition.

The theoretical and empirical literature on transitional economies (see, for example, Bevan et al., 1999) stresses the importance of privatisation, deregulation and stabilisation together with the hardening of budget constraints for the successful restructuring and the improvement of corporate performance. Most studies (for a survey see Havrylyshyn and McGettigan, 2000) on East European firms showed that privatisation

positively influenced the restructuring process. Outside ownership has generally been found to be superior to inside ownership in its performance effect. The concentration of ownership in the hands of outsiders (in particular, foreign ones) was identified as a necessary condition for receiving outside finance and expertise, i.e. for successful restructuring (e. g. Djankov, 1999). However, in slowly reforming economies where mass privatisation led to the domination of insiders, ownership effects on enterprise restructuring can be different compared to those in fast developing economies, and, as Nuti (1997) has argued, managerial ownership might play a positive role.

Many economists have argued that during transition increasing competition will lead to an improvement in enterprise performance (see, for example, Stiglitz, 1994; Dyker and Barrow, 1995). Several competition variables (together with the variables for ownership changes and hard budget constraints) were included in restructuring models by Earl and Estrin (1996, 1998) and tested on a sample of Russian firms. However, empirical studies that take competition effects on enterprise restructuring into account are still rare.

Finally, recent studies on enterprise restructuring suggest an important role of human capital in improving the performance of firms. Barberis et al (1996) and Claessens and Djankov (1999a) have argued that changes in top management are more important than equity incentives for inducing enterprise restructuring. Djankov (1997) has pointed out that CEO's training is an additional condition for restructuring in countries with imperfect labor markets for top managers and limited inflow of superior human capital. The question of the relative importance of CEOs' turnover versus CEOs' training at the early post-privatisation stage was, however, not addressed.

It is important to realize that, from the beginning of transition when firms were privatized, they have been at the same time faced with hardening budget constraints and exposed to increased competition (Earle and Estrin, 1998). Likewise, human capital has played an important role for enterprise restructuring from the very beginning of the privatisation process. Thus, hard budget constraints, competition, privatisation, and improvements in human capital should simultaneously influence enterprise restructuring and performance. In general, however, the empirical studies did not try to test for the simultaneous effects of these four factors. Early restructuring models did not take competition and human capital effects into account, while recent studies include human capital variables but ignore the competition effect.

In this paper, we study the impact of ownership structure, hard budget constraints, competition, and human capital on enterprise restructuring, during the early phase of economic reform. Restructuring is operationalized by the firms' activities towards strategic restructuring and by performance indicators. This allows us to capture the peculiarities of the restructuring process at an early stage of transition when due to a short after-privatisation time period and a generally slow pace of economic reform results of restructuring measures in terms of improvements of performance might not yet be visible.

2 Ukrainian Privatisation

In Ukraine, privatisation was mainly implemented on the basis of a voucher scheme (see e. g., Leshchenko and Revenko, 1999). Workers' collectives acquired shares in their enterprises at a nominal price using their privatisation certificates and by additional payments at a discount. Managers were provided with packets of shares of their enterprises (up to 5%) on a free basis or at a discount. Foreign participation in the privatisation process was limited as foreigners could not participate directly in the mass privatisation and were allowed to purchase shares of enterprises only following their privatisation.

The design of Ukrainian privatisation led to a dominant role of insiders in large and middle-sized industrial enterprises. Though during the initial privatisation stage, managers have not been provided with a controlling stake, their power in making strategic decisions is very high. Ukrainian industrial enterprises did not experience an extensive change of managers. The inflow of new managers from outside has been very low because of the underdeveloped market for managers and the limited participation of outside strategic investors in privatisation.

The development of the enterprise sector presently is still constrained by its limited ability to attract sufficient outside capital, weakness of financial discipline and failure in the enforcement of bankruptcy laws (Hirschhausen, 1998). Ukraine's deep economic crisis resulted in a decreasing profitability of the enterprises and a limited ability to self-finance restructuring. In 1998 about 50% of Ukrainian enterprises reported making losses. The Ukrainian banking sector still is at an early stage of development, it is small and undercapitalized. Credit to the private sector is scarce and loans are mainly short term. Though during the last 4 years state subsidizing was considerably reduced, soft budget constraints remained. According to EBRD estimates, by mid-1998, inter-enterprise arrears amounted to over 80% of GDP, wage arrears reached 5% of GDP (excluding public sector wage arrears), and barter trade supported 42% of industrial sales (EBRD Report, 1998, p.196). Under such conditions, firms use a broad array of informal mechanisms termed by Berliner (1952) a „web of mutual support". Informal mechanisms allow managers to navigate around the obstacles caused by systemic and policy failures (Linz and Krueger, 1998). These kinds of mechanisms increase managerial power inside the enterprises and, allowing firms to survive by muddling through, at the same time slow down true restructuring (Ericson, 1998).

The low and uneven pace of reforms provided the basis for the EBRD categorisation of Ukraine into the group of countries in a less advanced stage of transition.

3 Determinants of Enterprise Restructuring

Enterprise restructuring during transition from centrally planned to market economies is a complex process to maintain or increase profitability in the face of a changing economic environment, technological progress, and

competition from other firms. For transitional economies it has become customary in the literature (Carlin and Aghion, 1996; Grosfeld and Roland, 1998; Djankov and Pohl, 1998) to distinguish between "reactive" (passive or defensive) restructuring on the one hand, and "strategic" (active or deep) restructuring on the other hand. Reactive restructuring, which is forced upon enterprises that want to survive in spite of the decline in the demand for their products, market liberalisation, and the imposition of a harder budget constraint, encompasses cost-oriented measures (typically reduction of employment, shedding of so-called social assets and activities) aimed at a short-run improvement of the cash flow. Strategic restructuring, on the contrary, is implied by a more radical change in the goal function of the firm and strategic outlook of its managers toward market orientation and value maximisation. If sustained, strategic restructuring activities can be expected to result eventually in the enterprise's successful adaptation to the evolving new market environment reflected by its improved performance (in terms of productivity, profitability, and market valuation). In the short run, however, and in particular in the case of a slow-reforming economy like Ukraine in which the necessary changes in the legal-institutional framework favoring market-oriented, value maximizing entrepreneurial behavior are far from being completed, performance data may not yet vary significantly between firms that undertook steps toward strategic restructuring and those enterprises which, albeit formally privatized, still rely on the old web of mutual support and try to muddle through by means of extensive barter operations and accumulation of payment arrears. Therefore, we do look not only at performance variables but also at a set of indicators, which may plausibly be thought of as representing various active restructuring efforts more directly. They are used to construct a simple index of overall restructuring activity, and in addition some of them are also considered in their own right.

The main virtue of privatisation lies in the de-politicisation of enterprise management and its severance from government funds implying the imposition of harder budget constraints, which is a necessary condition for creating incentives to undertake restructuring measures. In most studies, the hardening of budget constraints is measured by a dummy variable for direct government subsidies (e.g., in Shleifer and Vishny, 1996; Estrin, Gelb and Singh, 1995). However, while direct subsidies have become less important in Ukraine (measured by their share in GDP) over the last five years, other sources of budget-constraint softness, in particular various kinds of payment arrears (such as inter-enterprise, tax, and wage arrears) and the extensive reliance on barter transactions have increasingly contributed to shielding privatized, formerly state-owned enterprises (SOEs) from market pressure, thus decreasing the need for restructuring (Alfandari and Schaffer, 1996). Therefore, in this paper, we include also variables for barter and the delay in payment of wages as proxies for the suspended hardening of budget constraints. We expect lower direct subsidies, shorter wage delay, and a smaller share of barter transactions in total sales to have a positive impact on strategic restructuring activities. As to performance, in particular the effect of barter arrangements may be more ambiguous since they are means to maintain at least partly pre-privatisation supplier-customer links thus mildening the "disorganisation" phenomenon typical for the early stage of transition also in Ukraine (Konings and Walsh, 1999).

Though privatisation and harder budget constraints are preconditions for market orientation and restructuring, it is competition that is generally considered the main driving force towards an efficient and innovative use of resources (see, e.g., Stiglitz, 1994; Dyker and Barrow, 1995; Earle and Estrin, 1996). Nickel et al. (1997) have found, for a sample of British manufacturing companies, that product market competition (in combination with financial pressure and shareholders control) are positively related to total factor productivity growth. Empirical tests on the impact of competition on enterprise behavior and performance in transitional economies are, however, limited in number (Earle and Estrin, 1996,1998). It has also been pointed out (Ickes et al., 1995; Earl and Estrin, 1998) that, in the short run, strong competition might negatively affect enterprise adjustment if adjustment costs are high. Our conjecture is that enhanced competition will generate positive restructuring results but may negatively influence enterprise performance in the short run. Moreover, economic theory suggests that competition and hard budget constraints are highly complementary as factors stimulating a stronger market and value-maximizing orientation of enterprise management.

Beyond privatisation as such it is the form of emerging ownership structures that is relevant for providing decisive incentives to strategic restructuring and improving performance (see, e.g., Djankov, 1999; Frydman, Hessel, and Rapaczynski, 2000). Privatisation transformed former SOEs into joint-stock companies with a variety of types of shareholders. In general, two basic kinds of corporate governance problems arise in joint-stock companies that have more than one owner and are led by hired managers: (1) the principal(s)-agent problem of ensuring the dominance of shareholders' (value-maximisation) interests over the interests of managers who enjoy significant discretionary powers; (2) the resolution of conflicts of interest between different groups of shareholders.

The separation of ownership and control does not per se constitute a severe problem. A single owner can impose monitoring mechanisms and incentive schemes, which make the managers behave as if they were owners themselves, and the costs of monitoring are outweighed by the benefits accruing to the owner who bears the costs of monitoring. It is multiplicity of ownership and a high degree of ownership dispersion that creates free-riding opportunities for the small individual shareholders, diluting their incentives to engage themselves in costly monitoring activities. As mentioned, privatisation of SOEs in Ukraine, as in a number of other transition economies, produced a thinly dispersed shareholder ownership of insiders (i.e. employees, including managers, and their family members) with a somewhat more significant but limited share in equity capital held by top managers. One possible way to overcome or at least alleviate the agency problem is the potential takeover by a dominant shareholder. This presupposes a well-functioning capital market, which does not exist in Ukraine and similar transition economies. The other possibility would be the actual presence of one or at most a few major shareholders or of financial intermediaries, which strategically exercise the voting rights connected with shares deposited with them. On theoretical grounds, the post-privatisation evolution of more concentrated ownership structures, and in particular of concentrated outside ownership, is expected

to have a beneficial influence on strategic restructuring and/or performance (Aghion and Blanchard, 1998; Djankov, 1997; Claessens and Djankov, 1999b). Frydman et al. (1999) provide empirical evidence that in the fast-reforming transition economies of Central Europe there are pronounced differences between firms controlled by corporate insiders and those dominated by outside investors. Empirical results for slow-reforming economies (e.g. Earle and Estrin, 1997; Jones, 1997, 1998; Akimova and Schwödiauer, 2000) cast doubt, however, on a significantly positive impact of more concentrated ownership structures on restructuring and performance in the short run and, in any case, suggest a differentiated response of restructuring and short-run performance indicators on changes in ownership structure. In this paper, we will test for the effects of various forms of private ownership and pay particular attention to managerial ownership the extent and importance of which is a characteristic trait of the Ukrainian as well as of other CIS economies. It emerged mainly because of the political necessity to secure the support of the managerial class for the privatisation programs. Can an extension of shareholding ownership by top managers be expected to generate sufficient incentives for strategic restructuring because as co-owners they will become as much interested in maximizing the value of the firm as its other shareholders? Morck, Shleifer and Vishny (1989) presented evidence that managerial ownership below certain levels improves performance (which they measured by Tobin's q, an indicator of long-run profitability expectations) while at higher levels it was found to be associated with lower performance values. Djankov (1999) too detected a non-monotonic relationship between managerial ownership and enterprise restructuring showing that managerial ownership is positively affecting restructuring at low (less than 10%) and high levels, but negatively at intermediate levels.

Hypotheses on the impact of a variation in the extent of managerial ownership should be put into the context of the before-mentioned class (2) of corporate-governance problems, viz. those arising from conflicting interests between different groups of shareholders. One type of such conflict is, of course, due to capital-market imperfections, which are severe in slow-reforming transition economies. It arises between large, strategic shareholders that may be assumed to pursue long-run value-maximizing goals, and small private shareholders, which, because of liquidity constraints, are more interested in currently paid-out dividends. Another type of conflicts which, as Nuti (1997) emphasizes is relevant for joint-stock companies, is due to the fact that some shareholders also have a stake in the enterprise apart from being as owners entitled to a share in the stream of profits. Such "stakeholding shareholders" may be suppliers of factors of production (workers, managers, suppliers of other inputs, banks and other creditors, suppliers of public goods, like local and regional authorities and the central state), customers (including debtors), competitors, and any economic agents exposed to external economies or diseconomies associated with the activities of the enterprises. This categorisation into stakeholding and non-stakeholding shareholders is broader, and at the same time more relevant to the problem in question, than the common distinction between insider owners (which are a special type of stakeholding shareholders, viz. employees, including managers, and their family members) and outsider-owners encompassing both stakeholding and non-stakeholding owners. Stakeholding "outsiders" seem

to be of particular importance in transition economies in the early stages of reform. They may be up-stream and down-stream firms that before privatisation had been together with the enterprise under consideration divisions of one vertically integrated SOE, or financial intermediaries ("house banks") established for the sole purpose to provide for the financial needs of the enterprise, or the "state" on various levels if it still happens to be one of the shareholders. The crucial point is, as Nuti (1997) shows, whether the fraction s_i of the total quantity of a certain service used by the firm that is provided by the stakeholding shareholder *i* ("service" should be interpreted here comprehensively, including e.g. the sales volume of one of the firm's products) is bigger than the fraction k_i of equity capital the stakeholding shareholder *i* owns. If $s_i > k_i$ the respective stakeholder is always interested in charging a price for his service which is above the market price in principle obtainable by the firm. In case such a "less-than-balanced" stakeholding shareholder exerts control over the firm's policy he will reward himself generously at the detriment of the other (in particular, non-stakeholding) shareholders. If necessary (because he on his own does not control a majority of votes), he may also collude with other less-than-balanced stakeholding co-owners. Such an ownership structure will therefore result in a lower value of the firm than could be achieved if control over the firm's policies is vested in the non-stakeholding shareholders.

The application of these concepts to managerial ownership has the following implications: Since we may assume that managerial labor is characterized by specific skills for which other types of labor (supplied by the worker-employees) are no substitute so that the rewards received by the management are to a large extent independent of the average wage paid by the firm, shareholding managers are always a less-than-balanced stakeholding group ($s_i = 1$) unless they own 100% of the enterprise ($k_i = 1$). Thus, managerial ownership ($k_i < 1$) can be expected to result in policies suboptimal from the pure-shareholder-value point of view if managers own more than 50% of voting shares because in this case they will be uninhibited to grant themselves not just high salaries but all kinds of extravagant fringe benefits. The same outcome will obtain if they own less than 50% but still a dominating package because of a high degree of dispersion among the other shareholders, or if they can effectively collude with other less-than-balanced stakeholders. The argument also carries over to the case in which suppliers, customers, or competitors of the firm are owned clandestinely (via strawmen or family members) by the managers. On the other hand, if the managers are shareholders below the threshold at which they gain a strategic ownership influence (in the sense that they can manipulate the relevant prices in their own stakeholder interest), managerial ownership obviously provides an incentive to increase the value of the firm (and of their shares) and a higher fraction (but still below the threshold) of total equity capital owned by them would enhance this incentive. What this threshold is (apart from being at any rate less than 50%) cannot, however, be said unconditionally, it will depend on the distribution of ownership rights among the other shareholders. For the sample of firms on which this study is based, we suspect that the average managerial shareholding of 10.6% (see Table 1) is below the critical

threshold so that this variable should be expected to exert a positive influence on restructuring and/or performance indicators.

Managerial human capital, in the comprehensive sense of acquired management skills as well as unacquired entrepreneurial abilities (Frydman et al., 2000), as a factor promoting restructuring and enterprise performance will to a large extent be complementary to managerial incentives provided by low-range managerial ownership or by corporate-governance mechanisms installed by concentrated outside, non-stakeholding owners: only given such incentives will managerial human capital be efficiently used, and only if sufficient managerial human capital is available to the firms will incentive mechanisms entail improved outcomes. In principle, there are two channels through which a firm may increase its stock of managerial human capital. One is simply the hiring of better managers, the other is training of its physically unchanged management. In several studies (e.g., Barberis et al., 1996; Djankov, 1997; Claessens and Djankov, 1999a; Dyck, 1997) it was found that changing managers plays an important role in increased restructuring efforts. In particular Barberis et al (1996) have put forth the hypothesis that firms in transition controlled by outside investors are doing better in terms of strategic restructuring and performance because they are able to attract more skilled and entrepreneurially spirited managers. For Ukraine in its early stage of privatisation and economic reforms, from which our sample stems, this hypothesis lacks plausibility. Foreign investors played a minor role in privatisation and the infusion of western managers was negligible. Moreover, the domestic market for managers has been scarcely developed. According to evidence provided by Frydman et al. (2000) this holds even for the more advanced Central European transition economies. For these, however, they find that a change towards more concentrated forms of outside ownership improved restructuring and performance significantly even in case of unchanged management. For Ukraine, on the contrary, we do not expect to observe such a clear-cut effect of ownership since even concentrated outside ownership is very likely inflicted by the biased incentives of stakeholding shareholders. Our hypothesis is, therefore, that management turnover will not matter significantly. This leaves us with the alternative channel of accumulating managerial human capital, viz. training of managers. Investment in the training of managers may be an endogenous variable too, explicable by the superior corporate governance ensured by the dominance of outside investors. If this effect can be assumed to be absent or too weak, management training will be undertaken on the initiative of the in-place managers themselves. Whether it has a beneficial effect on strategic restructuring and performance will in this case to a large extent be dependent on the presence of value-maximizing incentives of managerial ownership (provided that the latter remains below the threshold beyond which less-than-balanced stakeholding becomes harmful). The hypothesis tested in this paper is that the training of managers does have a significant positive effect on strategic restructuring and performance indicators, and that this effect will be detectable even independently of variations in managerial ownership incentives. The reason for the latter conjecture is that we suspect that the undertaking of training activities by the managers might be due to a considerable extent to self-selection of those managers that are endowed with more innate entrepreneurial spirit that is also more responsible for the

observed beneficial effects of training than the concrete skills acquired through it. In this sense the variable representing training effects can be considered exogenous relative to the size of the managerial ownership incentive.

The need for training of managers has been underlined in several studies on transition economies (e.g., by Blasi et al, 1997) without, however, carefully investigating the links between training of managers and successful restructuring. A first attempt at estimating the relative roles of ownership, hard budget constraints and the training of managers was made by Djankov (1997) for Moldova. The present paper is an extension of this analysis taking into account the effects of competition alongside hard-budget constraint variables, and paying due attention to the implications of managerial ownership incentives.

4 Description of the Data

A survey of 69 middle-sized and large privatized companies (number of employees more than 100) from three of the most industrialized regions of Ukraine was conducted in spring 1997 using in-depth interviews. Though the sample was not representative by sector, it covered a wide range of industries (chemical industry, construction materials and construction, food processing, production of non-durable and durable consumer products, engineering and production of electrical devices, pharmaceuticals) and was stratified by geographical region. The companies were randomly chosen from the regional data bases that contained the information about all privatized enterprises. The sample included industrial enterprises that were privatized to the extent of more than 70% during 1994-95.

In-depth interviews were conducted by professional interviewers on the basis of a prepared questionnaire. The questionnaire contained several parts with closed and open-ended questions. The first part of the questionnaire dealt with the legal structure of the company and peculiarities of its privatisation. In the second part of the questionnaire changes in employment and management of the company after privatisation were explored. The third part of the questionnaire dealt with the products and markets served by the company, and its marketing activity. The fourth part of the questionnaire contained questions concerning the financial situation of the company during the last two years. Income statement and balance sheet data for the period of 1995-96 were provided by each surveyed company. Financial data were converted into a Western accounting format. Tables (1) to (3) display some descriptive statistics of the survey data.

5 Methodology

We suppose that restructuring activities of a firm *i*, as measured by various qualitative indicators R_i, depend on managerial human capital (H_i), the

firm's ownership structure (O_i), effectiveness of budget constraints (B_i), competitive pressure (C_i), and a vector of other control variables (X_i),

$$R_i = f(H_i, O_i, B_i, C_i, X_i) \quad (1)$$

Following the methodology proposed by Earle and Estrin (1997,1998) or Estrin and Rosevear (1999b) we try to capture the multidimensionality of strategic restructuring efforts by using 12 dichotomous variables (for: installing new equipment, technological innovation, product innovation, international certification of products, improvement of quality control, regular advertising, development of a marketing plan, consumer analysis, competitor analysis, participation in international fairs, entering foreign markets, development of new distribution channels) r_{ij}, j=1,...,12, that take on the value of 1 if the corresponding measure was taken by firm *i* after privatisation, i.e. during 1995-1996 (and are otherwise equal to 0). An index of the firm's overall restructuring activity is computed as the (unweighted) sum $r_i = \sum_{j=1}^{12} r_{ij}$, the mean of which for our sample is 2.75 (with st.dev.=2.59, min=0, max=10) indicating a rather low aggregate level of strategic restructuring activity. The overall restructuring activities indicator for firm *i* if then defined as

$$\bar{r}_i = \begin{cases} 1 & \text{for } r_i > 3 \\ 0 & \text{for } r_i \leq 3 \end{cases}$$

In one version of the assumed functional relationship (1) we choose $R_i = \bar{r}_i$, i.e. we try to explain the firms' choices of "high" (above-average) and "low" overall restructuring activity levels by the variables H_i, O_i etc. In the other version of (1) we set $R_i = r_{i1}, r_{i2}$ (1=new equipment, 2=technological innovations), i.e. we focus on two specific restructuring activity variables that might be regarded as representing "hard" restructuring efforts.

As far as the performance of a firm *i* is concerned, which is represented by some quantitative variables P_i, it is assumed to be influenced by the factors that enter also (1) as independent variables :

$$P_i = f(H_i, O_i, B_i, C_i, R_i, X_i) \quad (2)$$

Moreover, we do not exclude a priori that restructuring R_i might have some impact on performance. For P_i, we experiment with six performance indicators: growth rates (from 1995 to 1996) of employment, sales, labor productivity (defined as sales per employee), net margin per unit of sales, costs per unit of sales, and investment per unit of sales. The nominal

values of all performance indicators were converted from Ukrainian currency into US dollar using the official exchange rates for 1995-96. The descriptive statistics (Table 1) show that, on the average, the firms in the sample suffered a drop in their profitability from 1995 to 1996 and did not succeed in cutting unit costs, though, they reduced some excess labor force. They managed, however, to increase labor productivity.

Managerial human capital (H_i) is represented by two dummy variables, *CHANGEMAN* and *TRAINMAN. CHANGEMAN* equals 1 if the firm reported a change in top management after privatisation, which in our sample is the case for 10.1% of the firms. A comparable estimate reported by Denis and Denis (1995) for US firms is about 9%, and for Russian CEOs between 1992 and 1996 this rate was estimated at 8.4% by Blasi et al (1997). *TRAINMAN* is equal to 1 if some top managers of the enterprise participated in a training program after privatisation. The corresponding rate in our sample in 10.1%.

Ownership structure (O_i) is measured by the four quantitative variables *OUTSOWN* (outside ownership), *CONCOWN* (concentrated ownership), *CONCOUTOWN* (concentrated outside ownership), and *MANAGOWN* (managerial ownership). *OUTSOWN* is the percentage of shares of a firm owned by outside financial and non-financial organisations, the State Property Fund, and individuals (neither employed by the firm nor being family members of an employee). *CONCOWN* is the percentage of shares owned by non-individual outsiders and top-managers. These groups of shareholders are "blockholders" that can be assumed to be able to coordinate their influence on the firm's strategic decisions (not necessarily in favor of value maximisation since they may also be substantial stakeholders!). *CONCOUTOWN* is the percentage of shares held by financial and non-financial organisations, including the State Property Fund. As can be seen from Table 1, the mean sample values of *CONCOWN* and *CONCOUTOWN* are 40% and 29.5%, respectively, with an average of 11.5% still held by the State Property Fund. State ownership is, however, limited to 41% of the firms (the median of shareholding by the State Property Fund is 0, while the median of *CONCOUTOWN* is 22%!). These numbers suggest that, at least for the firms in our sample, privatisation resulted in significant equity stakes of outside (and non-state) blockholders. Nevertheless, the pronounced dispersed-insider character of Ukrainian privatisation is also borne out by this sample since 53.5% of shares are on the average owned by non-managerial employees and their family members. Concentrated insider ownership is measured by *MANAGOWN* defined as the percentage of equity capital owned by a firm's top managers (executive director of the firm and his/her deputies). Thus, *MANAGOWN* is equal to *CONCOWN* minus *CONCOUTOWN.* The mean sample value is 10.5%, its median 8%, numbers that are small enough to suggest that the inherent unbalancedness of managerial ownership will not necessarily impede its potential positive incentive effect on strategic restructuring and performance. Evidence from the interviews also shows that the reported ownership structures emerged more or less simultaneously with privatisation itself at the beginning of 1995 justifying their inclusion as explanatory variables for R_i and P_i.

In order to capture the extent of hardening of budget constraints (B_i) we employ three variables: *SUBSIDIES, BARTER,* and *WAGEDEL. SUBSIDIES* is a dummy variable that is equal to 1 if the enterprise has received state subsidies after privatisation, and is 0 otherwise. In the sample, only three enterprises (4.3%) have received state subsidies during 1995-96. The quantitative variable *BARTER* is defined as the percentage of barter sales in total sales in 1996. Only 14 firms (20.3%) in the sample have reported no barter operations in 1996, while for 21 enterprises (30.5%) the share of barter in total sales exceeded 50%. *WAGEDEL* measures the delay in wage payment in 1996 in number of days. In the sample, 45 enterprises (61.9%) reported wage arrears, and 14.4% of the firms paid their employees with a delay of more than 6 months. This shows that facing a sharp cut in government subsidies, Ukrainian enterprises in their early after-privatisation phase continued to experience soft budget constraints by widely using barter operations and accumulating wage arrears. Though the data for *BARTER* and *WAGEDEL* refer to 1996, it is plausible to assume that they reflect, as far as their variation across firms is concerned, also the situation in 1995, and to consider them, therefore, as explanatory variables for restructuring behavior and performance.

The level of competition pressure (C_i) is measured using subjective estimates of managers given during the in-depth interviews. We use the dummy variable *COMPETITION* that is equal to 1 if the manager reported a high level of competition in the main markets served by the enterprise in 1996. In our sample, 21 enterprises (30.4%) experienced high competition in 1996. Again we assume that the variable *COMPETITION* describes the competitive pressure faced by the enterprises sufficiently well also for 1995.

As control variables (X_i) we use three regional dummies $REGION_{ij}$, j=1, 2, 3 (for regions of Kiev, Kharkov and Donetsk), three sectoral dummies $SECTOR_{ik}$, k=1, 2, 3 (for chemical, construction and pharmaceutical industries; food processing and consumer goods industries; electrical devices and engineering industries), $SIZE_i$ for the firm's size (measured by the number of employees in 1996, with a mean value of 1033 and min=175, max=10 000), and $INIPOS_i$ to control for the firm's initial position. In the equations for R_i we choose the firm's net margin (per unit of sales) in 1995 for $INIPOS_i$, in the equations for P_i the respective level in 1995 of the performance measure the growth rate of which defines P_i.

We parameterize and estimate the hypotheses (1) and (2) for the respective determinants of restructuring activities and performance in terms of the following regression equations:

$$L(R_i) = a + \sum_k b_k H_{ik} + \sum_l c_l O_{il} + \sum_m d_m B_{im} + eC_i + \sum_n f_n X_{in} + \varepsilon_R \qquad (3)$$

is a logit equation estimated through maximum likelihood methods. $L(R_i)$ is, as usual, the logarithm of the probability that firm *i* chooses the

restructuring measure or level for which R_i =1, minus the logarithm of the probability that it will not do so. The estimate of the probability that R_i =1 is equal to 1/(1+*exp*) where *exp* is the exponential function of $-(\hat{a}+\sum_k \hat{b}_k H_{ik}+\ldots+\sum_n \hat{f}_n X_{in})$. The constant term may be interpreted, following Frydman et al. (1997), as a common transition effect that, in case the other terms (human capital effects, ownership effects, etc.) were all zero, if negative would reduce the probability of R_i =1 below one half.

$$P_i = a + \sum_k b_k H_{ik} + \sum_l c_l O_{il} + \sum_m d_m B_{im} + eC_i + \sum_n f_n X_{in} + gR_i + \varepsilon_p \qquad (4)$$

is a linear regression equation estimated through OLS methods.

Several questions arise with respect to the specification of regression equations (3) and (4). One concerns the possibility of interdependence between the two equations in the sense that R_i (or the probability that R_i =1) depends on the value of the respective performance measure P_i, in which case ε_p and R_i would be correlated and the OLS-estimates would be inconsistent. We dismiss this possibility for the following reasons: First, the fact that our performance variables are growth rates of performance in 1996 on performance in 1995 while the restructuring measures captured by R_i to a large extent were taken in 1995 makes a dependence of R_i on P_i rather implausible. And, indeed, the additional insertion of a term $h P_i$ into equation (3) does not yield significant estimates $\hat{h}$. Secondly, if we use the estimated probability of R_i =1 from (3) as an instrumental variable for R_i in (4), the difference between the respective estimates of *g* prove insignificant in the Hausman-test.

Likewise, the endogeneity question may be raised concerning some of the explanatory variables in the above regression models. While competitive pressure C_i may safely be considered exogenous, this assumption seems, in principle, more doubtful for the variables used as proxies for managerial human capital, ownership structures, and hard budget constraints. Thus, we tried regressions of these variables (logit regressions where necessary) on the other remaining variables on the right-hand sides of equation (3) and (4), and, in some versions, also on P_i and R_i. The results, with one exception, turned out to be negative in so far as no significant regressions were found. The exception is the variable *CHANGEMAN* which depends significantly negatively on *MANAGEOWN* and significantly positively on *OUTSOWN, CONSOUTOWN,* and *CONCOWN,* a result the interpretation and plausibility of which is obvious. That *TRAINMAN* cannot be explained in terms of the other variables in (3) and (4) adds credibility to the conjecture about managerial training being a proxy for the exogenous variation in entrepreneurial talent. The negative results with respect to ownership structure confirm the predetermined nature of O_i relative to R_i and P_i in accordance with the evidence from the interviews on the insignificance of

changes in the ownership structure obtained immediately after privatisation over the two years till spring 1997. As to *SUBSIDIES, BARTER* and *WAGEDEL* we may conclude that they are indeed sufficiently exogenous relative to R_i and P_i and independent from the other explanatory variables to justify their use as proxies for hardness of budget constraints that might contribute to the explanation of a firm's restructuring propensity and performance. The extent of a firm's barter operations, e.g., is very likely rather a heritage of old-established links from pre-privatisation times than the result of post-privatisation ownership, restructuring efforts and performance.

In both sets of equations, (3) and (4), we try versions that differ with respect to the inclusion of the various specific H_i, O_i and B_i variables, i.e. we estimate also equations for which some of the coefficients b_k, c_l, d_m are set equal to zero. In section III it had been pointed out that competition and hard budget constraints can be expected to be highly complementary, and that the hardening of budget constraints in the wake of privatisation is a fundamental necessary condition for competitive pressure and ownership structure to impact beneficially on restructuring efforts and performance. In the regressions in which we simultaneously include $\sum_m d_m B_{im}$ (with at least some $d_m \neq 0$ a priori) and eC_i we cannot catch such a complementarity relationship between effective budget constraints and competition. Therefore, in order to test the hypothesis that competition will have positive effects on R_i and/or P_i if budget constraints are sufficiently hard, we estimate also equations (3) and (4) with all d_m =0 a priori, both for the sub-sample of firms with *SUBSIDIES=0* and *BARTER<50* (i.e., the firms with relatively hard budget constraints) and for the complementary group of firms.

Summing up, our core hypotheses are the following:

Hypothesis 1. Managerial human capital has a significantly positive impact both on strategic restructuring activities and on performance if it is represented by training of top managers, i.e., $b_k > 0$ for *k=TRAINMAN* in equations (3) and (4). A change in top management is not expected to exert a significant influence because of the qualitative shallowness of the Ukrainian market for managerial talent immediately after privatisation, i.e., $b_k = 0$ for *k=CHANGEMAN* in (3) and (4).

Hypothesis 2. Ownership has a significantly positive influence on restructuring activities and performance only through managerial shareholding, i.e. $c_l > 0$ for *l=MANAGOWN,* and $c_l \leq 0$ for *l = OUTSOWN, CONCOWN, CONCOUTOWN* in equation (3) and (4). The rationale is that the size of top managers' shareholdings is not high enough to let their stakeholding interests dominate their profit incentives. We do not expect outsider ownership to have a beneficial impact, either because of corporate governance problems (in particular for dispersed outside owners) or because of the dominance of less-then-balanced stakeholder interests in the case of concentrated outside owners.

Hypothesis 3. Harder budget constraints are expected to influence restructuring efforts positively, i.e., $d_m < 0$ for *m=SUBSIDIES, BARTER, WAGEDEL* in equations (3). As far as performance is concerned, the short-run nature of our performance indicators suggests a more ambiguous relationship. Opportunities to resort to barter transactions or delaying wage payments may in the short-run very plausibly have a positive effect at least on some performance indicators like sales, sales per employee, or net profit margins.

*Hypothesis 4.*Competition is expected to have a significantly positive impact on strategic restructuring activities and performance only for those firms which are exposed to harder budget constraints, i.e. e>0 in equations (3) and (4) with $d_m = 0$ a priori for all *m*, for observations on the sub-sample of firms that do not receive state subsidies and possess a barter-to-sales ratio below 50%. Independently of the effectiveness of budget constraints competitive pressure is not expected to exert a significant influence either on restructuring efforts or performance.

6 Estimation Results

Table 4 reports the logit estimates for the restructuring activities equation (3) when Ri is the indicator for the overall restructuring activity level of the firm. As explanatory variables we have used alternatively TRAINMAN and CHANGEMAN in combination with respectively one of the four ownership variables, all three budget constraint variables, and COMPETITION. Across all specifications the estimated equations are significant and display high explanatory power (with a correctly predicted percentage from 73,8 to 95,2). As expected, the variable CHANGEMAN proves statistically insignificant. The variable TRAINMAN, however, turns out to have a significantly positive effect on the overall restructuring indicator in all specifications in which MANAGOWN is not included. Together with the variable for managerial ownership, TRAINMAN (though staying positive) becomes insignificant suggesting a dominant role of managerial ownership incentives over the human capital factor as far as a broad concept of restructuring is concerned. When we use for Ri the two more specific, "hard" restructuring variables "installation of new equipment" and "introduction of technological innovations" (Table 5), TRAINMAN is the only significant explanatory variable (with a positive coefficient), even if the extent of managerial ownership is taken into account. This result might be interpreted as supporting the hypothesis that TRAINMAN, rather than measuring primarily the effect of acquired skills, represents the self-selection of more entrepreneurial managers ready to run the higher risks of investing in new equipment and venturing into technological innovations. Following Frydman et al (2000), one may argue that in this case the firms with trained managers should not only be expected to display a higher mean performance but also a significantly higher variance than the firms with untrained managers. In fact, we find that the variance in the growth rate of sales per employee across the firms with trained managers is 1,85 compared to 0,86 for the sub-sample of other firms, a difference which is significantly larger than zero at a 5% level.

In accordance with our second hypothesis we find no evidence for a significant impact on restructuring (broad or narrow measures) of either outside ownership or concentrated ownership apart from managerial ownership. In versions of equation (3) for the overall restructuring indicator which are not fully reported here, we represented the ownership structure by MANAGOWN together with OUTSOWN and, respectively, CONCOUTOWN. The results were not essentially different from those reported in Table 4: The coefficients of MANAGOWN are in both versions reduced to 0,16 (but remain significant) while the coefficients of OUTSOWN and CONCOUTOWN are not significantly different from zero.

In contrast to the clearly positive impact of managerial ownership and human capital on restructuring activities, the conjectures about the effects of the hard-budget constraints variables do not find strong support by the data. Though the coefficients of SUBSIDIES and BARTER are negative in the equations for the overall restructuring index (Table 4), they are statistically not significant. Only the variable WAGEDEL, measuring the extent of accumulating wage arrears, has a significantly negative effect on the broad measure of restructuring activities for almost all specifications.

The variable COMPETITION proves statistically insignificant in the restructuring equations estimated with the data for the whole sample (Table 4, 5). Moreover, this negative result also obtains when the equations are estimated without hard-budget constraints variables for the sub-sample of firms that face relatively hard budget constraints (i.e., do not receive state subsidies and have a share of barter transactions in total sales of less than 50%). Thus, we cannot corroborate our hypothesis on the complementarity between hard budget constraints and competition effects. Finally, the regressions provide no evidence for significant effects of industry, regional or size-related differences on the firms' propensity to restructure.

In Table 6 a set of linear regression estimates for the performance equation (4) with growth rates of labor productivity (sales per employee) as performance variable are displayed. As far as human capital is concerned, the variable CHANGEMAN, as expected, turns out again to be statistically insignificant (even the equation itself becomes insignificant). TRAINMAN, on the contrary, is significantly positive across all ownership structure specifications. When the ownership variable MANAGOWN is included, the coefficient of TRAINMAN is somewhat reduced but stays significant, MANAGOWN itself has a significantly positive impact on performance, while the effect of OUTSOWN is significantly negative suggesting severe problems due to less-than balanced stake holders. When OUTSOWN is included alongside MANAGOWN it remains negative but becomes statistically insignificant (the same holds for CONCOUTOWN).

The coefficients of the budget constraint variables BARTER and WAGEDEL are positive but, with a few exceptions, statistically not significant. In the equations on which we report in Table 6 we included as an explanatory variable the restructuring indicators NEWEQUIPMENT and, alternatively, TECHNOLOGY which themselves do not enter with statistically significant coefficients. For the equation in which TECHNOLOGY is included, WAGEDEL becomes significantly positive. When we control for restructuring by including the overall restructuring indicator the results with respect to the

significance of training and ownership variables do not change essentially (budget constraint variables are again insignificant). In case we do not control for restructuring, BARTER displays a significantly positive effect on performance.

As mentioned in the previous section, we have also experimented with other performance indicators. The estimation results turn out to be not so much different from those for the growth rate of sales per employee. The growth rate of sales, e. g., depends significantly positively on the variable TRAINMAN (while MANAGOWN is positive but not significant). For the growth rates in the number of employees, the net margin and the cost per unit of sales ratio it is MANAGOWN that enters statistically significantly with the predicted sign of coefficient, while TRAINMAN preserves the correct sign but becomes insignificant. The variable BARTER has a significantly positive effect on the growth rate of the net margin and significantly negative effects on the growth rates of employment and unit costs.

Also on performance the competitive pressure perceived by the managers (represented by the variable COMPETITION) does not have any significant impact, independently of what specification of (4) is considered, as long as all the sample data are used. The picture changes, however, as predicted by our "complementarity hypothesis", when only data from the sub-sample of firms facing a relatively hard budget constraint are used for estimation. In this case, COMPETITION enters the equation (for performance measured as growth rate of sales per employee) with a highly significant, positive (0,65) coefficient independently of the specification of ownership. Likewise, TRAINMAN displays a significantly positive coefficient of more or less the same size as in the equation estimated for the unrestricted data set. This result holds whether we control for restructuring activity or not.

Region, sector, size and initial position do not seem to exert a significant influence on the firms' short-run performance.

7 Conclusions

Using a sample of 69 middle sized and large formerly state owned industrial enterprises from the three most important industrial regions of Ukraine we have studied the joint impact of managerial human capital, ownership structure, hardening of budget constraints and competition on restructuring activities and performance outcomes for a period of two years immediately after privatisation. Though the sample is rather small and not fully representative, the quality and reliability of the data (which include quantitative performance data) due to careful personal expert interviews with top managers is deemed high.

One of the main results of our analysis is that managerial human capital plaid a crucial role in furthering restructuring and improving performance during the early phase of Ukrainian privatisation. Contrary to findings for more advanced Central European transition economies (Claessens and Djankov, 1999a) it was not management turnover that exerted a significant influence but the training of top managers which we are inclined to interpret as a proxy for entrepreneurial spirit and skills.

In many studies on transition economies the data seem to show that outside ownership, and in particular concentrated outside ownership, has a favorable impact on both restructuring and performance. Again, these results were obtained mainly for the Central European transition economies [e.g., by Claessens and Djankov (1999 b), Frydman et al (1999)]. For Ukraine, Estrin and Rosevear (1999 a, 1999 b) have not been able to detect a significant role for outside ownership, they rather find a positive influence of insiders as owners as far as product and input restructuring is concerned. They point to corporate governance problems created by the Ukrainian institutional environment and to the dispersion of outside owners as explanations for this phenomenon. Our analysis shows that also concentrated outside ownership either has no significant influence or affects performance even adversely. In our opinion this is due to the complete absence of foreign owners in our sample and, also for this reason, to the dominance of less-than-balanced stakeholder interests [Nuti (1997)] among (concentrated) outside owners. The positive influence of insiders seen by Estrin and Rosevear (1999 b) is, according to our results, owed exclusively to managerial ownership. The size of the top managers' equity shares lies in a range that does not allow them to impose their stakeholding interests on the other owners. This result and its interpretation is compatible with the finding of Djankov (1999) for six newly independent states.

As far as the impact of hard budget constraints is concerned, the evidence provided by our data is considerably weaker. Only the variable measuring the delay in the payment of wages (a proxy for the possibility of accumulating wage, and may be other, arrears) is found to exert a significantly negative influence on the propensity to restructure for the aggregate of a broad spectrum of activities. The impact of state subsidies and barter arrangements appears less clear. Independently of hard budget constraints the partial effect of a higher (perceived) competitive pressure is not significant. For those firms, however, which are subject to harder budget constraints competition matters for performance even in the short run.

In general, our research shows that in an economy which is a transitional late-comer like Ukraine restructuring activities and performance will not be closely correlated in the short run and will be susceptible to factors like managerial ownership and skills, as opposed to outside ownership, to various degrees and differently from the role ownership structures play in more advanced transition economies.

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Appendix

Table 1
Descriptive statistics of main variables

	Mean	Median	St. deviation
Ownership (% of shares)			
State	11.55	0.0	19.9
Managerial	10.59	8.0	14.02
Outsiders	35.91	30.0	33.96
Concentrated	40.06	34.2	30.46
Concentrated outsiders	29.56	22	32.23
Number of employees			
Before privatisation	1454	900	1547
In 1996	1033	720	1486
Soft budget constraints			
Barter (% of total sales)	36.4	30.0	36.0
Delay in paying wages (days)	77	45	96
Change in performance (1996 to 1995, %)			
Profitability (gross margin)	-41.0	-33.0	151.1
Sales per employee	23.9	-4.3	101.8
Number of employees	-11.0	-8.6	15.7
Costs/ total sales	13.2	8.6	39.3

Table 2
Restructuring activity and managerial human capital: descriptive statistics

Restructuring	Total sample N=69 %	No managerial training N=57%	Managerial Training N= 12%	Chi	No change of top managers N=62	Change of top managers N=7	Chi
Active restructuring							
Installation of new equipment	31.9	27.5	58.3	4.1**	31.6	57.1	1.3
Technological innovations	13	9.8	33.3	4.4**	12.3	28.6	1.3
Product innovations	49.3	47.1	75	3.04**	52.6	57.1	0.05
Certification of Products	13	7.8	33.3	5.7**	14	14.3	0.003
Passive restructuring							
Employee lay-off	72.5	80.4	66.7	1.05	77.2	85.7	0.25
Reduction of social assets	30.0	32.4	16.7	0.59	29.4	33.3	0.03
Closing of old product line	16.2	15.7	45.5	4.8**	16.1	57.1	6.4**
Selling of equipment	8.7	7.8	16.7	0.87	7	28.6	3.4**

** significant at $p<0.05$

Table 3
Contractional adjustment of Ukrainian enterprises

	%
Sent employees on administrative leave	42.1
Used barter operations	60.3
Reduced time of operations	29.5
Used less then 50% of production capacity	57.1
Delayed wage payment	53.6
Planned future employee lay-off	24.6

Table 4
Logistic regressions : restructuring activity equations

Independent variables	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8
Human capital								
TRAINMAN	30.0 (49.3)	-	6.65**(2.9)	-	5.83**(2.61)	-	6.50* (2.87)	-
CHANGEMAN	-	1.16 (1.23)	-	1.11 (1.25)	-	0.74 (1.16)	-	1.37 (1.34)
Ownership								
MANAGOWN	0.41*(0.24)	0.23*(0.11)	-	-	-	-	-	-
OUTSOWN	-	-	-0.02 (0.01)	-0.01 (0.01)	-	-	-	-
CONCOWN	-	-	-	-	-0.001 (0.01)	-0.005 (0.01)	-	-
CONCOUTOWN	-	-	-	-	-	-	-0.02 (0.02)	-0.02 (0.01)
Budget constraints								
SUBSIDIES	-16.6 (46.9)	-12.2 (37.6)	-7.0 (41.9)	-8.8 (42.6)	-7.1 (42.2)	-8.6 (42.2)	-7.19 (41.8)	-8.2 (42.6)
BARTER	-0.02 (.05)	-0.01 (0.01)	-0.02 (0.02)	-0.003 (0.01)	-0.02 (0.02)	-0.002 (0.01)	-0.02 (0.02)	-0.004 (0.01)
WAGEDEL	-0.23 (0.37)	-0.02*(0.01)	-0.02*(0.009)	-0.02*(0.009)	-0.03*(0.01)	-0.02*(0.009)	-0.03*(0.01)	-0.019*(0.009)
COMPETITION	2.26 (1.76)	1.42 (1.01)	0.72 (1.07)	0.77 (0.8)	0.59 (1.03)	0.73 (0.82)	0.60 (1.05)	0.76 (0.86)
Control								
REGION	Y	Y	Y	Y	Y	Y	Y	Y
SECTOR	Y	Y	Y	Y	Y	Y	Y	Y
SIZE	0.002 (0.002)	0.002 (0.002)	0.001 (0.001)	0.001 (0.001)	0.002 (0.002)	0.001 (0.001)	0.002 (0.002)	0.001 (0.001)
Constant	-4.5*(2.5)	-2.4*(1.3)	0.71 (0.94)	0.52 (0.7)	0.18 (1.04)	0.37 (0.77)	0.66 (0.97)	0.48 (0.69)
Chi-square	44.5**	26.4**	33.2**	18.1**	31.58**	17.04**	32.9**	18.8**
Correct percent	95.2	83.3	83.3	73.8	85.2	76.1	83.3	73.8

*p<0.01, ** p<0.05, significant coefficients bold-faced

Table 5
Logistic regressions, dependent variables: buying of new equipment (1-4) and technological innovations

Independent variables	Dependent variable: buying of new equipment				Dependent variable: technological innovations			
	1	2	3	4	5	6	7	8
Human capital								
TRAINMAN	3.46**(1.53)	2.66**(1.6)	2.74**(1.18)	2.66**(1.16)	2.30**(1.05)	3.15**(1.43)	2.58**(1.14)	2.43**(1.12)
Ownership								
MANAGOWN	-0.07 (0.06)	-	-	-	-0.01 (0.07)	-	-	-
OUTSOWN	-	-0.005	-	-	-	-0.05 (0.04)	-	-
CONCOWN	-	-	-0.01 (0.01)	-	-	-	-0.04 (0.03)	-
CONCOUTOWN	-	-		-0.002 (0.01)	-	-	-	-0.04 (0.03)
Budget constraints								
BARTER	0.02 (0.017)	0.02 (0.01)	0.03 (0.01)	0.05 (0.01)	-0.01 (0.01)	-0.002(0.01)	-0.006(0.01)	-0.004 (0.01)
COMPETITION	0.23 (1.06)	-0.07 (1.05)	0.07 (1.0)	0.07 (1.0)	0.34 (1.03)	-0.45 (1.2)	0.09 (1.09)	-0.07 (1.11)
Controls								
REGION	Y	Y	Y	Y	Y	Y	Y	Y
SECTOR	Y	Y	Y	Y	Y	Y	Y	Y
Net margin 95	0.05(0.04)	0.04 (0.04)	0.04 (0.04)	0.04 (0.04)	0.05 (0.05)	0.06 (0.006)	0.07 (0.06)	0.03 (0.01)
Constant	-0.95 (1.9)	-0.97 (1.15)	-0.79 (2.06)	-1.13 (2.5)	-0.86 (1.4)	-0.80 (1.6)	-0.60 (1.65)	-0.77 (1.63)
Chi sq.	13.0**	12.4**	12.4**	12.35**	9.6*	14.3**	13.4**	13.0**
Goodness of fit	33.0	28.7	30.8	30.1	43.6	27.5	34.1	28.2
N	65	65	67	67	65	65	67	67

* $p<0.1$, **$p<0.05$

Table 6
Performance equations, dependent variable – growth of total sales per employee in 1995-1996

Independant variables	1	2	3	4	5	6	7	8
Human capital								
TRAINMAN	1.09**(0.42)	1.29**(0.41)	1.31**(0.44)	1.24**(0.42)	1.12**(0.37)	1.33**(0.37)	1.29**(0.40)	1.29**(0.40)
Ownership								
MANAGOWN	0.02**(0.01)	-	-	-	0.02**(0.01)	-	-	-
OUTSOWN	-	-0.007*(0.003)	-	-	-	-0.01*(0.006)	-	-
CONCOWN	-	-	-0.004 (0.004)	-	-	-	-0.005(0.004)	-
CONCOUTOWN	-	-	-	-0.01 (0.006)	-	-	-	-0.005(0.004)
Budget constraints								
BARTER	0.005 (0.005)	0.003 (0.003)	0.003 (0.003)	0.002 (0.004)	0.005 (0.003)	0.003 (0.004)	0.003 (0.004)	0.003 (0.004)
WAGEDEL	0.51 (0.30)	0.50 (0.33)	0.50 (0.33)	0.32 (0.38)	0.54*(0.28)	0.43 (0.31)	0.44 (0.31)	0.44 (0.31)
COMPETITION	0.41 (0.27)	0.27 (0.28)	0.20 (0.28	0.43 (0.32)	0.39(0.25)	0.28(0.24)	0.22(0.33)	0.22(0.33)
NEWEQIPMENT	0.10 (0.44)	-0.07 (0.42)	-0.17 (0.45)	-0.05 (0.44)	-	-	-	-
TECHNOLOGY	-	-	-	-	0.08(0.55)	-0.39 (0.55)	-0.32 (0.61)	-0.32 (0.56)
Controls								
REGION	Y	Y	Y	Y	Y	Y	Y	Y
SECTOR	Y	Y	Y	Y	Y	Y	Y	Y
SIZE	-1.2E-08(1.1E-08)	-1.5E-08(1.1E-08)	-1.1E-08(1.2E-08)	-1.3E-08(1.2E-08)	-1.2E-08(1.1E-08)	5.1E-09(1.4E-08)	-1.7E-08(1.2E-08)	-1.2E-08(1.1E-08)
PERF95	-4.0E-06(2.4E-05)	-3.4E-07(2.4E-05)	-3.4E-06(2.6E-05)	-3.4E-06(2.3E-06)	-4.5E-06(2.6E-05)	-9.4E-06(3.5E-05)	-1.5E-06(2.8E-05)	3.2E-06(2.7E-05)
Constant	-0.21 (0.47)	0.29 (0.44)	0.30 (0.48)	0.25 (0.45	-0.17 (0.42)	-0.008**(0.003)	0.30(0.46)	0.27 (0.42)
Adj R sq.	0.410	0.399	0.308	0.366	0.409	0.415	0.314	0.377
F	3.09**	2.99**	2.33**	2.73**	3.08**	3.1**	2.37**	2.81**
N	65	65	65	65	63	63	63	63

*p<0.1, **p<0.05