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WHAT MAKES HUNGARIAN SMEs PERFORM POORLY?

A Stochastic Frontier Analysis

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Small and medium-sized enterprises (SMEs) have been the target of supportive government policies since economic transformation began in Hungary although the birth of a strong and healthy layer of SMEs has not been observed in the country up to now. In this article the issue of why this has not happened is addressed. Empirical evidence suggested that Hungarian SMEs are not usually driven by the corporate values of Max Weber's "protestant ethics"; instead, they aim at short-term financial enrichment. Hungarian SMEs cannot usually "climb the ladder" and turn into large enterprises – indeed, their survival period is relatively short.

Nickell (1996) argued that (total factor) productivity rather than profitability would reflect a company's efficiency level. Using *frontier production* and *frontier profit* functions there is an attempt here to prove that "technical (or allocative) efficiency" and "profit efficiency" both have a distinct role to play in explaining a firm's economic performance; and by applying *limited information maximum likelihood* models of SME profit gaps it will be shown that cost inefficiencies and unfavourable market conditions – alongside the inefficient allocation of factors of production – inevitably lead to the fairly low level of SME profitability.

The most important finding of the analysis is that employment has been a crucial factor in explaining the profit deviation of companies. Building on the results of Köllő (2001) the article argues that SMEs regard labour as flexible stock. Companies will seek out new labour if they find new market opportunities – but until these appear, they tend to remain in the arena of diminishing returns, this being the easiest way for them to maximise profits. Downgraded production activities do not attract substantial external financing. Yet a lack of financial resources when new market opportunities do emerge will prevent an SME from exploiting the chance.

Keywords: small and medium-sized enterprises, firm restructuring, technical and economic efficiency, frontier analysis

JEL classification index: C23, D21, D24, L25

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1. INTRODUCTION: AN ANALYTICAL FRAMEWORK

Small and medium-sized enterprises (SMEs) have been the target of supportive government policies since economic transformation commenced in Hungary. As the country moves towards a European Union accession date, it will also have to adopt EU directives aimed at helping SMEs to fully integrate themselves into a corporate sector dominated by global companies. Central and East European (CEE) countries have additional reasons for strengthening their SME sectors, i.e. besides the requirements of the EU. Firstly, these countries inherited an "upside down" corporate sector pyramid from their socialist past (Schweitzer 1982). A large number of relatively large – and only a few small – firms existed in these centralised, command economies. Consequently, potential benefits coming from a division of labour among firms could not be utilised. The centralisation of production may have reduced transaction costs among firms but it incurred co-ordination costs to an unmanageable extent. Secondly, foreign direct investment played a crucial role in the privatising of government-owned property in many of the CEE economies, though no large-scale local businesses emerged. By supporting the birth of new SMEs, CEE governments hoped to create the economic base for a new middle class. In fact, the birth of a strong and healthy layer of the SMEs in Hungary has not been observable so far. In the following pages the issue of why this has not happened will be examined.

In their article, Nickell, Nikolitsas and Dryden (1997) looked for the most decisive factors behind companies' economic successes using frontier production functions *(FPF)*.[1] They showed that competition, managerial incentives – or the minimisation of "managerial slack" – and the pressure of financial markets (i.e. shareholders' control) have a major amount of impact on a company's economic performance. Their analysis is based on Nickell's 1996 work in which the author argued that (total factor) productivity – rather than profitability – would reflect a company's efficiency level. Nickell – referring to Adam Smith's argument – stated: "Since it is productivity growth that is the cause of the 'wealth of nations', this emphasis on profitability is rather curious" (Nickell 1996, p. 725).

Productivity analysis of the Hungarian corporate sector, based on *FPF*, was done by Halpern and Kőrösi (2001). They measured efficiency – or rather the "efficiency gap" – as the relative distance of companies' actual output from the boundary of their production level. The authors concluded that foreign-owned companies operating in Hungary are significantly more efficient than firms with

[1] The notion of "frontier production function" was formalised by Aigner, Lovell and Schmidt (1977). Kumbhakar and Lovell (2000) give a comprehensive account of the inception and development of "frontier analysis".

a domestic ownership; and they also showed that there are sizeable differences among industries as regards a company's efficiency. As industries differ principally because of their different market structures, a company's efficiency is strongly influenced by market environment. Hence, ownership and market structure act as decisive factors regarding a company's level of productivity. They also found that the *market share* of companies does not fully reflect the existing market environment. While market share is a poor explanatory variable when it comes to productivity and productivity change, the more efficient a company is the larger its market share will tend to be.

In a research project started a year ago, the aim was to locate and specify the main factors accounting for Hungarian SMEs' fairly poor performance.[2] Empirical evidence suggested that Hungarian SMEs are not usually driven by the corporate values of Max Weber's "protestant ethics" (Weber 1972); rather, they long for short-term financial enrichment. While there has been a massive restructuring of the large – mostly privatised – companies in the Hungarian corporate sector since 1989–90, one was unable to witness a similar trend among Hungarian SMEs. A comprehensive group of SMEs functions as a healthy foundation for most industries in Western economies. A firm but transparent selection process in the market also exists that helps a large number of small companies grow into medium-sized ones, and medium-sized ones become large corporations. Yet Hungarian SMEs cannot usually "climb the ladder", thus turning themselves into large enterprises; their survival period is, instead, relatively short – and the intention was to see the reasons for such a skewed development.

Beyond pursuing the above, an opportunity has been taken to analyse the relationship between companies' productivity and profitability on an analytical as well as on an empirical level. There is a focus here on this fairly narrow issue therefore, and the argument will be that neither theory nor empirical evidence supports Nickell's scepticism about profitability as a way to measure corporate performance. It is textbook lessons and general empirical observation telling us that "companies maximise profits" – and while profit maximising can do good to a company's managers and its stakeholders, it may well do harm to society (that is, if profit maximisation is achieved by keeping production below its efficiency level). However, this is not the only way – nor is this the usual method – for company managers to increase profits. Profit maximisation and productivity growth can get along together, as follows from the duality theorems. The fact that competition drives profits to zero does not imply that companies substitute

2 The members of the research team were: Kálmán Kőhegyi, Mihály Laki, Iván Major, Ákos Róna-Tas, Márton Tardos, István János Tóth and Éva Voszka.

profits or profit maximisation for productivity growth. In fact, just the opposite seems to hold: companies increase factor productivity – or "technical efficiency" – in order to get larger profits. Moreover, if increasing one's profits is not possible, or if it were to be too risky for a company by their increasing product prices, such firms will need to reduce costs, i.e. they will be forced to economise with factors of production. And cost minimisation is just the "flipside" of productivity maximisation, as follows from the duality scenario.

In a previous article, *static* frontier production functions and profit functions were applied to Hungarian SMEs' balance sheet data between 1992 and 2000, and this showed that a maximising of productivity is directly connected to a maximising of profits (Major 2002).[3] The stochastic *frontier* production function is compatible with the theoretical design of production functions as it estimates the *maximum level,* rather than the average level, of output in relation to the amount of development of production factors. The frontier profit function can be derived from profit factors. Frontier production and profit functions differ from the "average" functions in that both have a one-sided disturbance term with a negative sign [$u \sim N(E(u),\sigma_u)$], besides the usual two-sided error term [$v \sim N(0,\sigma_v)$]. Thus, the one-sided error-term measures the productivity gap – in other words, the efficiency gap – and the profitability gap pertaining to a company, respectively.

In a second step, *OLS* estimations were used in order to identify the main factors that can explain the gap between SMEs' estimated frontier profit levels and their actual profits. It was found that the productivity gap of firms, their short-term liquidity position and their ownership structure had the most decisive – and statistically significant – impact on the profitability gap possessed by them – that is, on the distance between frontier (feasible maximum) and actual profits. Companies' export activities did affect the profitability gap in the "right" direction: the larger a company's export activities the closer it was to its profit frontier. The market share of a company and its regional location had a much smaller effect on its profitability gap. The reverse of this relationship also holds: i.e. short-term liquidity was greatly influenced by a company's profitability gap.

It was no surprise to see that short-term liquidity had a major effect on SMEs' corporate performances. As empirical evidence has shown, these firms have the most unstable company form financially. They are not large enough to have easy, not overly expensive access to outside financing, and especially to investment loans; yet such SMEs are not small enough either for their net revenues to be made use of in the personal well-being of their owners (as often happens with

[3] A model similar to Halpern and Kőrösi's (2001) was used.

individual private proprietorships). However, it was then striking to see that private ownership – and first of all, foreign ownership – widened rather than reduced a company's profitability gap. Foreign-owned companies may have had a higher *profitability level* than either domestic private or state-owned firms, but the foreign-owned firms were further away from their profit boundaries than either domestic private or state-owned enterprises.

Here, therefore, is the formulation of a theory and model that assumes a dynamic rather than static relationship between efficiency and profitability. There will be a focus on the profitability gap of SMEs, and an *FPF* model is only utilised as a means of estimating the frontier level of SME production. The theoretical basis of an analysis of factor productivity and profitability will be outlined in the next section, where the dynamic frontier production function and the implicitly dynamic frontier profit function will be defined too. The Hungarian SME sample and the models to be used in the analysis are given in Section 3; while linear models, for a determination of the most important factors of along with the direction and magnitude of their effect on company profitability margins, are also used. By using limited information maximum likelihood *(LIML)* models, one can see that enterprise production levels and profits are simultaneously interrelated. Results from the model estimations are looked at in Section 4; and conclusions arrived at appear in Section 5. *Tables* in the *Annex* present the results obtained with dynamic estimations as regards SMEs.

2. THEORY

We assume that companies maximise profits, even if they can have additional goals to pursue. For instance, companies may opt to increase their market share rather than directly strive for profit maximisation. Yet the enhancement of market share is a means rather than an end for any company in the long run, as are (or could be) investments which might incur losses for a company in the short run, even though such investments promise monopoly rent in the long run. If a company is able to increase its market share, it is more likely that it will earn a monopoly rent, for even a formerly competitive market will turn into a place where companies with a larger market share cease to be price *takers* any more. The same is true for investments that strengthen a company's market position either by enlarging its production base or bringing in technology that can lead to new product development and the resultant profits.

Before beginning to discuss the relationship between productivity and profitability, a few theoretical issues related to the notions resorted to in the text need to be dealt with. Aigner, Lovell and Schmidt (1977) attempted to merge the notion of "technical efficiency" – that is, a company's production function – with "economic efficiency", or cost efficiency. Kumbhakar and Lovell (2000) distinguished between two types of efficiencies: technical efficiency and allocative efficiency; they called a company "technically efficient" if it achieved the maximum target level with a given amount of production means, i.e. whatever that target and those means were; they added that technical efficiency is not necessarily the feasible maximum level of a firm's target, for an enterprise can still misallocate either its output mix or/and its inputs (costs) when making production and marketing decisions – so they used the term "allocative efficiency" when it came to an evaluation of a company's decisions in coming up with its output and input mix.

It follows from the definitions here that both technical efficiency and allocative efficiency can be defined and applied as an "input-oriented" or as an "output-oriented" indicator of a company's economic performance. In addition, the notions of technical and allocative efficiency can be used to measure a firm's distance from its *production* frontier, *cost* frontier, *revenue* frontier or *profit* frontier. Consequently, we can apply sixteen different efficiency indicators for an evaluation of a company's efficiency (Kumbhakar and Lovell 2000, pp. 32–61).[4] My purpose has been much more modest in this article. I wished to show that the indicator of enterprises' – here, Hungarian SMEs' – economic efficiency (or "profit efficiency", to use Kumbhakar and Lovell's term) gives relevant information as regards the economic performance of such firms as well as providing indicators of their technical efficiency. So I have not measured the technical and allocative efficiency of SME production functions separately – instead, I use the joint (technical and allocative) "production efficiency gap" had by enterprises along with the maximum feasible production level they have in a measurement of their "profit efficiency" levels.

The main hypothesis of the research reads as follows: under a non-zero degree of competition a company's profitability cannot be maintained against a low and declining level of factor productivity. With a given endowment of factors of production, the further away a company is from its production frontier the larger the gap between its "frontier profit" and actual profit level. Hence, a high amount of technical efficiency alone cannot ensure a company's high profitability. At first glance, indeed, the first part of the hypothesis here seems to be a tautology. Yet it is not. While a company's efficiency gap – that is, the distance between the *actual* production level and the *feasible* production frontier – does not de-

[4] They guide the reader through this complex set of notions and definitions.

pend on a firm's return to scale or on product prices/factor prices, the profit gap does. As such, therefore, a firm's efficiency gap – however interrelated with profitability – is not a perfect substitute for its profit gap.

There may be factors others than total factor productivity that have a significant effect on a company's profitability; these factors are related to a company's relative strength on the market (its market share), to its cost structure and to its financial standing. This is why profitability is an important, non-negligible indicator of a company's corporate performance. While factor productivity measures the technical and allocative efficiencies of an enterprise's production operations, profitability is more closely connected to its *economic* efficiency, i.e. to economising with costs and to responding to market demand.

There will be an attempt to show here that, at least in the case of the SMEs, factor productivity and profitability are interconnected. Thus, factor productivity is just as directly affected by profitability as a firm's profitability is by its technical efficiency. This interrelationship follows from the duality theorems pertaining to company production, profit and cost functions. The levels of production that maximise revenues from sales must be on the boundary-line of the set production – and they must minimise costs at the same time. What may be questionable (and this could only be tested empirically) was whether companies really are profit-maximising or are they pursuing some other objective? Another factor that could render the interrelationship between production and profits more complex is that the profit function of companies with monopoly rents incorporates demand elasticity and cost elasticity – which, in turn, depends both on the level of demand and, then, of production. However, we can rightfully assume that SMEs are price takers working with competitive prices. Thus – and because we are also assuming firms' profit-maximising behaviour – a fairly straightforward connection between factor productivity and profitability does exist.

If the frontier profit function does make sense – and the argument is that it does, i.e. whenever a firm maximises its profits – the one-sided error term of the profit function is a measurement of each company's distance from its profit frontier. The same principle applies in looking at how the disturbance term of a frontier production function indicates the amount of productivity gap of an enterprise. So it is feasible (and it is also important) to see what factors are responsible for such a profitability gap. Our hypothesis was that Hungarian SMEs were not able to reach their profit frontiers because of technical and allocative inefficiencies they had, and also because of their unstable financial liquidity. The relationship between SME production efficiency and liquidity was additionally analysed in order to exclude endogeneity concerns. Results show that the liquidity position of firms does not have a significant impact on their efficiency gap.

On the positive side, we assumed that the higher a company's export activity and market share, the closer it will get to attaining its profit frontier; an *increase* in market share should have the same result. It is not clear, though, whether the existence of given production factors' narrows or widens the profitability gap. Greater amounts of different factors of production might be connected to a firm's size; larger enterprises have more pronounced market shares, and they may be able to get higher profits. Nevertheless, an abundance of production factors might also be pointing to an inefficient use of such factors.

The logic behind the frontier production function is straightforward: companies strive to produce the largest feasible amount of output with a certain set of inputs. Consequently, it is sensible to estimate a firm's production function as a *frontier* rather than as an *average* function. Production function estimations depend here on the *Cobb-Douglas* (*C–D*) production function due to its convenient analytical properties and because *C–D* functions fit in well with our empirical knowledge of production technologies. The *FPF*s of the *C–D* type are estimated by comparing an enterprise's factor endowment and production level with the same indicators of so-called "best practice" enterprises. "Best practice" firms are those whose production is largest relative to their factor endowment. Hence, apart from a "random noise" there is no error term among their production function values. In other words, the one-sided disturbance term (u_t) of these companies is equal to zero. As the *FPF* parameters and its one-sided disturbance term are estimated in the same *ML* model, the parameters pertaining to the factors of production – the elasticity of factors – are those of a frontier rather than of an average production function.

The frontier profit function reflects an idea like that of the frontier production function. If firms are maximising profits, the proper estimator for the profit function is a frontier rather than an average function. The frontier profit function can be formulated in very simple way if the following assumptions hold: (1) enterprises are price takers on the product market as well as on the factor markets; (2) a firm's return to scale diminishes. Provided that the first assumption is valid for firms, we do not therefore need to involve ourselves with price/cost elasticity. If an enterprise is displaying a diminishing return to scale, the maximum level of profits can be expressed as a simple function of production[5]:

$$\max_{y_t} \pi_t(\hat{y}_{it}) = \max_{y_t} \{p\hat{y}_{it} - c(\hat{y}_{it})\} = (1 - a_{2t} - a_{3t} - a_{4t})\} \cdot p\hat{y}_{it}, \quad (1)$$

where $\pi_t(\hat{y}_{it})$ is the profit maximum of firm i, $\hat{y}_{it}$ is the estimated value of the production of firm i, $c(\hat{y}_{it})$ is the i^{th} firm's cost function and a_{2t}, a_{3t}, a_{4t} are the

[5] I would just like to remind the reader that *FPF* is a *C–D* type function.

estimated parameters of production in year (t–1), labour and capital, both in year t, respectively. Thus, the profit gap of a company is $DPROF_{it} = \hat{\pi}_{it} - GPROF_{it}$. $DPROF_{it}$ is the profit gap, $\hat{\pi}_{it}$ is the estimated profit level of the i^{th} company, and $GPROF_{it}$ represents profits before taxation of this i^{th} firm, all in year t. Since output and input prices are given, it is clear from equation (1) that a company can only survive if it operates with a diminishing return to scale. However, a diminishing return to scale directly implies that a firm can increase its profits by downgrading rather than expanding production activities.[6] Yet what happens to production and profits if firms produce with a constant or with an increasing return to scale? The simple formula for frontier profits is not sustainable here any more, for firms would be forced to set rather than passively accept market prices. Accordingly, the profit function would include the price elasticity connected with output and inputs. In such a case, therefore, we need to rewrite the frontier profit function:

$$\max_{y_t} \pi_t(\hat{y}_{it}) = \max_{y_t}\{p(\hat{y}_{it}) \cdot \hat{y}_{it} - c(\hat{y}_{it})\}. \tag{2}$$

The frontier profit function was laid out with the assumption that Hungarian SMEs would have been at their production frontier, had they faced input constraints only. Factor prices remained exogenous. Yet I have assumed that SMEs could – as a group – influence output prices by moving along the market demand curve. With this, the "best practice firms" were the ones able to achieve the highest profits by adjusting their output and input levels according to market prices, which would mean an adjustment of production and inputs as well as adjustment of prices. It follows from our definitions of *FPF* and the frontier profit function that the frontier production level is a certain *unique* point on the frontier of production possibilities.[7] However, several points that lay on this production possibilities frontier can be compatible with the maximum level of profits, depending on the product and factor prices. As a result, in the search for maximum profits we get a "production effect" with firms' adjustment processes.

The frontier profit function is a linear function of revenues and costs, with a random noise (r_{it}) and with a one-sided disturbance term (s_{it}). The values of s_{it} measure firms' individual distances from their frontier profit level in the same

6 Köllő (2001) argued that most Hungarian companies deliberately followed the strategy of downgrading their production activities in order to maximise profits. Using static models, Major (2002) also found that SMEs operated with a diminishing return to scale between 1992 and 2000.

7 We assume here that the level set for the production possibilities frontier is a convex set. Thus, *Figure 1* of a given output level is concave.

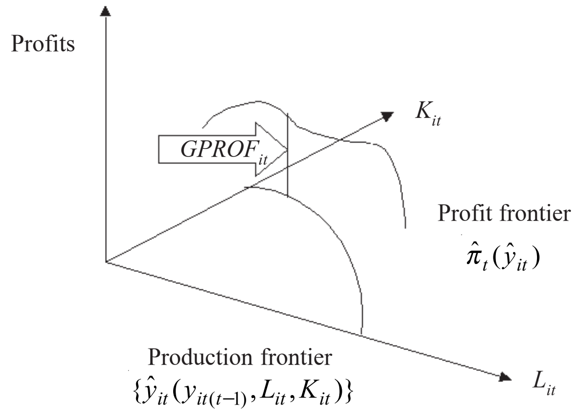

Figure 1. Production frontier and profit frontier

way as u_{it} measures the gap between a company's frontier and actual production level. Thus, the average profit gap of SMEs – as well as SMEs' average efficiency margins – is a weighted average of individual, one-sided disturbance terms. We get the s_{it} for each company from the *ML* estimation of the frontier profit function. The functional form of the profit function was thus as follows:

$$\pi(\hat{y}, x, p, w) = p \cdot \hat{y}(x) - w \cdot x,$$

where $\hat{y}$ is the vector of enterprises' frontier production levels, p is the vector of exogenous market prices, w is the vector of exogenous input prices and x is the inputs vector. We already have the frontier production level of a company before estimating their maximum level of profits; we can therefore go on to attain the conditional factor requirements for the amount of inputs, at a given level of production, that would maximise profits (and minimise costs). Thus, we do not deal here with the output-oriented measures of efficiency concerns.

The above model is simplified in at least two respects. First, it does not allow for multiproducts, in which case we would have defined distance functions so as to measure the optimal output mix of companies along with the production and profit functions. Second, we did not distinguish between variable and quasi-fixed factors of production that would have been more realistic, though more complicated too. Since SMEs do not usually use huge amounts of fixed capital, this simplification seemed to be acceptable. As Kumbhakar and Lovell (2000) suggest, the proper profit function for the estimation of a stochastic frontier profit function will read:

$$\pi(y,x,z,p,w) = p \cdot y(x,z) - w_x \cdot x - w_z \cdot z,$$

where z and w_z stand for the quantity of and prices of quasi-fixed inputs, respectively. An estimation of the above profit function would mean the decomposition and then estimating of output and inputs, as well as costs, simultaneously – which is a task that remains ahead of econometrics as yet (Kumbhakar and Lovell 2000, p. 162).

After having estimated the frontier profit function we can then identify the factors that have the largest effect on the individual profit gap of an enterprise. Two approaches ensued. First of all, we made an estimate of the *FPF*s and frontier profit functions by using all indicators that were assumed to be relevant for explaining the efficiency and profitability margins of firms.[8] These more extended functions are considered superior to a two-stage approach, i.e. where we get the variables of inefficiencies initially and we then try to explain the magnitude of inefficiencies in a separate model. The problem with the single-stage estimation is that the explanatory variables may be – and several of them in fact *are* – endogenous to the production efficiency and profit efficiency of companies. The single-stage approach is analytically and econometrically correct if it is carried out within a simultaneous estimation framework. We were not ready at the time to develop a simultaneous estimation model, so the traditional two-stage approach was followed.[9]

It seemed that a simple *OLS* estimation of the profit gap would do. Yet by applying the *Hausman-Wu* test for simultaneity one could see that the most relevant exogenous variables of the profit gap – such as, for instance, firms' short-term debts, efficiency margins and financial assets – are simultaneously interrelated with the dependent variable. In principle, then, there were two different options to choose from. One was to conduct a simultaneous estimation of the profit gap and look into the most relevant explanatory factors here, although the complexity of the simultaneous relationships to be examined appeared daunting; the other option was therefore resorted to, namely, locating the profit gap aspects of enterprises via using instrumental valuations and the method of "limited information maximum likelihood" (*LIML*).

8 The extended form of the frontier cost function was used, for instance, by Reifschneider and Stevenson (1991) to locate and measure firm-specific factors pertaining to the allocative inefficiency of electricity utilities.

9 Kumbhakar and Lovell (2000) say that the two-stage approach had an early version, while the single-stage one provided recent solutions to explanations for inefficiencies. They do not refute the two-stage approach however – *ibid.,* pp. 10–11.

3. COMPANY SAMPLES AND MODELS

3.1. The samples

An SME – as defined in European Union terminology for a company – is an enterprise that employs less then 250 people. In addition, its annual sales' value does not exceed HUF 4 billion (USD 16 million). The annual balance sheet data pertaining to Hungarian SMEs covering the period from 1992 to 2000[10] have been utilised, and the real values of SME balance sheet data were calculated by using annual GDP deflators. Data from the year 1993 were missing. A few indicators for SMEs and all Hungarian companies with double entry book-keeping (CDEs) are summed up in *Table 1* below.

Table 1

The number and average profitability indicator (ROA) of Hungarian SMEs and all Hungarian companies with double entry book-keeping (CDEs), 1992–2000

Hungarian SMEs	1992	1994	1995	1996	1997	1998	1999	2000
Number of companies	3,742	4,676	4,898	5,506	6,160	6,880	7,294	7,930
ROA, %	–30.29	–16.0	–18.69	–8.75	–12.49	–16.69	–9.00	4.42
Weighted variance	40.28	62.04	297.72	246.86	0.72	333.23	68.08	143.98
All Hungarian CDEs	**1992**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**
Number of companies	57,865	79,793	90,224	104,017	117,373	130,835	138,086	137,330
ROA, %	–2.57	0.56	0.90	2.01	3.82	3.33	3.89	3.75
Weighted variance	15.67	19.93	28.17	5.27	20.02	10.61	17.78	7.40

Note: ROA: Return on Assets (Profits before taxation/Total assets).

As can be seen in *Table 1*, the number of Hungarian SMEs – though it more than doubled between 1992 and 2000 – remained around one-twentieth of the number of the CDEs during the whole period. The average profitability of the SMEs had been negative until the year 2000, when it showed a "miraculous" turn. The CDEs average profitability slowly recovered after the Hungarian economy hit the bottom of the "transformation recession".[11] Another interesting difference between the two groups was the great distance between the variance of their profitability indicators. A large number of companies among SMEs reported zero or very little profit even in 1999 and 2000; only a small number of

[10] Balance sheet data for Hungarian SMEs was assembled by Kőhegyi, a member of our research team.

[11] The notion of the "transformation recession" was defined by Kornai (1993).

them achieved positive – that is, very high – profit rates. At the same time, profitability indicators had a much smaller variance among CDEs, despite their much larger numbers. Thus, SMEs seemed to be obeying the "zero profit rule" of competitive markets although, in fact, most companies deliberately adjusted their revenues and costs in such a way that they achieved zero profits and thus avoided paying corporate tax.

About 20% of all CDEs were acquired by foreign owners, while less than 10% of SMEs were owned by foreigners in 1992. The share of foreign-owned SMEs then went up to 24%; it grew to 27% among the CDEs until the year 2000. Hence, foreign ownership had similar shares in the two company groupings at the turn of the new century; and it is interesting to note, too, that only 0.6% of CDEs remained in government ownership, while its share among SMEs was 1.3% in 2000.

Two samples from the Hungarian SMEs were selected. The first consisted of those companies that had existed in 1992 and were still alive in the year 2000; the total number of such firms was 756 – that is, being about 20% of the number of all SMEs in 1992 and about 9% of firms in 2000. I termed this group "surviving SMEs"; the surviving SMEs sample could be used in cross section–time series panel estimations. The other group was composed of companies that existed for at least two successive years; the number of companies here varied from 3,500 to 5,500 in this group between 1992–1994 and 1999–2000. (Since data for 1993 was lacking, two year-lagged variables were computed for 1994.) This is the "two-year SMEs" group. The data on these two-year SMEs should not be regarded as a real panel – it could, though, be used for a cross section–time series analysis, for only companies in the sample of a given two-year period that existed in both years were included. Thus, the composition of the sample changed between 1992 and 2000, though it was stable in the two years for which the estimations were made.

The reason for assembling two groups of companies was that we would be able to observe a large amount of turnover among actually existing Hungarian SMEs between 1992 and 2000. One would expect that bankrupt firms would have become replaced by viable companies – yet this has not been the case. Many of the short-lived SMEs disappeared after one or two successful years of making fairly high profits.[12] So it is proper to ask whether the "stable core" of the SMEs prevailed due to their higher profitability levels or owing to other reasons.

12 Róna-Tas has made this observation. The reasons for this seemingly strange phenomenon will be looked at in a future study.

3.2. The models

Empirical analysis of SME balance sheet data was begun with a formulation of the frontier production function; there was then a test of whether or not the *FPFs* were revealing a diminishing return to scale. Approximated enterprise frontier production values in evaluations of frontier profit functions were used next. In a next step, *OLS* estimations, via which to find the main factors within a company's profit margin, were arrived at. There was then a check as regards simultaneity aspects by application of the *Hausman-Wu* test. Finally, as the relevant exogenous variables were simultaneously interrelated with the profit gap, a *LIML* estimation of the profit gap was done.

Maximum likelihood estimation of the FPF

The log-linear form of the dynamic *C–D* production function used was as follows:

$$\log Y_t = c + a_1 \log Y_{t-1} + a_2 \log L_t + a_3 \log K_t + v_t - u_t, \quad (3)$$

where Y_t is the amount of output, L_t and K_t are the amounts of labour and capital respectively, and v_t is the regular; while u_t is the one-sided disturbance term, all occurring in year *t*. Y_{t-1} is the level of output in year (t–1). The values of u_t can only be zero or negative.

The above estimator measures productivity adjustment rather than the level of productivity, for it incorporates the one year-lagged production level alongside the level of production factors in year *t*.[13] The assumption behind the above functional form is not crystal clear, however. It says that a company's output in year *t* depends on the base year's production amount (Y_{t-1}) and on factors used in the current year. It would also have been possible to have a regression of output change with regard to changes in factor endowments.[14] Then, though, our results would not have been comparable with other Hungarian data obtained via usage of the above estimator. In addition, by incorporating Y_{t-1} we assume that companies do "learn" from previous experiences – and that there is an adjustment process in the allocation of production factors. This is a sensible assumption allowing for an analysis of the dynamic properties of the *FPF*, and it still preserves the simplicity of the traditional model of production functions.

[13] The *FPF* includes the lagged value of output as an explanatory variable. Hence, the estimator is not exactly measuring output growth.

[14] I have to thank Róna-Tas here, who made this point when reading the manuscript.

As a first step, maximum likelihood estimations were used to obtain the frontier production functions (as defined under (3)) for the two SME groupings. The average productivity or efficiency gap of the two groups between 1992 and 2000 was then calculated. It needs to be emphasised here that the frontier production function is built on assumptions that "best practice firms" exist among companies setting the maximum level of output associated with a given endowment of inputs; the productivity level of all other enterprises is thus to be compared to the productivity of these best practice firms. This is a weak point within the productivity measurement, for one cannot know how and why a certain company becomes a "best practice firm". However, we need to accept for the time being that best practice companies do exist and their production technology sets the norm for the production function of companies taken as a whole.

Maximum likelihood estimation of frontier profit functions

A simple linear estimator for the frontier profit of SMEs based itself on the assumption that firms have already attained their production frontier. The estimator comes from the following:

$$Z_t = b_1 + b_2 W_t + b_3 D_t + b_4 H_t + b_5 \pi_t,$$
$$Z_t = p_t(\hat{Y}_t) \cdot \hat{Y}_t; \;\; W_t = w_L^t \cdot L_t; \;\; D_t = w_K^t \cdot K_t, \quad (4)$$

where Z_t is the level of output (value added), W_t is the amount of wage costs, D_t is depreciation, H_t is total overhead costs, and p_t is profits, all in year t.

After a simple rearrangement we get the following estimator of the frontier profit function:

$$\pi_t = b_1 + b_2 Z_t + b_3 W_t + b_4 D_t + b_5 H_t + r_t - s_t, \quad (5)$$

where r_t and s_t are the regular and one-sided error terms, respectively. The profit function is *implicitly* dynamic for it incorporates the estimated output level ($\hat{Y}_t$) as obtained from the dynamic frontier production function.[15]

As said above, an *ML* single-stage estimation of *FPF*s and the frontier profit functions for the "two-year SMEs" was made first. (The results of these estimations appear in the *Annex*.)

[15] Since $\hat{Y}_t$ is an explanatory variable of π_t and as Y_{t-1} is an independent variable in the estimation of output level $\hat{Y}_t$, we can therefore regard the frontier profit function as being implicitly dynamic.

Then the two-stage approach was applied in order to calculate approximately the "simple" frontier profit functions with an *ML* estimation for each of the two SME sub-samples; this came via usage of the estimated values of production (i.e. value added) from the respective frontier production functions.[16] Calculation of the average profitability gaps followed on. The estimated parameters were used to arrive at the magnitude of deviation of each company's actual profit from its frontier profit level. The profit deviation, or profit gap, is termed $DPROF_t$.

The *ML*-estimation of the frontier production and the frontier profit functions made it feasible to calculate the average efficiency gap (termed $E(u_t)$) and the average profitability gap ($E(s_t)$) of all companies in 1992 and afterwards in each year between 1994 and 2000. Thus, $E(u_t)$ and $E(s_t)$ are the *means* (weighted averages) of all companies' *relative* distances from their own frontier production/profit levels (in a percentage) respectively:

$$E(u_t) = 100 - 100 \cdot \frac{\sum_i Y_{it} \cdot e^{u_{it}}}{\sum_i Y_{it}} \quad \text{and} \quad E(s_t) = 100 - 100 \cdot \frac{\sum_i \pi_{it} \cdot s_{it}}{\sum_i \pi_{it}}, \qquad (6)$$

where *i* stands for company *i*, and *t* for year *t* in the respective variables' index.

OLS estimation for company profit deviation

One of our principal goals was to see what factors could explain the difference between companies' frontier and actual profit levels. A linear *OLS* estimator was resorted to for this purpose. An important issue pertaining to an analysis of corporate performance within transforming countries has been whether a firm's ownership structure and location regionally affect – and if so, to what extent – their efficiency and profitability. Dummy variables have been used for a firm's ownership structure (*own*) in the analysis. Ownership categories were as follows:

OWN_1 = state-owned enterprise (SOE), OWN_2 = domestic private company,
OWN_3 = domestic corporation, OWN_4 = foreign-owned company,
OWN_5 = company in other ownership.

[16] The log likelihood functions for *FPF* and the frontier profit functions were as follows: $constant - n \cdot \ln\sigma + \sum_i \ln\Phi\left(-\frac{\varepsilon_i\lambda}{\sigma}\right) - \frac{1}{2\sigma^2} \cdot \sum_i \varepsilon_i^2$, where *n* is the number of companies, σ is the variance of error, Φ(.) is the (normal–half normal) distribution function of the error term, ε is the estimated error term and λ is the ratio of the one-sided/two-sided error terms.

Regional dummies were also used, although these proved to have no significance when related to profit margins. The following indicators serve as explanatory variables: a company's efficiency gap (exp(u)), market share and its export share (*MARSH* and *EXPSH*). Also included within the estimator are variables for a firm's short-term and long-term liabilities (*SHDEBT* and *LDEBT*) along with factor endowment variables (*PHYS, HCAP, MON, MAT* and *L*).

The *OLS* estimator for the factors of profit deviation was as follows:

$$DPROF_t = c_1 + c_2 \exp(u) + c_3,...,c_7 OWN_t^{(1-5)} + c_8 SHDEBT_t + c_9 LDEBT_t + c_{10} PHYS + c_{11} HCAP + c_{12} MON + c_{13} MAT + c_{14} L + c_{15} MARSH + c_{16} EXPSH + \varepsilon, \quad (7)$$

where: *DPROF* = the difference between the firm's frontier and actual profit level; *SHDEBT* = current (short-term) liabilities; *LDEBT* = long-term liabilities; *PHYS* = physical assets; *HCAP* = intangible assets; *MON* = financial assets; *MAT* = raw materials and energy supply; *L* = number of employees; *MARSH* = market share; *EXPSH* = export share (export/sales). (See the estimator and a definition of the explanatory variables in the *Annex*, in *Table A.5*).

OLS estimations were made, too, by using two types of industry concentration indices: the traditional Hirschman–Herfindahl index (*HHI*) and the indicator of industries' asset concentrations (*HHA*). Concentration indices represented the market environment of different industries in our models. It seemed appropriate to use the concentration indices of assets by industry besides the *HHIs* (which show the level of market concentration) – for industries differ in technology, not just in market structure.[17] There is the assumption here that the higher *HHI* and *HHA* the closer an SME should be to its profit frontier – as SMEs, most of them being price takers, can free ride and they can benefit from dominant enterprises' oligopolistic pricing. *HHI* and *HHA* turned out to be non-significant in the regression model, however – so they have been left out of the analysis.

There is the idea here that the larger a company's market share and export share the closer it would get to its profit frontier; and it is an obvious assumption that the larger a company's short-term debt the further it departs from its profit frontier, for large current liabilities require greater debt service financing, leaving less for expansion therefore. Yet it is not so obvious what effects the long-term debts of a company will have on its performance. Long-term liabilities may have occurred because of previous expansion projects that can only attain tan-

[17] A more proper solution would be to have a modelling of profit functions and profit deviation by industry – which we plan to do in a later study.

gible results later. Finally, there is also the expectation that a larger endowment of factors of production will reduce rather than widen a firm's distance from its profit frontier.

An LIML estimation for SME profit gaps when SHDEBT and MON are endogenous

After having come up with an *OLS* estimation of the SME profit gap, the relevant explanatory variables for simultaneity were tested; and it turned out that the short-term liabilities and financial assets of enterprises – the two most relevant factors within the profit gap – were endogenous variables in the estimation. Accordingly, these endogenous variables were made into instrumental variables, and an *LIML* estimation was used to endeavour to find the parameters of the profit deviation equation. The results of the analysis will now be presented.

4. RESULTS

4.1. The estimation of *FPF*s and the efficiency gap of firms

As was mentioned above, a single-stage estimation of *FPF*s and frontier profit functions was made. (Results are given in *Tables A.0.1* and *A.0.3* of the *Annex*, and what came from the parameter analysis for SMEs' returns to scale are outlined in *Table A.0.2*.) It can be seen from the tables that the extended *FPF*s yielded very significant estimates with positive signs, which indicates that SME production went up when given factor endowment expansion. We could also observe that Hungarian SMEs operated with a decreasing return to scale throughout the period as a whole. These surprising results came from our efficiency analysis. As is shown in *Table 2* below, technical production and allocative efficiency of SMEs improved between 1992 and 1996, but then started deteriorating again.

Table 2

Average efficiency gap of two-year SMEs from dynamic frontier production functions, 1992–2000

Year	1992	1994	1995	1996	1997	1998	1999	2000
Average efficiency gap	31.1	25.3	20.5	18.4	20.8	19.5	21.0	21.4

How have production inefficiencies affected the profitability of Hungarian SMEs? An *ML* estimation of the frontier profit function was extended, and the average profit inefficiency of firms was also ascertained. As can be seen in *Table A.0.3* of the *Annex*, all of the explanatory variables were significant and worked in the "right direction" in the frontier profit function, except in the case of ownership variables. SME profits increased when there was higher value added, when given a larger amount of financial assets and with larger market and export shares – and profits declined with larger costs and with a larger amount of short-term/long-term debt. In addition, the average profit gap pertaining to SMEs from the frontier profit functions as estimated were calculated (the results being summed up in *Table 3* below).

Table 3

Average profit gap of SMEs from frontier profit functions, 1992–2000

Year	1992	1994	1995	1996	1997	1998	1999	2000
Average profit gap	85.2	67.7	64.2	45.2	44.8	48.3	48.6	41.4

The average profit gap of the Hungarian SMEs moved alongside their efficiency gap until 1999, as can be seen from the data. Yet we are able to see a "miraculous" improvement in profit efficiency in the year 2000. Such a phenomenon was most likely due to the 1998–2002 Hungarian government's strong campaign promising a large outflow of government money to Hungarian SMEs.[18] In fact, only a very limited amount of financial support was allocated to such companies before 2002.

The traditional *FPF*s and frontier profit functions for SMEs are estimated next. Along with a two-stage estimation of *FPF*s and the frontier profit functions, the parameters and values of one-sided disturbance terms for the dynamic frontier production function in connection with "surviving" SMEs and "two-year" firms were estimated first. The estimated parameters of the respective production functions are shown in the *Annex*, in *Tables A.1* and *A.2*.[19] Average efficiency gaps

[18] This campaign was an overture to the so-called "Széchenyi plan" which was used by the government between 1998 and 2002 to support loyal Hungarian entrepreneurs.

[19] The parameters *SIGMA* and *LAMDBA* in *Tables A.1* and *A.2*, and the parameters *SIGMAP* and *LAMDBAP* in *Tables A.3* and *A.4* are estimated along with an *ML* estimation of the parameters of *FPFs* and the frontier profit functions, respectively. These parameters come from the likelihood functions pertaining to an *ML* estimation, where $\sigma^2 = \sigma_u^2 + \sigma_v^2$, and $\lambda = \sigma_u / \sigma_v$. See Aigner et al. (1997), 26–7, and Amemiya (1973), 1015.

for 1992 until the year 2000 are provided in *Table 4* below. As is shown in *Tables A.1* and *A.2*, the lagged evaluations of firms' added values had the largest effect on company production levels in both groupings.

Table 4

The average efficiency gap ($E(u_i)$) of SMEs from frontier production functions, in percentage, 1992–2000

Year	1992	1994	1995	1996	1997	1998	1999	2000
				"Surviving" SMEs				
Efficiency gap	23.0	17.9	12.4	12.5	15.0	12.4	9.2	9.3
				"Two-year" SMEs				
Efficiency gap	27.9	23.0	19.2	17.9	19.8	18.8	20.2	19.4

We had expected to see that companies which survived throughout the whole period would have got closer to their production frontier than firms existing for two or more years only, i.e. less than the period of the analysis in total – and this is exactly what seems to have happened. While the average productivity gap was fairly low (it had even declined considerably in the first group by the year 2000), it remained high and even grew slightly in the second group after the government's financial stabilisation programme of 1995–96;[20] i.e. the allocative efficiencies of both groups improved to a major extent in the early 1990s. This was due to the expansion of the private sector and especially to the increasing presence of foreign-owned companies in the Hungarian economy. In addition the emergence of the new institutions of a viable market economy and the early results coming from company restructuring also helped the process. The efficiency improvement has continued in the group of "surviving" SMEs, though at a much slower pace, yet there has been a retreat by "two-year" firms.

The *FPF*s revealed a diminishing return to scale of the two company groups for most years. This result would have suggested application of the "simple" frontier profit function – though if SMEs showed constant or increasing returns in any of the two groups during one year, the simple profit model did not apply. Consequently, a testing of the parameters of *FPF*s for significance was required as regards a return to scale – as shown in *Table 5* below.

[20] The average efficiency gap of "surviving" SMEs is in the range measured by Halpern and Kőrösi (2001) for the Hungarian corporate sector as a whole.

Table 5

Return to scale of SMEs: a test of significance of the parameters, 1992–2000

Year	1992	1994	1995	1996	1997	1998	1999	2000
				"Surviving" SMEs				
$a_2+a_3+a_4-1<0$	–0.513**	–0.166**	–0.044	–0.025	0.051*	–0.015	0.063*	0.038
Wald-test ($\chi^2(1)$)	149.6**	27.2**	3.4	1.8	4.0*	0.4	5.7*	3.2
				"Two-year" SMEs				
$a_2+a_3+a_4-1<0$	–0.443**	–0.023	–0.104**	–0.03**	–0.03**	–0.026*	–0.035**	–0.059**
Wald-test ($\chi^2(1)$)	328.8**	0.981	53.5**	10.5**	9.3**	8.0**	12.5**	35.2**

Note: * significant at a .05 level; ** significant at a .01 level.

Frontier profits and the profit gap

As can be seen in *Table 5*, surviving SMEs operated with an increasing return to scale in 1997 and in 1999–2000. In addition, there were three years (1994, 1996 and 1998) when the parameters of the production function were not significantly within the area of diminishing returns. So we were not able to make use of the simple form of the profit function in the estimation of frontier profits. The parameters of *FPF*s with the "two-year" SMEs were not significant as regards return to scale in 1994. Thus, the extended form of the frontier profit function in an estimation of SME profit gaps was utilised. The estimated parameters are portrayed in the *Annex*, in *Tables A.3* and *A.4*.

We had expected that SME profit levels would increase with higher production levels – and that it would decline with larger wages/overhead costs and with faster depreciation. As *Tables A.3* and *A.4* show, the parameter of value added has a positive – and the parameter of wage costs have a negative – sign in both SME groups, as expected. Capital cost, that is depreciation, was also a significant explanatory variable in connection with profits. Overhead costs were significant in explaining profit levels, although the variable's sign was positive in certain years – which fact needs further elaboration. One reason for a positive connection between overheads and profits could be that overhead costs include all the expenses a company incurs by upgrading its information system, management and marketing organisation and R&D activities. That is, overhead expenses serve in the improvement of a firm's productive efficiency – which, in turn, leads to higher profits. There may be another explanation for this positive connection, too. It could well be that the more profitable a company the larger the amount it could spend on activities that are not directly related to the production process. Should this assumption hold, it is a reversal of the causal relationship between profits and overhead costs.[21]

The one-sided disturbance term (s_t) from an estimation of the frontier profit function could be made use of to measure the average profitability gap of SMEs between 1992 and 2000. Two indicators of the profitability gap have been calculated: one for "surviving", and another for "two-year" SMEs. Indicators of the profit deviation could be computed by using the estimated parameters of the frontier profit function. The average profit margins are shown in *Table 6*.

Table 6

The average profit gap ($E(s_t)$) of SMEs from frontier profit functions, in percentage, 1992–2000

Year	1992	1994	1995	1996	1997	1998	1999	2000
			"Surviving" SMEs					
Profit gap	117.3	51.1	47.4	42.7	41.7	35.5	42.4	54.1
			"Two-year" SMEs					
Profit gap	96.3	65.5	64.9	56.4	52.2	51.3	53.0	47.2

The results in *Table 6* are surprising. Companies that survived the entire period of 1992–2000 operated with a smaller profitability gap until 1999 than the SMEs existing for no less than two years – and this is what one would expect. Nevertheless, the average profitability gap increased for the first group of SMEs after 1998, while it remained on a declining trend in the second group – and the former indicator even surpassed the profit gap of the "two-year" SMEs. This is a strange result, for it tells us that Hungarian SMEs are able to survive but that they do not learn and/or are not improving upon their corporate performance to a great extent.

Another interesting result in the analysis was that the profitability gap of all companies showed a slowly declining trend, yet the indicator of surviving SMEs went down by merely 17%; and the profit gap of the two year SMEs diminished by almost 20% between 1994 and 1999. If we add up the figures for the year

[21] I have shown in Major (1999) that foreign-owned companies achieved higher profits in Hungary, at least after 1996, than did domestic firms and, along with this fact, overhead expenses have had a much greater share of the total costs of foreign companies than within the cost structures of domestic enterprises.

2000, the results are even more disappointing with regard to surviving SMEs: an almost 6% increase in the average profit gap. One might argue that the results going with the two groups are not comparable, for we were applying two different benchmarks, i.e. the "best practice firms" in each group separately. This is true, although the profit margin trends are still comparable – and these trends do not move in the same direction.

The above tells us that after the financial stabilisation of the Hungarian economy in 1995–96, there was some improvement in SMEs' productive efficiency, but this upturn did not last for long. Despite all the government rhetoric between 1998 and 2002, there has not been a comprehensive restructuring of the support system or of market conditions for Hungarian SMEs. Indeed, the economic expansion that was fuelled by the government further eroded the financial disciplines and productive efficiencies of SMEs.

4.2. Relevant explanatory factors for the profit gap

What factors can explain an SME's deviation from its frontier profit function? As mentioned above, *OLS* estimations were used to find the most relevant explanatory variables of the profitability gap. The results of these estimations can be found in the Annex, in *Tables A.5* and *A.7*. As is shown, a company's efficiency gap (u_t) had a considerable amount of impact, and with positive signs regarding profit deviation – as was expected for both SME groupings. Other major factors covering profit deviation were firms' current liabilities, their financial assets, long-term liabilities, and the endowment of physical and immaterial assets.

Profit deviation increased with the growth of current liabilities – and it decreased with higher amounts of financial assets (as expected). But, unexpectedly enough, companies with a larger endowment of physical assets moved further away from their profit frontier than firms with a smaller holding of physical assets. It is also interesting to note here that the "surviving" SMEs were unable to exploit the benefits of a larger market share. Market share is not a significant variable in this group, which might be due to the fact that an SME's larger market share is still too small for it to get a dominant position in the marketplace. Nonetheless, market share did prove to be a relevant and significant explanatory factor as regards a firm's profit gap in the group of "two-year" SMEs. Profit deviation declined with a larger market share. Companies' export shares are significant here, with a larger export share reducing the size of a firm's profit gap.

Ownership structure only rarely played a significant role in determining an SME's profit deviation. What is worth noting, though, is that (in contrast with the results gained in many other studies) foreign ownership has *not* significantly affected a firm's deviation from its frontier profit level. A positive sign for the ownership variable says that foreign ownership further enhanced – rather than reduced – a company's profitability gap. The same could be said about the domestic enterprises, while government-owned SMEs and companies in individual domestic private ownership were closer to their profit frontiers.

We have just seen that SMEs' short-term liquidity positions and their financial assets have a significant effect on their profitability. Yet the direction of causality is not overly clear. Is it the lack of profits that pushes a company into short-term indebtedness? Or is it the short-term liquidity problems of a firm that reduce its profit generating abilities? Are companies with a smaller amount of financial assets destined to become loss-makers, while firms with an abundant amount of financial assets make large profits? Or is the line of causality going in the opposite direction? To answer these questions the idea of whether *SHDEBT* and *MON* were endogenous variables in the profit deviation equation were tested. Results from this are shown in the *Annex*, in *Tables A.6* and *A.8*. Both explanatory variables turned out to be endogenous (as can be seen in the tables). Such an outcome tells us that an SME's profit gap and the relevant financial indicators are correspondingly interrelated. However, we must here use estimation methods that are different from the *OLS*. Thus, *LIML* estimations with instrumental variables that substituted for *SHDEBT* and *MON* were arrived at, and there was the application of one-year-lagged values with the endogenous variables for use as instruments in the estimation (except for in the year 1992). Inventories and liquid assets as instruments for *SHDEBT* and for *MON* were additionally applied for 1992.

4.3. Results from the *LIML* estimations

The estimated parameters of the profit gap equations for the "surviving" and for the "two-year" SMEs are shown in *Tables A.9* and *A.10* in the *Annex*, respectively. As can be seen here, firms' efficiency gaps maintained their impact on SME profit deviations. Profits increased in line with the inefficiency of companies. Long-term liabilities and physical assets replaced a company's short-term debt in the model, while the market share of SMEs and their level of employment proved to be major variables with a negative sign in place of financial assets. Company export shares were not a noteworthy aspect of a profit gap, nor did ownership significantly influence the profit deviation of firms.

The role played by employment in an enterprise's search for maximum profits is especially important. As already noted, both groups of SMEs operated with a diminishing return to scale in most of the years between 1992 and 2000. Since the capital stock of companies cannot be altered in the short run – in other words, the amount of a firm's fixed assets is its "control variable", while labour is adjustable – a diminishing return occurred when a company made most employees redundant. As Köllő (2001) has shown, profit maximisation was achieved by a downgrading of production, even in large corporations. However, if such enterprises had found new market opportunities they would have become not only profitable but also very efficient within a short period of time, just by re-hiring the formerly fired employees. Yet to find new markets does not only require an enhanced demand for SME products but, additionally, financial means via which to expand production capacities – yet SMEs were short of external finances. Thus, they found themselves in a vicious circle: they could not, in general, exploit the new market opportunities due to the lack of sufficient financial means and external financing, while the missed opportunities further deteriorated their poor financial positions.

5. CONCLUSIONS

I have tried in this article to identify the factors pertaining to the poor economic performance of Hungarian SMEs by using econometric methodologies. First, we are able to see that the number of Hungarian SMEs went up from about 3700 to 7930 between 1992 and 2000, yet their share in the Hungarian corporate sector remained well below 10%. The Hungarian economy is dominated by large and mainly by foreign-owned, global enterprises. However, the share of foreign-owned companies remained at around 20% among SMEs. 1900 SMEs out of 3742 companies obtained negative or zero profits in 1992, while 6000 out of 7930 were profitable in the year 2000. Here, I address the issue of how profitable Hungarian SMEs have actually been – that is, we look at whether these companies have been cost efficient or whether they have remained far from a feasible, attainable level of profit.

Using dynamic frontier production functions, the average productivity gap of two SME groups, for the years between 1992 and 2000, have been estimated. We can see that the SME productivity margins were within the range of Hungarian companies, as estimated by Halpern and Kőrösi (2001), overall. Nevertheless, SMEs that did not survive for long have a much higher efficiency gap on average compared to that of enterprises existing over the full time period.

Maximum likelihood estimations of the frontier profit function were arrived at to obtain the frontier level or the maximum feasible level of profits that companies could have achieved with their given endowment of production factors and with a given level of costs. The average profitability gap had by SMEs for each of the two groups was calculated – so we can observe that the profitability gap of enterprises was much larger than their efficiency gap even in the case of profitable firms, not to mention the loss-makers. Thus, SMEs were much further away from their maximum feasible level of profits than from an attainable level of production. This fact supports the assumption that cost inefficiencies and unfavourable market conditions alongside an inefficient allocation of factors of production also point to the quite low level of SME profitability. Consequently – and in contrast with Nickell's argument – "frontier profits" and profitability are relevant indicators of a firm's corporate performance, for they provide information on a company's productive/cost efficiency along with their technical efficiency or factor productivity.

I encountered a strange phenomenon when I was comparing the average profitability gap of SMEs that lasted for the whole 1992–2000 period with the profitability gap of SMEs that existed for at least two years: surviving SMEs were further away from their frontier profit level on average than were the two-year SMEs. Further analysis is, however, needed for us to learn more about the relationship between SME profitability and their potential for survival.

There was an intention to find the most relevant explanatory variables pertaining to SME profitability gaps by use of *OLS* estimations. It has been shown that a firm's profitability margin increases with a larger factor productivity gap, with a greater amount of current liabilities and when there is long-term debt – and it goes down with the existence of a greater concentration of financial assets and when there is a larger export share and market share. The effects of current liabilities on profit deviation are not as robust as in the static model; and a company's ownership structure does not have a substantial amount of impact on the profitability gap. Nor could we see any major connection between the concentration indices pertaining to an industry as such and a company's profit deviation when belonging to that industry.

By applying the *Hausman–Wu* test it has been shown that the profit gap on the one hand, and current liabilities and financial assets on the other, are simultaneously interrelated. Consequently, instrumental variables instead of the endogenous explanatory factors had to be used in the profit gap equation. The results indicate that SME efficiency gaps were still a relevant explanatory variable as regards their profit deviation. The most important finding of the *LIML* estimation was that employment was a crucial factor in explaining the profit deviation of firms. I have argued that SMEs regard labour as a flexible form of stock. Enterprises mobilise new labour if they find new market opportunities – but, until then, they remain in the area of diminishing returns, for this is the easiest way for them to maximise profits. By so doing, firms create for themselves their own trap, which they can then fall into. Namely, downgraded production activities do *not* attract a substantial amount of external financing; yet a lack of financial resources when new market opportunities do emerge will prevent an SME from exploiting such chances.

Finally, I have also showed that productivity and profitability – however interrelated – are two separate and important aspects of a company's corporate performance. This is an issue for further study, still we can safely say that most Hungarian SMEs were *not* able to grow into large corporations or to survive for a longer period not just because of their low level of allocative efficiency but also for several other reasons that directly affected their profit earning capacities.

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ANNEX

Dynamic estimations for SMEs with a one-year lag, 1992–2000

Table A.0.1

ML estimation of the dynamic frontier production functions, 1992–2000: single-stage approach

Dep. Var.: LogGDP	1992	1994	1995	1996	1997	1998	1999	2000
C	6.30**	3.17**	2.28**	1.61**	2.15**	1.87**	3.36**	2.82**
LogGDP(–1)	–	0.395**	0.662**	0.778**	0.657**	0.726**	0.691**	0.620**
LogEMPLO	0.213**	0.143**	–0.011	0.028**	0.058**	0.036**	0.040**	0.103**
LogPHYS	0.068**	0.132**	0.081**	0.055**	0.081**	0.081**	0.081**	0.058**
LogHCAP	0.082**	0.067**	0.025**	0.029**	0.049**	0.042**	0.053**	0.043**
LogMATCO	0.244**	0.145**	0.085**	0.045**	0.067**	0.040**	0.036**	0.060**
SIGP	0.897**	0.761**	0.645**	0.594**	0.575**	0.589**	0.633**	0.762**
LAMBDAP	1.16**	1.33**	1.32**	1.33**	0.949**	1.19**	1.23**	1.53**
Log likelihood	–1280	–1160	–1710	–1700	–2240	–2540	–3100	–3620
No. of observations	1186	1327	2399	2697	3270	3887	4343	4301

Notes: * significant at .05 level; ** significant at .01 level.
The variables in the frontier production function were as follows: GDP(–1) = value added in the previous year; EMPLO = the number of employed; PHYS = physical assets; HCAP = non-material assets; MATCO = materials and energy.

Table A.0.2

Return to scale of Hungarian, "two-year" SMEs: a testing of the significance of parameters

Year	1992	1994	1995	1996	1997	1998	1999	2000
$a_2+a_3+a_4+a_5+a_6-1<0$	–0.393**	–0.118**	–0.157**	–0.066**	–0.088**	–0.076**	–0.099**	–0.115**
Wald-test ($\chi^2(1)$)	182.9**	16.4**	105.3**	24.7**	73.5**	57.1**	102.1**	128.3**

Notes: * significant at .05 level; ** significant at .01 level.
The variables in the frontier profit function were as follows: GDPEST = value added as estimated from FPF; GRWAGE = gross wage costs; DEPR = depreciation; OVERH = overhead costs; SHDEBT = short-term liabilities; LDEBT = long-term liabilities; MONEY = financial assets; MARSH = market share measured by total sales; EXPSH = export share in the firm's total sales; OWN1–OWN5 = ownership category.

Table A.0.3

ML estimation of the dynamic frontier profit functions, 1992–2000:
single-stage approach

Dep. Var.: GPROF	1992	1994	1995	1996	1997	1998	1999	2000
C	0.008	0.021*	0.009	0.004	0.006	0.038**	0.031**	–0.082**
GDPEST	0.216**	0.406**	0.604**	0.537**	0.495**	0.493**	0.434**	0.501**
GRWAGE	–0.167**	–0.361**	–0.702**	–0.591**	–0.552**	–0.492**	–0.635**	–0.714**
DEPR	–0.505**	–0.221**	–1.17**	–1.56**	–0.688**	–0.947**	–0.861**	–0.992**
OVERH	0.115**	0.046**	–0.149**	–0.092**	–0.014*	–0.090**	0.109**	–0.031**
SHDEBT	–0.059**	–0.185**	–0.131**	–0.101**	–0.067**	–0.047**	–0.017**	–0.034**
LDEBT	0.009	–0.074**	–0.141**	–0.012	–0.203**	–0.097**	–0.061**	–0.014
MONEY	0.304**	0.346**	0.207**	0.269**	0.297**	0.123**	0.248**	0.208**
MARSH	1.46**	1.82**	1.62**	1.56**	0.587**	2.31**	0.921**	0.483**
EXPSH	0.014**	0.022**	0.036**	0.023**	0.026**	0.015**	0.023**	0.011**
OWN1	–0.005	–0.005	–0.001	0.0	–0.007	–0.018	–0.0003	0.0
OWN2	0.006	–0.005	0.006	0.005	0.012	0.003	0.017	0.008
OWN3	0.0	–0.014	0.002	–0.003	–0.003	–0.006	0.002	0.001
OWN4	–0.006	–0.020	–0.011	–0.001	0.009	0.006	0.002	0.008
OWN5	0.0	–0.006	0.0	0.0	–0.0002	0.0	0.008	–0.008
SIGP	0.050**	0.076**	0.071**	0.071**	0.090**	0.116**	0.129**	0.098**
LAMBDAP	1.45**	1.71**	0.905**	0.518**	0.548**	1.01**	1.09**	–1.28**
Log likelihood	2220	2020	3360	3490	3480	3640	3670	4990
No. of observations	1186	1347	2395	2695	3270	3886	4340	4289

Note: * significant at .05 level; ** significant at .01 level.

Table A.1

ML estimation of the dynamic frontier production functions, 1992–2000:
"surviving" SMEs

	1992	1994	1995	1996	1997	1998	1999	2000
C	9.02**	5.42**	1.51**	2.31**	2.16**	1.20**	0.927**	1.28**
LogGDP(–1)	–	0.343**	0.838**	0.731**	0.691**	0.874**	0.874**	0.832**
LogL	0.132**	0.182**	0.022	0.090**	0.199**	0.037*	0.121**	0.120**
LogK	0.355**	0.309**	0.096**	0.154**	0.161**	0.075**	0.068**	0.086**
SIG	0.903**	0.530**	0.351**	0.468**	0.448**	0.354**	0.487**	0.541**
LAMBDA	2.01**	1.21**	0.871**	1.80**	1.13**	0.975**	2.45**	2.64**
No. of observations	–660.0	–378	–148	–218	–279	–139	–189	–250
Log likelihood	704	696	709	707	709	714	709	703

Note: * significant at .05 level; ** significant at .01 level.

Table A.2

ML estimation of the dynamic frontier production function, 1992–2000:
"two-year" SMEs

Dep. Var.: LogGDP	1992	1994	1995	1996	1997	1998	1999	2000
C	8.67**	4.62**	3.36**	2.58**	3.28**	2.78**	3.00**	3.76**
LogGDP(–1)	–	0.375**	0.619**	0.706**	0.602**	0.674**	0.648**	0.555**
LogEMPLO	0.206**	0.245**	0.046**	0.065**	0.119**	0.094**	0.099**	0.154**
LogTOTASS	0.351**	0.357**	0.231**	0.191**	0.248**	0.206**	0.218**	0.232**
SIG	1.04**	0.777**	0.648**	0.612**	0.673**	0.639**	0.678**	0.782**
LAMBDA	1.93**	1.67**	1.51**	1.51**	1.57**	1.50**	1.52**	1.83**
Log likelihood	–2200	–1650	–2220	–2190	–2840	–3030	–3590	–4070
No. of observations	2013	1967	3259	3495	4001	4516	4945	4974

Note: * significant at .05 level; ** significant at .01 level.

Table A.3

ML estimation of frontier profit functions, 1992–2000:
"surviving" SMEs

	1992	1994	1995	1996	1997	1998	1999	2000
C	0.035**	0.005	0.023**	–0.036**	0.015**	–0.046**	0.024**	0.056**
GDPEST	0.0002**	0.0005**	0.0006**	0.0003**	0.0003**	0.0004**	0.0005**	0.0003**
GRWAGE	0.031	–0.208**	–0.407**	–0.121**	–0.130**	–0.337**	–0.520**	–0.319**
DEPR	1.08**	–0.483**	–1.26**	–0.951**	–0.411**	–0.677**	–1.41**	–0.599**
OVERH	–0.028	–0.094**	–0.153**	–0.034	–0.068**	–0.036**	–0.106**	–0.111**
SIGP	0.039**	0.053**	0.062**	0.050**	0.055**	0.064**	0.073**	0.079**
LAMBDAP	1.46**	1.93**	1.61**	1.34**	0.907**	2.08**	2.21**	1.30**
Log likelihood	1490	1330	1210	1310	1180	1240	1150	968
No. of observations	703	700	711	709	711	717	714	700

Note: * significant at .05 level; ** significant at .01 level.

Table A.4

ML estimation of frontier profit functions, 1992–2000:
"two-year" SMEs

Dep. Var.: GPROF	1992	1994	1995	1996	1997	1998	1999	2000
C	0.008	0.017**	0.023**	0.027**	0.037**	0.049**	0.056**	0.017**
GDPEST	0.001**	0.005**	0.006**	0.005**	0.005**	0.005**	0.005**	0.005**
GRWAGE	–0.221**	–0.393**	–0.677**	–0.536**	–0.595**	–0.494**	–0.624**	–0.558**
DEPR	–0.989**	–0.676**	–1.44**	–1.35**	–1.02**	–1.33**	–0.982**	–0.821**
OVERH	0.145**	0.065**	–0.243**	–0.141**	–0.035**	–0.071**	0.093**	–0.020**
SIGP	0.045**	0.077**	0.078**	0.086**	0.112**	0.130**	0.149**	0.100**
LAMBDAP	1.24**	2.13**	1.41**	0.922**	1.13**	1.33**	1.29**	0.735**
Log likelihood	3880	3090	4680	4310	4030	4100	3760	5130
No. of observations	2007	1997	3300	3555	4052	4580	5018	5058

Note: * significant at .05 level; ** significant at .01 level.

Table A.5

OLS estimation of SME profit residuals, 1992–2000: "surviving" SMEs

Dep. Var.: DPROF	1992	1994	1995	1996	1997	1998	1999	2000
C	0.073**	0.169**	0.218**	0.081**	0.033*	–0.058	0.211**	0.142*
EU	0.052**	0.140**	0.192**	0.043**	0.032**	0.100**	0.183**	0.124**
OWN1	0.002	–0.006	–0.0002	0.0	0.006	0.017	–0.012	0.0
OWN2	–0.002	–0.006	–0.003	–0.002	–0.002	–0.004	–0.003	0.049
OWN3	0.0	0.001	0.003	–0.004	0.001	–0.019	–0.005	0.041
OWN4	0.009**	0.005	0.01	–0.003	–0.004	–0.016	–0.007	0.041
OWN5	0.0	0.0	0.0	0.0	0.0	0.0	–0.014	0.048
MARSH	0.490*	–0.212	–0.081	–0.405	–1.32*	–5.50**	–1.22*	–7.89**
EXPSH	–0.007*	–0.013**	–0.013**	–0.011*	–0.011*	–0.014*	–0.013*	–0.01
SHDEBT	0.003	0.115**	0.061**	–0.01	0.046**	0.029	0.058**	0.043**
LDEBT	0.097**	0.065**	0.060**	0.106**	0.102**	0.01	0.118**	0.066*
PHYS	0.009	0.019**	0.018	0.016	0.018	–0.077**	0.013	–0.098**
MON	–0.232**	–0.204**	–0.290**	–0.177**	–0.198**	–0.149**	–0.055**	–0.153**
MAT	–0.038**	–0.035**	–0.026**	–0.059**	–0.014*	–0.039**	–0.011*	–0.037**
L	0.0005**	0.0002**	0.0003**	–0.003**	0.0002**	–0.003**	0.0002**	–0.002**
LM het. Test	16.7**	9.08**	11.2**	55.1**	36.6**	43.7**	16.2**	31.2**
Jarque–Bera test	4170**	5160**	16,000**	3780**	28,700**	2200**	3850**	2540**
Ramsey's RESET2	4.79*	10.6**	22.6**	0.019	3.47	1.42	70.7**	0.396
S. E. of regression	0.019	0.026	0.032	0.039	0.039	0.051	0.040	0.063
F-test	30.0**	25.8**	23.7**	22.2**	12.1**	36.8**	18.7**	34.6**
Adj. R^2	0.367	0.333	0.311	0.295	0.180	0.414	0.259	0.403
Log likelihood	1790	1580	1450	1290	1310	1110	1290	948
No. of observations	701	697	707	708	709	711	709	699

Note: * significant at .05 level; ** significant at .01 level.

Table A.6

Hausman–Wu test for simultaneity of *SHDEBT* and *MON*, 1992–2000: "surviving" SMEs

Year	1992	1994	1995	1996	1997	1998	1999	2000
SHDEBT	0.186**	0.018	0.103**	0.032	0.072**	0.024	0.079**	0.062**
MON	–0.282**	–0.101	–0.380**	–0.287**	–0.241**	–0.154**	–0.071**	–0.203**
No. of observations	701	697	707	708	709	711	709	699

Note: * significant at .05 level; ** significant at .01 level.

Table A.7

OLSQ estimation of profit residuals, 1992–2000: "two-year" SMEs

Dep. Var.: DPROF	1992	1994	1995	1996	1997	1998	1999	2000
C	–0.169**	–0.192**	–0.293**	–0.384**	–0.376**	–0.473**	–0.435**	–0.295**
EU	0.192**	0.245**	0.353**	0.444**	0.459**	0.576**	0.543**	0.476**
OWN1	–0.003	–0.009*	–0.003	0.0	–0.004	0.003	0.0008	0.0
OWN2	–0.005*	–0.005	–0.002	0.0001	–0.009	–0.006	–0.005	–0.123**
OWN3	0.0	0.009*	0.002	0.007*	–0.001	0.010	0.012	–0.110**
OWN4	0.011**	0.015**	0.011*	0.006	0.005	0.011	0.026**	–0.119**
OWN5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	–0.078**
MARSH	–0.317**	–0.489*	–0.785**	–0.686**	–0.193	–1.53**	–1.41**	–0.218
EXPSH	–0.006*	–0.015**	–0.021**	–0.016**	–0.024**	–0.015**	–0.028**	–0.017**
SHDEBT	0.080**	0.087**	0.102**	0.112**	0.115**	0.059**	0.041**	0.067**
LDEBT	0.080**	0.111**	0.093**	0.093**	0.101**	0.070**	0.021**	0.093**
PHYS	0.009	0.028**	0.040**	0.008	0.039**	–0.019**	0.018**	0.014**
HCAP	–0.056	0.093*	0.140**	0.061	–0.153**	0.032*	0.091**	0.043
MON	–0.154**	–0.124**	–0.147**	–0.122**	–0.222**	–0.091**	–0.184**	–0.170**
MAT	0.002	–0.011**	–0.008**	–0.014**	–0.015**	–0.004*	0.003**	–0.013**
L	0.0002**	0.0002**	0.0002**	0.0002**	0.0003**	0.0004**	0.0003**	0.0004**
LM het. Test	206**	54.1**	170**	250**	78.7**	78.7**	47.5**	148**
Jarque–Bera test	2180**	14,900**	20,700**	35,200**	39,900**	44,200**	192,000**	42,300**
Ramsey's RESET2	6.54*	0.441	47.5**	5.21*	25.7**	38.1**	1.29	115**
S. E. of regression	0.025	0.036	0.046	0.059	0.072	0.084	0.094	0.079
F-test	99.2**	48.2**	93.2**	81.5**	110**	85.7**	93.3**	134**
Adj. R^2	0.455	0.289	0.323	0.278	0.315	0.218	0.217	0.284
Log likelihood	4550	3770	5460	5020	4900	4860	4730	5630
No. of observations	2002	1976	3285	3549	4035	4558	4994	5047

Note: * significant at .05 level; ** significant at .01 level.

Table A.8

Hausman–Wu test for simultaneity of *SHDEBT* and *MON*, 1992–2000

Year	1992	1994	1995	1996	1997	1998	1999	2000
SHDEBT	0.013	0.053**	0.094**	0.074**	0.135**	0.091**	0.093**	0.101**
MON	0.066*	–0.087**	–0.093**	–0.084**	–0.224**	–0.099**	–0.201**	–0.170**
No. of observations	2002	1976	3285	3549	4035	4558	4994	5047

Note: * significant at .05 level; ** significant at .01 level.

Table A.9

LIML estimation of SMEs' profit gap, 1992–2000:
"surviving" SMEs

Dep. Var.: DPROF	1992	1994	1995	1996	1997	1998	1999	2000
C	0.076**	0.184**	0.247**	0.036	0.055**	–0.074*	0.229**	0.115
EU	0.052**	0.137**	0.199**	0.029	0.035**	0.095**	0.196**	0.121**
OWN1	0.004	–0.002	0.005	0.0	0.007	0.013	0.004	0.0
OWN2	–0.001	–0.002	0.01	–0.004	–0.0002	–0.008	0.013	0.044
OWN3	0.0	0.004	0.007	–0.001	–0.0002	–0.022	0.010	0.034
OWN4	0.006*	0.0003	0.007	0.004	–0.007	–0.017	0.005	0.032
OWN5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.050
MARSH	–0.247	–0.835**	–0.555	–0.174	–1.48**	–6.07**	–1.09*	–10.2**
EXPSH	–0.003	–0.003	–0.001	–0.021**	–0.001	–0.023**	–0.01	–0.011
SHDEBT	0.0	0.0	0.0	–0.023	0.0	0.029	0.0	0.0
LDEBT	–0.029*	0.084**	0.047*	0.106**	0.036**	–0.001	0.049**	–0.009
PHYS	0.099**	0.058**	0.063**	0.015	0.107**	–0.080**	0.138**	0.056
HCAP	0.011	0.036**	0.030**	–0.359**	0.023*	0.053	0.016	–0.098**
MON	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MAT	0.286**	0.091	0.213*	–0.145**	0.038	–0.134**	–0.039	0.099
L	–0.223**	–0.215**	–0.319**	–0.064**	–0.206**	–0.042**	–0.054**	–0.096**
S. E. of the regression	0.366	0.223	0.221	0.233	0.126	0.386	0.216	0.356
Adj. R^2	0.019	0.028	0.034	0.041	0.040	0.052	0.041	0.065
No. of observations	701	697	707	708	709	711	709	699
Endogenous variables								
SHDEBT	♦	♦	♦	–	♦	–	♦	♦
MON	♦	♦	♦	♦	♦	♦	♦	♦

Notes: * significant at .05 level; ** significant at .01 level.
– : not excluded from the regression; ♦ : excluded from the regression.

Table A.10

LIML estimation of SMEs' profit gap, 1992–2000:
"two-year" SMEs

Dep. Var.: DPROF	1992	1994	1995	1996	1997	1998	1999	2000
C	–0.133**	–0.174**	–0.279**	–0.364**	–0.366**	–0.450**	–0.414**	–0.265**
EU	0.182**	0.244**	0.356**	0.443**	0.466**	0.579**	0.543**	0.472**
OWN1	0.0001	–.006	–0.001	0.0	0.001	0.008	0.003	0.0
OWN2	–0.005*	–0.002	–0.001	–0.001	–0.008	–0.006	–0.006	–0.133**
OWN3	0.0	0.01*	0.002	0.005	0.0008	0.013	0.013	–0.118**
OWN4	0.005*	0.015**	0.009*	0.0007	0.001	0.006	0.021**	–0.134**
OWN5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	–0.080**
MARSH	–0.561**	–0.578**	–0.936**	–1.06**	–0.302*	–1.40**	–0.750**	–0.178
EXPSH	–0.005	–0.01**	–0.015**	–0.008*	–0.012**	–0.00004	–0.016**	0.002
SHDEBT	0.064**	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LDEBT	0.065**	0.073**	0.092**	0.093**	0.094**	0.048**	0.040**	0.048**
PHYS	0.020**	0.110**	0.087**	0.085**	0.098**	0.063**	0.018**	0.088**
HCAP	–0.057	0.035**	0.052**	0.022**	0.050**	–0.009	0.019**	0.026**
MON	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MAT	–0.161**	0.113*	0.144**	0.078	–0.150**	0.033*	0.091**	0.069
L	0.014**	–0.130**	–0.154**	–0.125**	–0.222**	–0.085**	–0.186**	–0.176**
S. E. of the regression	0.028	0.241	0.292	0.246	0.286	0.179	0.200	0.242
Adj. R^2	0.318	0.037	0.047	0.060	0.074	0.086	0.095	0.082
No. of observations	2002	1976	3285	3549	4035	4558	4994	5047
Endogenous variables								
SHDEBT	–	♦	♦	♦	♦	♦	♦	♦
MON	♦	♦	♦	♦	♦	♦	♦	♦

Notes: * significant at a .05 level; ** significant at a .01 level.
– : not excluded from the regression; ♦ : excluded from the regression.