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The Capital Structure of Hungarian Firms

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Abstract

In this paper we investigate the capital structure of Hungarian firms using a cross-section and a panel data approach. The data set constitutes of balance sheet data and information on market structure for 1100 firms from 1992 to 1996. We find evidence of forms of financial market imperfections, but also that banks are positively and actively involved in resolving the informational problems that are afflicting the credit market.

Keywords: Transitional Economies, Hungary, Capital Structure, Panel Data.

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1 Introduction

Somewhat paradoxically, the theory of capital structure has been made famous by a contribution (Modigliani and Miller (1958)) that showed its irrelevance to the value of the firm. In presence of perfect information, in fact, there is no difference between internal and external finance and therefore firm's capital structure, i.e., how it allocates its financial position between debt, equity and other forms of finance, becomes completely irrelevant. Forty years after Modigliani and Miller's seminal paper, economic theory has shown that while the frictionless neoclassical world is a useful theoretical benchmark, in reality there are financial market imperfections, mainly due to informational failures, that introduce a wedge between internal and external finance creating on one hand a "pecking order" (Myers and Majluf (1984)) of financing methods and on the other hand a precise link between investment and financing decisions. The relationship between financial structure and investment has in turn led in recent years to the development of a considerable literature that underlined its macroeconomic effects. The central result of this literature is that in presence of financial market imperfections and in absence of a complete collateralization of loans, firms' net worth is a key determinant of investment decisions, therefore macroeconomic shocks that affect net worth can be amplified (Bernanke and Gertler (1989), Greenwald and Stiglitz (1993)). Under this perspective financial market imperfections are not only a crucial factor in determining firms' capital structure but seem also to be a major determinant of macroeconomic fluctuations.

In this work we try to assess the relevance of those imperfections using Hungarian firm-level data and investigating the presence of constraints to the achievement of their optimal capital structure.

From the methodological point of view we carry out the analysis using both cross-section and panel data techniques that allow us to properly account for firm specific heterogeneity and to extract the maximum information from both the time series and cross sectional dimensions; under this perspective this work constitutes a major improvement with respect to related works

(see below) referred to Eastern Europe that usually exploit only cross section information.
This introduces the other qualifying aspect of the present work: the panel analysis is allowed by a data set that is quite unique for Eastern European standards, as it gives detailed information on balance sheet and market structure for some 1100 Hungarian firms from 1992 to 1996, allowing to test quite precisely the relevant hypothesis.
The remainder of the paper is organized as follows: section (2) introduces the theoretical framework, section (3) describes the data set and some general statistics, section (4) presents the empirical findings, section (5) concludes.

2 The Theory

In the previous paragraph we stressed that financial market imperfections constitute a potential serious problem for the development of any economy. There are two very good reasons for which those imperfections are likely to be particularly severe in Eastern Europe.
The first is that during the old planned-type economy banks did not exercise any monitoring or risk assessment activity: they were lending to firms simply because this was what the plan stated, but they were not concerned about the solvency of the borrower (the solvency of the whole system was guaranteed by the state itself). Therefore even if there existed a relationship between borrowers and lenders this relationship was completely uninformative. With the beginning of transition lenders had to be concerned about the creditworthiness of borrowers, but on one hand the former did not have any experience in monitoring activity, on the other hand the latter did not have any reputation or credit history to show.
The second reason is the economic instability that characterized the early stages of transition: in presence of an unstable economic system current performances are a very poor indicator for future performances. Therefore not only borrowers do not have any reputation deriving from the past, but

also they have relevant difficulties in building one *ex novo*.
In this situation the informational problems that are likely to emerge may cause severe forms of credit rationing and may in general create impediments to firms in achieving what they consider to be their optimal capital structure

How it is possible to test empirically the presence of financial market inefficiencies? Two complementary approaches have been proposed by the literature. The first and more traditional approach has been to look at firms' investment. In absence of market failures the firm's investment decisions should be perfectly captured the typical Q model. If one augments the investment equation derived from a Q model with variables that are proxies of internal net worth (like cash flows) and finds those variables to be statistically significant, this can be considered to be evidence of imperfections in financial markets. There is a considerable literature that estimated augmented investment equations (or Euler equations deriving from the Q model) in developed economies ranging from the seminal contribution of Fazzari, Hubbard and Petersen (1988) to more recent ones by Devereux and Schiantarelli (1990), Bond and Meghir (1994), and Bond, Elston, Mairesse and Mulkay (1997)[1]. In all those cases panel data techniques have been applied to show that there is indeed clear evidence of the existence of financial market imperfections that constraint in some ways firms' investment behaviour. In the case of Eastern Europe the only contribution is the one by Lízal and Svejnar (1998) that analyse a panel of Czech firms.

There is an alternative approach to the one outlined above: instead of looking at the constraints posed by credit market imperfections to firms' investment behaviour, we can look at the constraints posed to their financial position. This can be done by regressing some measure of leverage on variables that are supposed to affect firms' financing choices. Not surprisingly the literature on industrialized countries is conspicuous (see for example Titman and Wessels (1988) and Rajan and Zingales (1995)), but also in the case of Eastern Europe

[1] A very good survey of all this literature is provided by Schiantarelli (1997).

there are some studies that address those issues: Cornelli, Portes and Schaffer (1996) for Hungary and Poland, Revoltella (1998) for the Czech Republic and Carare and Perotti (1997) for Romania.

In the present work we follow the second approach, but while in all the above mentioned contributions the analysis is conducted at a cross sectional level, we conduct both a cross-section and a panel data analysis. We believe that the additional information and efficiency that can be extracted from a panel can considerably improve our understanding of the relevance of financial market imperfections in Eastern European economies and allows us to have a better grasp of the determinants of firms' capital structure in those countries.

When analysing the factors that are most likely to affect the achievement of an "optimal" capital structure by firms, it is important to distinguish between demand and supply side factors. This distinction can be made at theoretical level but, as it will be stressed later, it is often impossible to be made at empirical level.

2.1 Supply Side

Collateral There should be an unambiguous positive relationship between tangibility and debt (see Harris and Raviv (1991)). Assets that serve as collateral, in fact, provide an explicit guarantee over debts and reduce the risk of investment from the banks. We use two measures of collateral: the first is the ratio of fixed to total assets; this measure however carries the problem of the precise evaluation of those assets that are classified as fixed. This problem is particularly relevant in transitional economies where fixed assets are often inherited from the old socialist system where prices did not represent a proper measure of value and where it does not exist an efficient secondary market where those assets can be traded. We therefore included as an alternative measure the ratio of inventories to total assets; inventories should reduce the two above mentioned problems because it is easier to determine a "correct" price for them and because they can be re-sold on the primary market.

Profitability and growth opportunities If current profits are a good indication of future profits we should observe a positive relationship between profits and debt (Ross (1977)). At the same time if a firm displays good growth opportunities banks should be more keen to lend to it. We measure the profitability of a firm by the ratio of after tax profits over total assets and its growth opportunities by the ratio of investments over total assets.

Size It is usually assumed a positive relationship between firm size and leverage. Big firms tend to have diversified activities which reduce the risk of bankruptcy. Moreover reputational reasons induce big firms to be more averse to bankruptcy than small firms. In transitional economies an important factor to be considered is the implicit bailout clause that exists for large state owned firms. Often those firms are considered too big to fail both because their bankruptcy could have a destabilizing effect on the whole economic system and because the loss in terms of employment could be socially unacceptable. The existence of an implicit bailout clause may in turn trigger some perverse behaviour by the banks that may "gamble for bailout" refinancing loss making state owned firms (Berglöf and Roland (1995, 1997)). We measure size with two variables: one that captures more the "economic" considerations and is constituted by (the logarithm of) net sales; the other captures more the "political" considerations and is constituted by the level of employment.

Market Share As for the ownership variable (see below) in this case it is crucial to distinguish the issue of the growth of the firms from that one of the risk of the investment in those firms. Generally speaking, in transitional economies, more competitive firms are mainly new private firms which are the first to react to the changing environment and to the the new standards imposed by international competition. Those firms should have better prospects of growth with respect to traditional state owned enterprises; we should therefore expect banks to favour in their lending behaviour the former type of firms over the latter.

Firms which retain a consistent market power are conversely less dynamic state owned enterprises; even if their long term perspectives are not extremely attractive, in the short run their relevant market share often provides good profitability associated with low risk.
Whether banks' debt is positively or negatively related to firms' market power depend on how strong is the growth effect compared to the risk effect. We use two measures of market power: the log of the number of firms operating in the four digit industry and the share of sales in the four digit industry covered by the firm.

Ownership With respect to the ownership issue we can apply similar considerations to those applied to the issue of market share. State owned firms are often big firms with limited flexibility and ability to compete at international level. Their growth opportunities should therefore be limited. On the other hand the shield determined by their market power, reduces the risk of lending to them. More importantly there is the issue of the implicit bailout clause that is referred to big companies and that contributes significantly in reducing the investment risk. Again it is a question of how strong is the risk aspect compared to growth opportunities.

A different issue is that one of foreign ownership: foreign owned firms or firms in which foreign companies have a significant share should represent certainly the best possible investment opportunity from banks perspective. Those firms in fact have a substantially lower bankruptcy risk and adopt faster international standards in terms of product quality and internal efficiency.
Ownership is measured with two dummies one that represent whether or not a firm is state owned and the other whether or not there is a consistent (greater than 10%) foreign share.

2.2 Demand Side

Cash Flows If there is a "pecking order" in firms' financing decisions, the use of internal resources is certainly preferred to bank debt. As a consequence

firms with a higher cash flows will be characterized by reduced leverage as they substitute external with internal finance.
Our measure of cash flows is quite standard and is given by profits before tax, interest and depreciation.

Interenterprise Debt The issue of interenterprise debt has been controversial. At the early stages of transition several authors (Calvo and Coricelli (1994)) argued that interenterprise arrears could be a major channel through which soft budget constraints could be carried over. Later studies (Bonin and Schaffer (1995), Schaffer (1998)) showed that firms learned fast how to implement hard budget constraints in the lending positions among themselves and that interenterprise debt did not constitute a form of soft budget constraint. But interenterprise debt can still convey some information about the capital structure of firms. In absence of soft budget constraints associated with interenterprise arrears the observation of a negative correlation between bank debt and interenterprise debt would be a signal of the existence of a pecking order of firms' financial decisions and therefore of imperfections in the credit market (firms with no access to bank credit would resort to trade credit as a substitute). We measure interenterprise debt as the ratio of the net trade credit position (payables - receivables) to total assets.

3 The data set and some descriptive statistics

3.1 Data set

The data set used in the analysis is constructed merging the information from two sources. We first used a data set deriving from the Hungarian Ministry of Finance that contained information on all firms that paid corporate or profit taxes from 1992 to 1995; this data set covers almost the totality

of Hungarian firms, with the exclusion of small shops[2]. Due to substantial changes in accounting data definitions occurred in 1992, the data set results incomplete in some variables in 1994 and 1995. We then used a second data set deriving from the Hungarian Central Statistical Office that contains end of year financial statements of medium-big size firms, from 1993 to 1996[3]. Merging the information of the two sources we obtained data on financial variables (bank debt, interest payments, assets, trade credit etc.) plus information on ownership, employment and on market structure (the degree of concentration in the four digit industry)[4]. We concentrated our analysis on the manufacturing and on the service sector, therefore we dropped from the sample firms belonging to the following sectors: agriculture, finance, mining, electricity, gas, water, post and telecommunication, public administration, education and health. After some consistency checks[5] we were left with cross sections of approximately 1100 firms that kept the same identification number from 1992 to 1996[6]. Those cross sections allow us to construct a balanced panel.

The sample is fairly representative ranging from 32.1% and 37.4% to 22.6% and 20.6% of respectively total employment and sales of the manufacturing and service sectors as a whole (see Table 1)[7].

[2]The total number of firms ranges from 35000 in 1992 to over 90000 in 1995

[3]The number of firms belonging to this sample ranges from 5000 in 1993 to approximately 7000 in 1996

[4]The data resulting from the intersection of the two data sets described above suffers from a sample selection bias: as the small data set contains information on medium-big enterprises, in our sample those firms will be over-represented. We acknowledge the presence of this problem but we note that, since we are interested in finding evidence of financial market imperfections that are usually more relevant for small firms than for big firms, if we find evidence of those imperfections in our sample, they can be considered relevant *a fortiori* for smaller firms.

[5]Those consistency checks are described in appendix A where it is also described the procedure used to identify outliers.

[6]Using this procedure we could not avoid the following problem: when a big firm is split, a branch or a part of it will keep the same identification number of the original firm while to the other parts or branches will be assigned a different identification number. While the original firm and the branch that keeps the same id are *de facto* different firms, in the sample they are recorded as the same firm.

[7]The drop in the sample's share documented by table 1 is explained by the fact that

3.2 Descriptive Statistics

3.2.1 Employment and ownership structure

The ownership structure of firms considered changed considerably during the period investigated. As Table (2) confirms the share of state owned firms dropped from 27.8% in 1992 to 7.3% in 1995 while the share of private firms rose from 27.7% in 1992 to over 63% in 1995[8]. This pattern of ownership is quite common in transitional economies.

Total employment in the sample dropped heavily from 1992 to 1995 with a cumulative contraction of almost 29% (Table (1). The employment contraction is bigger than the one displayed by official statistics on industrial employment that showed a cumulative contraction between 1992 and 1995 of approximately 20% This result is probably due to a sample selection bias as we are considering mainly large and medium sized firms for which labour in excess was comparatively larger than other firms.

3.2.2 The amount and distribution of debt

One of the features of Eastern European financial markets that was most concerning was the problem of the initial stock of debt with which firms and banks started the transition process. The presence of a high stock of debt that some firms are clearly unable to repay, may force banks to roll over the debt in order to keep the firms viable and at the same time keep open the option of having (part of) the debt repaid sometimes in the future.
A simple test for the presence of debt rollover is to calculate the correlation coefficients between the *change* in short term debt in period $t+1$ and the level of short term debt in period t. Table (4) shows those coefficients. In presence of debt rollover we expect the correlation to be positive. In fact

from 1992 to 1995 the total number of manufacturing firms increased considerably, mainly due to the birth of new firms.

[8]The big fall in the share of cooperatives in 1994 is due to a change in the definition of cooperatives implemented by the Central Statistical Office at the end of 1993.

Year	Employment	Sales
1992	32.1	38.8
1993	31.7	37.4
1994	28.0	34.7
1995	22.6	20.6

Table 1: Share of employment and sales over total employment and sales in manufacturing and service sectors.

Year	State	Cooperatives	Joint Ventures	Private	
1992	27.8	20.3	24.2	27.7	100
1993	17.6	20.4	28.3	33.7	100
1994	11.2	0.8	29.4	58.6	100
1995	7.3	0.8	28.5	63.4	100

Table 2: Ownership structure of firms: share of each class on the total number of firms

1993	1994	1995
-14.8	-7.8	-6.2

Table 3: Percentage change of employment in the sample, with respect to the previous year

	1992	1993	1994	1995
Total	-0.28	-0.38	-0.28	-0.21
State	-0.18	-0.50	-0.15**	-0.19*
Private	-0.39	-0.37	-0.29	-0.21
Big	-0.33	-0.34	-0.26	-0.11**
Small	-0.26	-0.40	-0.31	-0.29

Table 4: Correlation coefficients between the *change* in short term debt in $t+1$ and the level of short term debt in t. The year identifies time t.

the correlation coefficients are all negative for the years considered. The correlation is greater for small firms than for big firms[9]; no clear pattern emerges for state versus private firms. The coefficients marked with a * or with ** denote respectively values that are not significant and values that are significant at 10% level.

It seems therefore that the initial stock of debt was not excessively problematic, at least not to the point of triggering debt rollover. This is consistent with the evidence advanced by Cornelli et al. (1996) that firms in Eastern Europe were not overloaded by debt (comparing to the standards of western economies) but rather underloaded. Nevertheless, even if firms were not on average exposed to an excessive debt burden, things can still be problematic if it turns out that the *distribution* of debt is source of concern. If debt is in fact concentrated mainly among loss making firms, bankruptcy may really become a serious issue.

We plotted the conditional distribution of debt (total, short-term and long-term) over firms' after tax profits of the same year. Looking at Figure (1, a) we can note that the distribution is fairly unimodal. This is in line with the findings of Bonin and Schaffer (1995) and contrasts with what found by Gomulka (1994) in Poland where a bimodal distribution was observed with a large proportion of debt concentrated in loss making firms. To be precise Figure (1, a) shows a "hint" of a bimodal distribution with approximately 9% of bank debt being concentrated in firms with heavy losses compared to total

[9]We defined as big firms employing more than 300 employees.

assets; to check if this small peak is showing a real pattern or just picking up some effect peculiar to 1992, we reported also (Figure (1, b)) the conditional distribution for 1993 which shows that the peak completely disappears. We can also split total debt between long term and short term debt (Figure (1, c,d,e,f)) and in fact we discover that whatever problem the "little peak" in 1992 might cause, it is not due to long term debt, on the contrary it is due to short term debt (less than 1 year).

In the light of this evidence we can therefore conclude that, at least for the sample of firms investigated, there was not a stock problem with huge amount of bank debt (mainly long term debt) being concentrated among loss making firms, and therefore the determinants of debt that will be investigated in the next sections are determined principally by demand and supply considerations.

The graphs used before can be a useful starting point to investigate issues related to the flows of debt rather than to the stock. In assessing whether or not banks are lending to "good" firms we can look at the conditional distribution of debt at time $t+1$ over profits at time t, and comparing different years we can determine how this conditional distribution changes over time, extracting some information about the dynamics of the relationship between debt and profits. This is done in Figures (2), (3) and (4)[10].

The three Figures show an unambiguous pattern: the distribution of debt (in all the three definitions of it (total, short and long term)) is progressively shifting the majority of the mass (and therefore the mean) towards higher values of profitability. While in 1993, 42.3% (41.5%) of total debt (short term debt) was allocated to firms that in the previous years displayed a negative profit/asset ratio, the percentage dropped to 22.6% (24.5%) in 1996. It seems therefore that banks are extracting money from loss making firms and

[10]We acknowledge the fact that this procedure is not rigorous, nevertheless it is useful to get an idea of the dynamic evolution of debt.

	1992	1993	1994	1995
Total	-0.12	-0.10	-0.13	-0.08
State	-0.16	-0.14	-0.03*	-0.22
Private	-0.12*	-0.09	-0.14	-0.09
Big	-0.13	-0.08*	-0.14	-0.13
Small	-0.10	-0.11	-0.13	-0.05*

Table 5: Correlation coefficient between short term debt and interenterprise debt.

reallocating their debt towards more profitable firms; this is in line with what found by Schaffer (1998).

We conclude this section presenting some descriptive statistics on the market for trade credit. In assessing whether bank and interenterprise debit are substitute or complements we can again use correlation coefficients. We define interenterprise credit as the difference between payables and receivables (if interenterprise credit is positive the firm is a net borrower on the trade credit market). If bank and interenterprise credit are substitute we would find a negative correlation between the two. Table (5) confirms that the two forms of credit were substitutes for all years considered. The correlation coefficient (albeit all small) seem to be higher for private firms.

4 Empirical Analysis

All those distinctions so clearly made at a theoretical level can be very rarely carried over at an empirical level. This problem arises also in the present work where the estimated reduced form equations do not allow to distinguish demand from supply side effects. Cause of most concern is profitability: we have already stressed that supply side considerations predict a positive relationship between banks' debt and profits. But profits are also a major determinant of cash flows and demand side considerations predict a negative relationship between debt and cash flows (if debt is more costly than internal finance, firms that have higher internal cash will try to substitute debt with

it). Therefore the sign of the coefficient is going to depend on the relative strength of those two effects.
In the case of Eastern Europe the shock of transition and the consequent massive change that it entailed, caused short term performance to be a very poor indicator for future long term performance, while on the other hand the widespread presence of credit rationing induced firms to rely heavily on internal finance. We therefore expect profits to capture a demand rather than a supply effect and we have included in the regressions profits as part of cash flows and not as an isolated regressor[11].

In the subsequent analysis we will estimate a reduced form equation with a measure of leverage as the dependent variable. As stressed by Rajan and Zingales (1995) there are several measures of leverage that can be used (total liabilities, total debt, coverage ratio etc.); in the present case we restricted our attention to bank debt and in particular to short term bank debt (defined as debt with less than 1 year maturity). The reason of this choice is due to the fact that short term debt is in any case the predominant form of debt for the firms investigated (it accounts for approximately 80% of total debt) and more importantly it does not carry the inertia of old socialist system financing methods like long term debt; at the same time short term debt has a time horizon sufficiently limited to capture all the relevant changes we are interested in.
As customary in this literature we lagged the regressors by one period to account for their possible endogeneity.

4.1 Cross sectional evidence

We first start with a cross-section analysis; subsequently we will develop a panel analysis (section 4.2). The cross-sectional analysis is an extremely useful complement to the panel one because the latter will be performed by fixed effects, which does not allow to estimate the effect of variables that

[11] We tried also to substitute cash flows with profits obtaining the same results

stay (more or less) constant over time like firms' market power, ownership, employment and foreign ownership. Information about those variables can still be extracted using cross-sections. However in interpreting cross-sectional results we will be careful not to compare the magnitude of coefficients on variables from one year to another as those comparisons are meaningless if there are time specific effects that have to be accounted for (in the panel we can control for those effects and we will later show that they are in fact important); we will therefore look only at the sign of coefficients and at their significance.

The estimated equation is the following:

$$\begin{aligned} sdta_{i,t+1} = \alpha + \beta_1 lsal_{i,t} + \beta_2 cfta_{i,t} + \beta_3 tata_{i,t} + \beta_4 iata_{i,t} + \beta_5 invnta_{i,t} \\ + \beta_6 invta_{i,t} + \beta_7 dfshr_{i,t} + \beta_8 mpshr_{i,t} + \beta_9 demp_{i,t} + \beta_{10} down_{i,t} + \epsilon_{i,t} \end{aligned} \quad (1)$$

The variables are identified as follows: $sdta$= short term debt over total assets, $lsal$= logarithm of net sales, $cfta$= cash flows over total assets, $tata$= tangible assets over total assets, $invnta$= inventories over total assets, $invta$= investment over total assets, $dfshr$= dummy for foreign ownership (takes value of 1 if foreign share of capital is greater than 10%), $mpshr$= share of net sales over total sales in the 4 digit industry, $demp$= dummy for employment (takes value of 1 if employment is greater than 300), $down$= dummy for ownership (takes value of 1 if the firm is state-owned); ϵ identifies the remainder stochastic disturbance.

Size (approximated by the logarithm of net sales) is positively related with debt indicating that big firms tend to have an easier access to bank credit with respect to small firms. The positive effect of size is much more weak when we consider the more "political" measure, that is the number of employees. The employment dummy is in fact positive and significant only in 1992 and

	92	93	94	95
$lsal_t$	.010	.019	.023	.018
	(2.92)	(5.83)	(6.89)	(5.03)
$cfta_t$	.007	-.089	-.156	-.063
	(0.21)	(-3.19)	(-5.77)	(-2.29)
$tata_t$	.047	.024	.021	-.017
	(2.46)	(1.40)	(1.20)	(-0.84)
$iata_t$	-.128	-.137	-.192	-.142
	(-4.78)	(-5.75)	(-8.03)	(-5.01)
$invnta_t$	.199	-.167	.209	.183
	(7.00)	(-6.64)	(8.18)	(6.38)
$invta_t$	-.010	-.034	.042	.052
	(-0.29)	(-0.83)	(0.95)	(1.22)
$dfshr_t$	-.005	.009	.024	.016
	(-0.51)	(1.96)	(3.33)	(2.02)
$mpshr_t$	.019	-.030	-.004	-.037
	(0.65)	(-1.09)	(-0.14)	(-1.07)
$demp_t$	.016	.006	.010	.037
	(1.98)	(0.73)	(1.20)	(3.87)
$down_t$	-.032	-.030	-.001	-.003
	(-3.87)	(-4.13)	(-0.07)	(-0.22)
$cons_t$	-.109	-.224	-.299	-.216
	(-2.37)	(-5.00)	(-6.64)	(-4.35)
R^2	0.100	0.135	0.201	0.163

Table 6: Cross-section estimates; dependent variable: $sdta_{t+1}$

1995 but it is not significant (with very low t statistics) in 1993 and 1994[12]. It seems therefore that the effect of size indicates that banks are preferring big firms because they are more diversified, more than because big firms are "politically" protected by the concern on their employment level.

Another aspect that has to be analysed jointly with size is the issue of ownership. As big firms are mainly state owned firms which could be protected by an implicit bailout clause by the government, banks may prefer big firms simply because they are state-owned. We are reassured by the fact that the dummy for ownership, when significant, indicates that banks are favouring private firms over state owned ones and not vice-versa.

The results on employment and ownership dummy seem both to indicate that banks are looking at the correct factors behind the fact that a firm is big or small.

Turning now to the other variables, tangibility is positive and significant only in 1992, while in all the other years is clearly non significant. This is an "unexpected" result as it contrasts with the typical result obtained in western-type economies (see Rajan and Zingales (1995)) where debt has a strong positive relation with tangible assets. It also contrasts with the result obtained by Cornelli et al. (1996) who find a significant negative correlation between tangible assets and debt. The non significance of tangibility is presumably due to the fact that in transitional economies fixed assets are not a good measure of collateral because they may be overvalued[13] or because there may be an inefficient secondary market. As it is hard to think that banks do not consider any measure of collateral in allocating their funds we included in the regression also inventories as an alternative measure of collateral. Inventories should reduce both the problem of evaluation and of the efficiency of a secondary market. The coefficient on inventories is in fact positive and strongly significant denoting that they provide a better proxy for collateral than fixed assets. Inventories seem therefore a more "efficient"

[12] We tried a different specification using the dummy at 500 employees obtaining analogous results.

[13] This is very likely if fixed assets are recorded by their book value.

measure of collateral than tangible assets.

Apart from being covered from the risk of default, banks should also be concerned with firms' future prospects, favouring firms which have the better growth prospects that in our sample are the firms that have invested more. We do not find support for this claim as the variable investment is never significant.

Turning now to the two "financial" variables, cash flows and interenterprise arrears, they clearly indicate the existence of a "pecking-order" theory of finance with internal funds preferred over trade credit preferred over bank debt. The availability of internal funds is measured by cash flows which display a negative coefficient indicating that firms substitute external with internal finance when they have the opportunity to do so (i.e. external finance is more costly than internal finance). At the same time the negative coefficient on interenterprise arrears show that firms tend to substitute bank with interenterprise debt.

The results presented in Table (6) show, somewhat surprisingly, that the degree of market power of the firm does not seem to have any effect on the allocation of debt towards it. The variable *mpshr* is never significant for the years considered; we also tried some different specifications, replacing the continuous variable with a dummy and using as an alternative measure of the market power the (log of) number of firms in the four digit industry. Banks seems not to care too much to firms' market power in allocating their credit.

Finally, with the exception 1992 foreign ownership dummy is always positive and significant indicating that banks are favouring, in the allocation of debt, firms with a consistent share of foreign ownership.

The conclusions that one can deduct from the cross section analysis suggest the presence of an underlying problem of asymmetric information in the credit market; this informational problem is reflected in the inability for firms

in achieving their optimal capital structure. Evidence for this is provided by the relevance of variables like cash flows and interenterprise debt in the panel estimates. But on the other hand banks are providing some positive and reassuring signs as they do not seem to be particularly attracted by the short term safety guaranteed by state ownership or market power.

4.2 Panel evidence

In the panel analysis we estimated the following equation:

$$sdta_{i,t+1} = \beta_1 lsal_{i,t} + \beta_2 cfta_{i,t} + \beta_3 tata_{i,t} + \beta_4 iata_{i,t} + \beta_5 invnta_{i,t} + \beta_6 invta_{i,t} + \epsilon_{i,t} \tag{2}$$

and

$$\epsilon_{i,t} = \mu_i + \lambda_t + u_{it} \tag{3}$$

where μ_i denote unobservable, individual time invariant, specific effects, λ_t accounts for any individual invariant time effect and $u_{i,t}$ is the remainder stochastic disturbance[14]. All the variables are defined as in the cross section. Equation (2) was estimated by fixed effect (see below at the end of the paragraph for an explanation on the estimating procedure), that is μ_i and λ_t are fixed parameters to be estimated.

Table (7) presents estimated coefficients, standard errors and t values.
Size, interenterprise arrears and inventories all show the same sign and significance of the cross-section and we do not add further comments on them.

[14]This is the familiar two-way error component specification. It is assumed that $u_{i,t} \sim IID(0, \sigma_u^2)$.

	Coeff.	Std.Err.	t
$lsal_t$	.008	.003	2.52
$cfta_t$	-.008	.014	-0.61
$tata_t$	-.022	.017	-1.29
$iata_t$	-.029	.014	-2.10
$invnta_t$	.084	.021	3.99
$invta_t$	.030	.017	1.98
$cons$	-.037	.041	-0.90
$R^2 = 0.097$			
N. of obs: 4128			

Table 7: Panel Estimates: dependent variable: $sdta_{t+1}$

With respect to the cross sectional analysis, the panel estimates present two major differences: cash flows are now not significant anymore while investment is now positive and significant.

It seems therefore that taking into account both the time effect and firms' specific heterogeneity the relationship between internal and external finance is much weaker. This result can be explained with the help of the theoretical part (section 2) which stressed that the variable cash flows can incorporate two effects: the demand side effect that would call for a negative relationship between debt and cash flows, and a supply side effect that calls for a positive effect between profits (and therefore cash flows) and debt. The panel analysis underlines that the supply side effect is stronger than estimated in the cross section and it offsets the demand side effect. This aspect allow us also to explain the behaviour of the variable investment: if the supply side effect incorporated by cash flows is relevant, it means that banks are favouring firms that showed past profitability because they assess that this could be a good indicator for future profitability. At the same time they are concerned about the fact that firms invested strongly in the past because this could provide a reasonable proxy for their future growth opportunities; hence the positive and significant coefficient on investment.

Two of the three year dummies[15] (not reported in Table (7)) are significant, indicating the presence of some time effect that is individual invariant.

We feel that the picture depicted by the panel analysis is more reassuring about the financial and capital structure position of Hungarian firms. With respect to the cross section analysis in fact there are indication of a more active involvement by banks in trying to resolve informational failures, and their involvement seems to be "correct" in the sense that they try to reduce the lending risk being mainly concerned with the growth and profit prospects of the firm[16].

A final comment is referred to the methodology of estimation of equation (7): we estimated the equation by fixed effect because the Hausman tests clearly rejected the random effect model. The result of the Hausman test seems to be quite robust (we tried different specification). Such result was in a way expected because in the present case the likelihood of having a correlation between individual effects and regressors is very high.
In a country like Hungary where workers' and unions' influence is not as high as in Poland, individual differences are most likely determined by two effects: differences in managerial ability and the fact to belong to sectors hit differently by the shock of transition. It is very hard in this case not to think of a correlation between those effects and the regressors, mainly profits (that are one of the components of cash flows) investment and inventories[17]: if a firm is run by a good manager most likely it will display better profits and investment than a firm run by a bad manager. In presence of those effects, the GLS estimates are biased and the within estimator should be the preferred estimator[18].

[15] One dummy (1992 in this case) had to be dropped to avoid perfect collinearity.

[16] The results of the panel are not altered if the 1992 or 1995 year are dropped from the analysis.

[17] In fact the coefficients of cash flows and investment are the ones that present the biggest difference between the fixed and random effect estimators.

[18] Usually in estimating models like the one presented in this work, there is the problem of the possible endogeneity of regressors. Such a problem can only be partially solved by

5 Conclusions

In this work we use a panel consisting of approximately 1100 observations over 5 years of Hungarian firms to investigate the presence of constraints to these firms in achieving their optimal capital structure and more in general the "efficiency" of the banking sector in providing credit.

In presence of imperfections in the financial market, most likely originating from informational failures, banks could have reacted in two ways: one, the easiest and the most myopic, would have seen banks looking for the short term safety of large monopolistic state owned firms and even gamble for bailout of loss making state owned enterprises. The second way would have seen banks actively trying to resolve the informational problems, allocating funds where it was possible to obtain adequate (and correct) collateral provisions, looking at firms' long term growth opportunities firms etc.

The analysis conducted in this paper suggests that Hungarian banks seems to have chosen the second way raising hopes of a fast resolution of the problems that are currently afflicting the financial market.

lagging the regressors as done here. An alternative and more efficient route would be to use generalized methods of moments (GMM) estimators, that as claimed by Arellano and Bond (1991), remove this endogeneity problem completely. We could not use GMM methods on the whole analysis because both the software and the machine used did not allow us to perform GMM routines. We actually performed GMM estimates with a different software without finding significant differences. Moreover, as the time horizon available is quite limited, it does not allow, after having differentiated the model, to fully exploit the orthogonality conditions that exist between lagged values of the endogenous variables and the disturbances (see Baltagi (1995), ch.8. that are at the basis of GMM procedure

Appendix A

The following consistency checks were applied to the data: we dropped from the sample firms which presented negative values for the following variables: sales, employment, debt (short and long term) and gross investment.

The procedure used to identify outliers deserves some attention: it is often difficult to identify influential observations (i.e. observations that, if removed, would change the estimated coefficients markedly); the difficulties increase when we consider multivariate data. In our analysis we employed a method developed by Hadi (1992, 94). This method can roughly be described as follows.
Given p variables the procedure defines an initial cluster of points defined as $r = p + 1$, selected minimizing a measure of distance[19]. Once the initial cluster is defined, it is then expanded taking the $r+1$ closest points (according to the same measure of distance) The procedure is then repeated until some stopping rule is satisfied.

The program Stata, used in the calculations, allow to perform such routine and also to define a "significance" level for the outlier cutoff; as usual in statistical analysis the significance level was chosen to be 5%.
This procedure has the big advantage that allows to deal easily (depending on the speed of the machine used in the calculations) with multivariate data; the routine was compared with other methods of identifying outliers like residuals analysis, tests based on Cook's and Welsch distances etc. In all

[19]More precisely let X be a $n \times p$ vector representing a random sample of size n from a p-dimensional population and let $D_i^2(C,V) = (x_i - C)^T V^{-1}(x_i - C)$, $i = 1, ..., n$ be an appropriate metric that measures the squared distance between the ith observation (x_i) and a centre estimator denoted as C, relative to a measure of dispersion (V), the distance chosen by Hadi is

$$D_i^2(C_R, S_R) = \sqrt{\{(x_i - C_R)^T S_R^{-1}(x_i - C_R)\}}$$

where C_R and S_R are robust estimators of the centre and covariance matrix.

cases it yielded better results in terms of the overall fit of the model being more parsimonious in terms of the variables identified as outliers.

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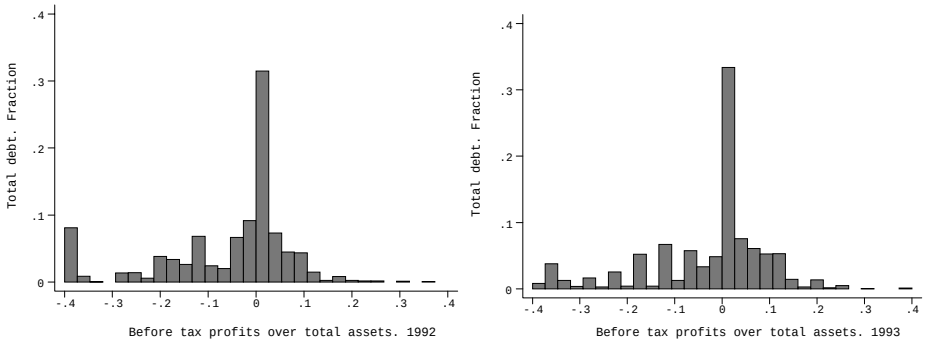
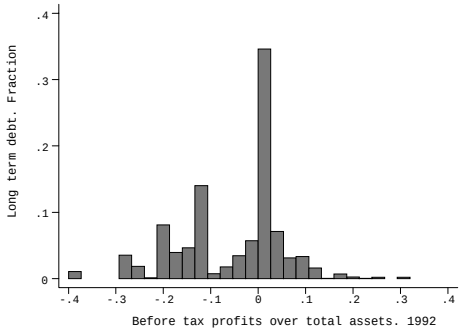


(a)

(b)



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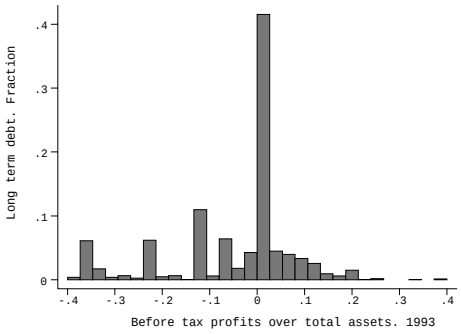

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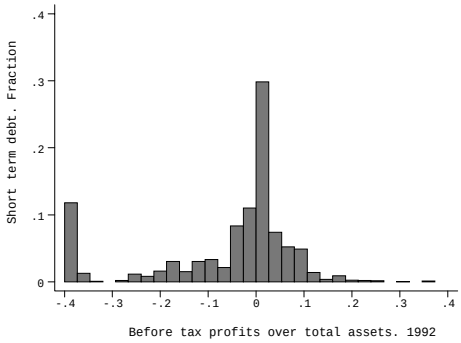

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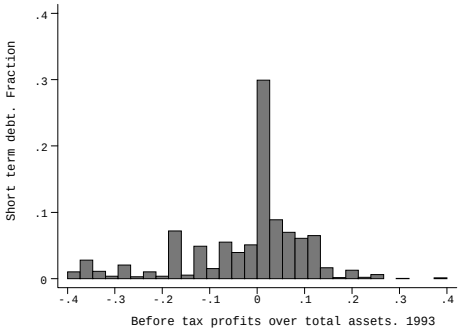
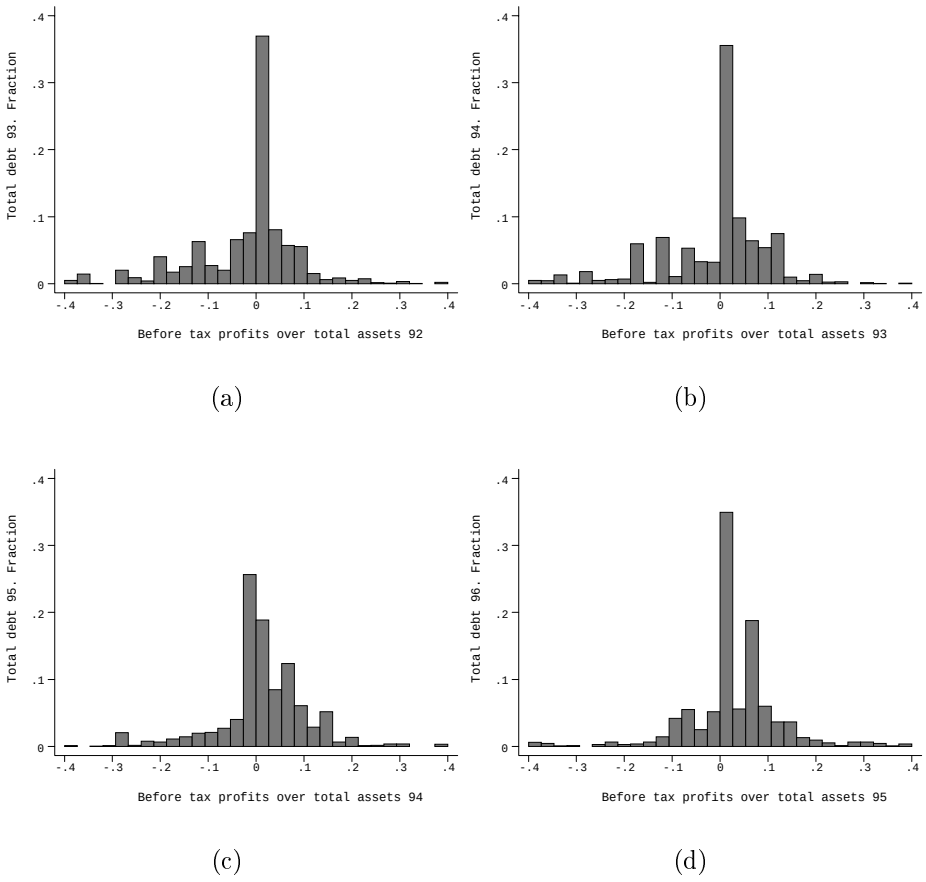


(f)

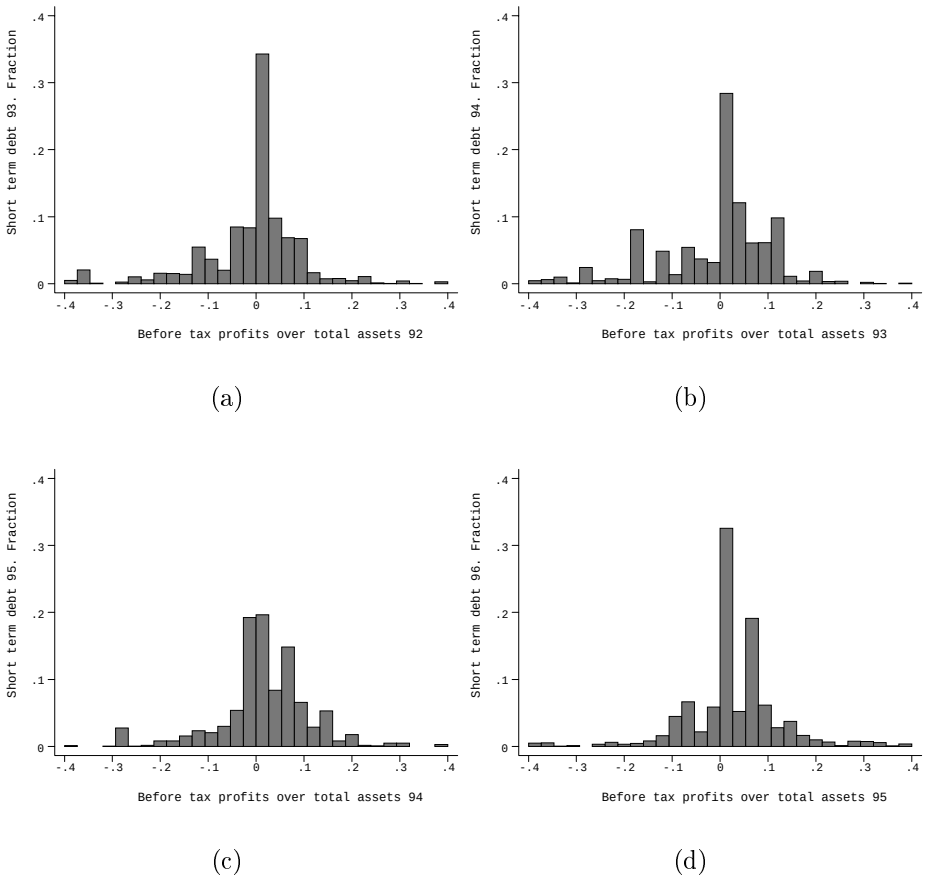
Figure 1: Distribution of bank debt, 1992-1993



(a) (b)

(c) (d)

Figure 2: Distribution of total bank debt with respect to previous year's profits



(a) (b)

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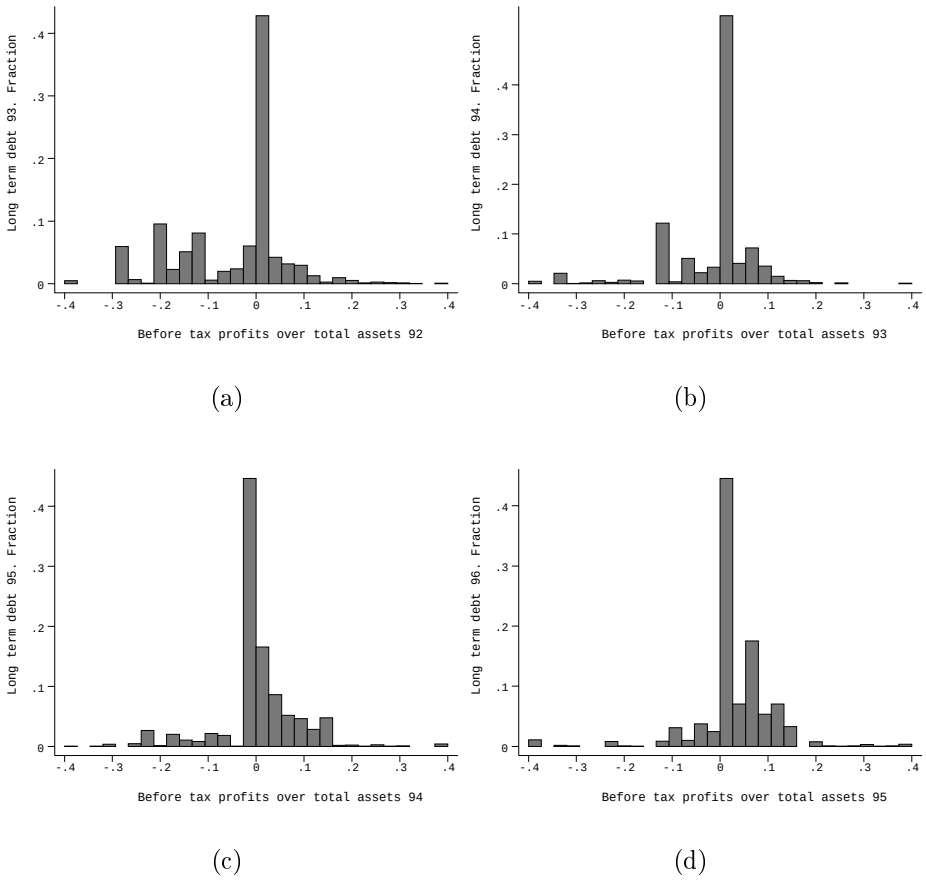
Figure 3: Distribution of short term bank debt with respect to previous year's profits



(a) (b)

(c) (d)

Figure 4: Distribution of long term bank debt with respect to previous year's profits